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The impact of rivalry and excludability on Personal Social Responsibility regarding transport behaviour - a pilot study

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Abstract:

Aim: While transport systems play a crucial role in socio-economic development, its expansion has serious environmental impacts. Reducing rivalry in use by supporting public transport, cycling and walking, as well as exclusion of car users are popular instruments to support sustainable transport. While such policy (external stimuli) may lead to positive impact in the short run, a change in attitude of transport users may be necessary in order to long-term sustainable transport. This attitude change is related to Personal Social Responsibility (PSR), relying on the education of a conscious and responsible society and influencing individual transport choices of individuals. The purpose of the paper is to examine the impact of modifications of the levels of rivalry and excludability in the access to transport systems on the development of Personal Social Responsibility in terms of sustainable transport behaviour.

Design/ Research methods: Based on literature review, a survey was developed to provide an answer to the main research question: To what extent do changes in the urban transport system supporting sustainable transport have an impact on transport behaviour? The following elements of Personal Social Responsibility are considered: aware and voluntary transport choices, state-of-well-being resulting from choices, environmental and social impact, and being a good example to others

Conclusions/findings: The respondents observed numerous changes in the elements of the Wrocław transport system they use (Wrocław is a large city in the South-West of Poland), mainly related to the development of road infrastructure. The level of competition between individual transport users remained largely unchanged or slightly decreased, to the benefit of pedestrians, cyclists and public transport users. Only 26.21% of the respondents declared a change of the most frequently used means of transport, with half of them choosing to drive by car, and half - by public transport. These changes were not related to concerns about ecology, the local community or awareness of doing good for people and the environment. Therefore, it can be concluded that they resulted from external stimuli affecting private benefits not related to the development of the PSR.

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Originality/value: While international research in the field of the field of sustainable mobility focuses mostly on factors impacting sustainable transport choices and the effectivity of different instruments of sustainable transport policies affecting the factors considered most important in transport choices, this study shows that even when changes in the intensity of rivalry and excludability in transport systems for different users lead to required changes in transport behavior, this does not necessarily result in the development of PSR elements that would overall support the social transformation towards sustainable transport development.

Keywords: transport behaviour, personal social responsibility (PSR), rivalry, excludability, sustainable transport
JEL: *Q01, R41, R48*

1. Introduction

Rivalry and excludability are key features of goods, influencing the possibilities for and the character of consumption (see, e.g. Romer 1990; Stiglitz 1999, 2000). In transport systems, rivalry and excludability can be analysed not only in terms of the access to these systems and interactions between transport users but in terms of selected aspects of sustainable transport as well (Blum 1998; European Conference of Ministers of Transport 2001; Platje 2012). The levels of rivalry and excludability (LRE) can be considered to have an impact on transport behaviour (TB) (Paradowska 2017b, 2017c, 2017d, 2018, 2019a, 2019b). Thus, they can be a basis for developing tools within the sustainable transport policy (see e.g. European Union 2014; Paradowska 2014).

While change in the levels of rivalry and exclusion may trigger off change in transport behaviour, being beneficial from the point of view of sustainability of transport systems, they are not related to a change in the awareness among users of transport systems of the relevance of sustainable transport. Due to the increased competition and exclusion in the use of infrastructure with regard to individual motorization, users of transport systems can choose more sustainable means of transport, but still be guided by private benefits, not related to the care for the environment and local community or other issues important for transformation towards a more sustainable transport system. This is in contradiction with the paradigm of the economics of sustainable development and the concept of homo cooperativus - an individual making conscious and responsible consumption choices (see e.g. Poskrobko 2011, 2013; Borys 2009, 2011; Midor 2012; Czaja 2011). For this reason, it is important that changes in city transport systems are based on

changes in levels of competition and exclusion are related to the development of sustainable mobility not only in the context of transport choices, but also the development of Personal Social Responsibility (PSR, see Davis et al. 2017), and thus factors influencing these choices and taking into account one's own responsibility for the impact of transport behavior on the environment, society, and in a broader sense - the possibility of transformation towards sustainable development. These issues are all the more important as car journeys satisfy many transport demands (i.e., travel expectations determining its subjective quality for the transport user (see, e.g., Marszałek 2001)) in a way that most satisfies the users of transport systems, for example in terms of comfort, privacy, independence or directness. As a result, more sustainable ways of traveling are often not close substitutes for individual transport, which makes the demand for private car journeys relatively inelastic. The development of PSR among users of urban transport systems could therefore mean the creation of strong incentives for sustainable mobility, while at the same time encouraging a more sustainable consumption of other goods and services and thus supporting a sustainable transformation of social awareness supporting sustainable development.

On the basis of the relationships outlined above between the intensity of competition and exclusion in access to transport systems as incentives for sustainable mobility and PSR, this paper aims to investigate the impact of changes of the levels of rivalry and excludability in transport systems on required changes in TB in the context of the development of Personal Social Responsibility (PSR). The analysis is based on the results of empirical explorative research conducted among users of the transport system in Wrocław (TSW), a large city in the South-West of Poland. The research presented tries to provide a possible answer to the main research question: "To what extent do changes in the urban transport system supporting sustainable transport have an impact on transport behaviour?". The following four auxiliary research questions were addressed in order to deal with the main research question: What changes took place in TSW? What was the impact of these changes on LRE in the access to the transport system for different transport users? What was the impact of these changes on transport choices? Did the changes contribute to the development of PSR?

2. Literature review

Rivalry and excludability as features of goods influence the possibilities of access to a good and the character of interactions between consumers (see: Samuelson 1954; Buchanan 1965; Ostrom 1990, 2010). Rivalry occurs when one consumer makes it impossible or harder for other consumers to use a good (Farley 2012). In transport systems, the levels of rivalry are strictly related to the capacity of these systems. Usually, the higher the number of transport users, the higher the levels of rivalry and the larger the probability of congestion (Platje 2012). Moreover, rivalry can take place between the same type or between different types of transport users and can lead to a partial or complete exclusion of some of them. Exclusion means that it is possible to prevent someone from the consumption of a good (Farley 2012) or simply, that it is impossible for someone to consume a good. Ostrom (2010) indicated, that both these features cannot be considered "present or absent" but they can have different levels from low to high. This fact is important for analysing transport systems and sustainable transport behaviour (STB). Using a complex approach, a transport system can be considered a club good (Platje 2012) or a public good (UN-Habitat 2013). In fact, different elements of transport systems have features of different types of goods and are characterised by different LRE (Level of Rivalry and Exclusion) (Blum 1998; Platje 2012). These levels can have different effects on the TB (Transport Behaviour) and attitudes of transport users, and thus – they can be a basis for sustainable transport policy tools. For instance, many solutions in this field are based on a required exclusion of drivers (see e.g. European Commission 2017; dell'Olio et al. 2019; Barata et al. 2011; Brockman, Fox 2011: 5-6; Shoup 2008; Bond, Steiner 2006; Toor, Havlick 2004). Satisfying transport demands depends on rivalry and excludability as well and can make sustainable transport means more attractive (see e.g. Paradowska 2017b, 2017c, 2017d). Putting it simply, LRE determine impediments that transport users meet while using a given transport mean. For this reason, modifications of these levels can lead to required changes towards STB. The question is, whether these changes express coerced behaviour or behaviour resulting from increased environmental and social awareness of transport users, what could be a signal of PSR. In the second

case, a real shift would be possible towards sustainable development, which requires changes in people's mental models (Platje 2011).

The concept of PSR has been developed based on inter alia the concepts of Social Responsibility, Consumer Social Responsibility, Ethical, and Green Consumerism and others (see Davis et al. 2017). Davis et al. (2017) define PSR "as the way a person performs in his daily life as a member of the society – and not only as a consumer – basing his decisions in a desire to minimize the negative impacts and maximize the positive impacts on the social, environmental and economic environment in the long run". Based on the revision and combination of the scientific output referring to the Consumer and Corporate Social Responsibilities, the authors distinguished economic, legal, ethical, philanthropic and environmental spheres as the main areas making up the PSR. Therefore, a really STB can be analysed based on the reaction on incentives and on the transport users' performance in all these spheres (Table 1).

Table 1. PSR and STB

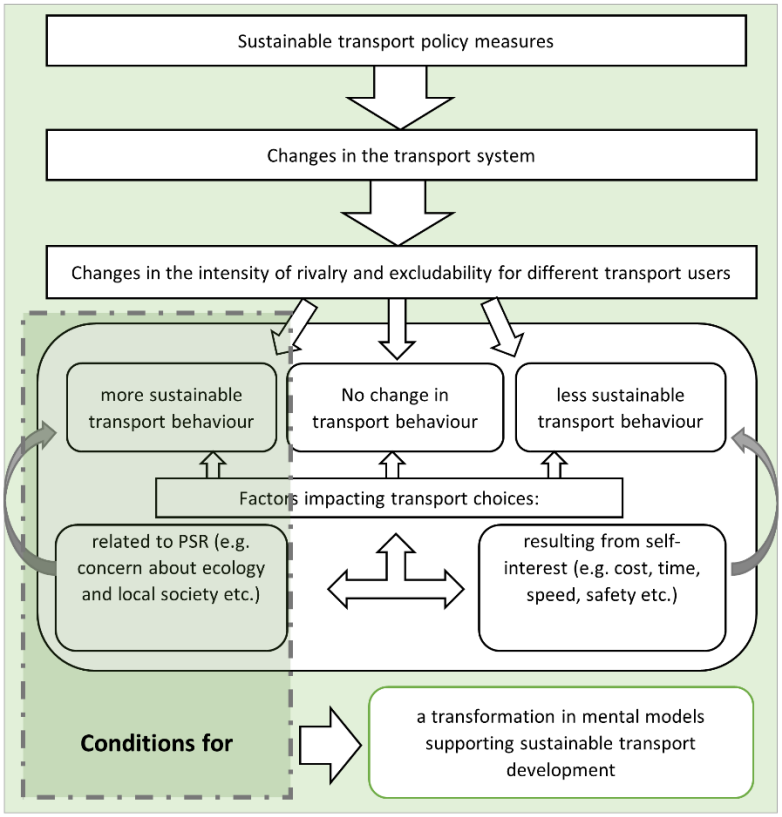
Spheres of PSR	Examples of STB
Economic	Rationalisation of transport demand, resignation from economically irrational transport means.
Legal	Obeying rules aimed at more sustainable transport.
Ethical	Awareness of the impact of own TB on the society, acting in accordance with social and ethical rules.
Philanthropic	Readiness to resign from own interest in order to contribute to the public interest.
Environmental	An aware reduction of own negative impact on the environment.

Source: author's own elaboration based on Davis et al. (2017: 159-160). .

As shown in Table 1, STB is linked to the concept of PSR. However, sustainable transport choices resulting from an exclusion of or a decreased attractiveness of using a car due to modifications of LRE do not necessary mean PSR, which is rather related to aware and voluntary decisions, not forced ones. In this context, STB should be expressed in an aware resignation from own interests and benefits in order to achieve economic, social and environmental goals significant from the perspective of the whole society. In this sense, the development of PSR goes hand in hand with the paradigm of the economics of sustainable development and the

concept of homo cooperativus. It is a necessary condition for an effective transformation towards the sustainability of development. In a deeper sense, sustainable transport behavior consists not only in the choice of more sustainable means of movement, but also in conscious choice, resulting from taking responsibility for the impact on the environment and society through own consumption patterns, which is to contribute to the increase of awareness of the entire society. The model used for analysis in this article is shown in Figure 1.

Figure 1. Research model



Source: author's own elaboration.

3. Research methods

A survey was conducted among the users of the transport system in the city of Wrocław in the South-West of Poland, in order to gather qualitative and quantitative data and to realise the main goal of the paper and answer the research questions. The survey questionnaire was divided into four small parts devoted respectively to the research questions presented above: changes in the transport system significant for transport users, impact of these changes on LRE, TB of respondents, PSR of respondents.

In order to grasp the difference between STB resulting from the concern about self-interest and a real PSR, four main aspects of PSR were taken into consideration: aware and voluntary transport choices, state-of-well-being resulting from choices, impact on the society and the environment and being a good example to others.

The survey questionnaire was available in printed and in online versions. It was distributed among different transport users of TSW. As the research concerns a pilot study for initial testing of the research model, the participants were kindly requested to forward the questionnaire to other respondents (snowball method). In order to reduce a sampling bias, the survey was distributed among groups with different characteristics in terms of gender and age. A total of 248 completed questionnaires were received at the end of the research.

As the research concerns a pilot study, simple statistical analysis was carried out (mean, median, shares of answers), in order to prevent overinterpretation of the results. Among the 248 respondents, 47.18% were women and 52.82% men. Young transport users were the majority – 51.61% respondents were aged 21-25 and 14.92% aged 26-30. About two-third of the questionnaires were completed by people living in Wrocław, and one third by people living outside of Wrocław. The share of employed people in the sample was 46.77%, 33.47% were students, 14.52% were working students, and only 4% were pensioners. Due to the unequal distribution of respondents in terms of these basic features, the results only provide an indication for future research.

4. Results and discussion

4.1 Changes in the transport system in Wrocław

In total, 206 out of 248 respondents indicated changes in the transport system. The majority – 76.2% (189) – of all respondents claimed there was a significant change in TSW, while 6.85% (17) matched the answer "It's hard to say". Both these groups were requested to indicate what kinds of changes were the most important for them. Multiple answers were possible to match in this question (Figure 2).

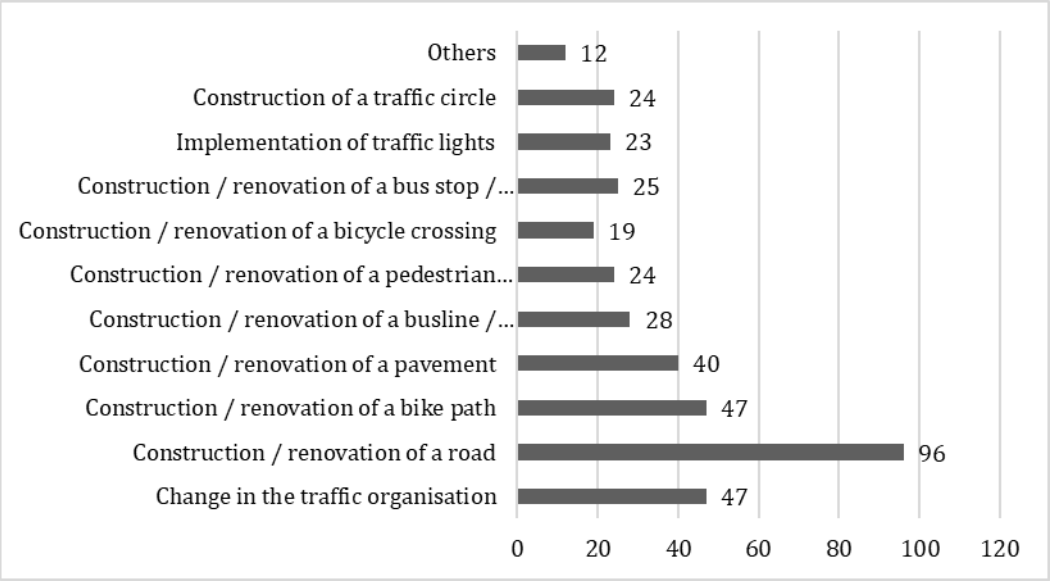


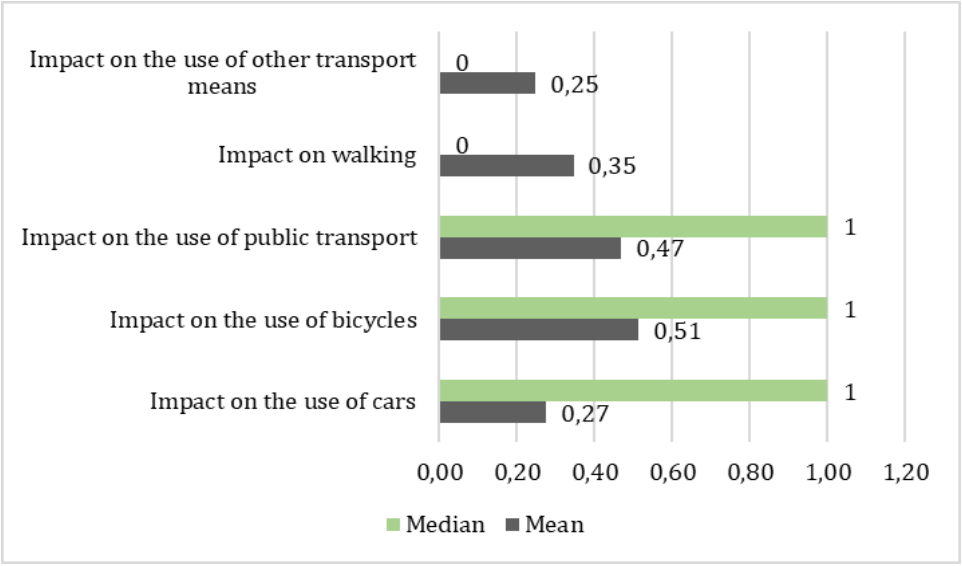
Figure 2. The most significant changes in TSW in the opinion of the respondents (number of answers)
Source: author's own elaboration based on the survey research.

According to the respondents, the majority of changes in the transport system referred to the construction or renovation of roads used by drivers. At the second position, changes in the traffic organisation and facilitations for cyclists were identified. The third important change was improved pavements for pedestrians. In the opinion of respondents, changes in the transport system led mostly to a better

safety, comfort, and accessibility of many places. Thus, it seems that most of changes, predominantly aimed at improving road infrastructure, are likely to cause a decrease in LRE. .

4.2 Changes in the levels of rivalry and excludability

Basically, modifications of elements of TSW had a positive impact on the use of all transport means. In particular, cycling and travelling by public transport have become more attractive (Figure 3).

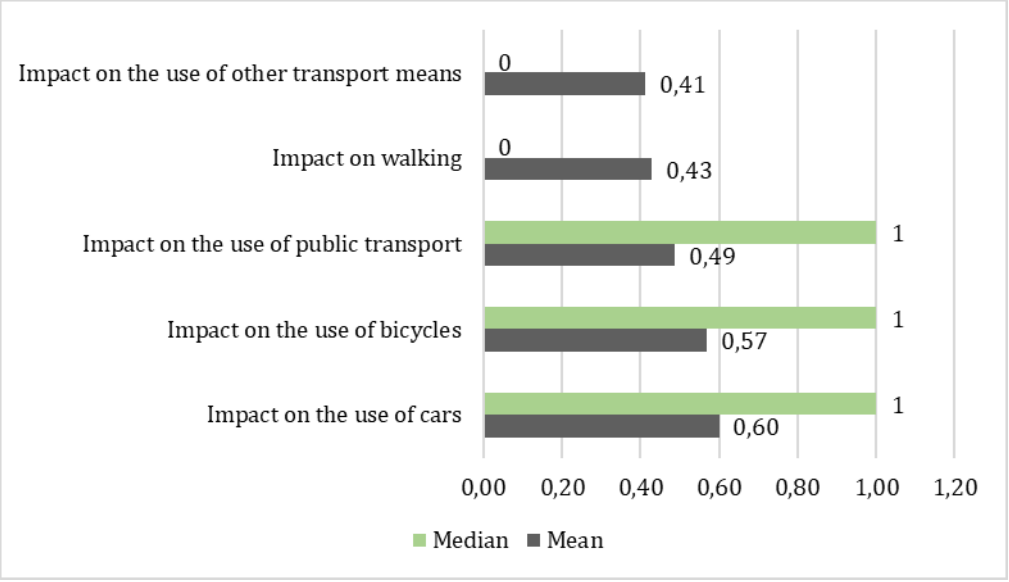


Legend: -1 – negative impact; 0 – no impact; 1 – positive impact

Figure 3. Impact of all changes in the transport system on the use of different transport means
Source: author's own elaboration based on the survey research.

Most benefits for all transport users were associated with the construction or renovation of roads (Figure 4). According to the system theory, the expansion of the road system increases the attractiveness of traveling by car in the short term, and in the medium and long term it contributes to the decline in profitability and attractiveness of public transport, which in turn intensifies the problem of congestion

problem (Magnuszewski 2008; Wyszomirski 2008). On the other hand, the construction or modernization of roads could be accompanied by the separation of bicycle paths, spaces for pedestrians and / or bus lanes, which reduces competition for access to the transport system between these users and car drivers.



Legend: -1 – negative impact; 0 – no impact; 1 – positive impact

Figure 4. Impact of improved road infrastructure on the use of different transport means
Source: author's own elaboration based on the survey research.

Levels of excludability didn't differ much as a result of changes in TSW (Figure 5). Nearly 17.5% (37) respondents claimed that it was impossible to use some transport means after a modification in TSW, which in particular concerned the use of cars.

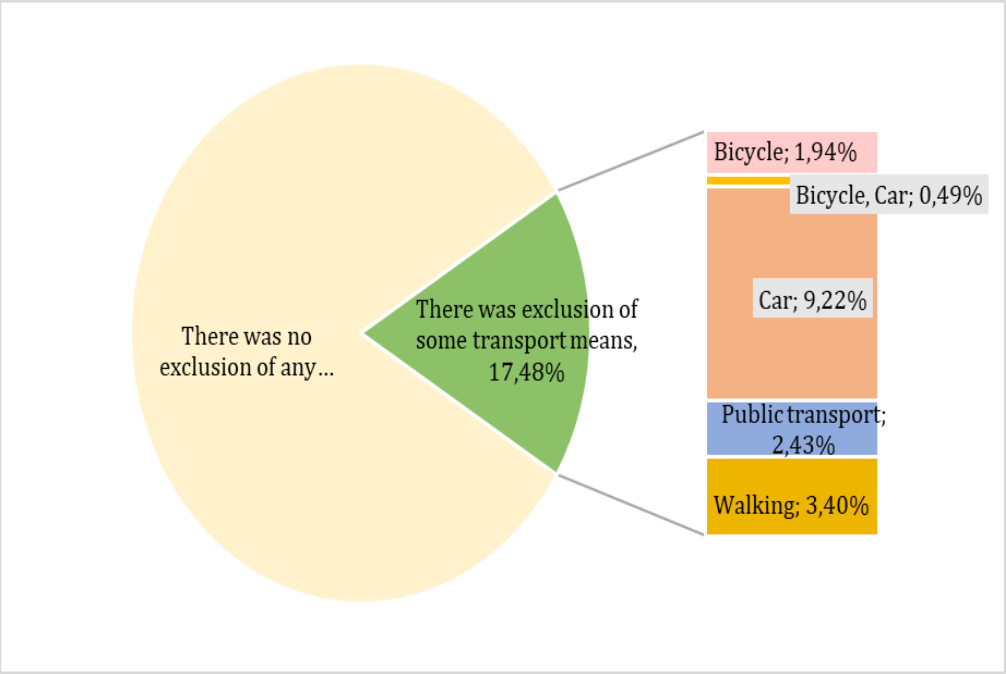


Figure 5. Exclusion of transport means resulting from changes in the transport system
Source: author's own elaboration based on the survey research.

As a consequence of changes in TSW, the levels of rivalry remained rather stable or decreased with regard to cyclists, public transport and pedestrians (Figure 6). However, in the opinion of respondents, the levels of rivalry between drivers changed in two directions – 33.33% (68) of respondents claimed that there were fewer impediments caused by drivers to other drivers, but at the same time 31.86% (65) of respondents argued that there were more impediments.

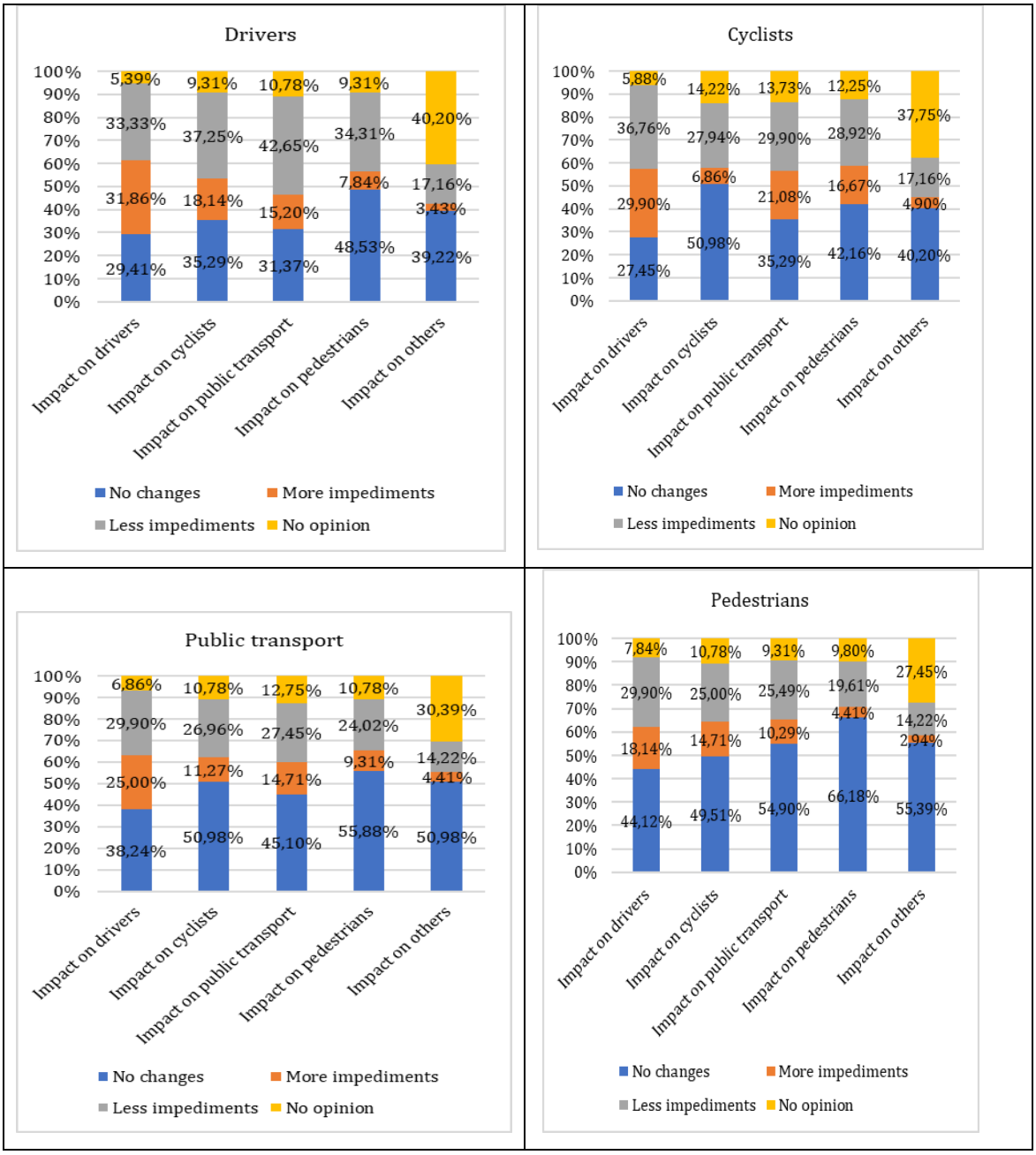


Figure 6. Changes in the levels of rivalry resulting from modifications in the transport system – impact of particular transport users on other users (shares of answers)

Source: author's own elaboration based on the survey research.

4.3 Changes in transport behaviour

The majority (61.65%, 127) of the respondents didn't change their means of transport due to modifications in TSW. However, 26.21% (54) of the respondents reported to have chosen new means of transport, while 12.14% (25) were indecisive. Both these groups were asked to answer questions regarding their new choices. The results unveiled that changes in TSW provided incentives to use always (13.92%, 11 respondents) or often (43.04%, 34 respondents) public transport. In case of the car, the changes in the TSW provided incentives for 6.33% (5 respondents) to always use, and for 26.58% (21 respondents) to often use a car (Figure 7). Respondents most often resigned from other means of transport and from cycling. The share of 13.92% (11) respondents that often resigned from a car can be considered pretty high compared to a frequent resignation from public transport or walking.

Among the 61.65% (127) of respondents that didn't change their means of transport, almost two-thirds travelled most often by car and over 23% by public transport. This provides some evidence for the hypothesis that car drivers tend to be less influenced by changes in transport systems aimed at a shift towards STB (low price elasticity of demand for travelling by car due to the (perceived) lack of good substitutes).

4.4 Development of PSR

In order to assess the development of PSR, respondents, who changed their transport means as a result of modifications in TSW (26.21%, 79 of all respondents), were divided into two groups: one group choosing most often the car (32.9%, 26 from these 79 respondents) and the second group choosing means of transport different from cars (67.1%, 56 from these 79 respondents). Then, selected aspects related to PSR were evaluated based on answers to questions regarding the state of well-being of respondents (Figure 8) and the perceived significance of elements of PSR (Figure 9).

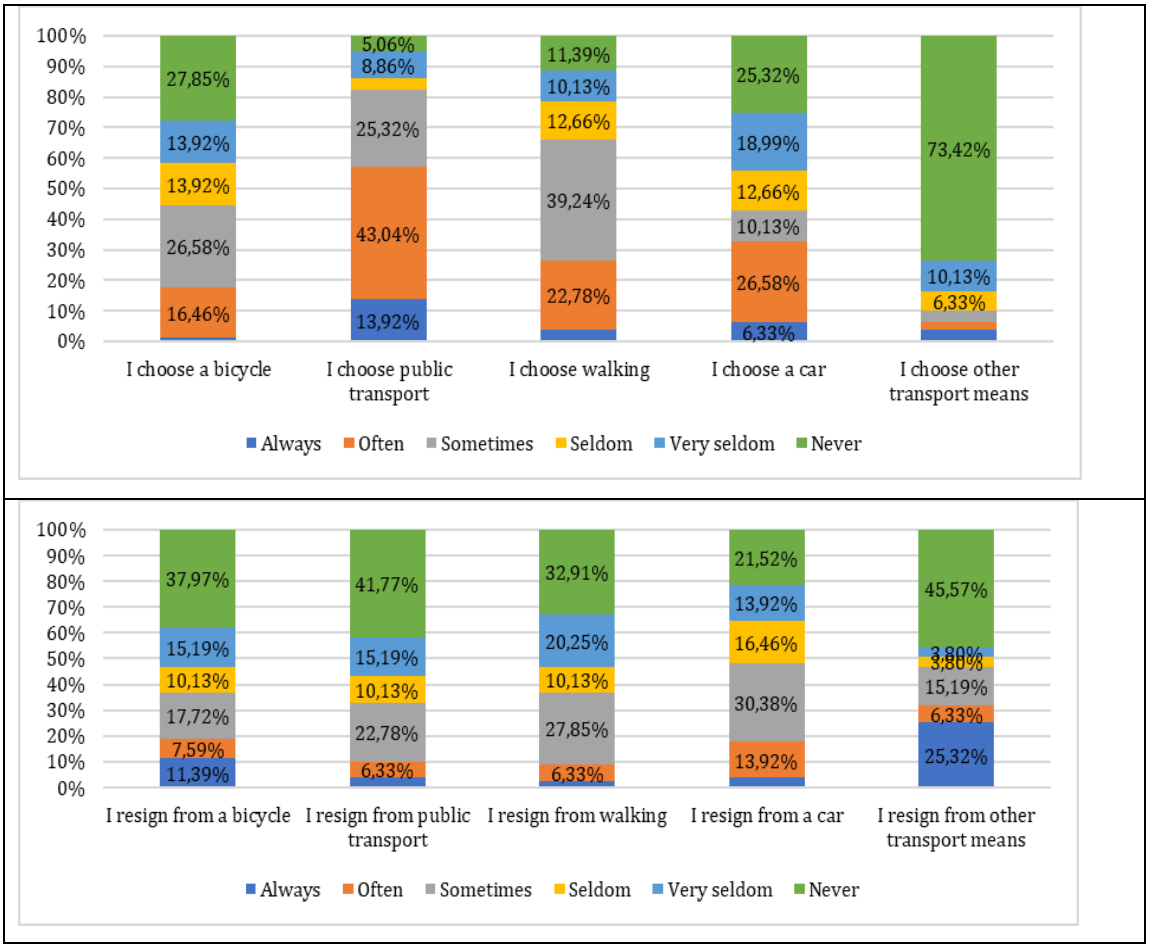
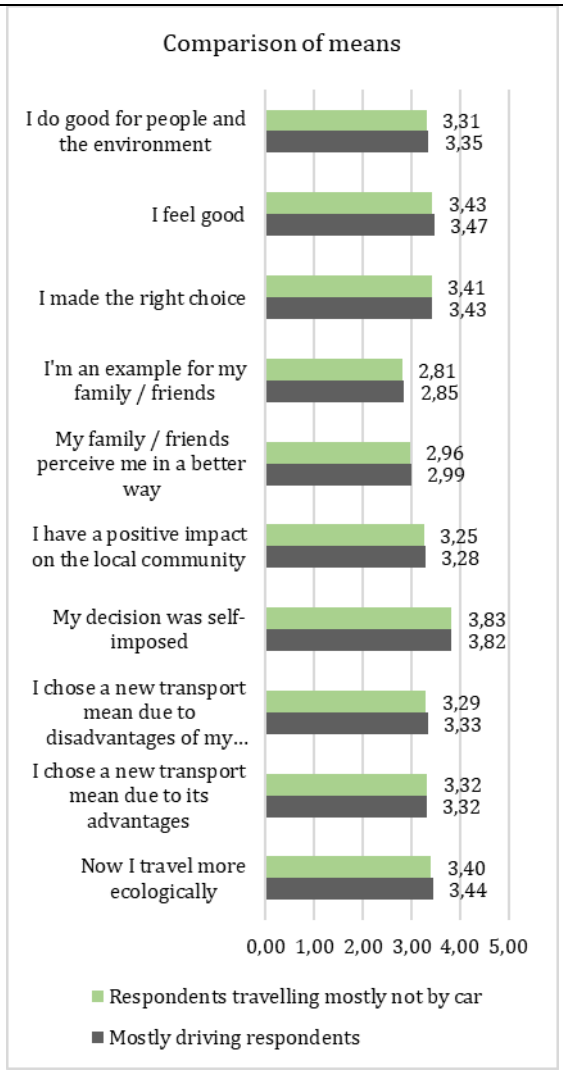
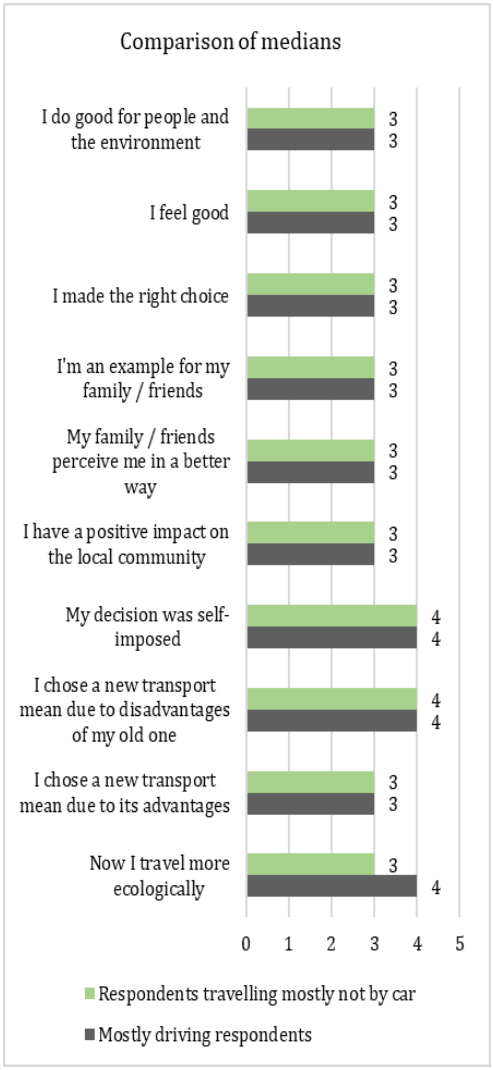


Figure 7. Changes in transport choices resulting from modifications in the transport system

Source: author's own elaboration based on the survey research.

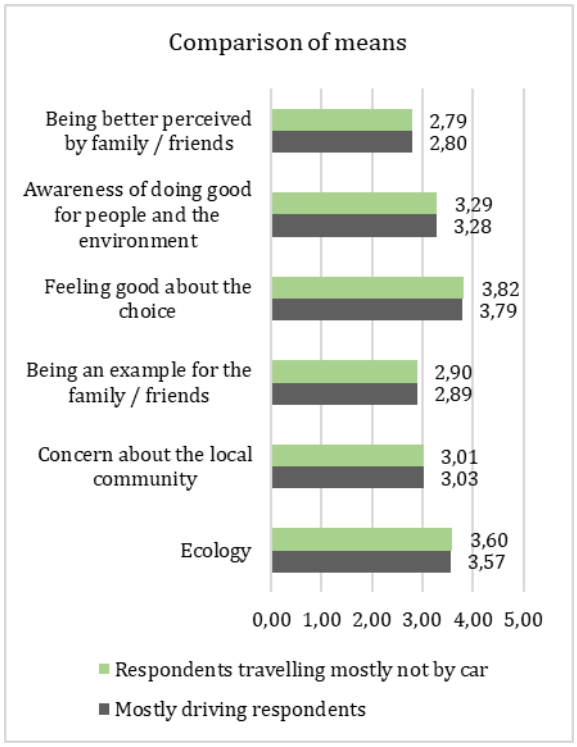


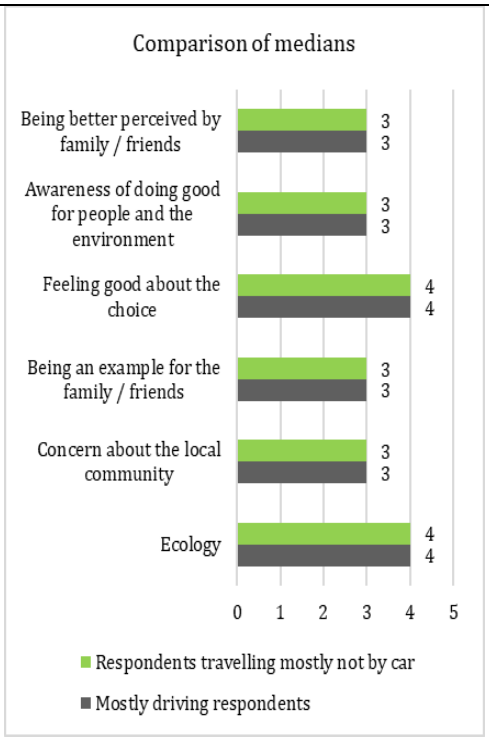


Legend: Likert item scale from 1 (strongly disagree) to 5 (strongly agree)

Figure 8. State of well-being of respondents resulting from a change of the transport mean

Source: author's own elaboration based on the survey research.



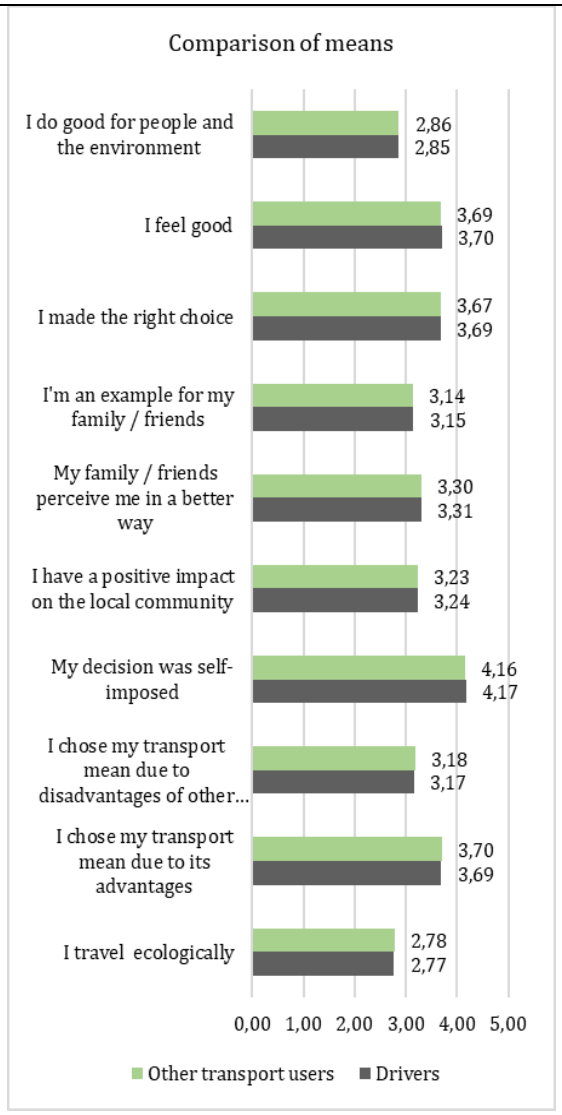


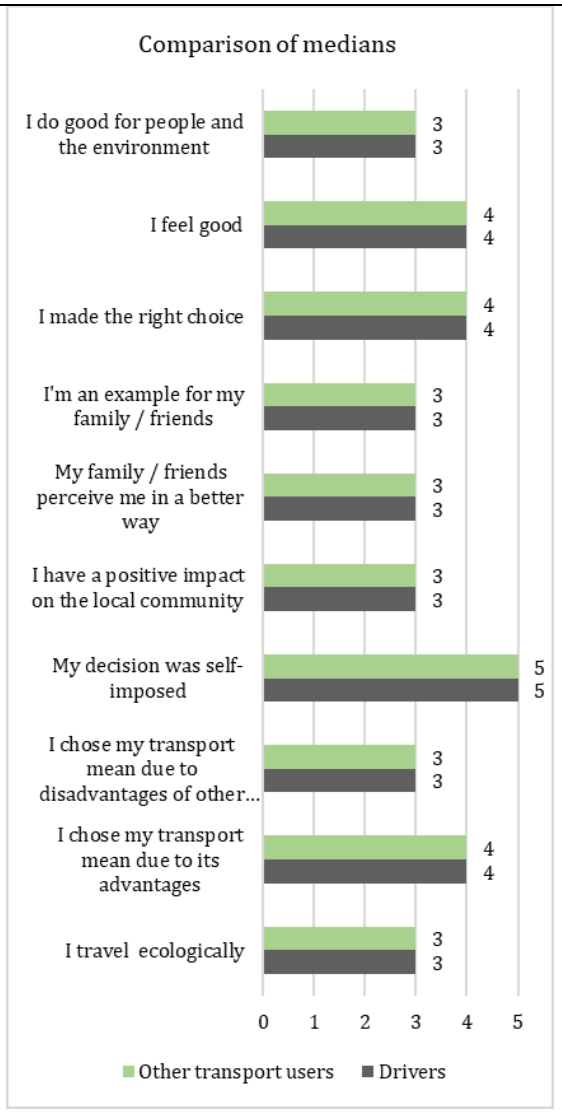
Legend: 1 – completely unimportant, 2 – unimportant, 3 – indifferent, 4 – important, 5 – very important

Figure 9. Perceived significance of elements of PSR among respondents who changed their transport mean
Source: author's own elaboration based on the survey research.

The data presented in Figures 9 and 10 do not indicate significant differences between frequent drivers and respondents travelling by more sustainable means of transport means in terms of their state of well-being as well as the perceived significance of elements of PSR. In addition, in both groups of respondents, PSR did not determine transport choices. The respondents followed mainly their own interests and changed their means of transport as a result of disadvantages of previous transport means. Though ecology was likely to be important while choosing a means of transport, all other aspects of PSR considered in the analysis turned out to be irrelevant. Similar comparisons were conducted with regard to the

respondents, who didn't change their transport means as a result of modifications in TSW (Figures 10 and 11).

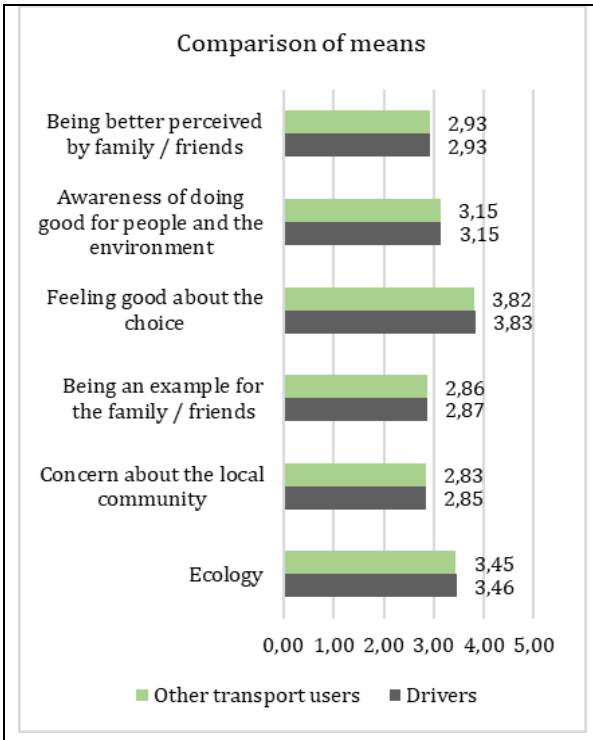


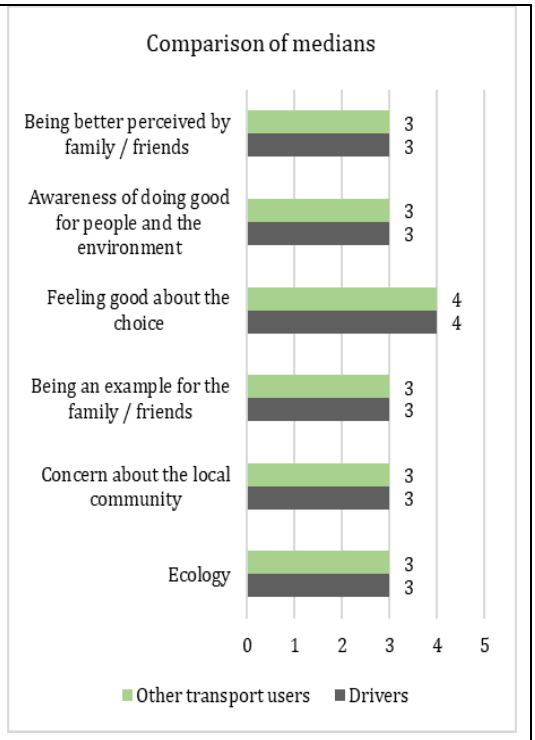


Legend: Likert item scale from 1 (strongly disagree) to 5 (strongly agree)

Figure 10. State of well-being of respondents who didn't change their transport means

Source: author's own elaboration based on the survey research.





Legend: 1 – completely unimportant, 2 – unimportant, 3 – indifferent, 4 – important, 5 – very important

Figure 11. Perceived significance of elements of PSR among respondents who didn't change their transport means
Source: author's own elaboration based on the survey research.

The results indicate, that PSR also has hardly been developed among respondents who didn't change their means of transport. However, this group of people was more convinced about the advantages of their means transport means, and that they mostly made voluntary decisions. They seemed to be more satisfied with their choices. What is worthy to notice is that there were no differences in assessments made by car users and users of other means of transport.

5. Conclusions

This study examined the impact of modifications of the level of rivalry and excludability (LRE) in transport systems on the development of Personal Social

Responsibility (PSR) in terms of sustainable transport behavior (STB). The following research questions was addressed in this study: To what extent do changes in the transport system in a city declaring commitment to the development of sustainable mobility result in the desired changes in transport behavior, both in the context of the choices themselves, and the factors determining these choices and related to the development of Personal Social Responsibility? Four auxiliary research questions were posed: What changes took place in TSW? What was the impact of these changes on LRE in the access to the transport system for different transport users? What was the impact of these changes on transport choices? Did the changes contribute to the development of PSR? Based on the results of the survey among transport users of the transport system in Wrocław (TSW) the answers to the research questions are as follows:

- While many changes have taken place in TSW, the majority of them were related to road infrastructure.
- In general, modifications in TSW led to decreased or unchanged levels of rivalry between transport users. Only perceived rivalry between drivers was considered to change in two contrary directions. There were few examples of exclusion, which affected mostly drivers.
- Changes in LRE didn't impact the transport behavior of respondents very much – only 26.21% of them claimed decisively that they changed their means of transport. These changes were half-way sustainable, as public transport and a car were most frequently chosen means of transport. In addition, car users seemed to be more resistant to changes than other transport users.
- Changes of means of transport were not accompanied by the development of elements of PSR, except for satisfaction from the decision that respondents made. Such aspects as ecology, concern about the local community or awareness of doing good for people and the environment were rather irrelevant for the respondents. PSR was also rather absent among respondents who didn't change their means transport. Moreover, these respondents were mainly more satisfied with their transport choices and means of transport. The majority of them were drivers.

In the light of the research results, the answer to the main research question does not sound favorable in the context of the paradigm of the economics of sustainable development. The changes in the transport system in Wrocław had no significant impact on the development of sustainable transport behaviour. The respondents who decided to choose means of transport other than a car, still focused on achieving their own benefits, without taking into account environmental issues and the interests of the whole community. In conclusion, the change in intensity of rivalry and excludability led, to a small extent, to the development of sustainable mobility, which, however, does not mean the change of society's attitudes, necessary to achieve sustainable development in the long term.

Concluding, it might be that measures aimed at a change in mental models and attitudes of transport users should be developed in pair with, or forerun changes in transport systems in order to ensure a real shift towards STB. Otherwise, concerns about self-interest are likely prevail and hamper the transition towards sustainable development.

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