



Influence of informational, social, convenience and financial tools on sustainable transport behaviour: The case of Lithuania

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ABSTRACT

The fast growth of the environmental impact of mobility is a significant issue for environmental policymakers. The primary condition of sustainable transport policy is human behaviour. The willingness to use sustainable transport mode is the leading trigger to implement sustainable transport policy successfully. Thus, the aim of this paper is to reveal the most effective tools and the reflection of the actual situation of the contribution of these tools to the sustainable transport behaviour. Referring to the representative survey performed in the transition country, i.e., Lithuania, at the beginning of 2020 and by applying the structural equation modeling, the results showed that the level of sustainable transport behaviour is relatively low. When analysing the impact of the main tools (financial, informational, social and convenience) on sustainable transport behaviour, the results revealed that informational, social and convenience tools were significantly related to this behaviour. Meanwhile, the financial tool insignificantly influenced sustainable transport behaviour. Considering the model of statements about the current situation, only financial and convenience aspects significantly influenced sustainable transport behaviour. Thus, this study revealed valuable insights for policymakers on the tools that contribute to and effectively promote sustainable transport behaviour.

1. Introduction

Sustainable transport is related to distinct aspects, such as air quality, climate change, traffic safety, and health. Mobility, along with food and housing consumption categories, is the most polluting sector. Furthermore, this sector is the most responsible for the household carbon footprint in the European Union (Ivanova et al., 2016). The biggest increase in carbon footprint was observed in the mobility sector as well in the Baltic States, particularly in Lithuania (Brizga et al., 2017). Moreover, mobility influences the fast growth of fuel consumption, pollution level (Siskos et al., 2018; Letnik et al., 2018; Zailani et al., 2016), public health impact (Zhao et al., 2020; Okokon et al., 2017) and noise (Woods and Masthoff, 2017). In the context of the SARS-CoV-2 coronavirus pandemic, due to quarantine, researchers showed a remarkable reduction of greenhouse gas emissions in the transport sector (Brand et al., 2021; Abu-Rayash and Dincer, 2020). Therefore, the reduction of transportation could vastly improve air quality and contribute to climate change mitigation. However, returning to normal life environmental impact caused by mobility remains one of the main issues.

White Paper on Transport argues that road congestion and substantial air transport volume are major issues contributing to pollution. There is an increasing shortage of public resources to finance infrastructure projects; therefore, a new approach to financing and pricing is needed. (White paper, 2011).

The EU air quality legislation and progressively stricter emission standards for road vehicles aim to protect citizens from exposure to the harmful effects of airborne pollutants and harmful particulates. However, compliance with legal requirements is still challenging for cities in almost all member states. It is partly influenced by the behaviour of the population; thus, EU legislation emphasises the concept of sustainable urban mobility and the need for its implementation. The concept of sustainable urban mobility promotes balance development and better integration of different modes of mobility. According to this concept, urban mobility must be organised with regard to the population as a primary concern. Therefore, the involvement of citizens and stakeholders is emphasised, and changes in mobility patterns are encouraged. The implementation of sustainable urban mobility's concept helps cities efficiently use existing transport infrastructures and services and develop

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and deploy new urban mobility measures based on artificial intelligence solutions in a cost-effective way (EU Communication, 2020).

A large number of researchers revealed that public transport could mainly decrease all environmental and health problems related to mobility (Pietrzak and Pietrzak, 2020; Abubakar and Dano, 2019; Zhao et al., 2020). However, other authors suggested the sustainable transport behaviour approach, which is related not only to the usage of public transport but also to other environmentally friendly transport modes as bicycles, electric cars, etc. (Waqas et al., 2018; Diao, 2019; Oviedo and Guzman, 2020). Thus, in the literature, scholars vastly studied how to promote sustainable transport behaviour in order to decrease environmental impact caused in the mobility sector and to seek Sustainable Development Goals (Shekhovtsov et al., 2020; Stephenson et al., 2018; Zhao et al., 2020; de Paula and Marins, 2018). The primary condition of sustainable transport policy is human behaviour. The willingness to use sustainable transport mode is the main trigger to implement sustainable transport policy successfully.

Authors analysing the main factors of sustainable transport behaviour used various theories such as the Theory of Planned Behaviour (TPB) (Khoo and Ong, 2015), Norm-Activation Theory (Waqas et al., 2018; Mehdizadeh et al., 2019), Campbell Paradigm (Taube et al., 2018) and Social Norms (Kormos et al., 2015) suggested the tools and provided the recommendations for policymakers how to enhance the performance of this behaviour. Informational, convenience, social and financial tools are the most important regarding sustainable transport behaviour (Schneider, 2013). However, no previous researchers analysed all these tools in one study.

1.1. Financial tools related to sustainable transport behaviour

A financial tool could be assumed to be as the benefit of sustainable transport usage and cost of polluting transport consumption. Xia et al. (2017) analysed it as push and pull measures. Considering the cost level, the high cost of parking and fuel influenced the promotion of sustainable transport behaviour and reduction of car usage (Nguyen-Phuoc et al., 2018; Simićević et al., 2021; Culjkovic, 2018; Khordagui, 2019; Zhang et al., 2020). However, Yan et al. (2019) found that travellers are more willing to change parking locations but not to change the modes of transport. Moreover, fuel price elasticity and fuel cost impact are more necessary in territories where sustainable transport modes are more available (Cornut, 2016). Furthermore, the impact depends on the price and income level in these territories (Chatterton et al., 2018; Hössinger et al., 2017; Leung et al., 2019). Meanwhile, the price level of public transport tickets differently determined the usage of public transport in EU countries (Minelgaitė et al., 2020). Other authors showed that the price level is the leading indicator in Greece and Spain (Cascajo et al., 2018; Ngoc et al., 2017). However, considering the case of Estonia, Hess (2017) revealed that free public transport did not raise the usage of public transport as expected.

1.2. Informational tools related to sustainable transport behaviour

An informational tool is directly related to the enhancement of environmental knowledge and awareness. It is a determinant that also influences the belief (Dong et al., 2021). Abasahl et al. (2018) declared that enhancement of environmental knowledge could also promote cycling behaviour. Chowdhury and Ceder (2016) found and emphasised the information and knowledge necessity for public transport usage. Meanwhile, Aini et al. (2013) found that knowledge provision about environmental problems insignificantly determined sustainable transport behaviour.

1.3. Social tools related to sustainable transport behaviour

Social pressure is an essential factor in promoting pro-environmental behaviour in general. Social motivation and pressure are also crucial in

mobility management campaigns (Hiselius and Rosqvist, 2015, 2016). Other authors showed that the decline of private vehicle usage could be reached by highlighting norms that other individuals use sustainable transport (Poiani et al., 2018). Thus, social norms significantly determined the intention to use public transport (Zhang et al., 2016). While Zailani et al. (2016) found that the impact of subjective norms on public transport usage was insignificant for all travelling modes and purposes. Meanwhile, the image of public transport is an outstanding variable for intention to use it. Aini et al. (2013) observed that personal norms significantly determined sustainable transport behaviour. Meanwhile, Khoo and Ong (2015) showed that peer pressure was not correlated with sustainable transport usage intention.

1.4. Convenience tools related to sustainable transport behaviour

The convenience level is the main factor that can trigger the usage of public transport (Ramos et al., 2019; Nutsugbodo et al., 2018; Chowdhury and Ceder, 2016). This indicator is particularly necessary for higher-income societies (Nutsugbodo et al., 2018). However, cars' usage is more convenient than public transport usage (Woods and Masthoff, 2017). While the convenience level of public transport as comfort is the vital factor for the usage of public transport (Ngoc et al., 2017; Irtema et al., 2018). However, this factor is not important in all EU countries (Minelgaitė et al., 2020). Furthermore, Mugion et al. (2018) found that individuals are more likely to use public transport due to good service quality. Moreover, it is necessary to improve public transport accessibility and quality and integrate public transport and cycling systems (Saphloğlu and Aydin, 2018).

Thus, researchers and policymakers have a unanimous consensus that a successful transition to more sustainable mobility is essential. For public authorities to be able to address the negative economic, environmental, and social impacts associated with sustainable mobility patterns, in-depth research and reasoned conclusions and proposals are required.

Moreover, studying how the main tools contribute to sustainable transport behaviour, the reflection of the actual situation must be analysed as well. Usually, policymakers implement various tools such as environmental information companies, infrastructure reconstruction, but behaviour does not change. Thus, the declarative tools highlighted by the respondents cannot help promote more environmentally friendly behaviour because it is not related to the reflection of the actual situation. Therefore, in this study, the impact of the main tools (social, informational, financial, convenience) was investigated considering not only the declarations but reflections on the actual situation as well. Thus, the aim of this paper is to reveal the most effective tools and the reflection of the actual situation of the contribution of these tools to the sustainable transport behaviour. This topic is still rather new in considering pro-environmental behaviour in general.

2. Methods and data

Providing the methodology of this study, it is important to present some aspects as: information about survey participants in order to guarantee that the survey was representative; the formation and application of constructs and used statistical methods.

2.1. Survey participants

For the analysis of the main tools of sustainable transport behaviour, the Lithuanian case was selected. When analysing the EU context, it was observed that individuals use public transport in Lithuania more often than in wealthier EU countries (Minelgaitė et al., 2020). The lack of affordability for very young or old individuals to have a car was one of the main reasons. However, according to the Lithuanian statistic database, the number of passenger cars is increasing. Furthermore, the carbon footprint in the mobility sector among the Baltic States is the

highest (Brizga et al., 2017). The main problem is that the car fleet is very old. In Lithuania, the share of cars older than ten years is 64%. Furthermore, diesel is the main fuel source, and people are more likely to use this fuel due to financial attractiveness. The infrastructure of electric cars is only in the initial phase. Thus, the environmental impact of mobility activities during the recent decade is increasing (Brizga et al., 2017). Thus, the case of Lithuania is particularly interesting and very useful when analysing the main tools of sustainable transport behaviour. In this paper, not only the declarations of how social, financial, convenience and convenience tools determine this behaviour but also, whether the reflection of real situation considering these tools contribute to the performance of sustainable transport behaviour were analysed.

The analysis was performed referring to the data of representative survey conducted before the worldwide pandemic named Covid-19 from 10 January to 1 February, 2020. This analysis is instrumental, whereas the economic, health, and social due to the pandemic was not considered, and results revealed the reflection of the actual situation without any disturbance. The survey was performed in Lithuania, one of the Eastern European Union countries and still attributed to transition countries. In the survey, 1027 individuals were interviewed. Referring to the recommendations of a sample size calculator for SEM, the number of respondents was sufficient for the study (Hair et al., 2014a,b, Wolf et al., 2013). An independent institution of public opinion and market research – RAIT – executed this survey using face-to-face and quota sampling methods. The respondents were selected randomly using a quota sampling method based on the proportion of the population by age and gender. According to demographic characteristics, 47.8% of respondents were male, and 52.2% were female. In the survey, 15–75-year-old citizens participated, and the average age of respondents was 45.3. The largest share (45%) of participants had higher education (Table 1).

2.2. Measurements

In this paper, nine constructs (social; financial; convenience; informational tools, the current (reflection of actual) situation of these tools, and sustainable transport behaviour) were evaluated. The four-point Likert scale was applied to assess the answers ranked from strongly disagree (never use) (1) to strongly agree (always use) (4). The scales were constructed referring to Spector's (1992) methodology, whereas almost all constructs were newly proposed. Therefore, in the first step of

Table 1
The demographic characteristics of the survey.

	Number (N)	Percentage
Gender:		
Male	491	47.8%
Female	536	52.2%
Age:		
15–24	121	11.8%
25–34	200	19.5%
35–44	157	15.3%
45–54	188	18.3%
55–64	215	20.9%
65 >	146	14.2%
Education level:		
Primary school	21	2%
Basic education	103	10%
Completed secondary education	173	17%
Post-secondary vocational education	134	13%
Further education	134	13%
Higher education	462	45%
Income		
Below 300 Eur	107	10.4%
301–500 Eur	224	21.8%
501–700 Eur	209	20.4%
701–1000 Eur	208	20.3%
1001 > Eur	117	11.4%
Difficult to identify	162	15.8%

the scale construction, the pilot survey was carried out in order to improve, validate and refine the proposed scales. Considering that all latent variables were used, the confirmatory factor analysis (CFA) was performed. All scales were refined, validated and reviewed. According to the final survey and their data and results provided in Table 2 the reliability and validity of all scales were satisfied. The financial tools encompassed the prices (parking, ticket of public transport), taxes, car maintenance cost and income aspects; social tools included public transport image, the example of famous people and relatives' impact; informational tools included environmental education and information provision; convenience tools – the quality of infrastructure, public transport service and renewal of public transport vehicles.

In the constructs of the current (reflection of actual) situation of tools, the statements were included rather similarly as in constructs of social, financial, convenience and informational tools. However, in this case, citizens were asked questions about the current situation. In the scale of sustainable transport behaviour, the usage of public transport and selected alternatives instead of going to stores and works by cars were included (Table 2).

2.3. The proposed model and statistical analysis

CFA was used to evaluate the measurement properties of tools, current situations, and sustainable transport behaviour. CFA is a factor analysis applied to identify and evaluate the factors and test whether measures of scales are consistent by evaluating interrelationships among hypothetical items of the scales (Brown, 2012). Therefore, the objective of CFA is to analyse whether the survey data fit a hypothesised measurement model.

Using structural equation modelling (SEM), the proposed two models presented in Fig. 1 were studied. This covariance-based statistical technique allows assessing the hypotheses about causal relationships of a large number of constructs, including interactions and moderating effects of predictor variables. The CFA and SEM analysis were conducted by the AMOS computer program, Version 26.

To evaluate the fit of the models, the comparative fit index (CFI) and the root mean square error of approximation (RMSEA) were evaluated. The CFI index should exceed the level of 0.9, and RMSEA should be lower than 0.08 (Bentler, 1990; Byrne, 2001). The reliability of constructs was assessed by applying the coefficient of Cronbach's alpha. The coefficients of this indicator should exceed 0.7, showing the strong reliability among constructs (Nunnally and Bernstein, 1994; Hair et al., 2014a). The convergent validity was assessed referring to standardised loading items and the average variances extracted (AVE) values. The convergent validity is adequate when the standardised loading items exceeded 0.6 and AVE values are higher than 0.5 (Fornell and Larcker, 1981). The discriminant validity was evaluated referring to correlation coefficients. All the correlation coefficients among variables should be below 0.7 and specify a tolerable level of discriminant validity (Sussman and Siegal, 2003). Moreover, the lower values of the correlation coefficient compared with the square root of the AVE index also endorse discriminant validity (Fornell and Larcker, 1981).

3. Results and discussion

The promotion of sustainable transport behaviour is particularly important seeking to improve air quality and contribute to climate change mitigation. However, the main issue remains whether implementing financial, informational, social and convenience tools effectively contribute to the sustainable transport behaviour.

3.1. Descriptive and measurement model analysis

When evaluating the outstanding tools in promoting sustainable transport behaviour, respondents stated that the convenience tool is the most important. In particular, respondents agreed that the frequent and

Table 2

The items of the survey, means, standard deviations and results of CFA analysis (reliability and validity).

	M	SD	Factor Loading	Cronbach's Alpha	AVE
Financial tools:	2.78	0.72		0.83	0.56
The high parking price raises the performance of sustainable transport behaviour	2.70	1.03	0.76		
The reduction of public ticket price motives performance of sustainable transport behaviour	3.36	0.83	0.80		
Reducing incomes raises the performance of sustainable transport behaviour	2.79	0.97	0.77		
Financial insecurity motivates the performance of sustainable transport behaviour	2.70	0.93	0.69		
The increasing car maintenance cost raises the performance of sustainable transport behaviour	2.75	0.99	0.80		
The taxes on old cars stimulates the performance of sustainable transport behaviour	2.40	1.06	0.68		
Social tools	2.66	0.81		0.75	0.51
The increase of public transport image prompts performance of sustainable transport behaviour	3.02	0.93	0.70		
The example of famous people motivates performance of sustainable transport behaviour	2.32	1.07	0.67		
The relatives encourage to perform sustainable transport behaviour	2.66	0.97	0.76		
Informational tools	2.82	0.84		0.85	0.66
The increasing environmental awareness motivates to perform sustainable transport behaviour	2.90	0.93	0.79		
Information about transport environmental impact promotes to perform sustainable transport behaviour	2.80	0.94	0.85		
The knowledge about negative transport impact forces to perform sustainable transport behaviour	2.75	0.99	0.90		
Convenience tools	3.16	0.71		0.88	0.58
The good infrastructure raises the performance of sustainable transport behaviour	3.15	0.87	0.75		
The punctual public transport promotes to perform sustainable transport behaviour	3.16	0.89	0.80		
The frequent public transport motivates performance of sustainable transport behaviour	3.22	0.83	0.79		
The convenient public transport impels to perform sustainable transport behaviour	3.21	0.84	0.80		
The renewed public transport vehicles promote	3.09	0.91	0.71		

Table 2 (continued)

	M	SD	Factor Loading	Cronbach's Alpha	AVE
to perform sustainable transport behaviour					
Current situation of financial tool:	3.44	0.59		0.6	0.5
The parking price is very high	3.31	0.77	0.74		
The price of car maintenance is very high	3.58	0.64	0.64		
Current situation of social tool:	2.69	0.72		0.6	0.5
The image of public transport is strong	2.72	0.88	0.75		
My relatives perform sustainable transport behaviour	2.67	0.84	0.65		
Current situation of informational tools:	2.77	0.77		0.7	0.55
I am educated to perform sustainable transport behaviour	2.76	0.86	0.66		
I know that usage of cars contributes to negative environmental impact	2.79	0.88	0.82		
Current situation of convenience tools:	2.71	0.77		0.84	0.58
The infrastructure of sustainable transport is developed good enough	2.73	0.93	0.80		
The public transport is punctual	2.81	0.86	0.71		
The public transport is frequent	2.65	0.94	0.85		
The public transport is convenient	2.64	0.99	0.68		
Sustainable transport behaviour:	2.33	0.92		0.93	0.62
I use public transport	2.42	0.89	0.68		
I do not use the car going to store	2.23	1.07	0.83		
I do not use the car going to work	2.34	1.22	0.84		

AVE – average variances extracted. REMSE-0.038, CFI-0.93.

convenience of public transport could promote sustainable transport behaviour. [Minelgaitė et al. \(2020\)](#) also found that public transport service quality (as frequency and reliability) determined public transport usage. The informational tool is also necessary for citizens. The majority of respondents stated that enhancing environmental awareness could promote sustainable transport behaviour. Considering the financial tool, respondents also agreed that it could promote sustainable transport behaviour. The majority of respondents highlighted that the reduction of public transport ticket prices could promote sustainable transport behaviour. The ticket price level in Lithuania is relatively high, and if the travel destination is rather short, it would be cheaper to go by car. [Minelgaitė et al. \(2020\)](#) also pointed out that the ticket price significantly influenced public transport usage. Meanwhile, individuals negligibly agreed that the taxes for old cars could promote sustainable transport behaviour. This tax is still under discussion, but many policymakers agree that it could enhance the income inequality in Lithuania. The increasing taxes do not motivate using public transport or other alternatives if it is not convenient. The social tool is the least evaluated, and only a minority agree that famous people could help promote the performance of sustainable transport behaviour. Meanwhile, most respondents agree that the image could promote this behaviour. In Lithuania, this image is relatively low, and usually, it is usually assumed that people who use public transport cannot afford a car and belong to a low social class, even considering the income level.

Considering the current situation, citizens mostly agreed that the price level of parking and car maintenance is high. In Lithuania, the

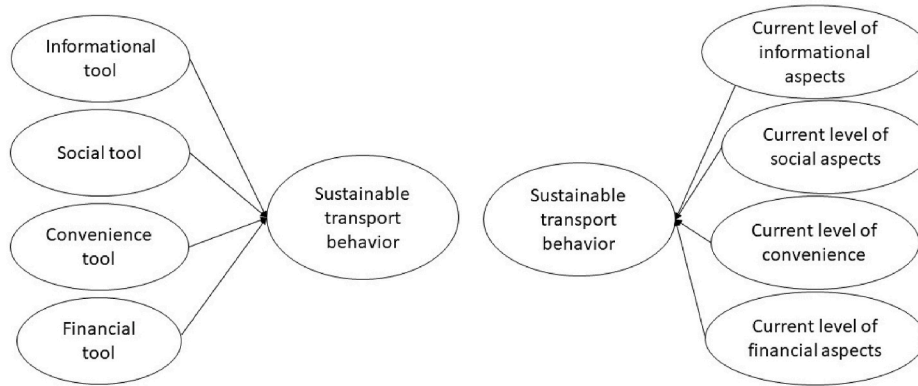


Fig. 1. Proposed model.

parking price in centres of towns in particular increases every year in order to reduce the traffic in the town. In terms of informational aspects, most of the respondents also declared that they are educated and know about the environmental impact caused by the usage of cars. Meanwhile, the current (reflection of actual) level of social and convenience tools were evaluated the least. The minority agreed that public transport is frequent and convenient, and they stated that their relatives are not likely to perform sustainable transport behaviour. When analysing sustainable transport behaviour, citizens do not tend to use public transport a lot. Furthermore, people usually use cars to commute to the store and work. Thus, sustainable transport behaviour is not very popular in Lithuania, and policymakers should make all efforts to enhance this behaviour.

Considering the CFA analysis, a good fit to the data is observed: $\lambda^2 = 1433$, $df = 369$; $p < 0.001$. The value of CFI was 0.93, RMSEA was 0.038. Thus, these indicators show that the model fits adequately (Bentler, 1990; Byrne, 2001). The reliability of constructs and internal consistency also were suitable. Cronbach's alpha for all constructs exceeded the value of 0.7. Furthermore, the results showed that the assumption of convergent validity was satisfied as well. Standardised loading items revealed that the threshold values exceeded 0.6, the values of AVE for all constructs were higher than 0.5 (Table 2).

Considering the discriminant validity, all the correlations among all constructs were below 0.7 and exceeded the level of the square root of the AVE factors (Table 3.). Moreover, the results showed that informational and social tools, informational and convenience tools were the most related variables. People who stated that informational tools are essential also declared that social and convenience tools are necessary. Thus, when implementing one tool, the other tools simultaneously could be enhancing. Meanwhile, the relationship between the social tool and the current situation of the financial tool and the current situation of financial and convenience tools were the weakest. Therefore, people who pointed out that the social tool promotes sustainable transport behaviour disagreed that the current level of financial tools and current financial and convenience situations are good. Hence, the growing prices did not enhance the convenient level of sustainable transport.

Table 3
Constructs' correlations.

	1	2	3	4	5	6	7	8
1. Financial tool	0.748							
2. Social tool	0.641	0.714						
3. Informational tool	0.648	0.70	0.812					
4. Convenience tool	0.539	0.624	0.700	0.761				
5. Current situation of financial tool	0.045	0.01	0.062	0.136	0.707			
6. Current situation of social tool	0.360	0.316	0.368	0.178	0.148	0.711		
7. Current situation of informational tool	0.309	0.328	0.309	0.200	0.190	0.522	0.741	
8. Current situation of convenience tool	0.390	0.352	0.360	0.099	0.077	0.587	0.43	0.761

Diagonal elements in bold show the square root of AVE.

Furthermore, the correlation matrix revealed that all factors were rather dissimilar, and multicollinearity was excluded from this study.

3.2. Structural model analysis

The SEM analysis was carried out in order to evaluate the proposed models presented in Fig. 1.

When analysing impact of the main tools (financial, informational, social and convenience) on sustainable transport behaviour, the SEM model fit indicators provided evidence of model suitability: $\lambda^2/df = 5.59$, $p < 0.001$; CFI = 0.93, RMSEA = 0.047. The results revealed that informational, social and convenience tools were significantly related to this behaviour ($\beta = 0.19$, $p < 0.01$; $\beta = 0.21$, $p = 0.002$, $\beta = 0.20$, $p < 0.01$) (Table 4). Other authors also confirmed that these tools are important in order to promote the usage of public transport and other

Table 4
Path coefficients for SEM analysis.

Paths	Estimate	SE	CR	P
Financial tool → sustainable transport behaviour	0.06	0.051	1.23	0.20
Informational tool → sustainable transport behaviour	0.19	0.05	3.73	<0.001
Social tool → sustainable transport behaviour	0.21	0.069	3.07	0.002
Convenience tool → sustainable transport behaviour	0.20	0.058	3.42	<0.001
REMSEA-0.047, CFI-0.94				
Current situation of financial tool → sustainable transport behaviour	-0.57	0.114	-4.95	<0.001
Current situation of informational tool → sustainable transport behaviour	-0.08	0.069	-1.18	0.243
Current situation of social tool → sustainable transport behaviour	0.15	0.102	1.51	0.131
Current situation of convenience tool → sustainable transport behaviour	0.40	0.057	7.07	<0.001
REMSEA-0.039, CFI-0.96				

sustainable transport modes (Aini et al., 2013; Chowdhury and Ceder, 2016; Ngoc et al., 2017; Irtema et al., 2018; Minelgaitė et al., 2020; Saplioglu and Aydın, 2018). While financial tool insignificantly influenced sustainable transport behaviour ($\beta = 0.06$, $p = 0.21$). Hössinger et al. (2017), Yan et al. (2019), Cornut (2016), Leung et al. (2019) and Chatterton et al. (2018) revealed that if fuel (parking; ticket) price is inelastic, it is difficult to recommend this tool for the promotion of sustainable transport behaviour. Therefore, concerning these results, the main suggestion would be to improve infrastructure, educate people about the negative impact of car usage, and enhance the status of public transport as well as motivate relatives to promote sustainable transport behaviour. The financial mechanisms, according to respondents' declarations, are not essential when promoting this behaviour.

Considering the model of statements about the current situation, it reveals a good fit to the data ($\lambda^2/df = 4.09$, $p < 0.001$; CFI = 0.96, RMSEA = 0.039). However, the results differed comparing with previous ones. In this case, only the convenience aspect significantly and positively influenced sustainable transport behaviour ($\beta = 0.40$, $p < 0.001$). Therefore, people stated that when the convenience level is higher, they tend to perform sustainable transport behaviour more. Thus, only the results of the impact of the convenience tool and the current situation of this tool on sustainable transport behaviour were coincident. The enhancement of sustainable transport infrastructure and service quality is the most important aspect of implementing sustainable transport policy. The current situation of informational and social tools influence this behaviour slightly ($\beta = -0.08$, $p = 0.243$; $\beta = 0.15$, $p = 0.131$). According to respondents' declaration, these tools significantly influenced sustainable transport behaviour, but the reflection of the actual situation was different. Therefore, the latter tools can enhance only the intention to use sustainable transport modes. When considering the current level of the financial tool, the impact on sustainable transport behaviour was significant but negative ($\beta = -0.57$, $p < 0.001$) (Table 4). Respondents who declared that the prices of car usage are higher tended to perform this behaviour less. Therefore, in Lithuania, the price level of car maintenance was inelastic, and the growth of price did not motivate people to change the transport mode. The main reason for this result is that the convenience level of sustainable transport is relatively low. The intensity of public transport particularly in peripheries is very low because people use cars more and vice versa, people are more likely to use individual cars due to the undeveloped public transport.

4. Conclusions and policy implication

Promoting sustainable transport behaviour is one of the main aspects of sustainable transport policy and when seeking the reduction of the environmental impact of mobility, which has been growing fastly. The tendencies of sustainable transport behaviour are rather worrying in Lithuania, whereas the cars are the primary choice for respondents to commute to work and other places. Also, public transport is not very popular, and only a minority of respondents declared that they always use public transport. Therefore, the promotion of sustainable transport behaviour is still a great challenge for environmental policymakers seeking sustainable mobility goals. The main tools which could be the main determinants of sustainable transport behaviour could be distinguished to social, informational, financial and convenience. Furthermore, it is also essential to investigate whether these analysed tools contributed to sustainable transport behaviour considering the current (reflection of actual) situation of these aspects. Thus, considering the representative survey performed before the Covid-19 pandemic (in 2020) in Lithuania, this paper aimed to analyse the influence of declared social informational, financial and convenience tools, and reflection of actual situations on sustainable transport behaviour.

The results showed that considering all assumed tools, the informational, convenience, and social tools significantly determined the sustainable transport behaviour. While financial tool insignificantly influenced this behaviour. However, when considering the actual

situation, only the current situation of convenience level significantly determined sustainable transport behaviour. The reflection of the actual situation of the informational and social tools influenced this behaviour insignificantly. The financial tool significantly but negatively influenced sustainable transport behaviour. Therefore, the convenience level is the central aspect to which policymakers should take into account the most. Thus, the policymakers should primarily enhance the convenience level and invest in infrastructure and service of public transport and hope that people will use sustainable transport mode more willingly because it takes less time and is very convenient and pleasant to commute to the workplace. Furthermore, seeking the reduction of environmental impact in transport sector the cleaner technologies should be implemented as production of electric and more environmentally-friendly public transport vehicles and development of electrical vehicle infrastructure. Information provision and social pressure would be significant only when sustainable transport is convenient, and people can easily change their mode of mobility. When considering the current situation, the financial tool was not effective. The growing prices did not motivate people to use the more environmentally friendly transport modes instead of cars. Therefore, attractiveness and convenience should be the main features of sustainable transport in order to implement a successful sustainable transport policy.

In Lithuania, the environmentally friendly programmes directed to reduce environmental impact in the transport sector are rather intensively implemented. One of these programmes is that people can change old cars to environmentally friendly vehicles or tickets for public transport, bicycles or electric scooters. Moreover, the investments in the public transport sector, the renewal of bus fleet are also intensively increasing. However, the main issue is that the systemic changes have not been considered. New and frequent routes are required. Society should be involved in the planning of public transport more. Therefore, sustainable transport should be more attractive and convenient to implement a sustainable transport policy. All financial revenues should be assigned to the development of sustainable transport infrastructure.

These results could be relevant for other countries because the implemented tools for the promotion of sustainable transport behaviour are universal and encompassed all categories. Furthermore, the globalization also equalised the tendencies particularly in western world countries.

5. Limitations and future directions

In this paper, the main tools of sustainable transport behaviour were analysed. Sustainable transport behaviour was evaluated in general. Thus, researchers should also analyse the main determinants of separate types of this behaviour in the future as the usage of public transport, bicycles/scooters, etc. Furthermore, in this paper, the main tools, such as financial, social, informational and convenience, which can contribute to promoting sustainable transport behaviour, were included in the models. However, in the future, it would be important to analyse the difference of these tools among people with different environmental awareness levels or age groups. It could enrich this topic and provide more concrete recommendations for policymakers to promote sustainable transport behaviour more. Moreover, in this paper, the Lithuanian case was analysed. Thus, future researchers could perform a comparative analysis of tools in question in different countries. The scarcity of fuel resources and an increasing fuel price could also be essential for future research revealing the boundary when people fundamentally change their behaviour.

CRediT authorship contribution statement

Genovaitė Liobikienė: Conceptualization, Methodology, Software, Formal analysis, Investigation, Data curation, Writing – original draft, Writing – review & editing, All authors have read and agreed to the published version of the manuscript. **Astrida Miceikienė:**

Conceptualization, Validation, Writing – original draft, Writing – review & editing. All authors have read and agreed to the published version of the manuscript.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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