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Gender Difference in Perception of Value of Travel Time and Travel Mode Choice Behavior in Eight European Countries

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Abstract: Women and men often do not experience equal mobility opportunities in their societies. Increasingly, gender is being recognized to play a significant role in transport planning, particularly for addressing individual mobility needs in urban and rural areas. By understanding the link between male and female travelers' preferences, perceived values, and travel behavior, as well as experienced barriers, transport systems could be better tailored to women's activities and mobility needs by putting the women's perspective on center stage. Therefore, the objective of this paper is twofold: (1) to perform an in-depth analysis of women's and men's travel behavior to scrutinize the difference in perception of the value of travel time derived from travel experience using various transport modes and (2) to identify the significant factors influencing men and women's travel behavior in terms of transport mode choice. The empirical analysis is based on a multinomial regression model of 1406 female travelers and 1486 male travelers in eight European countries. In regard to the subjective values associated with users' perception of travel time worthwhileness, this research implies that the perception of enjoyable travel time and the perceived mood from the travel experience would increase the tendency of ridesharing and using private motorized modes of transport as a passenger among women. Results also demonstrate that women have a higher perception of the worthwhileness of travel time for walking compared to men using bicycle and micro-mobility systems and private motorized vehicles as a driver. Regarding public transport, a significant difference in the perceived worthwhileness of travel time between female and male users of public transport in the European urban areas was also discovered.

Keywords: value proposition of mobility; worthwhileness of travel time; gender-sensitive design; mobility planning; transport policy; mode choice

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1. Introduction

Mobility gives access to opportunities that are essential to people's needs and quality of life, and it stimulates employment, economic growth, prosperity, and global trade. Despite its importance, research into gender and mobility suggests that essential aspects of mobility are biased towards the travel needs of men, while transport systems in Europe and elsewhere are not geared towards women's needs. This has profound implications for the participation of women in society. Since about 1980, gender is being recognized to play a significant role in transport planning, particularly for addressing individual mobility needs in urban and rural areas [1–6].

In recent decades, much effort toward understanding gender differences in mobility patterns has been demonstrated both in theory and practice. Investigating the relationships between changes in needs due to demographic and socio-economic changes and spatio-temporal constraints, proposed by Hägerstrand [7], was one of the most interesting aspects of identifying women's mode choice behavior that has been researched in the last decade.

The growing literature on travel behavior indicates significant gender differences in mobility and travel patterns where women experience more trips than men both in the developed world and in many developing countries [8–17].

The focus on differences in men's and women's travel patterns has been a characteristic feature in many discussions, and the notion of gendered mobility refers to differences in male and female travelers' behavior that many and include: women use slower modes such as public transport and walking more than men; they travel shorter distances; they have more complex trip chains; women more often travel accompanied by children or dependent others, and are more likely to experience obstacles and constraints in terms of physical accessibility, safety, security [18–20] or shortage of time, (i.e., time constraint) due to traditional care and reproductive roles. Such knowledge is, however, rarely taken into consideration when planning current (and future) transport systems. Lack of accounting for differences in mobility patterns and needs will constrain mobility and in turn limit access to education, employment, and other welfare activities affecting wellbeing. Additionally, if women experience transport as inconvenient, expensive, and hard to access, the whole family can suffer, e.g., women are less able to contribute to household income, poorer choice of schools and extracurricular activities, and more limited health visits.

Other demographic and socio-economic factors such as income, age, household size and structure, elder-child care responsibilities, ethnicity, employment status, degree of disability, location, class, education, and proficiency in the use of information and communication technology (ICT) can cause significant differences among women's mobility patterns and their travel mode choice. Furthermore, the extensive body of literature suggests that the high penetration of ICT in transport in addition to the ability to conduct ICT-related activities while on the move plays a pivotal role in people's value proposition of mobility (VPM) and increases the subjective perception of the value of travel time in terms of experiencing meaningful travel time, which may influence their daily travel mode choice [21–23]. Empirical research on the use of ICT devices onboard and its relationship with users' perceived worthwhileness of travel time demonstrates the gender difference in carrying out ICT-related activities as women most likely use fewer ICT devices while on move compared to men [24–26]. Albeit, the growing number of studies implied the substantial impact of ICT on multi-tasking using different transport modes, the role of gender in conducting various ICT-related activities, its linkage with the perceived value of travel time (VTT), and transport mode choice is still under research.

Moreover, some other factors such as personal safety, security and quality of transport services are important concerns of women's mobility [27–32]. Therefore, taking gender differences into account in travel behavior should be seen as a barometer of the degree of equality between two groups to identify how different modes of transport and their attributes could make them more or less satisfactory for both men and women in particular with respect to women's transportation needs and mobility gender-sensitive provisions [30,33,34].

The other important exogenous factor with the effect on people's travel behavior, notably the user's subjective perception of travel time value and choice of travel mode, is the weather conditions. However, the impact of weather precipitation and temperature on transport mode choice has been discussed by several scholars [35–39]. These studies corroborate that the increasing precipitation would increase the probability of using private motorized vehicles than the active transport modes. However, how diverse weather conditions as a notable determinant could differently affect men and women's choice of transport modes have not been deeply scrutinized in the previous studies.

Depending on the situation, other factors such as individuals' hedonic values and increased comfort or well-being may influence a traveler's choice more than time and cost, therefore they are considered more valuable. The perceived value proposition of a certain travel option may not match the actual value delivered to the traveler. When the actual experience has a lower value than the perceived one, this could affect future mobility choices toward the use of other transport modes in similar situations by men and women

in different age ranges. Hence, knowledge of factors playing a role in the traveler's choice is key to aligning expectations and actual experience as found in a recent study by Nathan et al. [21] that shows 66% of respondents in the Paris region evaluated their trip with public transport as wasted and unproductive.

Previous studies also investigated the causal impact of commuting time using different transport modes on travelers' moods, (i.e., affective experience) [40–42]. For instance, Lancée et al. [42] found that in the case of the Netherlands the impact of traveling by different transport modes on individuals' moods is associated with trip lengths. This research demonstrates that using active modes (cycling and walking) is less likely to boost the mood of young, low-educated women compared to older, highly educated men. In addition, this study also implicates that short commutes have a higher positive effect on the level of mood, and people who travel alone using public transport have lower mood levels during commuting.

Even though extensive research has been conducted to broaden the scope of the gender dimension in transport planning and policies in the EU and national frameworks, there has been little attention put on exploring the influence of gender on the subjective value of travel time in terms of perceived travel experience and consequently mode choice as a part of travel behavior. Since the perceived quality of time influences individual well-being [43], it is important to understand and reflect on own time use, for instance, to adjust own behavior and to consider alternative choices that would better fulfill travelers' needs, goals, and expectations.

Therefore, this paper has three aims, as shown in Figure 1. First, to investigate how the dichotomous men and women's subjective travel experience, (i.e., perception of the value of travel time) varies using various transport modes in the different built environments and their impact on modal choice. Second, to identify the role of internal factors related to the trip characteristics and users' subjective travel experience derived from transport system attributes and services available in the European urban areas and their impact on female and male travelers' choice of transport mode for daily commuting trips. Third, to examine how the weather conditions, (i.e., variability) as an external factor influence individuals' habits regarding the travel mode choice behavior.

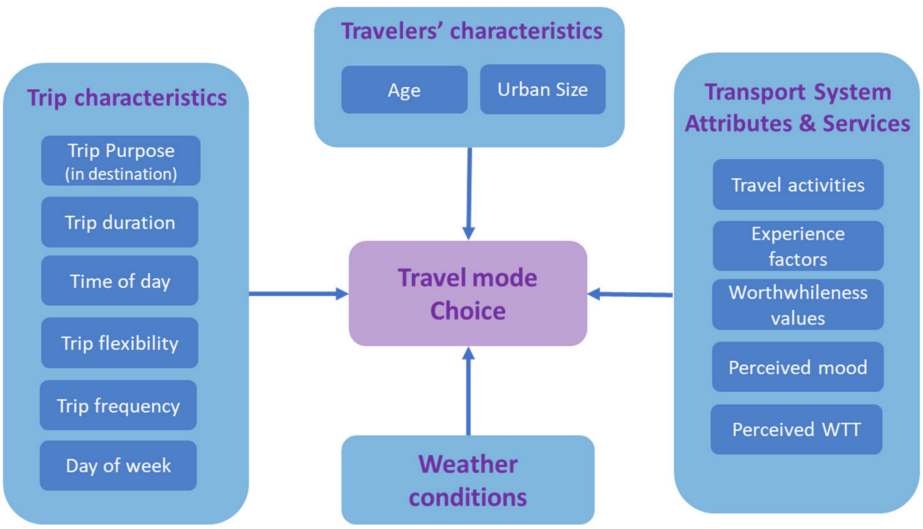

Figure 1. Proposed model for explaining factors influencing travel mode choice behavior.

2. Research Method (Materials and Methods)

2.1. Data Collection and Sample Description

The data analyzed in this paper were acquired within the H2020 MoTiV "Mobility and Time Value" project, where the individual's subjective perception of the value of travel time (VTT) has been investigated based on genuine travel experience across different transport

modes available in the European urban areas. Within the scope of the MoTiV project, an Android/iOS app titled Woorti has been developed for this purpose (see Appendix A). Data collection performed through this mobile application was conducted in 2019 in two periods from May to July and from September to November mainly in eight European countries (Belgium, Finland, France, Italy, Norway, Portugal, Slovakia, and Spain).

Participants have been tasked with downloading and using Woorti app for a minimum of 7 successive days. Through an automated process, the app was able to detect user's trip data, such as date and time, speed, traveled distance, and transport mode used. Furthermore, a subjective evaluation of the travel time and its value have been inquired of the individual. This included the confirmation of the deployed mode of transport and provision of details on the trip purpose, its general evaluation, assessment of whether traveled time was wasted or worthwhile, and on top of that specification of the factors that influenced perception of worthwhileness of the travel time and gained values related to the travel time worthwhileness (i.e., paid work, personal task, enjoyment, and fitness). Socio-demographic information, such as age, gender, residence, education, marital status, occupation, years of residence and number of household persons were also requested. For more information about the dataset composition, see [44]. Weather data were also gathered through the Application Programming Interface (API) of the OpenWeatherMap online service for the time periods of 09:00, 12:00, and 18:00 for each day in a set of 66 cities in eight campaign countries during the course of MoTiV data collection. Based on real-time weather data collected, the weather conditions have been computed for the time and place trips occurred.

The collected data allowed, among others, comparisons across gender, age, and geographical contexts. The dataset incorporates "qualitative" inputs from travelers, (e.g., mood, purpose of a trip) that are used to derive the general mobility context, activities carried out while traveling, to what extent ICT and transport services/infrastructure supported such activities, and overall satisfaction/dissatisfaction in terms of subjective perception of value of travel time either at the onboarding stage for each mode in general, or at trip leg-level, or in a combination of both.

The goal of the project defined by the consortium was to have 500 active users of the application from every participating country. The sample was defined by the usage of simple probability sampling for more accuracy [45]. Additionally, minimum required sample size for every country was calculated based on population size, margin error of 5%, and confidence level of 95% (n = 385) [46].

At the end of data collection period, 3300 users recorded 67,177 door-to-door trips. For the purpose of this paper, all data were used. However, after a cleaning and screening procedure, the sample was reduced to 2892 people. Among them 1406 (49%) are females, and 1486 (51%) are male travelers from 8 European countries (see Table A1). Considering the population of men and women in Europe, margin error of 5% and confidence level of 99%, the samples in this research are bigger than their required size (n = 664).

Considering the urban size, almost half of the female and male respondents reside in the metropolitan areas with more than 500,000 inhabitants. More than 23% of both female and male respondents live in medium-sized cities with population up to 500,000 inhabitants and almost more than 22% are residents of small cities with the population between 50,000 and 200,000 (see Figure 2).

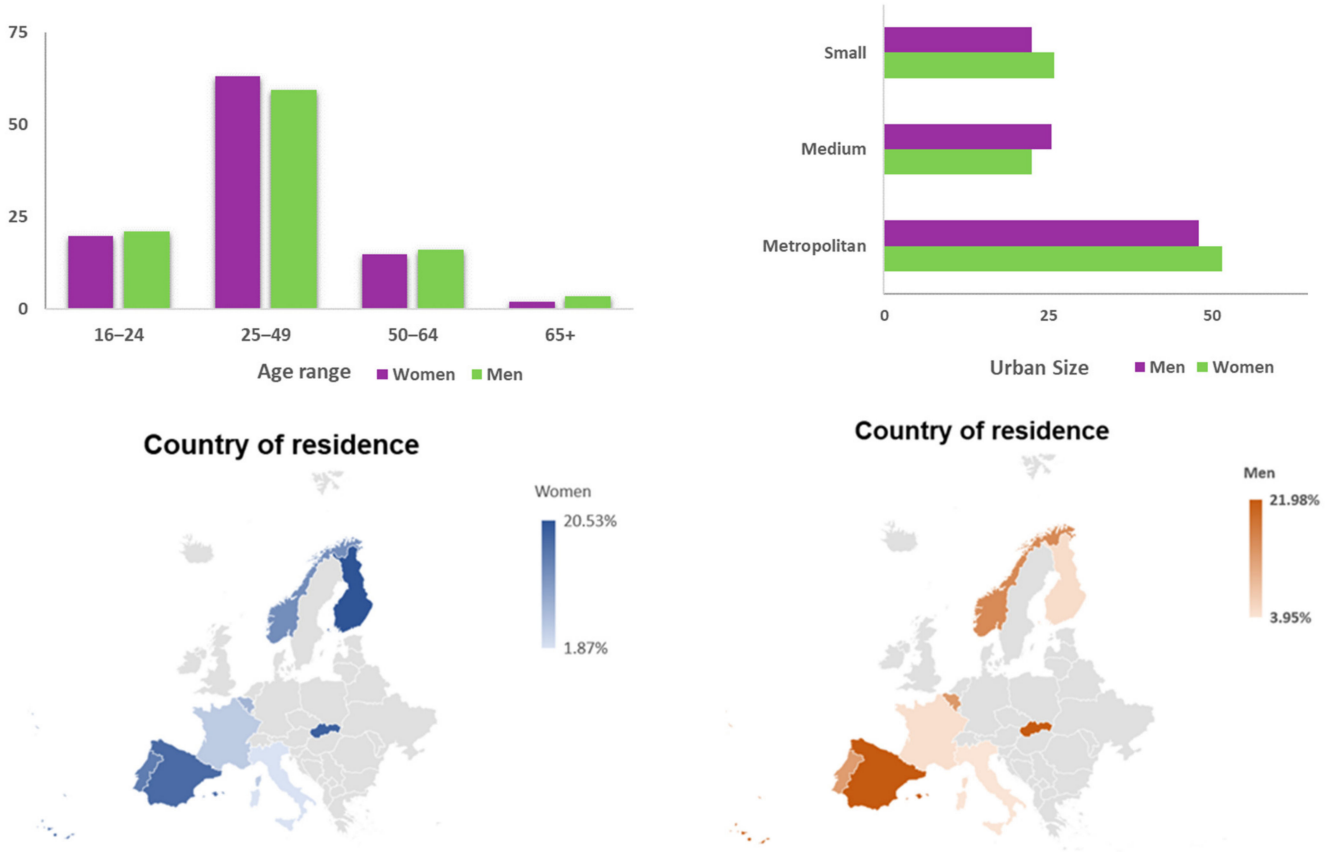

Figure 2. Socio-demographic characteristics of respondents.

2.2. Modeling Methodology

For estimating effects of introduced variables as shown in Figure 1. on travel mode choice of men and women who participated in this study, the multinominal logit (MNL) method was applied. This method uses the random utility maximization theory to compute the choice probabilities by users among a set of alternatives. The MNL is commonly employed in transportation research to analyze discrete choice modeling and analysis of random behavior of people in decision making.

3. Results and Discussion

3.1. Descriptive Data Analysis of the Gender Impact on Transport Mode Choice and Perception of VTT

3.1.1. Trip Purpose

The trip purposes applied in this study are associated with those activities travelers undertake at the destination, which are grouped into eight categories: work, (e.g., work and education in school/university), business trip, shopping, (e.g., grocery shopping/everyday shopping), leisure and hobby, (e.g., sport, entertainment, socializing and communicating), personal task and errands, (e.g., medical care, banking, administrative services), pickup/drop off a passenger, return-to-home and other. The transport categories shown in Figure 3 also indicate the main mode of transport used by women and men to undertake an activity at the destination. As can be seen in Figure 3, women most often use public transport (38.15%) and bicycle and micro-mobility systems (35.14%) for their work and school trips compared to other trip purposes. Moreover, concerning leisure and hobby trips women rather travel by private motorized vehicles as a passenger (25.94%) or walk (23.63%) to their destinations instead of using public transport. The descriptive analysis also confirms that there is no significant difference between women and men using private

motorized vehicles for daily shopping, which highlights the persistent role of the car for personal freedom.

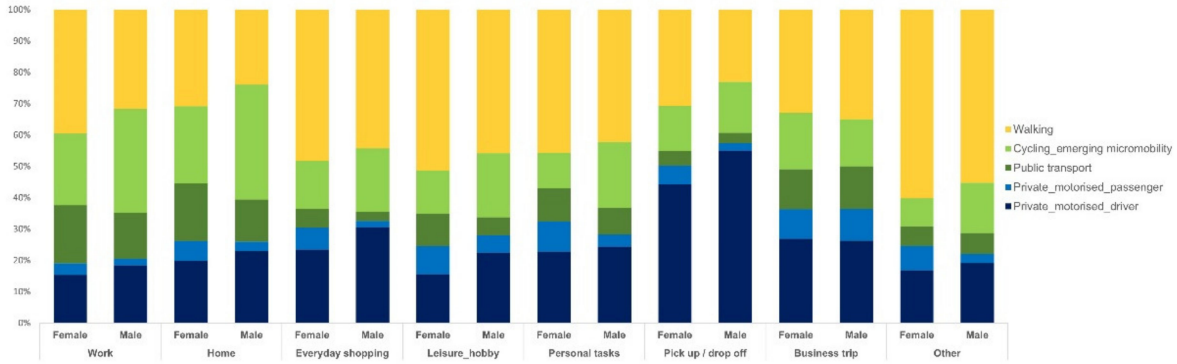

Figure 3. Frequency of trip purpose at destination for women and men based on different transport mode categories.

3.1.2. Trip Frequency and Trip Flexibility

The frequency of reported trips in terms of their occurrence by respondents is shown in Figure 4. As can be seen, the majority of female and male travelers in the sample undertake the reported trips occasionally and regularly. From Table A2, it also becomes clear that for private motorized vehicles as a driver, most female respondents indicated reported trip as a regular trip (46.17%), while surprisingly male respondents stated the reported trip as a trip that they undertake occasionally (47.99%). Regarding public transport, both male (56.75%) and female (55.73%) travelers indicated the occurred trip as a regular trip in which they use public transport. Concerning the bicycle and micro-mobility, the descriptive analysis also reveals that trips reported by female (64.79%) and male (61.69%) travelers are regular trips of respondents.

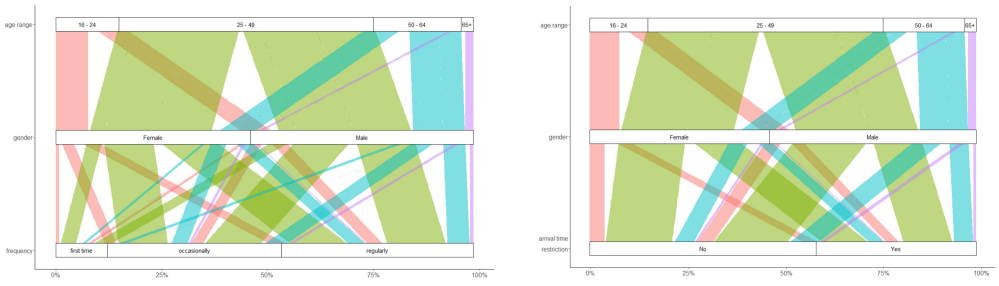

Figure 4. Frequency of trip and time restriction for arrival (travel time flexibility) for women and men among in different age groups.

In regard with flexibility of respondents for arriving whether at a fixed time or not in their destination, analysis illustrates that for the gathered trips, on average more than 59% of women and men in different age ranges reported about not having time restriction for arrival at a certain time (see Figure 4). From the Table A2, it is more evident that most likely women and men use private motorized vehicles as a passenger (71.39% and 61.45) followed by walking (62.6% and 64.74%) due to having more time flexibility, (i.e., fewer time constraints) to arrive at fixed time in their trip destination.

3.1.3. Worthwhileness of Travel Time (WTT)

To better compare the perceived subjective worthwhileness of travel time (WTT) between women and men on "How much of their travel time did they feel as wasted?" derived from travel experience, female and male respondents' distribution of WTT rates (1—all time was wasted, 5—all time was worthwhile) across various transport modes

have been shown in Figure 5. This figure shows that women have higher perception of worthwhileness of travel time for walking (9.01%) compared to men using bicycle and micro-mobility systems (4.99%) followed by private motorized vehicles as a driver (4.34%). Regarding the public transport, a significant difference on perceived WTT between female and male users of public transport in the European urban areas is also evident.

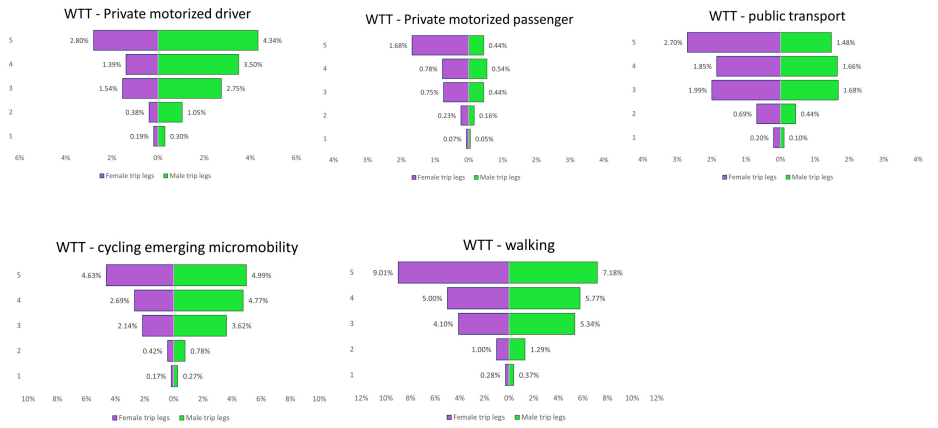

Figure 5. Distribution of WTT for women and men based on different transport mode categories.

3.1.4. Mood

The perceived mood, (i.e., emotions/feelings) from the travel experience of female and male respondents on a five-point scale (1—lousy, 5—great) for the reported trip leges using various transport modes have been shown in Figure 6. This figure markedly reveals the heterogenous impact of transport modes on individuals' moods during commuting due to different attributes of transport systems and services. The most significant difference in female and male travelers' self-assessment of how they felt about their trip can be seen between the private motorized vehicles as driver and passenger. For the private motorized vehicles, men rated mostly 4 or 5 as drivers while women reported happier feelings about their trip when using private motorized vehicles as passengers. Overall, in terms of the effect of transport mode on travelers' mood, it can be also noted that women perceived a greater, (i.e., happier) feeling of the trip thanks to the higher affective experience of public transport and walking as predominate modes of travel for women [47,48].

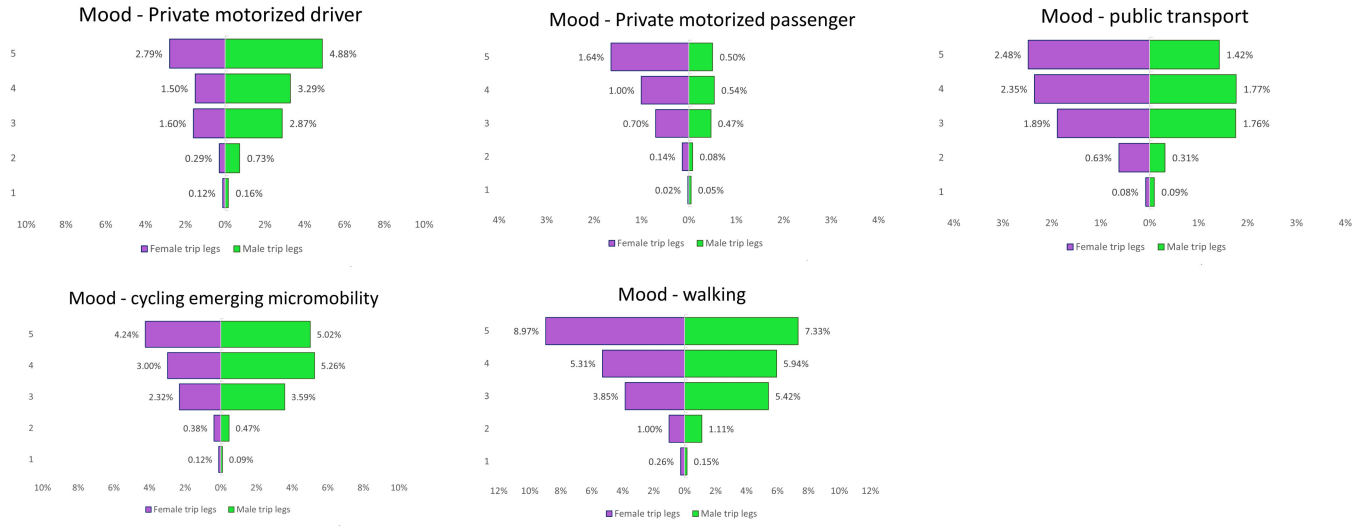

Figure 6. Distribution of mood for women and men based on different transport mode categories.

3.1.5. Worthwhileness Factors (Values)

Distribution of the four values of travel time worthwhileness, (i.e., paid work, personal task, enjoyment, and fitness) using different transport have been presented in Figure 7. Results elucidate that for all the worthwhileness values, most women and men in the age range of 25–49 reported enjoyment and ability to do personal tasks while on move as the most important gained value for their travel time.

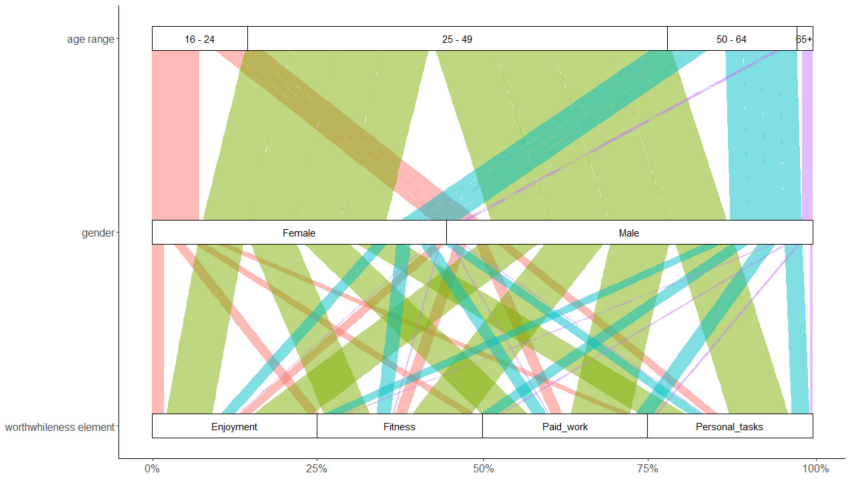

Figure 7. Frequency of worthwhileness values for women and men in different age groups.

3.1.6. ICT-Related Activities While on the Move

The most frequent ICT activities performed by travelers using various transport modes in eight EU countries have been illustrated in Figure 8. Although there is no significant difference between the ICT-related activities performed by women and men across different transport modes, the results imply a common pattern and high tendency of using ICT devices for browsing the Internet among men and women while traveling by public transport. The distribution of frequency for using ICT devices for four predefined activities in the MoTiV data collection: browsing the internet, listening to audio, e-reading, and watching videos by men and women has also been shown in Figure 8.

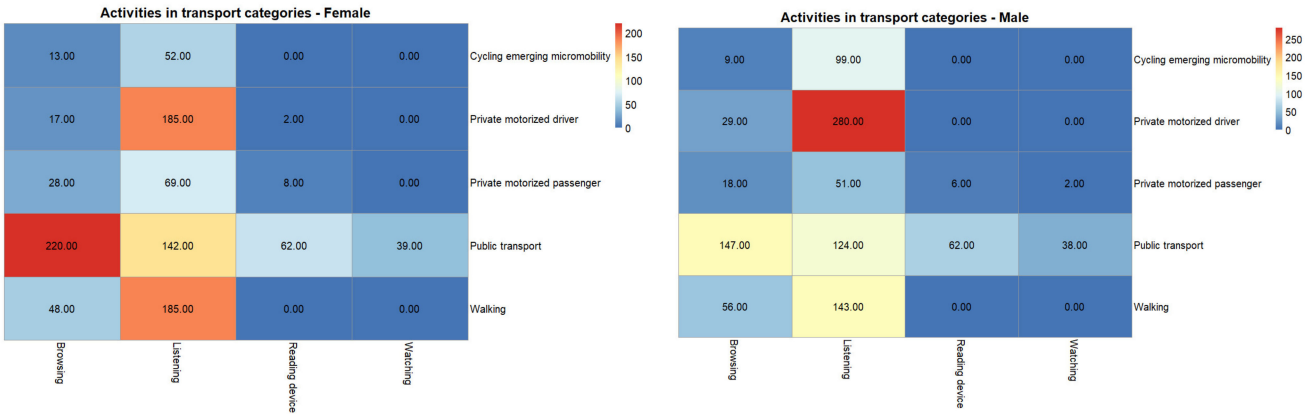

Figure 8. Number of ICT activities carried out by women and men during travel based on different transport mode categories.

As delineated in Figure 9, women and men are mainly listening to audio, (e.g., music, books) or browsing the internet while traveling in all age ranges below 65 years. For people over 65, results also indicate that the most favorable and frequent ICT-related activity for people in this age range is reading electronic devices when using public transport, private motorized vehicle as a passenger, or walking to their destination.

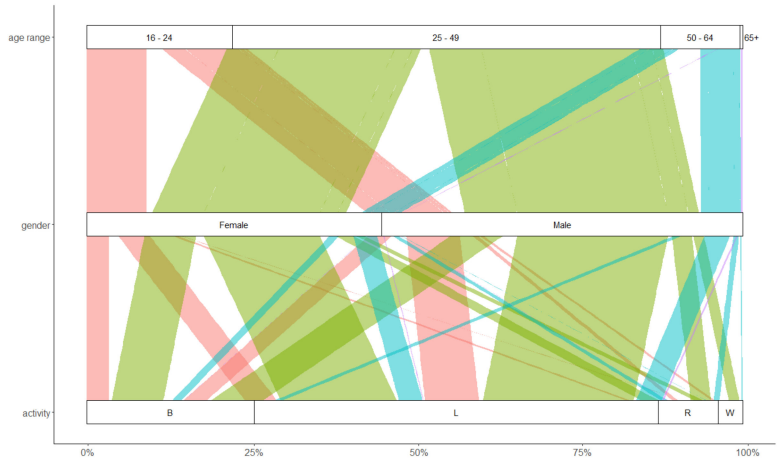

Figure 9. Frequency of ICT activities carried out by women and men in different age range during travel based on different transport mode categories.

3.1.7. Travel Experience Factors

During traveling, travelers' experience derived from using different transport modes varies in terms of subjective perception of the value of travel time and notably travel time worthwhileness. In this study, various experience factors were gathered based on the used mode of transport for which users could report a positive or negative contribution to the perceived quality of travel time (see Table A3). As can be seen in Table A3, descriptive analyses reveal that the "ability to do what I want" is the most dominant factor across four transport modes (private motorized vehicle as a driver and passenger, public transport, and walking) contributing to the European male and female travelers genuine travel experience. In regard to the private motorized vehicle as a driver and passenger, results show that "Traffic congestion and delays" has also a profound contribution to the perceived value of travel time for both male and female users. With regard to public transport, the analysis also exposed that reliability of travel time and crowdedness, and seating are the most frequent factors reported by women (9.51%) compared to men (6.98%) influencing their quality of travel experience and in the particular subjective perception of travel time.

Based on the descriptive analysis, it is also observed that "Road path availability & safety" is a frequent factor reported by men (12.4%) compared to women (5.18%), contributing to people's travel experience using bicycles and micro-mobility services in European urban areas.

3.2. Analysis of Gender Difference in Travel Mode Choice for Daily Commuting Trips

The difference in travel mode choice of women and men over 16 years old who participated in the MoTiV data collection campaign was analyzed using the MNL regression model in R Software. The travel mode choice was estimated using the maximum likelihood (ML) method. In this study four transport mode categories are used for female and male travelers' mode choice modeling: (1) private motorized vehicle as a driver; (2) private motorized vehicle as a passenger; (3) public transport; (4) walking as an active mode. The cycling and micro-mobility transport category is set as the reference alternative. Thus, as a reference alternative, the utility of "using bicycle and micro-mobility services" is set to zero.

The pseudo-R-square values as goodness-of-fit measures for the assessment of the models' quality together with the estimated *p*-value for each model have been presented in Table 1.

Table 1. Estimated R-square values.

Pseudo R-Square	Private Motorized Driver		Private Motorized Passenger		Public Transport		Walking	
	Female	Male	Female	Male	Female	Male	Female	Male
McFadden	0.7094	0.7126	0.7898	0.7389	0.7625	0.6632	0.2835	0.2295
p-value	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

All statistically significant predictors resulting from the models for males and females in every transport category are shown in Figure 10 and Table 2. The estimated results of MNL are also presented in Table A4 (see Appendix A). The model results (Figure 10 and Table 2) indicate that similar factors influence the choice of means of transport for both males and females. Detailed differences for every transport category are described below.

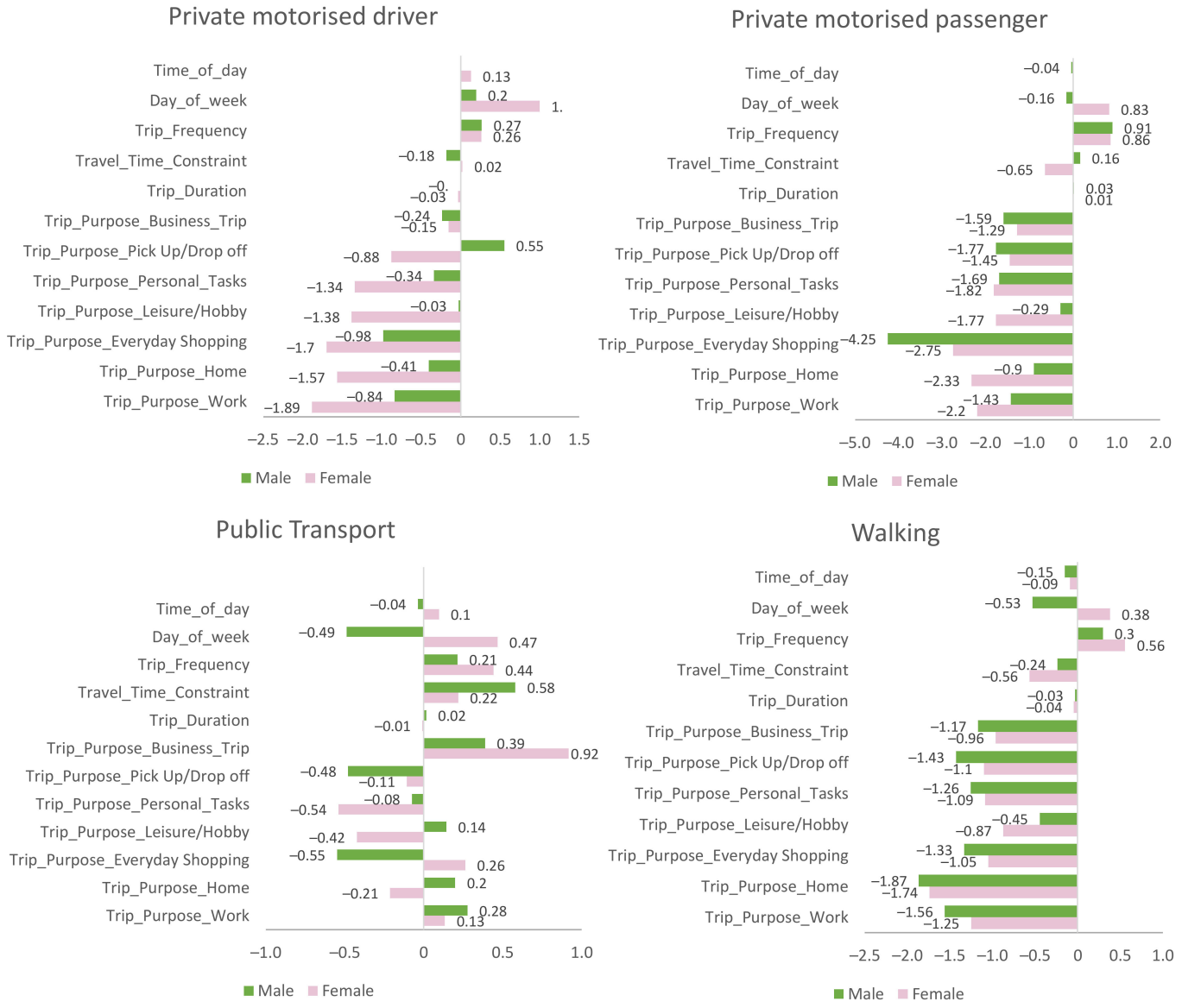

Figure 10. Values of regression coefficient for trip characteristics obtained by applying multinomial logistic regression. (Only values corresponding to statistically significant predictors are shown.)

Table 2. Values of regression coefficient for age, urban size, weather condition, and travel attributes obtained by applying multinomial logistic regression.

Variable		Private Motorized Driver		Private Motorized Passenger		Public Transport		Walking	
		Female	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
Socio-demographic characteristics									
Age		0.406	0.677	−0.477	−0.702	−0.931	−0.351	−0.030	0.177
Urban size		0.173	0.173	−0.321	0.027	−0.972	−0.137	−0.553	0.144
Weather condition									
Weather	neutral	−0.772	−1.248	−0.483	−0.667	0.074	−1.549	−0.222	−0.269
	windy	2.744	3.575	3.365	4.286	1.945	3.306	1.771	2.538
	rainy	11.137	1.186	-	1.344	-	-	11.83	1.123
	cloudy	−1.238	−1.493	−0.945	−2.089	−1.524	−2.222	−0.870	−1.079
	cold	0.387	0.356	0.287	−0.632	0.229	−1.186	0.399	−0.408
Travel attributes									
Travel activities	Browsing the Internet	0.5975	1.890	2.272	2.390	3.283	4.359	1.611	2.104
	Listening to music	1.529	2.051	1.262	2.194	1.394	1.438	1.329	0.715
	Reading electronic device	21.079	-	-	10.45	21.209	18.581	-	-
	Watching videos	-	-	-	-	14.768	18.875	-	-
Worthwhileness values	Enjoyment	0.250	−0.242	0.979	0.429	0.424	0.810	−0.262	−0.078
	Productivity (paid work)	0.609	0.581	0.658	1.275	0.389	-	0.007	0.176
	Productivity (personal tasks)	0.686	0.173	0.746	0.637	0.597	0.174	0.202	0.113
	Fitness	−2.829	−3.108	−3.886	−4.404	−3.066	−2.107	−0.675	−0.431
Mood	Mood rating	0.180	−0.293	0.199	−0.054	−0.036	−0.242	0.170	−0.038
Worthwhileness Experience factors	Worthwhileness rating	−0.159	0.231	−0.562	−0.155	−0.118	0.156	0.169	0.048
	Simplicity/difficulty of the route	−0.086	−0.009	0.145	0.144	0.294	0.225	−0.0134	−0.0132
	Reliability of travel time	0.412	0.342	0.235	0.415	1.387	0.897	0.456	−0.206
	Air quality	-	-	-	-	0.532	0.220	0.224	0.114
	Scenery	0.629	0.002	0.513	0.104	0.776	0.120	0.470	0.194
	Parking at end points	1.176	0.801	0.719	0.437	-	-	-	-
	Ability to do what I wanted	1.586	0.571	1.345	0.492	1.492	0.540	0.948	0.380
	Vehicle quality	32.872	18.499	27.672	12.085	-	-	-	-
	Seat comfort	19.380	19.049	21.745	15.441	-	-	-	-
	Privacy	18.940	18.503	16.531	15.838	48.892	23.200	-	-

Table 2. *Cont.*

	Variable	Private Motorized Driver		Private Motorized Passenger		Public Transport		Walking	
		Female	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
Worthwhileness Experience factors	Security and safety	19.902	18.388	18.320	12.11	25.883	21.604	-	-
	Ability to take kids or pets along	1.586	0.778	1.197	−0.031	1.469	0.227	0.541	−0.021
	Traffic congestion/delays	21.512	19.169	36.333	12.566	-	-	-	-
	Other passengers/people	-	-	-	-	1.294	0.634	0.751	0.350
	Road quality	-	-	-	-	26.891	19.187	-	-
	Crowdedness/seating	-	-	-	-	25.436	20.031	-	-
	Seating quality/personal space	-	-	-	-	25.523	19.945	-	-
	Payment and tickets	-	-	-	-	27.181	20.172	-	-
	Convenient access	-	-	-	-	1.024	0.112	-	0.291
	Cars/other vehicles	-	-	-	-	-	-	−0.350	−0.429
	Road path availability and safety	-	-	-	-	-	-	0.010	−0.206
	Road path quality	-	-	-	-	-	-	−0.136	−0.196
	Road path directness	-	-	-	-	-	-	−0.216	−0.036

Significant at 95% (p-value ≤ 0.05). Reference category is cycling and emerging mobility. Only values corresponding to statistically significant predictors are shown.

- Private motorized driver

In terms of traveler characteristics, the results allude that the older females and males are more interested in using this transport category than in cycling and using micro-mobility modes of transport (Table 2). Interestingly, in the case of urban size, the bigger city female dwellers are more likely interested in traveling as car drivers, on the contrary, male dwellers are less interested.

The models' results also show that all trip purposes at the destination significantly impact the choice of this transport category (Figure 10). Females are less likely to travel by car as a driver than traveling by bicycle or micro-mobility systems for all these trip purposes. It also applies to males, except for the reason to pick up or drop off someone. In that case, they prefer to drive a car. A significantly positive impact on choosing this travel category in comparison to cycling and emerging micro-mobility by females and males was also identified for trip characteristics such as trip frequency, a day of the week and time of day. It is evident from the results that women would rather choose private motorized vehicles as a driver during weekends instead of bicycles or micro-mobility compared to men. Moreover, results also demonstrate that traveling during off-peak hours and late evening most likely increases the probability of using private motorized vehicles as a driver by women with access to a private car more than by men.

According to the estimated results, a significant influence of travel activities on the choice of private motorized transport mode as a driver was also ascertained. During travel, males who are willing to browse the Internet or listen to music are more likely to choose this travel category rather than those traveling by bicycle and micro-mobility devices. In the case of females, listening to music and reading electronic devices would also increase the propensity of using a car as a driver. Several experience factors also have a positive effect on the choice of this transport category. Vehicle quality, seat comfort, privacy, security, and safety are among those with the biggest impact. It means that males and females who consider these experience factors either as positive or negative factors influencing their travel experience are more likely to use a car as a driver than a bicycle or emerging mobility services.

The results also indicate that females with better mood resulting from the trips are more likely to choose travel by car as a driver rather than a bicycle. On the contrary, males with better mood are more interested in cycling than driving a car. The exact opposite applies to the worthwhileness of their travel time. The more men consider their travel time to be worthwhile, the more likely they are to travel by car as a driver than by a bicycle, and vice versa, the more women consider their travel time to be more worthwhile, less likely they will choose this category than cycling. In terms of the type of perceived value of travel time, the results show that females and males who tend to rate their trips as productive, whether in terms of personal tasks or paid work are more likely to choose traveling by car as a driver than traveling by bicycle and micro-mobility devices. As expected, people who consider their trips as fitness trips (being able to do exercise) are more likely to choose cycling than driving a car. In case of enjoyment as a gained subjective value, results, surprisingly, indicate that women are more likely perceive enjoyment as a positive influencing value for travel time worthwhileness when using a car as a driver than a bicycle, which is in contrast to male travelers' perception of value of travel time.

In terms of weather, the significant impact on choosing this transport category was identified for both, men and women. The females and males would be more likely to choose this means of traveling rather than cycling and emerging micro-mobility in windy, rainy and cold weather. On the contrary, they would less likely select this transport mode in neutral and cloudy weather over the use of bicycle or micro-mobility services. Interestingly, the results also indicate that females would be much more interested in this transport mode in rainy weather rather than males.

- Private motorized passenger

According to the estimated results, age was identified as a negative factor influencing the choice of this transport category for both women and men. It means younger people are more interested to use a different type of private and shared motorized transport system as a passenger rather than bicycle or micro-mobility services. In addition, the urban size was also identified as a significant factor with an impact on female traveler choice of this transport mode. The results indicate that women residing in smaller urban areas are less interested in using private motorized vehicles as passengers compared with cycling and other micro-mobility services.

Regarding trip characteristics, all trip purposes have significant negative impact on choosing this transport category compared to cycling and micro-mobility services, which can also be interpreted as the low tendency of both male and female travelers for ride sharing. Trip duration and trip frequency positively influence choosing traveling as a passenger of private motorized vehicle. For instance, women who make the reported trip more often are most likely to be interested to choose being a car passenger over riding bicycle or micro-mobility systems. For females, it was also found that travel time flexibility negatively affects choosing this transport category which means women with time constraint for arriving at the destination would most probably choose less private motorized vehicles as a passenger compared to bicycle and micro-mobility services for their daily trips. The results further confirmed that men and women who prefer to browse the Internet while traveling or listening to music are willing to travel by car rather than bicycle. The positive impact on choosing this travel category was also identified for activity reading an electronic device. Men who read during their trips are more willing to travel by car as a passenger. Concerning experience factors, the biggest positive significant impact was identified in the case of females for traffic congestion, vehicle quality, and then seat comfort, security, safety, and privacy. Interest in traveling by car as a passenger with respect to cycling is higher for males who consider seat comfort and privacy as important factors for their travel mode choice.

Worthwhileness rating and perceived mood were identified as significant factors for both genders. The results indicate that females whose feelings derived from travel experience were better, (i.e., emotionally happier) are more likely to choose traveling by car as a passenger than cycling, but on the contrary, men are less interested. In the case of evaluation of travel time worthwhileness, a higher travel time worthwhileness rating negatively influence the tendency for choosing this transport category. In a comparative investigation, it can be argued that both female and male travelers with a higher perception of gained WTT values for productivity and enjoyment would most likely rather use private and shared motorized transport services rather than driving a car. According to the result, it can be also asserted that people with a higher positive fitness value assessment of travel time, would be less interested in choosing this category.

Concerning the weather condition as an influencing determinant, it was found that neutral and cloudy weather conditions have a significant negative impact on choosing this travel category for both females and males. Cold weather also negatively influences the interest of males in traveling by car or motorbike as passengers. On the contrary, windy weather has a significant positive impact on choosing this category.

- Public transport

As can be seen in Table A4, for both men and women increasing age will most probably degrade their willingness in choosing public transport rather than cycling and emerging micro-mobility systems. Therefore, it can be interpreted that being an old woman would decrease the likelihood of using public transport, which is in line with the findings from Tyrinopoulos and Antoniou [49]. In a similar vein, it also applies to the impact of the urban size in which respondents live there. For instance, both women and people living in metropolitan or medium-size urban areas would rather use less public transport in case of having a choice of using bicycle or micro-mobility systems. For the trip purposes, work-

related and business trips were identified as significant factors for both men's and women's choice of public transport. It means that females are more likely to choose public transport than cycling and emerging micro-mobility when traveling for work-related trips and when are on a business trip. Not surprisingly, results also indicate that women are more willing to use public transport for daily shopping than men. In view of other trip characteristics, it was found that increasing trip duration negatively influences females' interest in public transport and positively males' tendency. Travel time flexibility, trip frequency, day of the week, and time of the day were also realized to be significant influencing factors for females for choosing public transport instead of cycling positively. For males, travel time flexibility and trip frequency also positively impact choosing public transport, while the occurrence of trips during weekends could negatively influence their choice of public transport.

According to estimated results, all travel activities for both men and women were identified as positively significant for a public transport mode choice. Based on the model's results, it can be seen that even in the case of experience factors, it is not possible to observe large differences between men and women. However, more significant factors have been identified for women, but those with the highest coefficients are the same as for men: privacy, security and safety, road quality, crowdedness/seating availability, seating quality, and payment and tickets. All these determinants positively influence travelers' tendency for using public transport rather than cycling.

Model results also point out that the more positive the men feel about the trip, the less interested they would be in traveling by public transport. On the contrary, with increasing travel time worthwhileness assessment, the likelihood of using public transport would raise among male travelers. In the case of women, those who have a higher perception of usefulness (i.e., worthwhileness) of their travel time, and happier feelings about their trip, in general, would be less interested in traveling by public transport. While in the case of men, those who perceived higher WTT would be more willing to use public transport for their daily trips.

Regarding the influence of weather conditions, both females and males would most probably choose public transport instead of cycling and emerging micro-mobility in windy weather and females in cold and neutral weather conditions. On the contrary, a lack of interest in public transport arises in the case of cloudy weather for both female and male travelers.

- Walking as an active mode

The model results for walking as an active mode demonstrate that with the increasing age of men, their interest in this category also increases compared to cycling in smaller urban areas, and this is also the case in urban sizes. Conversely, in the larger urban areas (metropolitan and medium-sized cities), women would be more interested in traveling on foot.

In regard to the effect of trip characteristics impacting people's decision on choosing walking, all variables were identified as significant. Furthermore, results also reflect that people would choose cycling instead of walking for all trip purposes.

A negative impact on this category in both genders was also found in the case of trip duration, travel time flexibility, and time of day. The difference between men and women was only in the case of the day of the week when women would choose walking more likely than cycling during weekends, while men conversely would rather use bicycle or micro-mobility means of transport during weekends.

The results show that women and men who consider their travel time more worthwhile are more interested in walking than cycling. In a similar vein, it also applies to the perceived mood in the case of women. It can also be seen that people who prefer to enjoy their travel time or be able to do exercise would more likely use cycling than walking. In terms of conducting activities during travel, results elucidate that people who listen to music or browse the Internet would prefer to travel on foot rather than by bicycle. The identified significant experience factors partly differ between men and women. In the case of women that negatively affects their interest in walking, such as the difficulty of the route, other

cars and vehicles, road path quality, and road path directness. Conversely, air quality, scenery, ability to do what is wanted, ability to take kids, reliability of travel time, road path availability and safety, and other people all affect the decision to walk instead of use bicycle and micro-mobility systems.

Regarding the influence of weather on walking as a travel mode, model findings indicate that the weather conditions negatively affect the choice of this mode for both genders in neutral and cloudy weather while for windy or rainy weather conditions, people would prefer to walk instead of using bicycles or micro-mobility services. The only significant difference between males and females was found for the case of cold weather in which females choose to walk rather than cycle in contrast with males' tendency for choosing bicycle or micro-mobility systems.

4. Conclusions

Transport and mobility are areas that have an enormous impact on women, users of different cultural backgrounds, and vulnerable groups. Studies have shown how men's and women's travel patterns differ and how different access to transport is a major contributor to gender inequality. Gender differences in mobility have been proven also for their involvement in transport research and in the provision of transport services. At both European and national levels, there are still serious gaps when it comes to recognition and inclusion of gender aspects in transport strategies, for inclusive mobility.

The value proposition of a travel option plays a significant role in the traveler's choice, which is not only based on the purpose of the travel, (e.g., commuting, accompanying children to school, getting merchandise or leisure traveling) and the time needed. As such, knowledge of the role that the soft factors have, (e.g., curiosity, comfort, safety and security, costs and travel-based multitasking) are valuable metrics in assessment of travelers' perceived value of time embedded in individual mobility choices. The value proposition of mobility implies a range of expectations associated to mobility behavior, which are tightly connected to motivational factors and individuals' prior travel experience.

This research finding corroborates that transport system attributes and quality of service and the way women and men experience and perceive their travel time play an essential role in decisions on travel and mobility choices for daily trips. Looking closer to perceived values of travel time worthwhileness also indicates the productivity in terms of being able to do personal task when onboard followed by enjoyment are most positive gained values for the public transport riders. The findings also reveal that younger women's willingness to use their travel time as activity time for conducting personal tasks and e-reading are much larger than men's who are interested to enjoy their travel time for non-productive tasks such as watching videos on ICT devices, which are similar to [50] findings.

This is also confirmed by part of estimated results: the vehicle ride smoothness, crowdedness, seating availability, personal space, safety and security and the privacy are substantial factors with influence on female traveler's choice of public transport systems. This implies an increasing use of transport as the most sustainable and adequate mode of transportation and boosting more the social equity. In addition to the most cited conventional travel time reliability and convenient access measures, making the vehicles environment more appealing for women and ensuring as much as privacy and safety and security by the public transport authorities remain important.

In regard to core values of users' perception of travel time worthwhileness, this research yields interesting results that the perception of enjoyable travel time would increase the tendency of ridesharing and using private motorized vehicles among women that is consistent with [51] findings. Furthermore, it appeared that women have more likely a greater sense of wasted travel time using private motorized vehicle as a driver and shared-ride and public transport passengers compared to male travelers, which support the recent study of Singleton [52]. The analysis also elucidates that for work-related and business trips, women are more likely to choose public transport than cycling and emerging

micro-mobility. Not surprisingly, results also indicate that women are more willing to use public transport for daily shopping than men.

The results also show that the increasing trip duration would decrease most probably women's choice of private motorized vehicles either as drivers or passenger and public transport riders due to lower self-evaluation of worthwhileness travel time in terms of subjective perception of usefulness.

The estimated results allude that young female commuters with personal travel time budget (TTB) constraint for arriving in their destination may use public transport and drive while older women who have less travel time flexibility would rather use private motorized vehicles as a driver for non-regular, (i.e., non-routine) trips. In addition, the findings also suggest that women most likely would choose public transport for trips during late evening which might perceive a lower perception of worthwhileness of travel time with increasing trip duration compared to the male travelers. Furthermore, the model results indicate that the rainy weather condition comparatively will highly influence the propensity of women for using private motorized vehicles as a driver.

Hence, the built environment and low density of residential area could affect people's travel behavior and specially travel mode choice, consequently causing more car dependency. However, this research illustrates that women who live in metropolitan urban areas are less interested to use public transport compared to men, perhaps due to the quality of public transport services and travelers experience. These are quite insightful observations for the EU green and healthy vision for reaching climate neutrality by 2030.

Similar to other studies, these research findings have to be seen in light of some limitations. Due to being optional for the Woorti users to report their occupation, marital status and household size, most of the users have not provided such information in the time of app registration. Therefore, this socio-demographic information has not been considered in the modeling of this study. Regarding the age, the overall sample is skewed towards the 25–49-year-old population. This was largely explained by the design of the Woorti app which tended to be more appealing to these groups.

Overall, the study results make the case that from a travelers' perspective, the experience of travel time in association with ICT-related multitasking behavior does matter and can play a pivotal role in transport planning. They bring important insights for conventional transport planning and assessment tools that are currently based on a more simplified set of variables such as travel costs and time savings in trips made by some specific transport modes. Incorporating both women's and men's well-being perspectives and travel experiences in current urban mobility planning cycles can also support the identification of gaps and requirements for future transport models.

From the policy perspective, it is of note that the findings of this research have implications for a broad range of applicants such as urban and transport planners, policymakers, and authorities and help them implement more human-centric, (e.g., gender-sensitive) designs of urban mobility services as well as prepare inclusive and equitable transport policies of future mobility services and transport infrastructure, (e.g., mobility as a service, automated on-demand shared solutions). As it was evident from the results that privacy, security and safety, and fare payment challenges are the most important concerns of women for choosing public transport and shared mobility services; this all also corroborates the previous research findings [53]. This means that besides the seamless payment methods, particular attention should be given to improving the feeling of safety and security among women as the crucial factors to enhance the understanding of transport-related values perception and mobility needs and wishes of different social groups of women with the shared mobility services and future automated transport solutions.

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Data Availability Statement: The datasets generated by the MoTiV project and analysed during the current study are available on the project website (https://motivproject.eu/project-results/deliverables.html accessed on 7 August 2022) and the EU open access repository (https://doi.org/10.5281/zenodo.4027465 accessed on 7 August 2022) and interested research communities can use it for the further studies of value of travel time.

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Abbreviations

API	Application programming interface
ICT	Information and communication technology
TTB	Travel time budget
MNL	Multinomial logistic regression model
MoTiV	Mobility and time value
ML	Maximum likelihood
VPM	Value proposition of mobility
VTT	Value of travel time
WTT	Worthwhileness of travel time

Appendix A

Table A1. Socio-demographic characteristics of sample.

	Female	Male		Female	Male
	%	%		%	%
Gender	49.0	51.0	**Country of Residence**		
Age			Belgium	7.73	13.83
16–24	19.93	21.01	Finland	20.53	4.94
25–49	63.14	59.31	France	5.07	4.69
50–64	14.91	16.12	Italy	1.87	3.95
65+	2.02	3.56	Norway	13.03	15.56
Urban size			Portugal	15.20	13.33
Metropolitan	51.49	47.98	Slovakia	18.93	21.73
Medium	22.55	25.94	Spain	17.60	21.98
Small	25.96	22.48			

Table A2. Trip legs characteristics based on transport category.

Sample Size	Private Motorized Driver		Private Motorized Passenger		Public Transport		Cycling and Micro-Mobility		Walking	
	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male
Trip Duration (%)										
<20 min	51.64%	43.15%	47.50%	48.77%	24.01%	22.00%	43.82%	40.74%	52.00%	53.08%
20–40 min	29.77%	34.48%	32.71%	30.42%	39.34%	35.03%	33.89%	32.31%	24.47%	24.96%
40–60 min	10.28%	13.42%	10.16%	11.21%	20.44%	24.09%	13.35%	14.48%	11.78%	10.64%
>60 min	8.31%	8.95%	9.63%	9.61%	16.21%	18.89%	8.94%	12.47%	11.74%	11.33%
Travel Time Constraint (flexibility) (%)										
Yes	49.29%	42.44%	28.61%	38.55%	49.87%	52.22%	48.19%	44.31%	37.40%	35.26%
No	50.71%	57.56%	71.39%	61.45%	50.13%	47.78%	51.81%	55.69%	62.60%	64.74%
Trip frequency (%)										
First time	10.01%	13.68%	19.34%	25.49%	12.38%	10.74%	6.02%	7.84%	12.48%	14.08%
Occasionally	43.82%	47.99%	52.58%	49.01%	31.89%	32.51%	29.19%	30.46%	45.15%	45.74%
Regularly	46.17%	38.33%	28.07%	25.49%	55.73%	56.75%	64.79%	61.69%	42.38%	40.18%
Day of week (%)										
Working day	79.12%	74.11%	60.78%	66.01%	86.92%	87.88%	84.91%	84.18%	79.84%	78.00%
Weekend	20.88%	25.89%	39.22%	33.99%	13.08%	12.12%	15.09%	15.82%	20.16%	22.00%
Time of day (%)										
Morning peak (06:30–09:00)	13.68%	14.22%	12.57%	9.98%	15.51%	20.23%	16.24%	16.10%	13.75%	13.13%
Morning off-peak (09:00–15:30)	40.89%	37.98%	43.14%	43.84%	36.96%	35.73%	39.02%	38.05%	48.64%	48.49%
Evening peak (15:30–18:00)	20.91%	19.37%	17.47%	16.87%	18.41%	17.32%	18.08%	19.39%	16.79%	16.04%
Evening off-peak (18:00–22:00)	13.43%	16.72%	17.29%	16.75%	10.57%	9.68%	9.50%	9.00%	11.52%	13.39%
Night (22:00–06:30)	11.09%	11.71%	9.54%	12.56%	18.55%	17.04%	17.16%	17.46%	9.31%	8.95%

Table A2. *Cont.*

Sample Size	Private Motorized Driver		Private Motorized Passenger		Public Transport		Cycling and Micro-Mobility		Walking	
	Female	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
Trip Purpose (%)										
Work/School	22.21%	23.66%	15.24%	19.46%	38.15%	42.66%	35.14%	36.98%	26.07%	26.91%
Home	20.66%	20.38%	19.16%	19.21%	27.27%	27.19%	27.32%	28.29%	14.71%	14.08%
Everyday shopping	8.46%	8.50%	7.22%	3.94%	3.08%	1.81%	5.88%	4.87%	7.96%	8.13%
Leisure/hobby	15.72%	14.39%	25.94%	25.00%	14.71%	8.34%	14.83%	11.33%	23.63%	19.41%
Personal tasks	14.95%	14.13%	18.00%	15.76%	9.91%	11.10%	7.86%	10.56%	13.66%	16.14%
Pick up/drop off	8.77%	10.94%	3.39%	3.33%	1.32%	1.50%	3.02%	2.79%	2.78%	3.03%
Business trip	3.71%	2.79%	3.74%	7.64%	2.51%	3.27%	2.63%	1.38%	2.08%	2.45%

Table A3. Statistical description of transport systems attributes for the observed trip legs.

Sample Size	Private Motorized Driver		Private Motorized Passenger		Public Transport		Cycling and Micro-Mobility		Walking	
	Female	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
Travel Activities (%)										
Browsing the Internet	1.66%	1.50%	5.76%	5.95%	23.47%	20.85%	0.61%	0.27%	1.86%	1.57%
Listening to music	20.43%	18.08%	12.99%	12.86%	15.15%	13.60%	4.30%	3.88%	6.66%	6.74%
Reading electronic device	0.14%	0.03%	1.74%	3.32%	9.17%	9.11%	0.00%	0.00%	0.00%	0.00%
Watching videos	0.00%	0.00%	0.54%	0.69%	4.13%	4.17%	0.00%	0.00%	0.00%	0.00%
Worthwhileness values (%)										
Enjoyment										
None	56.40%	55.97%	40.82%	44.14%	48.63%	46.37%	35.84%	33.08%	45.80%	46.40%
Some	24.75%	27.49%	28.91%	32.06%	33.87%	33.50%	33.74%	39.25%	31.06%	31.71%
High	18.84%	16.54%	30.27%	23.80%	17.51%	20.13%	30.42%	27.67%	23.15%	21.89%

Table A3. *Cont.*

Sample Size	Private Motorized Driver		Private Motorized Passenger		Public Transport		Cycling and Micro-Mobility		Walking	
	Female	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
Productivity (Paid work)										
None	88.13%	86.07%	89.06%	84.67%	89.19%	89.52%	89.70%	89.44%	90.13%	88.87%
Some	5.21%	5.22%	5.34%	6.56%	5.35%	5.28%	3.33%	5.17%	4.78%	5.03%
High	6.66%	8.71%	5.60%	8.77%	5.46%	5.20%	6.97%	5.39%	5.09%	6.09%
Productivity (Personal Tasks)										
None	53.56%	52.37%	49.93%	48.42%	57.17%	56.07%	72.57%	72.06%	60.62%	60.02%
Some	17.76%	23.12%	23.70%	24.83%	26.53%	25.74%	13.52%	15.02%	20.56%	20.96%
High	28.68%	24.51%	26.37%	26.75%	16.30%	18.20%	13.91%	12.92%	18.81%	19.01%
Fitness										
None	17.40%	88.33%	86.73%	85.63%	87.50%	80.38%	17.40%	27.34%	54.29%	58.72%
Some	39.01%	6.91%	4.70%	8.77%	5.01%	11.42%	39.01%	36.40%	22.61%	24.87%
High	43.59%	4.76%	8.57%	5.60%	7.49%	8.20%	43.59%	36.25%	23.11%	16.41%
Perceived WTT										
1 = wasted	7.41%	9.67%	4.52%	4.37%	7.14%	7.91%	1.73%	2.50%	2.77%	3.07%
2	11.67%	12.89%	8.57%	8.65%	12.94%	9.99%	5.57%	5.97%	5.46%	6.29%
3	24.89%	27.34%	21.90%	27.63%	26.80%	26.43%	23.50%	21.47%	20.68%	24.93%
4	19.31%	24.95%	22.14%	25.76%	26.46%	26.46%	26.39%	28.35%	25.65%	25.79%
5 = worthwhile	36.71%	25.15%	42.87%	33.60%	26.65%	29.21%	42.82%	41.72%	45.43%	39.92%
Mood										
1 = lousy	4.17%	3.85%	2.97%	2.24%	3.50%	5.57%	1.40%	1.98%	2.17%	2.54%
2	8.26%	10.88%	5.07%	5.36%	9.06%	6.97%	4.35%	4.02%	6.11%	6.46%
3	23.95%	28.58%	20.69%	25.24%	28.91%	29.87%	21.22%	22.69%	22.69%	26.10%
4	23.57%	26.78%	25.25%	29.14%	29.35%	27.49%	29.81%	30.72%	27.51%	27.88%
5 = great	40.05%	30.23%	46.02%	38.01%	29.18%	30.10%	43.22%	40.60%	41.53%	37.01%

Table A3. *Cont.*

Sample Size	Private Motorized Driver		Private Motorized Passenger		Public Transport		Cycling and Micro-Mobility		Walking	
	Female	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
Experience factor										
Simplicity/difficulty of the route	0.00%	0.51%	0.09%	0.37%	0.09%	0.22%	0.09%	0.24%	0.23%	0.27%
Reliability of travel time	1.06%	1.31%	1.59%	2.25%	9.51%	6.98%	0.80%	0.65%	0.25%	0.60%
Air quality	0.00%	0.02%	0.00%	0.25%	0.22%	0.04%	0.04%	0.30%	0.22%	0.42%
Scenery	0.19%	0.37%	0.47%	0.25%	0.49%	0.22%	0.18%	0.82%	0.43%	0.99%
Parking at end points	1.47%	4.34%	1.96%	2.62%	0.00%	0.00%	0.14%	0.91%	0.00%	0.00%
Ability to do what I wanted	9.48%	14.82%	10.37%	11.74%	9.73%	11.94%	3.26%	4.01%	13.97%	14.14%
Vehicle quality	0.94%	2.10%	1.40%	2.62%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Seat comfort	0.19%	0.26%	0.93%	0.62%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Privacy	0.72%	0.73%	0.93%	0.62%	0.13%	0.13%	0.00%	0.00%	0.00%	0.00%
Security and safety	0.49%	2.53%	2.34%	2.5%	0.98%	1.10%	0.00%	0.00%	0.00%	0.00%
Ability to take Kids or pets along	0.42%	0.65%	0.56%	0.25%	0.13%	0.04%	0.29%	0.13%	0.20%	0.19%
Traffic congestion/delays	4.84%	6.77%	5.98%	6.62%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Other passengers/people	0.00%	0.00%	0.00%	0.00%	0.62%	0.97%	0.07%	0.30%	0.73%	1.06%
(Road quality) vehicle ride smoothness	0.00%	0.00%	0.00%	0.00%	7.42%	7.62%	0.00%	0.00%	0.00%	0.00%
Crowdedness/seating	0.00%	0.00%	0.00%	0.00%	9.45%	8.64%	0.00%	0.00%	0.00%	0.00%
Seating quality/personal space	0.00%	0.00%	0.00%	0.00%	7.60%	7.90%	0.00%	0.00%	0.00%	0.00%
Payment and tickets	0.00%	0.00%	0.00%	0.00%	6.30%	6.60%	0.00%	0.00%	0.00%	0.00%
Convenient access	0.00%	0.00%	0.00%	0.00%	4.48%	3.81%	3.28%	3.42%	4.49%	5.49%
Cars/other vehicles	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.04%	0.30%	0.08%	0.16%
Road path availability and safety	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	5.18%	12.40%	4.49%	4.47%
Road path quality	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.65%	1.38%	1.27%	1.27%
Road path directness	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.22%	0.52%	0.57%	0.79%

Table A4. Multinomial mode choice model estimation in the participant countries.

		Private Motorized Driver		Private Motorized Passenger		Public Transport		Walking	
		Female	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
Socio-demographic characteristics									
Age		0.406	0.677	−0.477	−0.702	−0.931	−0.351	−0.030	0.177
Urban size		0.173	−0.321	0.027	−0.972	−0.137	−0.553	0.144	−0.258
Weather condition									
	Neutral	−0.772	−1.248	−0.483	−0.667	0.074	−1.549	−0.222	−0.269
	Windy	2.744	3.575	3.365	4.286	1.945	3.306	1.771	2.538
	Rainy	11.137	1.186	-	1.344	-	-	11.83	1.123
	Cloudy	−1.238	−1.493	−0.945	−2.089	−1.524	−2.222	−0.870	−1.079
	Cold	0.387	0.356	0.287	−0.632	0.229	−1.186	0.399	−0.408
Trip characteristics									
Trip Purpose	Work	−1.885	−0.837	−2.196	−1.425	0.134	0.276	−1.252	−1.563
	Home	−1.568	−0.405	−2.325	−0.898	−0.213	0.199	−1.739	−1.867
	Everyday shopping	−1.702	−0.981	−2.750	−4.247	0.263	−0.549	−1.05	−1.334
	Leisure/hobby	−1.382	−0.029	−1.770	−0.291	−0.423	0.142	−0.874	−0.446
	Personal tasks	−1.342	−0.338	−1.820	−1.694	−0.541	−0.075	−1.088	−1.256
	Pick Up/Drop off	−0.880	0.551	−1.451	−1.773	−0.107	−0.479	−1.10	−1.429
	Business trip	−0.152	−0.237	−1.287	−1.591	0.918	0.389	−0.964	−1.170
Trip duration		−0.034	−0.003	0.011	0.025	−0.009	0.016	−0.044	−0.031
Travel Time Constraint (flexibility)		0.023	−0.182	−0.647	0.163	0.218	0.580	−0.564	−0.238
Trip frequency		0.260	0.266	0.863	0.906	0.441	0.214	0.558	0.297
Day of week		0.998	0.196	0.830	−0.156	0.468	−0.488	0.380	−0.530
Time of day		0.131	0.073	−0.004	−0.039	0.096	−0.037	−0.093	−0.149

Table A4. *Cont.*

		Private Motorized Driver		Private Motorized Passenger		Public Transport		Walking	
		Female	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
Travel attributes									
Travel activities	Browsing the Internet	0.5975	1.890	2.272	2.390	3.283	4.359	1.611	2.104
	Listening to music	1.529	2.051	1.262	2.194	1.394	1.438	1.329	0.715
	Reading electronic device	21.079	-	-	10.45	21.209	18.581	-	-
	Watching videos	-	-	-	-	14.768	18.875	-	-
Worthwhileness values	Enjoyment	0.250	−0.242	0.979	0.429	0.424	0.810	−0.262	−0.078
	Productivity (paid work)	0.609	0.581	0.658	1.275	0.389	-	0.007	0.176
	Productivity (personal tasks)	0.686	0.173	0.746	0.637	0.597	0.174	0.202	0.113
	Fitness	−2.829	−3.108	−3.886	−4.404	−3.066	−2.107	−0.675	−0.431
Mood	Mood rating	0.180	−0.293	0.199	−0.054	−0.036	−0.242	0.170	−0.038
Worthwhileness	Worthwhileness rating	−0.159	0.231	−0.562	−0.155	−0.118	0.156	0.169	0.048
Experience factors	Simplicity/difficulty of the route	−0.086	−0.009	0.145	0.144	0.294	0.225	−0.0134	−0.0132
	Reliability of travel time	0.412	0.342	0.235	0.415	1.387	0.897	0.456	−0.206
	Air quality	-	-	-	-	0.532	0.220	0.224	0.114
	Scenery	0.629	0.002	0.513	0.104	0.776	0.120	0.470	0.194
	Parking at end points	1.176	0.801	0.719	0.437	-	-	-	-
	Ability to do what I wanted	1.586	0.571	1.345	0.492	1.492	0.540	0.948	0.380
	Vehicle quality	32.872	18.499	27.672	12.085	-	-	-	-
	Seat comfort	19.380	19.049	21.745	15.441	-	-	-	-
	Privacy	18.940	18.503	16.531	15.838	48.892	23.200	-	-
	Security and safety	19.902	18.388	18.320	12.11	25.883	21.604	-	-
	Ability to take Kids or pets along	1.586	0.778	1.197	−0.031	1.469	0.227	0.541	−0.021
	Traffic congestion/delays	21.512	19.169	36.333	12.566	-	-	-	-

Table A4. *Cont.*

		Private Motorized Driver		Private Motorized Passenger		Public Transport		Walking	
		Female	**Male**	**Female**	**Male**	**Female**	**Male**	**Female**	**Male**
Travel attributes									
Experience factors	Other passengers/people	-	-	-	-	1.294	0.634	0.751	0.350
	(Road quality) vehicle ride smoothness	-	-	-	-	26.891	19.187	-	-
	Crowdedness/seating	-	-	-	-	25.436	20.031	-	-
	Seating quality/personal space	-	-	-	-	25.523	19.945	-	-
	Payment and tickets	-	-	-	-	27.181	20.172	-	-
	Convenient access	-	-	-	-	1.024	0.112	-	0.291
	Cars/other vehicles	-	-	-	-	-	-	−0.350	−0.429
	Road path availability and safety	-	-	-	-	-	-	0.010	−0.206
	Road path quality	-	-	-	-	-	-	−0.136	−0.196
	Road path directness	-	-	-	-	-	-	−0.216	−0.036

Significant at 95% (p-value ≤ 0.05). Reference category is cycling and emerging mobility.

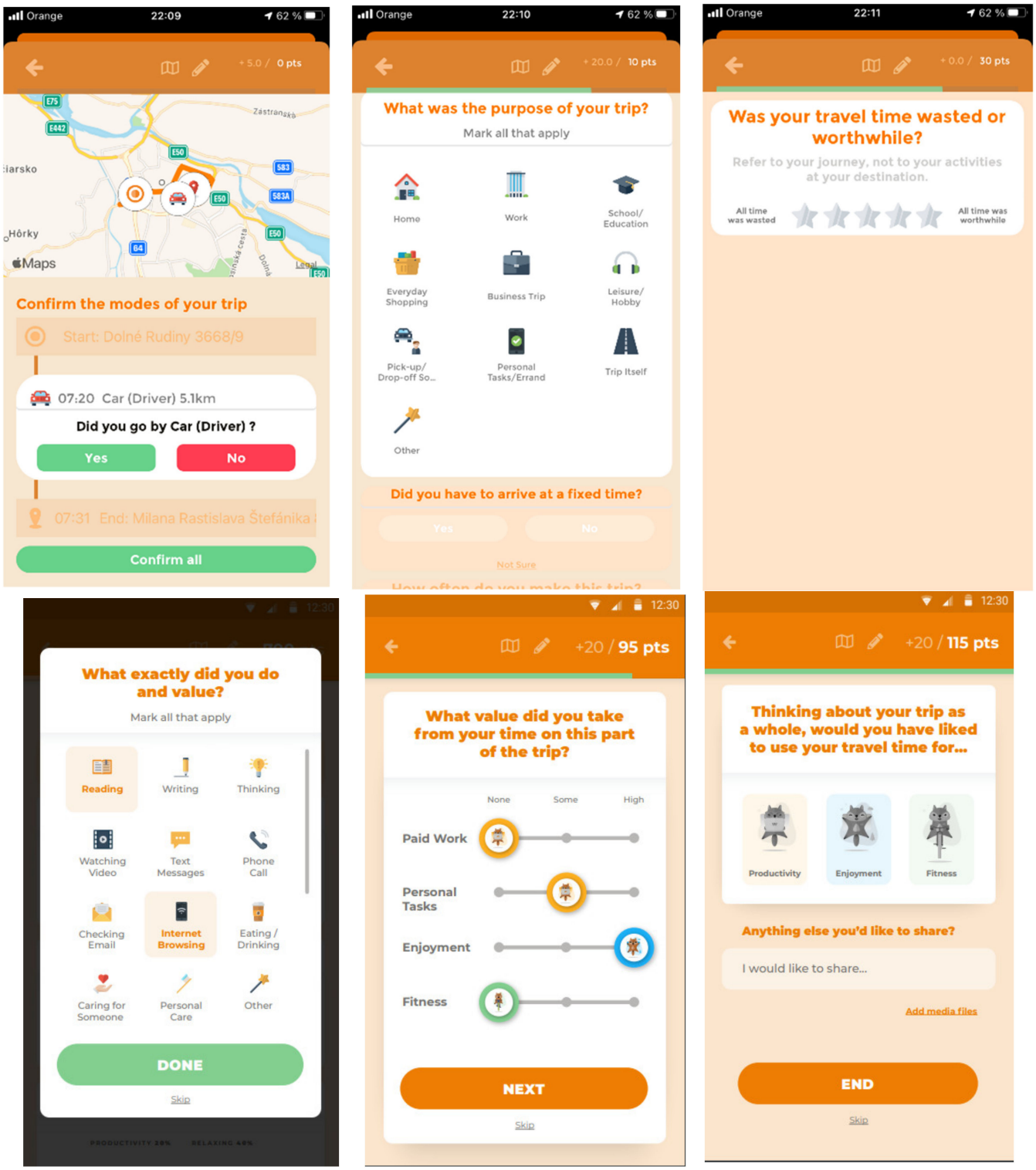

Figure A1. Screenshots from Woorti mobile application developed for the MoTiV data Collection.

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