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SMEP - Deliverable 1

Literature Study and Survey Results

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1. Summary

This study marks the first output of the SMEP project - Shared Mobility Equity Principles. In this project, Mpact, with financial support from the Belgian Federal Public Service for Transport and Mobility, examined gender inequalities in public transport and shared mobility.

We began by focusing on the extent to which public transport and shared mobility are used in Belgium and identifying gender differences. We found that these differences are most pronounced with newer forms of shared mobility, such as micromobility (e.g. scooter sharing). Secondly, we conducted a literature review to map the various barriers that women face when using shared forms of transport (or intending to use them). We focused on four topics: the existing service offer, digitalisation in mobility, harassment and (the feeling of) insecurity, as well as female employment in transport and mobility. Not only did we identify barriers, but we also provided examples of measures that can enhance the accessibility and convenience of public transport and shared mobility for women. Thirdly, we present the results from a survey among Belgian university and college students regarding their usage of public transport and shared mobility, the challenges they face, and the solutions they support to increase gender equity in shared mobility.

Key takeaways from this study include that (1) men use micromobility much more frequently than women; (2) the transport system as a whole has predominantly been designed from a male perspective, inadvertently neglecting specific female needs; (3) digitalisation can push more vulnerable users, mostly women, further towards transport poverty; (4) harassment remains one of the most important issues that women have to deal with when using public transport (and less so when using shared mobility); and (5) there is broad support among men and women for specific measures to increase women's safety while travelling, such as the 'nightstop' system. Also, both men and women broadly support the introduction of blind CV-screening to enhance female presence in the transport and mobility sector.

With this study, we aim to provide policymakers with a comprehensive overview of the various barriers that hinder women's access to public transport and shared mobility. Additionally, we aim to inspire by listing several solutions that can significantly enhance women's usage of specific transport modes, improve their travel experiences, and encourage their consideration of careers in the mobility sector.

The study's findings will be complemented by policy recommendations provided by students from various Belgian universities during a series of guest lectures as well as through an online Hackathon.

2. Introduction

A growing number of Europeans are relying on shared mobility as their principal mode of transport. More traditional solutions, such as public transport, as well as more recent services like carsharing, bike sharing, shared e-scooters, mopeds, and cargo bikes, are gaining popularity, especially in medium-sized and large cities. The uptake of shared mobility has many advantages. For instance, shared cars are usually less polluting than privately owned (mostly fossil-fueled) cars and allow for the creation of more green spaces due to the decline in required parking spots. Another example is the increasing number of micromobility services, which complement the existing public transport network and provide an alternative in underserved areas or at night. Increased shared mobility usage is a positive evolution, provided that everyone has equal access to this mode. As we demonstrate in this document, public transport is not well adapted to women's needs, and women do not always have equal access to new shared mobility solutions. Just one example of this is that women make less use of scooter sharing schemes than men (see further). Therefore, we argue that gender inequality is an underestimated but crucial challenge for the public transport and shared mobility system.

Since the 1960s and 1970s, the feminist movement has identified numerous inequalities between men and women regarding housekeeping, work-life balance, glass ceilings, wage gaps, and so on. Despite increased equality, especially in the West, inequalities persist. Recently, the International Monetary Fund has developed a gender strategy to increase economic opportunities for women worldwide. The focus on gender equity in mobility is, however, fairly recent: its origins can be traced back to the 1990s with the creation of the predecessor of Femmes en mouvement, les transports au féminin. This French association aims to increase the visibility of women in the transport sector and develop solutions that are adapted to women's needs. Similar organisations include (without being exhaustive) Women in Mobility or Women Mobilize Women.

There is a growing number of research projects related to gender inequality in transport as well. One example is the Horizon 2020 DIAMOND project, which identifies the needs of women as users of public transport, automated vehicles, bike sharing, as well as the needs of female professionals in mobility. This project resulted in numerous recommendations (Ari Thimnu et al., 2022). A second case is the TinnGO project, which resulted in the creation of a European Observatory for Gender Smart Transport that aims to become the reference portal for all issues related to gender and mobility in the EU (see Sansonetti & Davern, 2021: 12-14 for an overview of the EU initiatives related to gender equity in transport and mobility). Finally, it is worth referring to the EIT Empowering Women in Urban Mobility project, which, among other things, focuses on female entrepreneurship and decision-making in the field of urban mobility.

Despite the increasing attention to gender equity in mobility, there is a consensus in the literature that inequalities persist. Women tend to travel shorter distances than men, use public transportation more frequently, engage in more non-work travel outside of rush hours, make more multi-stop trips, often accompany other passengers (typically children or dependent elderly persons), and are more likely to transport goods such as groceries (Maffii et al., 2014; Department for Transport, 2022; DG MOVE, 2014; Transport for London, 2015:69; Ng & Acker, 2018).

This report comprises a literature review that identifies barriers and solutions related to gender inequality in transport, as well as a survey conducted among Belgian youngsters aged 18 to 34, primarily university students. Our focus will be on shared and sustainable mobility, encompassing public transport, carsharing, carpooling, and micromobility options like shared bikes, mopeds, and scooters. We will not delve extensively into equity issues linked to private car usage, even though we acknowledge that gender differences also exist

in this context. For instance, fewer women possess a driver's licence compared to men, a trend observed across various income categories in Brussels (Bruxelles Mobilité, 2023).

Through the literature study, survey, guest lectures, and Hackathon organised as part of the SMEP-project, our aim to:

- Inform (potential) users of shared mobility, policymakers, mobility professionals, and students about the barriers that women continue to encounter when using shared modes of transportation.
- Provide practical solutions and policy measures to make public transport, carpooling, carsharing, and micromobility more female-friendly.
- Cultivate in-house expertise concerning the relationship between shared mobility and gender, and communicate about this topic through our communication channels as well as the various advisory boards and projects in which Mpact is engaged.

Our report is structured as follows: We begin by describing the main sources and methodology used for this deliverable (Section 3). Subsequently, we provide background on the topics of 'gender' and 'mobility,' outlining the evolution of gender (in)equality, the extent of shared mode usage, and the presence of gender differences in using these modes (Section 4). In Section 5, we delve deeper into the barriers women face when using or considering shared and connected mobility. Additionally, we present an overview of potential solutions to address these issues. We focus on the service offer, digital barriers, insecurity and harassment, and, finally, careers in mobility and transport. Drawing insights from the literature study, we developed a survey distributed among young Belgians. The survey results are discussed in Section 6. Our report ends with interim conclusions.

Throughout this document, our focus lies on analysing the differences in shared mobility usage and the specific barriers encountered by women. We acknowledge that gender is not confined to a binary 'man' and 'woman.' Nonetheless, due to the predominant availability of studies and data on binary gender classifications, we have chosen a similar approach. To ensure inclusivity, our survey participants were provided options to identify as 'men,' 'women,' 'non-binary,' 'other,' or 'prefer not to say.' Additionally, we emphasise that for practical reasons, our exploration is restricted to data and studies sourced from European countries, with some attention given to North America.

3. Main sources and method

To familiarise ourselves with the topic, we conducted a desktop research phase during which we consulted a range of publications pertaining to gender and mobility. Certain reports and studies played pivotal roles, acting as foundational stepping stones for subsequent research or providing invaluable data and insights. For instance, 'Gender and Transport' by Duchène (2011) presented global perspectives, best practices, and recommendations on the subject. A foundational study, 'She moves' (2014), from the European Commission's Directorate-General for Mobility and Transport, primarily focused on gender disparities in car driving, safety, and employment. Several pertinent analyses centering on shared mobility originated from France. The 2020 report by Malandrino & Berman showcased outcomes from the TinnGO project, shedding light on gender disparities in shared mobility use in the Paris region while discussing women-specific barriers. Their data often drew from the 2016 FNAUT study (Fédération Nationale des Associations d'Usagers des Transports) on sexual harassment towards women in public transport (Débrincat et al.). The work of Badré & Daulny (2018) from the French Centre Hubertine Auclert explored women's roles in public spaces, dedicating a chapter to safety concerns faced by women in public transport. Alessandrin et al. (2016) delved into the issue of harassment against women on the public transport network in Bordeaux. The report by Maffii et al. (2014) within the context of the CIVITAS WIKI project brought together extensive data from across Europe, offering numerous examples of best practices and policy recommendations. Also worth mentioning is the 'Women and Transport' study by Sansonetti & Davern (2021), conducted under the auspices of the European Parliament's Policy Department for Citizens' Rights and Constitutional Affairs. A notable resource addressing the attraction of more women to the transport sector is the toolkit developed by Duxfield & Allen (2023) as part of the Sustainable Mobility for All project. Operators are also increasingly engaging with the issue of gender inequality, evident in VOI's study on shared e-scooters (2022).

The insights obtained during the literature review were utilised to create a survey concerning gender inequality in shared mobility. In this questionnaire, we focused on the barriers faced by (potential) users and asked them to evaluate several potential solutions. We gathered data from both women and men, as well as from users and non-users of shared modes. This approach allowed us to identify gender differences and make comparisons between the experiences of users and the perceptions of non-users. It's important to note that our survey is confined to a specific demographic: young individuals between 18-24 and 25-34, particularly students. This age categorization aligns with the age groups utilised in other studies focusing on shared mobility. For instance, similar age categories have been employed in studies by Bösehans et al. (2023), Bruxelles Mobilité & BRAT (2019), Horjus et al. (2022), Kawgan-Kagan (2015), and Shaheen et al. (2017). Focusing on young individuals and students is justified by the fact that students tend to be frequent users of shared modes (Jorritsma et al. 2015, Horjus et al. 2022). However, we should be careful when extrapolating our findings to the broader society. This caution is particularly important because shared mobility adoption rates are notably lower among older individuals, those with lower levels of education, and/or those with limited financial resources.

Lastly, we gathered insights in this topic via the discussions during the interactive guest lectures at the University of Hasselt, Vrije Universiteit Brussels and UCL Saint Louis Bruxelles. This has provided us with valuable qualitative data regarding how students utilise shared mobility and the barriers that deter them from using these modes. Additionally, we gained valuable insights through a meeting with Ride Your Future, a grassroots organisation located in Brussels that strives to promote cycling among women and children through enjoyable activities such as BXL Bike Pump, women's cycling groups, and (technical) training.

4 Gender and Mobility: the case of Belgium

To offer background information on the subject of gender equity in shared mobility, this paragraph provides a concise overview of gender (in)equality, shared mobility usage, and gender differences related to the utilisation of shared modes in Belgium.

4.1 Gender (in)equality

A tool for assessing gender inequalities and monitoring their evolution is the United Nations' 'Gender Inequality Index' (hereafter referred to as GII). This metric captures gender disparities across three domains: health (maternal mortality ratio and adolescent birth rate), empowerment (percentage of the female and male populations with at least secondary education, and the distribution of parliamentary seats between females and males), and the labour market (ratios of female and male labour force participation). The underlying principle of the GII mirrors that of the Gini Index: the lower the value, the greater the level of equality, and conversely.

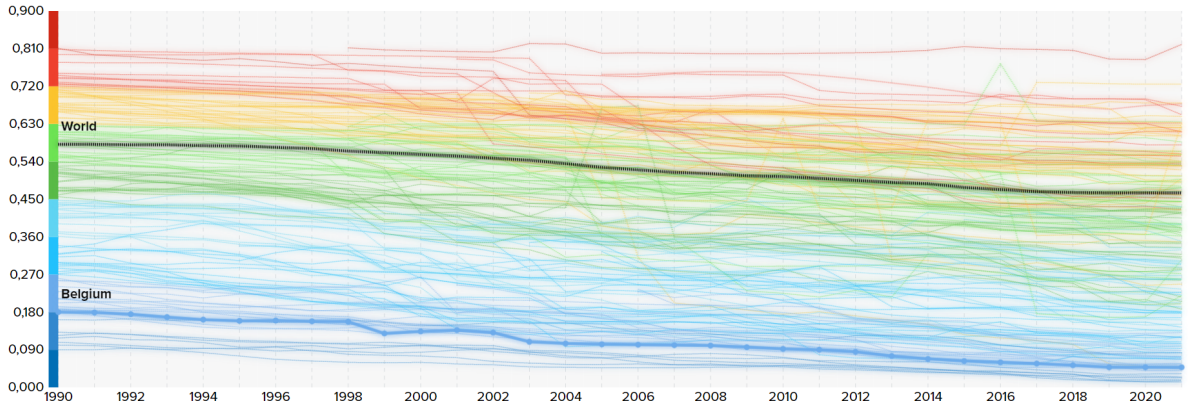

Figure 1: Evolution of the Gender Inequality Index in Belgium (UNDP).

From a global perspective, gender inequalities in Belgium were already quite minimal in 1990 (0.180) and have steadily decreased over time, reaching a GII of 0.048 in 2021. This positions Belgium as the 10th most gender-equal country worldwide, with Denmark (GII: 0.013) holding the top position in terms of gender equality. Some of our neighbouring countries have slightly better scores, with the Netherlands ranking 5th with a score of 0.025, Germany in 7th place with 0.073, and Luxembourg in 9th place with 0.044. In contrast, gender inequality is more pronounced in France (22nd place with 0.083) and the United Kingdom (25th place with 0.098).[1]

[1] The dataset can be downloaded here: https://hdr.undp.org/data-center/documentation-and-downloads.

	Male	Female	Source
30-34 year olds with higher education degree (2022)	45.6%	60.6%	EU2020 Indicatoren uit EAK (2000-2020)
Average wage before taxation (2020)	€ 3,837	€ 3,821	Gemiddelde bruto maandlonen 1999-2020 - tabblad 'LEEFTIJD'
Employment rate amongst 25-49 year old (2022)	85.9%	78.4%	Werkgelegenheidsgraad volgens geslacht en aantal kinderen
Risk at poverty or social exclusion (2022)	18.1%	19.4%	SILC-Indicatoren 2019-2020 - tabblad 'AROPE'
Not able to buy a car due to financial reasons (2022)	5.7%	6.4%	Materiële en sociale deprivatie (MSD-SMSD) - tabblad 'wagen'
Low, limited or no digital skills (2021)	43%	49%	Digitale vaardigheden 2021 - tabblad 'DSK'

Table 1: Figures related to gender (in)equality in Belgium (STATBEL).

Despite the evolution observed in the GII towards greater gender equality, the STATBEL data in the table above presents a nuanced perspective of present-day Belgium. On one hand, there are more women holding higher education degrees, and women and men earn, on average, the same wages. However, in spite of these advancements, the employment rate among women remains lower than that among men, primarily due to the unequal distribution of household and family-related tasks, as figures from VUB's TOR research department show. As a result, women face an elevated risk of poverty and social exclusion, as can be seen in the table above. Additionally, the data shows that women, on average, possess lower digital skills than men. While there appears to be greater equality between men and women than a few decades ago, gender inequalities across society as a whole still persist.

4.2 Trends in Shared Mobility Usage

To what extent do Belgians rely on shared modes of transportation, and are there discernible differences between men and women? This paragraph commences with a comprehensive examination of shared mobility usage as a whole, subsequently followed by an exploration of gender-based disparities.

To gain an understanding of mobility usage, both shared and private, within Belgium and its various regions, we have access to a range of data sources. The most comprehensive survey in this context is the MONITOR survey, a national mobility study conducted from September 2016 to March 2017 (FOD/SPF, 2019). Over 10,000 Belgians participated in this study, responding to general inquiries about their transportation habits and maintaining a booklet to track their daily movements. By juxtaposing the findings from this survey with analogous assessments from 1999 (MOBEL) and BELDAM (2019), we can discern trends. These surveys collectively highlight that while the car has historically held a dominant position in Belgium, its prevalence is gradually diminishing in favour of public transportation and cycling:

	Car (dri. and pas.) (%)	Public transport (%)	Bike (%)	On foot (%)	Other (%)
1999	67	8	8	13	2
2010	65	9	8	16	2
2016	61	11	12	14	2

Table 2: Modal split (in number of trajectories) between 1999 and 2016 (FOD/SPF, 2019).

The most recent extensive mobility survey, however, predates the COVID-19 pandemic and did not encompass the surge in shared modes, which experienced significant uptake in the aftermath of the pandemic (see further). In order to assemble an overview of shared mobility usage, we aggregated data from comparable studies. Our primary reliance was on the 2022 BeMob survey conducted by FOD/SPF Mobiliteit en Vervoer / Mobilité et Transports, which provides insights into modes of transportation used by Belgians at least once annually (sample: 4500 participants - FOD/SPF, 2023a). This information was supplemented by data from the FOD/SPF micromobility survey and data furnished by Autodelen.net pertaining to nationwide carsharing (FOD/SPF, 2020; Autodelen.net, 2023).

Data from these studies illustrate that the 'conventional' shared mobility options, namely public transportation, continues to dominate the landscape of shared mobility in Belgium. Nationally, over half of the Belgian population utilises trains at least once annually, while between one-third and half of the population uses other forms of public transportation. Notably, public transport usage is notably more pronounced in Brussels compared to other regions. Additionally, roughly a quarter of the population has been carpooling at least once over a year. In contrast to public transport and carpooling, carsharing and micromobility constitute smaller components of the shared mobility system. Approximately 1.3% of Belgians have availed themselves of shared car services in the past year, while 2-3% of the population has utilised shared scooters and bicycles. These findings align with recently published data for Flanders (Onderzoek Verplaatsingsgedrag 6), wherein the percentage of households enrolled in scooter, bike, or carsharing programs ranges between 1% and 2% (Janssens et al., 2023b:31). It is important to note that these percentages are significantly higher in urban areas, as is the case for Brussels.

	BEL (%)	BCR (%)	VLA	WAL	Source
Train (domestic)	54	64	59	54	FOD/SPF, 2023a
Metro	34	81	31	24	FOD/SPF, 2023a
Tram	40	80	45	19	FOD/SPF, 2023a
Bus	49	80	50	37	FOD/SPF, 2023a
Carsharing[2]	1.3	5.2	1.2	0.1	Autodelen, 2023
Carpool (driver)	23	23	23	25	FOD/SPF, 2023a
Carpool (passenger)	27	28	26	28	FOD/SPF, 2023a
Shared e-scooter	2	9.6	0.9	1.7	FOD/SPF, 2023a
Shared (e-)bike	3.1	7.6	2.7	2.4	FOD/SPF, 2020[3]

Table 3: Modes used at least once a year, nationwide and according to the region in which the respondents live (Autodelen.net, 2023; FOD/SPF, 2020; 2023a).

Despite their relatively small market share, both carsharing and shared micromobility have experienced a significant increase over the past few years, particularly in the aftermath of the global pandemic. Fluctuo, an organisation that gathers data on shared mobility, reports a year-on-year growth between the beginning of 2022 and the beginning of 2023 across most modes in Europe. E-bike sharing has witnessed an 11% increase in ridership, traditional bike sharing has risen by 25%, e-scooter sharing by 11%, and carsharing by 6% (Fluctuo 2023). A study conducted by McKinsey forecasts that the global micromobility market's value will double to $440 billion by 2030 (Heineke et al. 2023).

This increased adoption of shared modes is also evident in Belgium. Carsharing, introduced in Belgium in 2002 with the inauguration of the country's first carsharing station in Namur, has grown to encompass more than 120,000 active users in the country, as reported by Autodelen.net (2023). Micromobility has witnessed increased popularity in recent years, although the latest figures from Brussels Mobility concerning free-floating e-scooters and e-bikes indicate that usage is stabilising (August 2023).

Nationwide data supplied by the operators indicates that micromobility continues to experience growth, particularly in medium-sized cities. For instance, Blue-bike, which manages a fleet of station-based (e-)bikes, primarily stationed at railway stations, reported that 2022 was their most successful year since their inaugural year of operations in 2011. During this period, they facilitated over 300,000 rides and expanded their membership by 22% to surpass 30,000 members. This expansion can be attributed to the establishment of new stations, particularly in small or medium-sized cities. Another illustration is Donkey Republic, a provider of free-floating e-bikes, which is extending its presence into less densely populated areas such as Western Flanders or regions outside the core of Antwerp.

[2] Calculation made by the author based on the number of active carsharing users according to figures published by Autodelen.net (2023). They count 121.394 active users in Belgium as a whole, 50.178 in Brussels, 67.758 in Flanders and 3.638 in Wallonia. To express these figures as a share of the population, we made use of the official STATBEL population figures for the 1st of January 2023. We counted the part of the population that is older than 18. See: https://bestat.statbel.fgov.be/bestat/crosstable.xhtml?view=7ef37f09-4a96-4c4c-8d90-350d3dafb4ac.

[3] For shared bikes, we combined the figures on regular shared bikes and shared e-bikes. We presume this is an underestimation since the figures date from before the Covid-pandemic. In the aftermath of the global pandemic, the popularity of micromobility has increased.

In contrast, public transport is undergoing a much slower recovery from the pandemic; for example, NMBS-SNCB's traveller numbers in 2022 reached 90% of those in 2019.

4.3 Gender differences in shared mobility

What are the gender differences regarding the general usage of these modes? Until about a decade ago, this question was a 'black box' since authorities, in most instances, did not differentiate by gender when collecting and analysing mobility data (Duchène, 2011; Maffii et al., 2014; Sansonetti & Davern, 2021). However, this situation is evolving as an increasing number of transportation administrations are incorporating gender considerations into their analyses. A noteworthy example in this regard is the United Kingdom's National Travel Survey, which, due to its longstanding history of gathering gender-specific transportation data, can examine gender-based disparities dating back to 1965 (Department for Transport, 2015). In Belgium, the MONITOR survey offers gender-specific data regarding the modal split for the years 2016-2017. This dataset reveals that women drive less than men, utilise the metro, tram, and bus more frequently, and engage in cycling to a lesser extent.

	Car (dri.) (%)	**Car (pas.) (%)**	**Train (%)**	**Metro/tram/bus (%)**	**Bike (%)**	**On foot (%)**	**Other (%)**
Women	41	21	4	8	10	15	1
Men	50	11	5	6	13	14	1

Table 4: Modal split (in number of trajectories) between women and men in 2016 (FOD/SPF 2019).

The BeMob survey and the micromobility survey conducted by FOD/SPF Mobility and Transport, which queried respondents about modes they used at least once in the past year, also offer gender-disaggregated data. These surveys reveal minor disparities in public transport usage. With respect to carpooling, Belgian women and men use this travel option to a similar extent. This contrasts with France, where 2013-data provided by BlaBlaCar show that most of their users are men (54% vs. 46% women, see Shaheen et al., 2017:8).

In the realm of shared micromobility, despite its limited utilisation across the population, notable gender-based differences emerge. Shared e-scooter use is approximately three times higher among men compared to women, while shared bike usage is roughly twice as high among men. Information furnished by the Swedish e-scooter operator VOI, operational in Brussels, indicates that globally, only 28% of their users are women (Haddad et al. 2022). Data from Transport for London show that 21% of e-scooter users are women.[4] Figures provided by VOI show that in Brussels, only 19% of e-scooter users identify as women. In some Nordic cities such as Helsinki, Oslo and Tampere, these figures are much higher, respectively 35, 36 and 40% of e-scooter users here identify as women. Similar trends are observed in bike sharing: data from 2018 on gender distribution among Villo-users, the station-based bike sharing service in Brussels, illustrates that around 70% of users are men (Kesteloot et al., 2018: 17). This is confirmed by observations for Paris, where women make up about 30% of the bike sharing users (Gorrini et al., 2021). Given the trend of increasing shared micromobility usage (as discussed earlier), it becomes imperative to delve deeper into the factors contributing to the lower uptake of these modes by women (a topic we will explore further in this report).

Unfortunately, we lack precise figures for Belgium concerning gender differences in carsharing. However, data regarding carsharing in France reveal that in 2022, 55.5% of

[4] Figures shown during the POLIS 'Governance and Digitalisation' meeting in Berlin on the 19th and 20th of October 2023.

carsharers are men. For the sake of comparison: men make up 48.3% of the French population (ADEME, 2022).

	Women (%)	Men (%)	Difference (W vs. M)	Source
Train (domestic)	54	55	-1%	FOD/SPF 2023a
Metro	33	36	-3%	FOD/SPF 2023a
Tram	40	40	none	FOD/SPF 2023a
Bus	49	49	none	FOD/SPF 2023a
Carpool (driver)	23	24	-1 %	FOD/SPF 2023a
Carpool (passenger)	28	26	+2 %	FOD/SPF 2023a
Shared e-scooter	1	3.1	-2.1 % / -3x	FOD/SPF 2023a
Shared bike	1.8	2.7	-0.9 % / -1.5x	FOD/SPF 2020
Shared e-bike	0.5	1.1	-0.6 % / -2.2x	FOD/SPF 2020

Table 5: Gender differences regarding modes used at least once a year, nationwide and according to gender (FOD/SPF 2020, 2023a).

Lastly, the FOD-SPF survey on home-work travel has been offering data on gender differences since its 2014 questionnaire (cf. FOD/SPF, 2013; FOD/SPF, 2016). The table below provides an overview of modes used by gender. It is important to note that these figures represent modal-split data and not data on modes used at least once in the past year, as seen in the BeMob and micromobility surveys. Concerning commuting between home and work, the table below illustrates that women utilise the metro, tram, and bus more frequently than men. Conversely, women engage in carpooling for home-work trips almost three times less than men. However, it is worth noting that there exists an academic discourse regarding the influence of gender on carpooling. While certain studies identify gender as a key determinant for both home-to-work and non-work carpooling, others do not find a significant correlation (cf. Queroles, 2023:10).

	Women (%)	Men (%)	Difference (W vs. M)	Source
Train	9.2	8.7	+0.5 %	FOD/SPF, 2023b
Metro, tram, bus	6.3	4.4	+1.9 / x 1.4	FOD/SPF, 2023b
Carpool (home-work)	0.7	1.9	-1.1% / -2.7x	FOD/SPF, 2023b

Table 6: Modal split data according to gender for home-work travel (FOD/SPF, 2023b).

For Europe as a whole, Eurostat modal split data, disaggregated by gender from 2007, reveal that women have a higher rate of public transport usage compared to men (23%

versus 18%, Maffii et al., 2014). Additionally, men are more inclined towards driving, whereas women tend to walk more. Recent Eurostat data from 2020, which analyses the primary transport modes on a typical day, indicates that this trend persists, as women continue to use cars less frequently, prefer walking, and rely more on public transport (Sansonetti & Davern, 2021). For France and Sweden, data from 2011 illustrates that approximately two-thirds of public transport users are women (Duchène, 2011:8). In cities such as Paris, Vienna, or Hannover, research has shown that women use public transport more frequently than men, while men are more inclined to drive themselves (Malandrino & Berman, 2020, based on the Enquête Globale Transport, 2010; Maffii et al. 2014).

Regarding shared micromobility, the findings for Belgium align perfectly with European trends: women utilise these modes less frequently than men. As is shown in Table 5, there are two to three times as many male users than female users of micromobility services. Eurostat data concerning the primary modes of transport highlights that men are twice as likely to use shared micromobility options compared to women (Sansonetti & Davern, 2021). This trend is consistent with national-level data for France (Malandrino & Berman, 2020:24-25, citing relevant studies) which indicates that shared service users are predominantly male, including young individuals, students, and professionals. A study conducted in Brussels in 2019 reveals that a significant 66% of e-scooter users, whether shared or privately owned, are men. The majority of users in this category are under the age of 34 and hold university degrees (Bruxelles Mobilité & BRAT, 2019:7-10).

Regarding carsharing, Autodelen.net's 2023 survey observes a nearly equal gender participation ratio, with 51% male and 49% female respondents. However, it is important to exercise caution when interpreting these figures, as they may not necessarily represent the precise distribution of carsharers in practice. For Brussels, data dating back to 2017 indicates that 41% of station-based carsharers are women, while only 23% of users of free-floating carsharing services are women (Wiegmann et al., 2020). These statistics should be approached with caution, given the significant changes that have occurred in the shared mobility market during and after the pandemic. Nevertheless, these findings align with international observations suggesting that carsharers are predominantly men, often with higher levels of education. Research conducted in Canada and the United States shows that approximately 55% of carsharers are men (as cited in Association des Acteurs de l'Autopartage 2021, Boonman & Brabers 2015:44, Kawgan-Kagan, 2015). A similar gender division was observed in the Netherlands (Jorritsma et al., 2015:24). In France, more than half of shared car users are men, typically holding executive positions, and approximately 75% of them reside in city centres (Malandrino & Berman, 2020:24-25).

Particularly in the realm of micromobility and carsharing, it is evident that men and women utilise these modes to varying degrees. While usage data related to public transport are relatively similar between men and women, further studies and surveys discussed indicate that women have distinct experiences when using these modes compared to men (see further).

5. Gendered barriers in the shared mobility system

In this section, we will identify various barriers that make public transport and shared mobility less accessible for women than for men. We will focus on the service offer, digital barriers, insecurity and harassment, and, finally, careers in mobility and transport. For each of these topics, we will also provide examples of measures that can enhance equity. We will do so while considering shared mobility (micromobility, carsharing), carpooling, and public transport together because these modes are complementary. In Flanders, the core of the Hoppin strategy is to integrate public transport and shared mobility. In Brussels, public transport and shared mobility are increasingly being combined by their users, with MIVB-STIB having developed the Floya app that integrates various modes of transport, and the Region working on a mobility hub strategy to physically integrate all forms of mobility. In Wallonia, the Regional authorities have explored how to integrate public transport and shared mobility within the context of a European project on mobility hubs. It also makes sense to study public transport and shared mobility together because they are both confronted with similar challenges.

It is worth noting that the majority of existing literature and research projects have primarily emphasised public transport, and that less attention has been given to emerging forms of shared mobility. This imbalance has implications for the subsequent discussion on the barriers to mobility equity outlined below, as our focus leans more towards public transport rather than shared mobility. However, it is important to mention that our analysis will be enriched by data from our survey, where we have consciously allocated equal attention to both public transport and shared mobility options.

5.1 Service offer

Problem identification

Stereotypes regarding what is considered 'masculine' and 'feminine' behaviour have tangible socio-economic consequences. Women are more likely to work part-time, resulting in lower earnings, and often bear a larger share of household and caregiving responsibilities, including childcare, elderly care, and caring for relatives. This division of tasks leads to distinct travel behaviour patterns between men and women. European and American studies emphasise that, as a result, women tend to have more intricate, interconnected travel patterns compared to men (Duchène, 2011:7; Martinez et al., 2022:24-25; Sansonetti & Davern 2021). A comparative analysis of gender-specific travel patterns in cities such as Auckland, Dublin, Hanoi, Helsinki, Jakarta, Kuala Lumpur, Lisbon, and Manila reveals that women typically travel shorter distances and rely more on public transport and taxi services than men (Ng & Acker 2018). National-level analyses for the United Kingdom, Germany, Spain, and Italy also show that men's travel patterns are more work-related, while women tend to travel more for non-work-related (domestic) purposes, such as shopping or family-related reasons. Similar observations are made in the cities of Paris and Vienna (Maffii et al., 2014; Department for Transport, 2022; DG MOVE, 2014:8-10; Malandrino & Berman, 2020, based on the Enquête Globale Transport, 2010). In the context of home-to-work commuting, a study for France indicates that 24% of women make detours during their commute, compared to 13% of men (Malandrino & Berman, 2020). An investigation by de Madariaga and Zucchini in Madrid delved deeper into the concept of 'mobility of care,' which involves unpaid time spent accompanying non-autonomous individuals. By monitoring the mobility patterns of 800 residents in Madrid aged between 35-50, with an equal distribution of men and women, over a 24-hour period, they found that 40% of women's trips were related to caregiving, while only 9% of men's trips were similarly linked (research cited in Sansonetti & Davern, 2021:30-31).

Public transport is ill-suited to accommodate the travel patterns associated with the 'mobility of care' in several respects. To begin with, public transport systems have predominantly been designed in a 'radial' manner, primarily focusing on transporting people from suburban or rural areas into city centres. In contrast, women frequently undertake journeys within residential and peripheral areas, where they take their children to school or engage in shopping activities. Unfortunately, the radial structure of public transport networks does not align with these more neighbourhood-oriented travel needs (Duchène, 2011:9). While car-based (private or shared) travel could potentially offer an alternative solution, figures reveal that fewer women possess driver's licences compared to men. For instance, in Flanders, only 80% of women hold driver's licences, as opposed to 90% of men (Janssens et al., 2023a:70). Furthermore, most carsharing programs are concentrated in densely populated urban areas, rather than in peripheral regions, rendering them an ineffective option for women travelling in these peripheral areas. Consequently, it comes as no surprise that in suburban and peripheral zones surrounding cities, women often find themselves compelled to rely on walking (Duchène, 2011:9).

Furthermore, shopping and caregiving responsibilities, such as looking after older relatives, often occur outside of rush hours, typically after dropping off or picking up children from school. Unfortunately, public transport schedules are not tailored to these needs; instead, they have traditionally been designed to cater to commuter traffic, shuttling people to and from their workplaces. Outside the peak hours of 7-9 in the morning and 16-18 in the evening, when women tend to travel more for household tasks, their journeys often take longer than during rush hour (Duchène, 2011:7). Women also encounter challenges when using public transport with strollers and children. They frequently find insufficient space for strollers, may experience feelings of stigma when travelling with multiple children, or

encounter difficulties when boarding and disembarking buses (Transport for London, 2015:92).

Another concern pertains to ticketing. As women tend to make more interconnected trips, involving various modes of transport and operators, they may need to purchase multiple tickets from different providers for separate segments of their journey (Duchène, 2011:16). This increases the overall cost of their travel, even though the quality of service is suboptimal due to longer travel durations. In many countries, tickets typically remain valid for just 60 minutes, which can compel passengers to acquire multiple tickets. In Belgium, this issue is somewhat mitigated by the relatively affordable season tickets offered by MIVB-STIB, De Lijn, and TEC. However, a more pressing problem is the lack of ticket integration among different operators, which can lead to confusion among those less familiar with the local transport system. Mobility-as-a-Service (MaaS) applications can potentially offer a solution, although this technology may also present inconveniences for women, as discussed further.

The difference in how women use shared modes compared to men may be attributed to the fact that women are often raised to be more risk-averse, making them less inclined to use shared modes that are perceived as 'riskier'. A recent study, for instance, discovered that women face greater penalties when taking risks compared to men, who tend to be rewarded for their risk-taking behaviour (Morgenroth et al., 2022).[5] For example, a study conducted in Strasbourg and Montpellier revealed that socialisation pressures restrict girls' engagement in public space, leading to a decreased inclination among girls to engage in solo cycling, whereas the opposite is observed in boys (Sayagh, 2018). Another notable observation pertains to the correlation between gender and risky driving behaviour, whether in cars or on motorcycles. The data indicates that (young) men are more prone to exhibit risky driving behaviour compared to women (DG MOVE, 2014:6-7). Furthermore, it is observed that women are less inclined to choose modes of transportation that are (perceived as) more hazardous. One example is speed-pedelecs, which can reach speeds of up to 45 km/h. A recently conducted survey on speed-pedelecs in Flanders reveals a striking gender disparity, with 77% of users being male. Additionally, male speed-pedelec users, on average, have longer commutes compared to their female counterparts (Van den Steen et al., 2023). A study on speed-pedelec usage in Brussels similarly indicates that 85% of users are men (Swennen et al., 2020).

A shared mode often perceived as riskier - and thus less suited for women - is the shared e-scooter. This perception of e-scooters being more hazardous is substantiated by statistics published by VIAS: between 2021 and 2022, the number of accidents resulting in injuries increased by over 80%.[6] This surge in accidents involving e-scooters is partly attributed to the growing popularity of this relatively new mode of transportation. Indeed, the number of e-scooter users has more than tripled between 2017 and 2023. Specifically in Brussels, data reveals that the number of injured e-scooter users increased fivefold between 2019 and 2022 (Debaene, 2023:12).[7] Numerous European and American studies indicate that the risk of accidents with (shared) e-scooters is significantly higher compared to (shared) bicycles, and the resulting injuries are often more severe (refer to De Vos & Slootmans, 2023:11-12 for an overview). The number of male casualties is 2.3 times higher than female casualties (De Vos & Slootmans, 2023). This is in line with the distribution of male and female users of this mode (see Table 5). Additionally, the perception of e-scooters as a 'masculine' mode of transportation influences its usage. A recent study by VOI indicates that women tend to view

[5] A summary of this study is available on the Forbes website: https://www.forbes.com/sites/kimelsesser/2022/04/29/women-arent-risk-averse-they-just-face-consequences-when-they-take-risks/.

[6] Note that this concerns all e-scooter accidents, shared vehicles and privately owned vehicles combined.

[7] The number increased from 132 in 2019 to 688 in 2022. This includes all e-scooters, shared and privately owned: https://brulocalis.brussels/sites/default/files/2023-07/momo-68-fr.pdf.

e-scooters as a 'masculine' mode of transport and associate them primarily with young men, making it more challenging for women to identify with this mode (Haddad et al., 2022).

Shared modes like e-scooter or (e-)bike sharing are poorly suited for tasks that remain primarily carried out by women, such as grocery shopping or childcare (Haddad et al., 2022; Malandrino & Berman, 2020; Martinez et al., 2022:32). On shared bikes and scooters, transporting shopping bags or luggage is nearly impossible. Specifically regarding Brussels, interviews with women have indicated that the local bike sharing service is perceived as unreliable and uncomfortable due to the fluctuating availability and the digital skills required to use them (Martinez et al., 2022). A barrier cited by women in a study concerning e-scooters is the difficulty of manoeuvring these vehicles, especially when wearing heels (Haddad et al., 2022). Shared cars can be a useful means for transporting goods, groceries, and children. However, this mode is not always well-equipped for carrying toddlers or babies due to the limited availability of children's seats. For example, Cambio provides them at some stations or cars, whereas the free-floating operator Poppy does not offer any information on this through their website.

Lastly, unsafe infrastructure for shared mobility is recognized as a significant barrier for women when it comes to using shared modes, particularly micromobility (Gorrini et al., 2018). Insights from focus groups and surveys conducted by e-scooter provider VOI shed light on this issue (Haddad et al., 2022). The findings reveal that many women perceive roads as unsafe, primarily due to the absence of dedicated lanes for non-motorized traffic. Aggressive behaviour from car drivers directed towards (female) e-scooter users further discourages the adoption of micromobility among women. Additionally, a complex web of regulations, such as rules governing e-scooter parking, and a lack of proper infrastructure for docking shared e-scooters are identified as additional obstacles to using this mode.

Overview of potential solutions

The purpose of this section is to offer a concise overview of strategies and examples aimed at enhancing gender equity in public transport and shared mobility. While our objective is not to provide an exhaustive list, our aim is to inspire and illustrate how even minor adjustments can yield significant impacts.

Adapt network and schedules - Considering that women tend to travel more outside rush hour and have more complex, chained travel patterns that public transport may not accommodate, it is crucial to maintain adequate public transport frequencies outside of peak hours. In urban or suburban areas, the adoption of hourly services should be avoided. Demand-Responsive Transport (DRT) solutions, such as 'Belbus' or 'De Lijn Flex,' hold significant potential in this regard, particularly in rural areas where sustaining hourly bus services might be financially challenging (Maffii et al., 2014). DRT solutions offer women the advantage of travelling directly between their destinations, eliminating the need for frequent line changes dictated by the radial structure of the public transport network. This, in turn, reduces travel time and expenses. Data indicates that the DRT solution provided by De Lijn in rural parts of Flanders, enjoys widespread popularity among women, constituting approximately three-quarters of its users (Randall et al., 2021:20).

Improve physical accessibility - One of the primary challenges faced by women is the inadequate suitability of public transport, shared cars, bikes, and scooters for transporting goods and children. To enhance comfort on public transport, it is advisable to incorporate multi-purpose compartments within buses, trams, and metros, offering additional space and dedicated seating. These compartments should cater to the needs of pregnant women, disabled individuals, and those travelling with toddlers, who are often women (Ari Thimnu et al., 2022:27). Notably, some cities like Berlin have already made dedicated compartments mandatory (Maffii et al., 2014). To ensure physically barrier-free access to these modes,

public transport agencies can invest in low-floor rolling stock for easy boarding and disembarking. Additionally, ensuring that platforms are at the same level as buses and trams is essential. In cases where this is not feasible for operational reasons, public transport providers should prioritise low-floor equipment on routes with a high concentration of schools and kindergartens. Platforms should align with the same heights as buses and trams, minimising the use of stairs and providing ramps for passengers travelling with strollers, luggage, groceries, and more (Ari Thimnu et al., 2022:28). Moreover, at major mobility hubs or transit points, dedicated infrastructure can be developed. This includes facilities like public restrooms, parcel lockers, and storage rooms (Martinez et al., 2022:32).

Introduce maxi-cosi's to fleet - To enhance the accessibility of shared cars for women, operators of these services can increase the availability of vehicles equipped with maxi cosi child seats or include them as standard equipment in the car's trunk. In the realm of micromobility, it is advisable to provide specialised bikes equipped with child seats or baskets (Ari Thimnu et al., 2022:29). Establishing a network of shared (e-)cargo bikes can offer a practical solution for women as it allows for transporting both children and goods, especially when maxi-cosi seats can be attached and securely fastened to certain operators' bikes. A survey conducted among Cargoroo users in Leuven between June and July 2022 sheds light on the reasons for utilising shared cargo bikes, with transporting children and groceries ranking among the most frequently cited motives (Evenepoel, 2022). Research conducted in the United States echoes similar findings, emphasising that access to (e-)cargo bikes contributes to female empowerment, provided they are economically accessible and accompanied by adequate cycling infrastructure (Riggs & Schwartz 2018). It is hereby worth noting that migrant women from certain cultural backgrounds may lack cycling skills due to the absence of prior training or because cycling may not be socially acceptable for women within their communities (Gorrini et al., 2018; Martinez et al., 2022:24). Therefore, organising cycling training programs tailored to this specific target group is recommended.

Affordable and integrated pricing - Given that women often undertake interconnected trips and, in some cases, need to rely on various modes of transportation from different operators, it is essential to ensure that pricing remains as affordable as possible (Duchène, 2011:16). Ideally, in areas where multiple operators operate, ticket pricing should be integrated. While this integration is already in place in and around Brussels through the Brupass XL, it is not yet established along the Flemish-Walloon border or at international border regions. To eliminate the need for purchasing multiple single-journey tickets, public transport operators should continue offering affordable day passes and actively promote them, particularly among more vulnerable users who may not be familiar with the network's structure and pricing. Additionally, considering reduced ticket prices during non-rush hours, a time when women tend to travel more, is a viable option. Two noteworthy examples of affordability initiatives come from Brussels: the MIVB-STIB is introducing free public transportation subscriptions for employees in the healthcare and non-profit sectors, which traditionally employ more women, and micromobility operator Bolt has launched a social tariff for individuals with limited or no income. Information regarding pricing and ticket purchase procedures, as well as pricing structures of various operators, should be easily accessible and comprehensive (Maffi et al., 2014). This information can be effectively communicated through analog or digital displays, as an alternative to the current situation where each public transport operator employs its own methods to communicate information about its services and pricing.

Safety of shared e-scooters - In the preceding section, we demonstrated that women are significantly underrepresented among e-scooter users, primarily due to the mode's 'male' reputation and the higher safety risks associated with it. It can be reasonably assumed that implementing stricter legislation will lead to a decrease in accidents with injuries and potentially encourage more female users. Several measures can contribute to this, including mandatory helmet use, increased police controls related to violations such as speeding,

riding on footpaths, carrying two persons on one scooter, and more. Awareness campaigns aimed at both e-scooter users (highlighting risks) and car drivers (emphasising awareness of blind spot accidents) can raise awareness about safety concerns. Additionally, considering requirements for shared scooter operators to limit speeds in designated pedestrian zones, use designated drop-off zones, and monitor compliance through georeferencing systems, as well as employing technology to detect instances where two people are using a single scooter, can all help improve e-scooter safety. As women tend to prefer shared modes perceived as safer, enhancing the safety of e-scooters can encourage more women to adopt this mode.

Training sessions - Specific measures that can further accompany the uptake of micromobility among women, are for instance places where new users can learn how to ride an e-scooter and dedicated training sessions organised by the public authorities (the Mobility Visits organised in Brussels have potential in this respect). Women-to-women training sessions are seen as a measure that could increase the uptake of ridership among women.

Involve women in planning and design - As the transport sector remains predominantly male-dominated, it often overlooks the female perspective when making strategic decisions related to shared mobility and public transport. When establishing new routes, procuring new rolling stock, revising schedules, designing mobility hubs, or introducing new shared modes, it is crucial to include the voices of women, as well as those of children and the elderly. An example on how involving women has a concrete impact, is the development of e-scooters that are lighter and thus easier to manipulate for women (Haddad et al., 2022). Female involvement can make the design of public space and traffic infrastructure more equitable as well. An instructive example on how to achieve this stems from Malmö, Sweden. During an urban redevelopment project in the Rosengård suburb, the city aimed to transform an old parking lot into an area for recreational activities such as skating, climbing, and graffiti. This project faced criticism as these activities were primarily geared towards boys. Consequently, it was decided to transform the space into a more gender-balanced area. Through the involvement of a focus group consisting of young women, more cultural activities related to music and dance were proposed for the square, and local associations and small businesses collaborated to plan various activities and manage the budget (see Maffii et al., 2014 for a more detailed description). Involving women in the design of mobility infrastructure has positive effects as well: research for Australia shows that involving women in decisions about implementing new bike infrastructure, as well as expanding the use of e-bikes through financial incentives, are key to getting more women on the road (Pearson et al., 2023). Lastly, an interesting initiative to follow in the course of the next months stems from the US, where the Shared-Use Mobility Center has received funding to develop a design framework for mobility hubs centred around women and caregivers.

5.2 Digitalisation

Problem identification

The mobility ecosystem is increasingly reliant on apps. This evolution offers numerous opportunities, especially for young people, often referred to as digital natives. For them, it has become more convenient to check timetables, book tickets, shared cars or micromobility services, and track real-time vehicle positions through these digital tools. However, this shift towards digitalization presents a significant barrier for older individuals or those with limited digital skills, further limiting their access to transportation services. Table 1 illustrates that 49% of Belgian women have low, limited, or no digital skills, while the same applies to 43% of men. Given that digital skills tend to be lower on average among women, the concept of 'gender-based digital exclusion' has emerged as a new challenge that must be addressed (Malandrino & Berman, 2020). This issue is particularly pronounced in the mobility sector. A literature review conducted by Durand et al. (2021) indicates that women, especially older women or those with a migration background, are more likely to be vulnerable to the increased reliance on digital platforms in transportation services.

The growing reliance on digital applications for shared mobility services is also evident in Belgium:

	Type	**Bookable via app**	**Alternative**
cambio	Carsharing	Yes	Contact centre
Poppy	Carsharing	Yes	-
Blue Bike	Bike sharing	Yes	Scanning membership card
Donkey Republic	Bike Sharing	Yes	-
Cargoroo	Cargo bike sharing	Yes	-
Dott	E-scooter sharing	Yes	-
Lime	E-scooter sharing	Yes	-
TIER	E-scooter sharing	Yes	-
VOI	E-scooter sharing	Yes	-
Felyx	Moped sharing	Yes	-

Table 7: Booking process for a selection of shared mobility operators in Belgium (source: desk research on operators' websites by authors).

It is worth noting that mobility apps are predominantly developed from a male perspective, often resulting in the oversight of features that would be beneficial for women. These overlooked features may include considerations related to caregiving, such as whether shared modes accommodate strollers or luggage, the availability of child seats on shared transportation, or the feasibility of trip-chaining. Additionally, mobility apps frequently employ gamification techniques to encourage (potential) travellers to adopt sustainable and shared mobility options. These techniques often involve leaderboards where 'top-users' earn badges

or rewards. Research, however, indicates that these competitive elements align more with the preferences of male users than female travellers. For example, in urban mobility apps focused on bicycling, the leaderboards are often dominated by highly physically active men (Luger-Bazinger et al., 2023).

Another potential pitfall of mobility apps is related to the level of digital skills, which is on average lower among women than among men (see Table 1). As part of the SmartHubs project, researchers from the Vrije Universiteit Brussels organised interviews with various vulnerable groups, including individuals with limited digital skills. These interviews highlighted several barriers. Among them were a reduced ability to physically purchase tickets for public transport, such as buying them on the bus or at a kiosk. Additionally, many of these individuals had limited access to credit cards, which are often required for payment in digital mobility services. Furthermore, there was a prevalent fear among these individuals regarding scams or making mistakes when purchasing tickets through digital platforms (Martinez et al., 2022:19-20).

A fairly recent development in shared mobility, is the increased uptake of MaaS (Mobility as a Service) applications that allow travellers to plan, book and pay for multimodal transport through a single platform. Examples of these platforms are Olympus for businesses, or Whim for the larger audience. In September 2023, the Brussels transport operator MIVB-STIB released its MaaS application Floya. The increasing reliance on MaaS solutions also has an influence on gender equity. Applying a SWOT analysis, McIlroy (2023) made the following observations:

- Strengths - Given the multimodal, non-car travel-focused nature of MaaS, it is well-suited to women's travel patterns. As discussed earlier, these patterns are more complex than those of men.
- Weaknesses - Social and cultural norms that define travel differences between men and women, as well as safety and security issues that women face when travelling, are not currently within the scope of MaaS.
- Opportunities - MaaS has the potential to integrate security ratings for particular routes, thus improving women's safety.
- Threats - As pointed out earlier, women have (slightly) lower digital skills than men and face higher poverty risks. Given that MaaS is offered as an online, and often paying, service, there is the risk that women will have less access to these increasingly used platforms than men.

Given the increased use of digital technologies in public transport and shared mobility, specific supporting measures are required to ensure that transport poverty does not increase among specific target groups.

Overview of potential solutions

Using apps, websites, digital kiosks, or touchscreens has unquestionably improved travel convenience for a significant number of users. However, this observation does not imply that all non-digital forms of communication should be abandoned, as doing so could create new barriers for those who are less digitally proficient, with women being overrepresented in this group (as seen earlier in Table 1). We propose some alternative solutions and accompanying measures below.

Incorporate female perspectives in app-development - By incorporating specific features related to caregiving responsibilities, mobility apps can become more female-friendly. For carpooling and shared mobility services for instance, a useful feature could be the ability to select rides or vehicles equipped with child seats. Public transport apps could indicate the accessibility of rolling stock with strollers. To cater to women's trip-chaining patterns, apps

should offer the option to plan multiple stops using route planners, such as for grocery shopping, childcare, and school, making it easier to estimate travel times. Enhancing safety for women while travelling is also crucial for creating female-friendly shared mobility. Features that can be integrated into apps include carpool options with trusted contacts (i.e. ridesharing with people you know or whom you have already travelled with), route safety information provided by other users, SOS buttons, and location sharing in case of emergencies. Regarding nudging techniques, it's advisable to avoid competitive leaderboards as a motivating strategy. Instead, focusing on community aspects like building a network supportive of sustainable travel choices or developing reward schemes for CO2 emissions saved through specific travel choices tends to be more appreciated by women (Luger-Bazinger et al., 2023).

Non-digital communication tools - To ensure equitable access to information, it is recommended that essential travel information, such as timetables and maps (both for the network and the surrounding area), remain readily available and visible at stations and transport stops (Martinez et al., 2022). For shared cars and micromobility, physical information pillars explaining how to use these modes and their pricing can serve as valuable interventions to enhance their adoption and visibility. At larger mobility hubs, providing digital maps accessible via smartphones or through digital pillars can also be beneficial, as long as there are ample analogue alternatives in place. This ensures that individuals without smartphones or with limited digital proficiency can also smoothly utilise these hubs (Baguet, 2022, for best practices concerning signposting).

Assistance and training - In addition to these physical interventions, providing access to a 'real' person for inquiries is a simple yet effective solution for individuals with limited digital skills. Having the option to purchase a ticket at a (wo)manned ticket counter remains essential, especially at larger transport hubs. Training sessions are also deemed beneficial, such as instructing individuals on how to purchase tickets using self-service kiosks, how to access information on a digital information pillar, and how to plan, book, and pay for a journey through the operator's app or MaaS apps (Martinez et al., 2022:26). These training sessions can be implemented temporarily, for example, by public transport staff assisting travellers with digital kiosks during the first month of deployment, or by conducting pop-up training sessions in underprivileged areas, on market days for instance.

5.3 Insecurity and harassment

Problem identification

In this section, we will delve deeper into the topic of insecurity and harassment. By this, we are referring to the occurrence of unwanted acts while travelling, which may include:

- Improper remarks about your gender, sexual orientation, skin colour, physical appearance, and more.
- Unwanted touching or leering.
- Becoming the victim of verbal or physical assault.

It is important to note that the definition of harassment is highly personal. What one person may perceive as crossing boundaries or unwanted, another may not. Therefore, the definition provided above is not set in stone.

One of the primary conclusions drawn from data collected during the DIAMOND project is that 'safety' (or the lack thereof) is a pivotal factor influencing women's travel choices, regardless of the continent under study (Ari Thimnu et al., 2022; Ng & Acker, 2018). Public transport, in particular, is frequently cited by women as an unsafe environment (Malandrino & Berman, 2020). For instance, in the broader Parisian Region (Île de France), a staggering 39% of all reported incidents of sexual aggression against women in public spaces occur on public transportation (Badré & Daulny, 2018). It comes as no surprise, then, that sexual harassment unquestionably stands out as the primary issue women face when using public transport. A study conducted in France found that 87% of female public transport users reported being victims of sexual harassment, with 95% of these cases involving male perpetrators. A significant majority (84%) of these harassment incidents occur within the confines of the vehicles (Debrincat et al., 2016:14).

In response to these acts of (sexual) aggression, women significantly adapt their travel behaviour. For instance, figures from Bordeaux indicate that 64% of female travellers prefer to use public transport when there are other passengers on board the vehicle, actively avoiding situations where they are the sole occupants. Overcrowded situations are also typically avoided due to the heightened risk of unwanted touching (Alessandrin et al., 2016; DG MOVE, 2014:15). In London, for example, 28% of women choose to travel with someone else as a safety measure, compared to 18% of men (Transport for London, 2015:94). More than half of female travelers alter their attire when using public transport to minimize the risk of sexual harassment (Alessandrin et al., 2016). Additionally, over half of women avoid using public transport during specific hours, particularly at night, in cities like Paris and Bordeaux (Alessandrin et al., 2016; Debrincat et al., 2016:10; DG MOVE, 2014:15). Following outings with friends in the Parisian region, three-quarters of women opt to return home by car or use ride-sharing platforms like Uber, rather than relying on public transport (data sourced from previous studies cited in Malandrino & Berman, 2020).

Discrimination against and verbal violence towards women extend beyond sexism. Comprehensive surveys conducted among female public transport users in Bordeaux reveal that, in addition to sexual harassment, which constitutes 58% of reported discrimination, racism towards women of foreign backgrounds accounts for 15% of such incidents, while appearance-related discrimination also stands at 15%. These statistics have led the authors to the conclusion that “white women are in a sense better off because they do not have to deal with racist remarks” while travelling (Alessandrin et al., 2016:59).[8]

Harassment, whether it is sexual, racist, or of any other nature, is not confined to public transport. Research on harassment against women in micromobility remains a relatively

[8] Translated from French: ‘les « blanches » s’en sortent mieux que les immigrées car elles n’ont pas à subir le racisme et ses effets’.

understudied area compared to safety concerns in public transportation. Nonetheless, a study commissioned by VOI has shed light on the issue of harassment faced by women using e-scooters. The research by VOI indicates that women may feel reluctant to use e-scooters while dressed in 'feminine' clothing, such as a dress (Haddad et al., 2022). Some female users express concerns about the introduction of speed reductions in certain cities, viewing it as a safety hazard. In interviews, women have shared their fears of potential attacks or harassment, especially during nighttime rides. On the other hand, some women find e-scooters safer than walking through crowded areas or traversing poorly lit streets after dark (Haddad et al., 2022).

In addition to actual unsafety and harassment, there is the issue of perceived insecurity, which is undoubtedly exacerbated by the negative experiences women have encountered on public transport. Nearly three-quarters of female users of the Parisian public transport system express regular (or very regular) concerns about being harassed (Debrincat et al., 2016:10). Among younger women aged 18-40, this fear is even more pronounced, with roughly three-quarters of them harbouring concerns about harassment (Debrincat et al., 2016:12). Notably, the feeling of insecurity among women is most pronounced on the metro system, as highlighted in the case of Paris (Badré & Daulny, 2018). Data from England also indicate that 60% of women feel unsafe at railway stations, and 61% feel unsafe at underground stations (DG MOVE, 2014:15). Given the consistently high figures, it becomes evident that the sense of insecurity on public transport is systemic.

The issue of unsafety is also observed at mobility hubs. A mobility hub is a physical location where various shared transport options are offered at permanent, dedicated, and highly visible locations, often with public or collective transport available within walking distance (for an overview of definitions and characteristics, see Geurs et al., 2022:8-12). Examples include bus stops with bike or carsharing services, train stations, and park-and-ride facilities. At these hubs, travellers' feelings of insecurity are often related to the design of the public space and may not necessarily be a direct consequence of safety issues on the public transport network itself. An analysis conducted among female park-and-ride users in Bordeaux revealed a rather negative perception of safety at these transfer nodes, with nearly half of the users reporting moderate to severe negative feelings when using park-and-ride facilities. The primary causes of this feeling of insecurity, especially at night, are the lack of adequate lighting and longer waiting times due to lower frequencies (Alessandrin et al., 2016:73-76).

Overview of potential solutions

There are numerous measures that can be implemented to enhance the safety of women while travelling. Below, we provide a list of specific interventions that can improve safety during travel.

Safety measures on vehicles and transit stops - One of the most effective measures for enhancing the feeling of safety involves increasing video surveillance both at stations and on the rolling stock itself: three quarters of women feel safer on public transport because of this intervention. Furthermore, it facilitates police investigations (Badré & Daulny, 2018; DG MOVE, 2014:15). Another valuable practice is the implementation of emergency contact numbers accessible through phone calls or text messages, along with mobile applications that enable (female) travellers to alert the operator's security personnel about unsafe situations (Badré & Daulny, 2018; Luger-Bazinger et al., 2023). Equally beneficial are the presence of alarm buttons on buses, trams, metro systems, trains, as well as at stations and on platforms (Ari Thimnu et al., 2022; Badré & Daulny, 2018). Findings from the DIAMOND project demonstrate that improving the response time of security personnel in the event of an incident can significantly enhance the satisfaction of female travellers on public transport

networks (Ari Thimnu et al., 2022:28). To avoid that women would have to travel in (almost) empty carriages at night, one of the Californian public transport operators BART is reducing the length of their trains in order to create a safer environment with more social control. Finally, Some studies also recommend providing dedicated women's seating areas located in proximity to the bus driver (Maffii et al., 2014).

To reduce the feeling of insecurity while waiting for transportation services or during transfers between modes, several recommendations can be implemented. Maintaining a good frequency of public transport to reduce long waiting times is crucial. Specific interventions in the design of public transport infrastructure, mobility hubs or micromobility drop-off zones can also contribute significantly. It is for instance advised to avoid dark and isolated corners when (re)designing public spaces, which can be achieved by removing bushes and shrubbery. Eliminating poorly lit access ways to transit stops, such as tunnels, is another important step. Providing ample lighting, clean waiting facilities, and well-kept surroundings can make a substantial difference. Equipping stops with communication devices for security services and placing mirrors in underpasses and transit locations (e.g., metro) to eliminate blind spots and enhance visibility of immediate surroundings are all effective measures (Alessandrin et al., 2016; Ari Thimnu et al., 2022; Haddad et al., 2022; Maffii et al., 2014; Martinez, 2022).

Physical presence of staff members - One of the most effective measures for enhancing security on public transport or at mobility hubs is the presence of human staff members at information desks, ticket offices, or on the transport mode itself (Ari Thimnu et al., 2022:27; Martinez, 2022:25). A substantial 65% of female public transport users regard the physical presence of staff as the most effective measure to bolster security within the transport network (Debrincat et al., 2016:23). Naturally, it is essential that all staff members receive training that equips them to handle situations of harassment and other forms of aggression.

Awareness campaigns - Raising awareness among all travellers regarding undesired behaviour is frequently cited in literature as a best practice. These awareness campaigns can be tailored to different groups. Firstly, campaigns can be designed to inform female travellers about the various channels available for contacting security teams. Secondly, targeted campaigns can address the (largely male) offenders, conveying a clear message that sexual or other forms of harassment will not be tolerated and that fines will be imposed. Thirdly, there can be awareness campaigns focused on the 'bystander effect.' Research indicates that in cases of harassment on public transport in the presence of witnesses, a staggering 89% of bystanders do not intervene (Debrincat et al., 2016:18).

Figure 2: Campaign to raise awareness on the Parisian public transport system (see Badré & Daulny 2018:60).

Night stops - A measure implemented in Montreal, Canada, to enhance security for nighttime travellers involves allowing women travelling alone to disembark from the bus between regular stops during the night. This practice, in place since 1996, enables women to exit public transport as close to their residences as possible, thereby avoiding longer solo walks during the nighttime. A similar approach can be found in Kalmar, Sweden, where the 'nattstopp' system permits bus drivers to drop off passengers between standard bus stops. (DG MOVE, 2014:17; Maffii et al., 2014).

Explorative walks - An effective strategy for gaining insight into where and why women often feel unsafe while using public transport or shared mobility, is through 'exploratory walks.' Originating in Canada in the 1990s, groups of women follow designated routes through the city, providing them with the opportunity to voice their safety concerns at specific locations. This approach allows public authorities and operators to better understand the safety issues at hand. In France, the national train operator SNCF and Paris' public transport operator RATP began organising exploratory walks in their stations in 2015 to collect information on women's security perceptions and enhance station planning (Malandrino & Berman, 2020; also recommended in Maffii et al., 2014). Similar initiatives exist in Belgium, where the non-profit organisation Tous à Pied organises 'marches exploratoires' to improve public space quality for women, or 'Walkshops' organised by Kind & Samenleving in Brussels that want to understand how young girls experience public space. It would be beneficial to extend this concept to the Belgian public transport, mobility hubs, or park-and-rides in order to enhance (the feeling of) safety. This qualitative approach can be complemented by data collection, as demonstrated by the recently launched STEP-UP project in Milan, Italy. This project focuses on walkability for women and utilises geolocated data to assess the perceived security level, thereby identifying problematic areas or zones and proposing physical interventions to enhance security.

Female only services - To enhance the safety of women while travelling, several female-only initiatives have emerged across Europe. An example from the city of Bolzano in Northern Italy is the Taxi Rosa, which provides taxi services exclusively for women during evening and nighttime hours. The municipality reimburses 5 euros per ride for all girls and

women residing in Bolzano who possess the 'Taxi Rosa Card.' Another initiative involves dedicated parking areas for women, strategically located in easily accessible, well-lit spots near garage exits (Maffi et al., 2014). In Europe, this concept is most prevalent in German-speaking countries and regions and was developed in response to women feeling increasingly unsafe in poorly managed parking lots and fearing potential sexual assaults. Nevertheless, the 'Frauenparkplatz' have sparked debates since their introduction in the 1990s, with some considering them sexist. They are gradually being replaced by gender-neutral 'family parking' spaces; however, this transition should be approached cautiously, as the branding of these dedicated spots often reflects traditional family models, such as a caring mother and children (Maffi et al., 2014).

5.4 Careers in mobility and transport

Problem identification

The issues and examples cited in the preceding pages illustrate that the perspective of women has often been overlooked when developing public transport and shared mobility networks. Part of the explanation lies in the fact that decision-making and employment within the mobility sector are still predominantly dominated by men. Data from Canada indicates that approximately 27% of the workforce in the transport sector consists of women, and this figure has remained relatively stable over the past two decades (cited in Duxfield & Allen, 2023:9). Female participation in Europe appears to be even lower: an analysis by Sansonetti & Davern (2021) reveals that in the European Union, the presence of women in the transport sector ranges from 10.2% in Romania to 27.5% in Germany. In Belgium, women constitute 19.4% of the workforce, roughly in line with the EU average of 18.6%.

However, it's important to note that these figures might be an overestimation, as highlighted by Malandrino & Berman (2020), as they include the aeronautics sector, where the female workforce constitutes 40%, and therefore may not accurately represent the public transport and shared mobility sectors. Within these sectors, the gender imbalance seems even more pronounced: it is for instance estimated that only around 10% of bus drivers in Europe are women (Duchène, 2011:12). Female employment in ride-hailing services is also limited. Data from the United States indicates that only 8% of drivers in the traditional taxi industry were women (based on 2012-2013 data). Female employment at app-based ride-hailing companies, specifically Uber, is slightly higher at 14% (based on 2014 data). When asked about their reasons for becoming Uber drivers, 42% of women stated that they opted for part-time or flexible work due to family, education, or health reasons, compared to 29% of men (Hall & Krueger, 2018).

Women are notably underrepresented in white-collar positions within the sector, such as those involved in designing transport schemes and infrastructure. Consequently, fewer measures tend to be developed with the goal of addressing women's transportation needs (Sansonetti & Davern, 2021). Moreover, research indicates that over half of the women working in the transport sector ended up in their roles 'by accident' (Duxfield & Allen, 2023:25). The underrepresentation of women isn't confined to within transport organisations alone; data from Pinakes, a database providing an overview of various political contacts relevant to the social profit sector, reveals that only 25% of all alderpersons (*schepen, échevin.e)* responsible for mobility are women.

Decision-making bodies within public transport operators and shared mobility providers also remain predominantly male-dominated (DG MOVE, 2014:22). In 1993, during a conference organised by the Groupement des Autorités Responsables de Transport (GART), an association of elected officials responsible for public transport in French cities and regions, a group of women noticed that all the elected officials in GART were men. In response, they established an association with the aim of advocating for better consideration of women's needs and active participation in the decision-making process. This organisation evolved into the present-day *Femmes en Mouvement* (Duchène, 2011:12). Despite this and other initiatives, decision-making in the transport sector continues to be male-driven. This is evident when examining the gender distribution within influential bodies of four Belgian transport operators. As the table below illustrates, women remain a minority in these top management positions.

	Body	Men	Women
NMBS-SNCB	Directiecomité / Comité de Direction	6 (67%)	3 (33%)
De Lijn	Managementcomité	6 (86%)	1 (14%)
TEC	Directions transversales & territoriales	9 (82%)	2 (18%)
MIVB-STIB	Beheerscomité / Comité de gestion	11 (92%)	1 (8%)

Table 8: Overview of gender inequality in key decision-making bodies of the Belgian public transport operators (situation on 18.07.2023).

Several reasons contribute to the unattractiveness of the transport sector for women (for an overview, see Ari Thimnu, 2022:30-32; Duxfield & Allen, 2023; Sansonetti & Davern, 2021). One primary reason women may not consider working in the mobility sector is its perception as traditionally male-dominated. Culturally, roles involving driving or piloting vehicles have been seen as 'typically male.' Additionally, many women fear potential discrimination, harassment, or violence when pursuing transportation jobs, both from transport users and colleagues. Next to this, careers such as bus driving or operating trains, metros, and trams often involve irregular schedules, including night or morning rush hours, conflicting with traditional caregiving roles that women may still fulfil (DG MOVE, 2014:22). Many transportation jobs, especially those in the field like bus driving, offer limited part-time opportunities and lack the flexibility available in white-collar positions, which might allow for combining childcare responsibilities with commuting.

Furthermore, jobs in the transport sector often require technical skills. Due to gender stereotypes, women may be less inclined to pursue technical education and, subsequently, are less likely to work in the transport sector. It's worth noting that facilities within the sector often lack adaptations tailored to women's needs, such as separate women's toilets, as highlighted in the DIAMOND project (Ari Thimnu et al., 2022:32). Finally, there is a shortage of campaigns aimed at encouraging women to consider careers in the transport sector, as well as limited networking opportunities for women already working in the industry. Consequently, existing stereotypes persist.

Overview of potential solutions

A survey conducted by Duxfield & Allen (2023:23) found that 97% of respondents, of which three-quarters were women, believe that the transport sector needs to become more diverse. This is not surprising given the observation that many of the barriers that make it more challenging for women to pursue careers in the transport sector are closely tied to gender stereotypes. Achieving greater gender equity in employment within the mobility sector can be realised through a toolkit developed by Duxfield & Allen, with its main components discussed below (Duxfield & Allen, 2022:48-66 unless stated otherwise).

Ban gender stereotyping - Several interventions can help mitigate gender stereotyping in the mobility sector. An important element is ensuring the use of gender-neutral language in recruitment procedures. The DIAMOND project, for instance, identified gender-neutral employment advertisements as a best practice to increase female employment in the transport sector (Ari Thimnu et al., 2022:29). In practical terms, job offers can be made more gender-neutral by avoiding the use of 'male' terms. For example, in French, it is advisable to use both *conducteur* and *conductrice* instead of just *conducteur*. Transport job offers can also be disseminated through channels targeting women, such as the Women in Mobility

network. When organising interviews, it is best to avoid having single-sex panels. Additionally, blind CV-screening can improve gender equity in the sector. Finally, it is equally important to inform women about job opportunities in the transport sector. This can be achieved at various career stages, including making technical education more accessible for girls or organising career days at schools (Ari Thimnu et al., 2022:32).

Eradicate discriminatory work cultures - Gender discrimination and harassment remain prevalent issues, particularly within the male-dominated mobility sector. To foster a more inclusive workplace, several measures can be implemented, including designating a dedicated person responsible for inclusivity and establishing procedures and tools for reporting harassment. To raise awareness and cultivate an inclusive organisational culture, providing comprehensive training to staff, and especially the male-dominated senior management, on gender equality and its practical implementation is recommended. It is noteworthy that although such training is considered crucial to address biases and discrimination in the workplace, most organisations do not consistently offer it to their employees (AFT, 2017a; 2017b; 2017c; 2017d; Ari Thimnu et al., 2022:20; Duxfield & Allen, 2023:27). Additionally, creating a female-friendly working environment is essential. This may involve employers investing in dedicated facilities for women, such as separate toilets or lockers (Ari Thimnu et al., 2022:32). To enhance gender equality in the transport sector, the UK's Department for Transport has developed a set of guidelines and a checklist (with yes/no questions) for assessing gender equality. While primarily targeted at managerial staff in the United Kingdom, these resources can also serve as inspiration for (senior) management within Belgian public transport and shared mobility providers.

Make work more flexible - Women continue to shoulder the majority of caregiving responsibilities, a reality to which public transport and shared mobility operators remain rather ill-adapted. However, the aftermath of the COVID-19 pandemic has demonstrated that introducing greater workplace flexibility is possible. Implementing and promoting family-friendly policies, such as part-time work options or shift changes, can encourage more women to pursue careers in the mobility sector (Ari Thimnu et al., 2022:17, 29-30). Instead of adhering to rigid 9-to-5 schedules, employers can experiment with alternative timeframes during which physical presence is required (e.g., 10 a.m. to 3 p.m.) or allow for flexible weekday attendance to enhance the work-life balance. Additionally, in response to women's more complex travel patterns due to caregiving tasks, it is advisable not to schedule meetings before 8 a.m. and after 6 p.m., thus improving the work-life balance. For roles such as bus drivers and technicians, which require more fixed schedules and late or night shifts, employers can still make efforts to promote part-time work as an accepted option. Larger employers, such as public transport companies, may even consider offering on-site childcare services or laundry facilities for their staff, as seen in the example of Swiss Federal Railways (cited in Duxfield & Allen, 2023:59).

Break glass ceilings - The representation of women in middle and higher management positions remains significantly low. This is unfortunate, as having more women in senior roles is recognised as a best practice for increasing female employment in the transport sector as a whole (Ari Thimnu et al., 2022:16). To facilitate women's career advancement, it is essential to establish clear and unbiased promotion criteria. Providing training opportunities for women can support their career progression. To ensure equal access to training, these sessions should be scheduled during office hours rather than in the evening. Connecting new female hires with female managers and leaders, perhaps through networking events or mentoring programs, can be highly motivating for young recruits. Another strategy for breaking through glass ceilings involves organisations committing to participate in conferences and events only if the panels demonstrate diversity in their composition. Finally, quotas are often suggested as a measure to enhance diversity, particularly in senior roles (AFT, 2017d).

Awareness campaigns[9] - To challenge existing stereotypes, shared mobility operators and governments can develop campaigns targeting three distinct groups. Firstly, campaigns can be directed at women. Examples include campaigns highlighting women who are already thriving in the sector or campaigns emphasising the job diversity within the industry (Ari Thimnu, 2022:32). Secondly, awareness campaigns can centre on passengers with a focus on safety. Thirdly, campaigns should be aimed at male colleagues, emphasising respect towards women to prevent (sexual) harassment. These initiatives can be complemented by activities for both new male and female staff members, concentrating on defining acceptable and unacceptable behaviours.

An increasing number of employers in the public transport and shared mobility sector are implementing measures to promote gender equity among their staff. Survey results presented by Duxfield & Allen (2023:26) reveal that 76% of respondents report their organisation has introduced flexible working arrangements, 42% mention the presence of protocols for addressing sexual harassment, 26% offer childcare support, and only 14% state that their employer has adopted blind CV selection. While these initiatives undoubtedly represent best practices, there is still ample room for improvement.

[9] This section is not based on Duxfield and Allen.

6. Survey analysis

In this section, we present the results from a survey that we developed regarding gender inequality and shared mobility. The survey ran from the 18th of September until the 20th of October 2023. In line with the goal of this project, we targeted young Belgian university and college students between 18 and 35 years old. The survey was created using the Qualtrics software. To make sure that we only collected data within the targeted age group, we included a ‘filter question’ in which the participants had to indicate their age. Participants under the age of 18 or above the age of 35, were excluded from the remainder of the survey.

In order to reach our target groups, we disseminated the survey via the universities that also host our guest lectures, i.e. the University of Hasselt, Vrije Universiteit Brussel and UCL Saint Louis (Brussels). We have also sent the survey to other universities where we have contacts, and via a direct mailing to all student associations of which we could find the contact details. The full list of associations that we contacted to disseminate this survey, is available upon request. To complement this dissemination strategy, we also drew attention to the survey via our website, LinkedIn-page and Instagram-channel.

The questions asked in the survey were inspired by the findings from the literature study, which gave us valuable insights on the topics to which we could draw our attention. In the survey, we followed the same structure as the literature study:

- Demographic information and transport usage
- Transport offer
- Digitalisation
- Personal safety and harassment
- Careers in mobility and transport

The survey was designed in such a way that it would take no longer than 15 to 20 minutes to fill out. We also included a ‘trick question’ midway the survey to check how accurately the participants responded to our questions. In a matrix question in the part related to ‘Digitalisation’, we asked the following “Are you still awake? If yes, select 'Strongly agree'”. No fewer than 97.9% of the participants answered this question correctly, meaning that our results have a high degree of accuracy.

For the sake of clarity, we present the main findings of the survey in the form of information sheets for each of the analysed topics, in which we discuss the most important findings of the survey. The full results of the survey are available in the annex to this study. Where relevant, we compare our findings with the results of other studies in order to contextualise them. The full dataset containing all anonymised answers is available upon request.

6.1 Demographics and mobility behaviour

Participants (annex sections 1.1 → 1.3)

In total, 194 participants have completed the survey:

- Gender: 42% of the participants are men, women make up 53% of the group, the rest of the participants identify themselves as 'non-binary', 'other', or prefer not to state their gender;
- Language: 67% of the participants took the survey in Dutch, 15% in French and 18% in English;
- Age: 78% of the participants were between 18-24 years old;
- Residence: 91.2% of the participants lives in Belgium for at least two years;
- Degree: 55.1% of the participants it is a 'university degree', the highest degree for 36.1% of participants was 'secondary education';
- Smartphone: 99.5% of the participants have a smartphone.

Participants enrolled at a university or college could indicate their *alma mater* (non mandatory questions). Most of the participants - 104 to be precise - are students from the University of Hasselt. Most of the participants used public transport and/or shared mobility in the province of Limburg (113), the Brussels Capital Region (108) and the province of Antwerp (86). When analysing the results on the following pages, we should keep in mind that they are more representative of a rural and semi-urban setting (Limburg) than for the purely urban context (Brussels). This represents Belgian geography, which is characterised by the presence of few large cities and a (semi-)urbanised countryside.

Mobility behaviour (annex section 1.4)

Public transport remains by far the most popular transport mode of the young Belgians. The majority of the participants use the train (91.3%) and bus (90.2%) at least on a yearly basis, followed by tram (63.4%) and metro (60.3%). The bus is used on a daily or weekly basis by 54.6% of the participants. Among men, the train is most popular (91.5%). Among women, the bus is most popular (94.1%). The somewhat lower share of tram and metro usage in these figures can be explained by the high number of participants from Limburg, where tram and metro are not available.

Private cars are used on a yearly basis by 77.4% of the participants. No fewer than 58.8% of the participants use a privately owned car on a daily or weekly basis. On a yearly basis, men use private cars a bit more (79.3%) than women (77.7%).

New forms of shared mobility are considerably less popular among the participants in our survey.[10] Within the entire group of participants, shared cars are the most popular, with 20.1% of the respondents using them at least once a year. This is followed by shared (e-)bikes (16.5%) and shared e-scooters (14.4%). Among men, shared (e-)bikes are most popular, with 19.5% using them on a yearly basis. This is followed by shared e-scooters and carsharing (both at 17.1%). The top 3 looks different among women, for whom carsharing is most popular (20.4% on a yearly basis), followed by shared (e-)bikes (13.6%) and e-scooters (11.7%).

[10] In an urban setting, the use of shared mobility is higher than on the national level. Data from an Attest survey (provided by VOI) show for instance that 15-27% of adults in Brussels use micromobility on a weekly basis.

Among our participants, (e-)bikes and e-scooters are less popular among women than among men. This finding is in line with observations from the literature (see section 4 of this document).

6.2 Service offer

Perception of mobility modes (annex section 2.1 → 2.5)

We asked the participants how they perceived different public transport and shared mobility solutions. The participants could select multiple transport modes.

The train is perceived as the handiest mode to use in general (selected 161 times), followed by the bus. Shared mobility is seen as less handy than public transport.[11] Carpooling is perceived as the handiest form of shared mobility by the participants. There are no striking gender differences related to this, besides that bus and carpooling are, relatively speaking, perceived as handier by women than by men (70.9% of women find the bus handy vs. 65.9% of men; 39.8% of women find carpooling handy vs. 34.1% of men).

The train is seen as the handiest mode to transport goods (luggage) (124), followed at a distance by carpooling and carsharing. Both men and women perceive the train as the handiest mode to transport goods (63.4% of men and 64.1% of women selected this mode). Men put carsharing in second place (40.2%), followed by carpooling (36.6%). Women perceive carpooling as handier for transporting goods than carsharing (42.7%). Women find carpooling and carsharing handier for transporting goods than men.

When it comes down to travelling with children, the train (161), bus (115) and shared car (108) are perceived as the most suited non-privately owned travel modes. This top-3 is the same among men and women, although the train being perceived as 'more suited' by a higher share of women (86.4%) than men (81.1%).

The train (160), bus (132) and tram (119) are seen as safest modes in general. We see that women find nearly all modes less safe than men. We observe this difference for instance for the train (87.8% vs. 80.6%), bus (78.0% vs. 61.2%) or tram (74.4% vs. 52.4%).

The bus is seen as the most affordable mode by our participants (134). Men perceive tram and metro as second and third most affordable, while among women, this is carpooling and the metro. Shared micromobility and carsharing are seen as considerably less affordable by both men and women. In general, men find the cited mobility options more affordable than women. We observe these differences for instance travelling by bus (76.8% vs. 63.1%), tram (59.8% vs. 38.8%) or metro (53.7% vs. 40.8%).

Making the service offer more accessible to women (annex section 2.6)

In the literature study, we showed that women face various mobility-related barriers. Moreover, figures from governments, mobility providers and from our own survey (annex section 1.4) show that e-scooters and e-bikes are less popular among women.

Based on literature, we proposed measures that can increase gender equality in shared mobility and asked our participants to rank them. Providing maxi-cosi's to shared cars is seen as the most effective measure to increase gender equality in shared mobility by both men and women (28% of men put this measure in first place, and 28.2% of women).

Women also broadly support making helmets mandatory for shared (e-)bikes and e-scooters to increase safety (47.6% of men put this measure in 1st or 2nd place). Men are much in

[11] This can be influenced by the fact that our participants are less familiar with shared mobility. See section 6.1.

favour of training sessions to learn how to ride a (shared) bike or e-scooter (46.4% of men put this measure in 1st or 2nd place in their ranking).

6.3 Digitalisation

Mobility app usage (annex section 3.1)

The use of apps for planning, booking and paying for public transport and shared mobility is increasing. We asked the participants in our survey which apps they have used over the last year. Google Maps is the most popular transport app, with a staggering 97.9% of participants having used it over the past year. The apps of the public transport operators are widely used as well. Interestingly, women use these apps more than men: for instance, the SNCB-NMBS app has been used by 79.6% of the female participants over the past year, compared to 64.0% of male participants. Apps of the shared mobility operators are used by on average 10% or less of the participants. This is related to the fact that these modes are less used by the participants of our survey than public transport (see section 6.1).

Visions related to digitalisation in mobility (annex section 3.2)

Via a set of statements, we aimed to gain insight into the visions of young Belgians related to the increased reliance on apps in mobility. A staggering 89.7% of the participants find that public transport and shared mobility apps make travelling easier. There are no significant differences between men and women related to this.

Slightly more than 75.8% of the participants find it safe to pay for their transport using an app. Male participants find paying via an app safer than women (84.1% vs. 71.9%).

The young Belgians taking part in this survey are confident about their digital skills: only 10.3% of them think that they would require training on how to use transport apps. Somewhat more men (12.2%) than women (7.9%) find that they need training to use apps.

Despite their positive attitude and familiarity with apps to plan (and book or pay for) their travel, 83.0% of respondents (strongly) disagrees with the following statement: ‘I think that kiosks where you can physically buy a ticket or get information are outdated.’ There are no significant differences between men and women regarding this. Put differently, our participants consider that, despite the growing availability of and familiarity with mobility apps, kiosks where you can buy tickets or get information (from a person) are still a useful and essential component of the mobility system.

6.4 Insecurity and harassment

We devoted considerable attention in our survey to the topic of personal safety and harassment. As became clear during the literature study, this is one of the major issues identified by female users of public transport and shared mobility. In our survey, we described 'harassment' as follows:

"By harassment, we refer to unwanted acts such as: improper remarks about your gender, sexual orientation, colour of skin, physical appearance, etc.; unwantedly being touched or looked at; being the victim of verbal or physical assault; …"

We stressed that the definition of harassment is highly personal and provided the respondents the possibility to provide an alternative definition.

Fear of being harassed and adaptation of travel behaviour (annex section 4.1 → 4.2)

More than half of our respondents fear that they will be harassed when using public transport. This percentage is highest on the metro (60.8%), followed by bus (55.7%), tram (55.2%) and train (53.1%). The fear of being harassed is considerably lower when using shared mobility. The shared modes on which our respondents are most afraid of being harassed are carpooling and shared e-scooters (21.6% each) and shared (e-)bikes (19.6%). Carsharing is the transport mode on which our respondents are the least afraid of being harassed (13.9%). For all modes, our participants are most afraid of harassment at night.

We observe considerable differences between men and women regarding the fear of being harassed. The table below shows that a majority of women fear being harassed while using public transport or shared mobility, while this is only the case for a minority of men:

	Men	**Women**
Train	24.4 %	73.8 %
Metro	28.0 %	86.4 %
Tram	25.6 %	77.7 %
Bus	25.6 %	77.7 %
Shared (e-)bike	2.4 %	33.0 %
Shared (e-)cargobike	3.7 %	30.1 %
Shared (e-)scooter	2.4 %	36.9 %
Shared moped	2.4 %	32.0 %
Carsharing	7.3 %	20.4 %
Carpooling	11.0 %	30.1 %

The fear of being harassed as well as the actual harassment makes women - much more than men - adapt their travel pattern. No fewer than 61.2% of female respondents indicated that they avoid travelling after dark (compared to 19.2% of male participants). A staggering 64% of female respondents adapt their travel routes after dark (compared to 34.1% of men). Finally, 28.1 % of the female respondents avoid trains, buses and metro carriages that are almost empty, compared to 3.6% of men.

Actual harassment (annex sections 4.3 → 4.5)

Of all persons taking part in this survey, more than one third (37.6%) indicated that they have already been the victim of harassment while using public transport or shared mobility. The actual harassment against the female participants is thrice as high than towards the male participants in this survey (54.4% compared to 17.1%). This 3-to-1 ratio is observed for the nearly all modes of transport, except for metro carriages, where women have been harassed five times more often than men:

	Men	**Women**
Train	9.6 %	35.9 %
Bus	8.5 %	31.1 %
Metro	3.7 %	18.4 %
Tram	3.7 %	11.7 %

Our respondents indicated that most of the harassment took place in Brussels, followed by Antwerp. Unfortunately, we have too few people that identify as ‘non-binary’ or ‘other’ to draw conclusions for this group.

Potential of female-only mobility solutions (annex section 4.6)

Based on practices identified during the literature study, we proposed five female-only mobility services to our participants and asked to rank them. By female-only services, we refer to specific transport solutions of which women only can make use. Some of these specific offers have already been implemented abroad.

An overwhelming majority of all participants prefers implementing the ‘nightstop system’, allowing women to leave the bus between stops at night. This reduces the walking time to their final destination and thus decreases the risk of being followed and harassed. No fewer than 44.3% of all respondents chose this option as their first choice; 59.8% of participants selected the ‘nightstop service’ as first or second preferred option. There is broad support among both men and women for this measure: 46.3% of male and 42.7% of female respondents selected the ‘nightstops’ as their first choice; 62.2% of male and 58.2 % of female participants selected this service as first or second choice.

The second most preferred solution is implementing taxi services with female drivers and passengers only: 49% of all participants (53.7% of male and 45.6% of female participants) selected this as their first or second preferred solution.

6.5 Careers in mobility and transport

Perception of this sector (annex section 5.1)

More than one third of our respondents find that transport is a typically male-dominated sector. A significantly larger share of female participants find this sector male-dominated (41.7%) than the male participants (28.1%). Similarly, 22.3% of the female respondents find that jobs in the transport sector are not adapted to women's needs, compared to 12.2% of the male respondents. Note that 53.4% of female participants and 29.3% of male respondents did not have a strong opinion on this matter and answered 'neither agree nor disagree' to the statement that 'Transport jobs are not adapted to women's needs'.

It is thus not surprising that more men than women consider pursuing a career at a public transport operator or organisation (25.6% of men vs. 18.4% of women), or at a shared mobility operator or organisation (15.9% of men vs. 14.6% of women). Despite these lower figures among women, especially concerning public transport, men and women find it suited for women to pursue a career in transport (despite prevailing stereotypes). We measured this via the provocative statement that "it is not suitable for a woman to pursue a career in the transport sector". No less than 91.5% of male and 72.9% of women (strongly) disagree with this statement. Interestingly, the female respondents find a career in transport less suitable for women than the male participants.

Increasing female employment in mobility and transport (annex section 5.6)

Based on findings from the literature study, we proposed some measures that can potentially increase female employment in mobility and transport. Our participants had to make a top-5 of these solutions according to their preferences.

The preferred measure to increase female employment is implementing 'blind CV-screening' in which name, gender and age are anonymised. No less than 57.7% of all respondents put this option in first place, and 76.3% of participants selected this measure as their first or second choice. Among the male participants, 59.8% selected 'blind CV-screening as their preferred measure (79.8% as first or second choice), and 56.3% of women has 'blind CV-screening' as their first choice (74.7% as first or second choice), showing that there is broad support among men and women to implement this measure.

Next to this, both men and women find that campaigns that showcase female role models working in the mobility and transport sector is an adequate strategy to increase the share of women in this sector's workforce: 53.6% of men and 46.6% of women selected this measure as their first or second choice.

7. Conclusion

In this study, we explored the topic of 'gender inequality in shared mobility' by undertaking a multifaceted approach. Firstly, we analysed the extent to which public transport and shared mobility are utilised in Belgium and examined gender differences in their usage. Secondly, we conducted a literature review to identify various barriers faced by women when using shared forms of transport. Lastly, we launched a survey targeting students from Belgian universities and colleges to understand their use of public transport and shared mobility, the challenges they encounter, and the solutions they support to promote gender equity in shared mobility.

From a global perspective, Belgium is characterised by a high level of gender equality. However, certain inequalities persist, among others in the field of mobility. These disparities are not only related to the design of the mobility system and specific transport modes but also to women's feelings of safety when using public transport and shared mobility, considering issues such as harassment, and their access to jobs in the mobility and transport sector. Our literature study and survey revealed gender-related barriers related to the service offer, digitalization, harassment, personal security, and job opportunities. We also identified specific measures that can enhance female access to the public transport and shared mobility ecosystem.

We observed a mismatch between the current mobility system and female travel patterns, which are still heavily influenced by caregiving and household responsibilities. To resolve this issue, it is imperative to engage women in decision-making processes concerning the development of the public transport and shared mobility systems. Other potential solutions to enhance women's access to non-privately owned mobility solutions include adjusting transport schedules, ensuring easy accessibility of rolling stock with strollers, and maintaining affordable pricing. Regarding shared mobility, our survey indicated that providing maxi-cosi's in shared cars, enhancing e-scooter safety, and organising training sessions for biking or e-scooter usage are effective measures to make shared mobility more accessible to women.

While digital applications for smartphones are seen as a positive evolution by young and more educated users, it is important to acknowledge that not everyone possesses sufficient digital skills to be able to use these apps. Approximately 49% of women in Belgium have limited or no digital skills, compared to 43% of men. To prevent digitalisation from exacerbating transport poverty among women, essential travel information should remain available in non-digital forms. Providing assistance and training for individuals with limited digital skills and involving women in app development and testing processes are crucial steps as well.

The most pressing issue faced by women during travel on public transport is (sexual) harassment. Women are significantly more afraid of harassment and have been victims of it to a greater extent than men. Safety concerns significantly influence women's travel choices, especially in public transport. To address this issue, potential solutions include video surveillance, alarm buttons, well-lit and well-designed public spaces, staff presence, awareness campaigns, dedicated women's seating areas, and exploratory walks to gather insights on safety concerns. Female-only services, such as taxis with female drivers and passengers only, are other solutions to increase women's (feeling of) safety while travelling. Additionally, our survey revealed broad support for the 'nightstop' system, which allows women to leave the bus between stops at night to reduce walking time, a measure already implemented in Kalmar (Sweden) and Montréal (Canada).

Lastly, women are underrepresented in the mobility and transport sector, both as employees and in management positions. Discriminatory work cultures, gender stereotypes, and

inflexible work schedules contribute to this disparity. Solutions to address these issues include gender-neutral job advertisements, eradicating discriminatory work cultures through awareness campaigns and training, promoting workplace flexibility, breaking glass ceilings through unbiased promotion criteria, and implementing quotas to enhance diversity in senior roles. Awareness campaigns targeting women, passengers, and male colleagues are also crucial. Our survey indicated broad support for blind CV-screening, where names and gender are anonymized to avoid gender bias when selecting candidates for job interviews.

In light of these findings and solutions, we hope that policymakers will consider some of the solutions showcased in this study for implementation in Belgium. By embracing the measures successfully deployed in other countries, our country has the opportunity to lead the way toward a public transport and shared mobility ecosystem that is more equitable, safe, and accessible for women, as well as increasing diversity and inclusivity among employees in the transport and mobility sector.

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Annex - Results from Survey

Jelten Baguet (he/him)
with the cooperation of Esen Köse (she/her), Rita Qaf (she/her) and Zara Hublet (she/her)

15 / 11 / 2023

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1 Demographics and mobility behaviour

1.1 Demographics

We had 194 participants who have fully completed the survey. The table below shows the main characteristics of these participants.

Gender		
Man	82	42%
Woman	103	53%
Non-binary	4	2%
Other	3	2%
Prefer not to say	2	1%
Language (in which the survey was taken)		
NL	130	67%
FR	29	15%
EN	35	18%
Age		
18-24	151	78%
25-34	43	22%
Living in Belgium for more than two years?		
Yes	177	91.2%
No	16	8.3%
Prefer not to say	1	0.5%

Table continues on the next page.

Highest degree of the participants		
None	1	0.5%
Secondary education	70	36.1%
Higher education - college	16	8.3%
Higher education - university	107	55.1%
Has a smartphone		
Yes	193	99.5%
No	1	0.5%

1.2 College or university

Participants who answered that they are enrolled at a college or university, could indicate where they study. Answering this question was not mandatory. Most respondents came from the University of Hasselt, which has a mobility studies department. They have actively disseminated the survey among their students.

Absolute number of participants per college or university. This was a non-mandatory question.

ICHEC	1
Interuniversitaire master	7
Hogeschool Gent	1
KU Leuven (+ campus Geel)	7
UCLouvain Saint Louis Bruxelles	13
Universiteit Antwerpen	13
Universiteit Gent	11
Universiteit Hasselt	104
Vrije Universiteit Brussel	7
Vrije Universiteit Brussel & Université Libre de Bruxelles (interuniversitair)	4

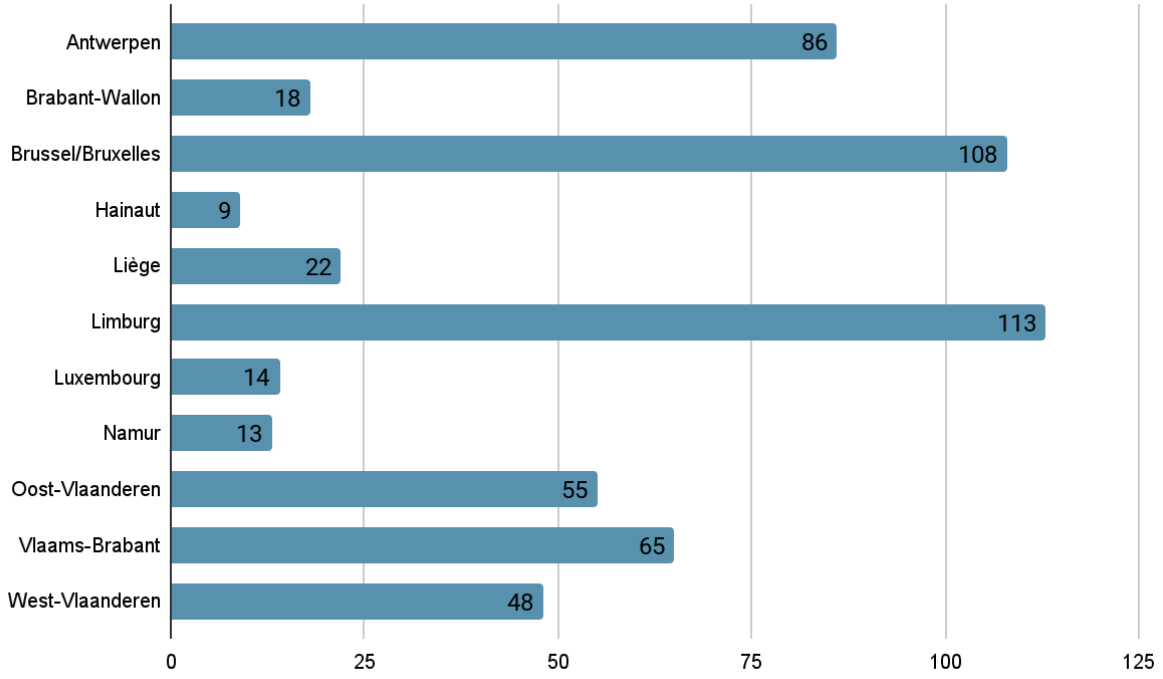
1.3 Region in which public transport and/or shared mobility was used.

We asked the participants the following question:

- During the last year, in which province or region did you use public transport or shared mobility?
- In welke provincie of regio heb je het afgelopen jaar gebruikgemaakt van het openbaar vervoer of deelmobiliteit?
- Au cours de la dernière année, dans quelle province ou région avez-vous utilisé les transports en commun ou la mobilité partagée ?

The participants could select as many options as they wanted to.

Absolute number of participants having used public transportation and / or shared mobility per province or region.



1.4 Usage of different transport solutions

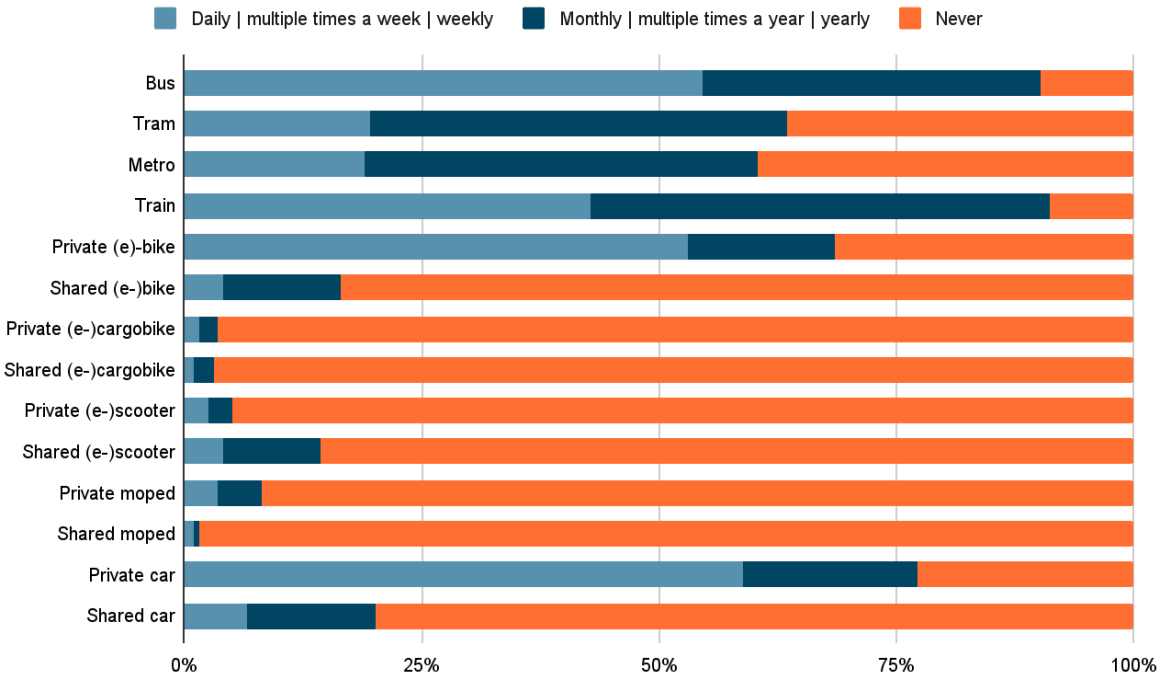
We asked the participants the following question:

- During the last year, how often did you use the following transport solutions?
- Hoe vaak heb je het afgelopen jaar gebruikgemaakt van de volgende mobiliteitsoplossingen?
- Au cours de la dernière année, à quelle fréquence avez-vous utilisé les solutions de transport suivantes ?

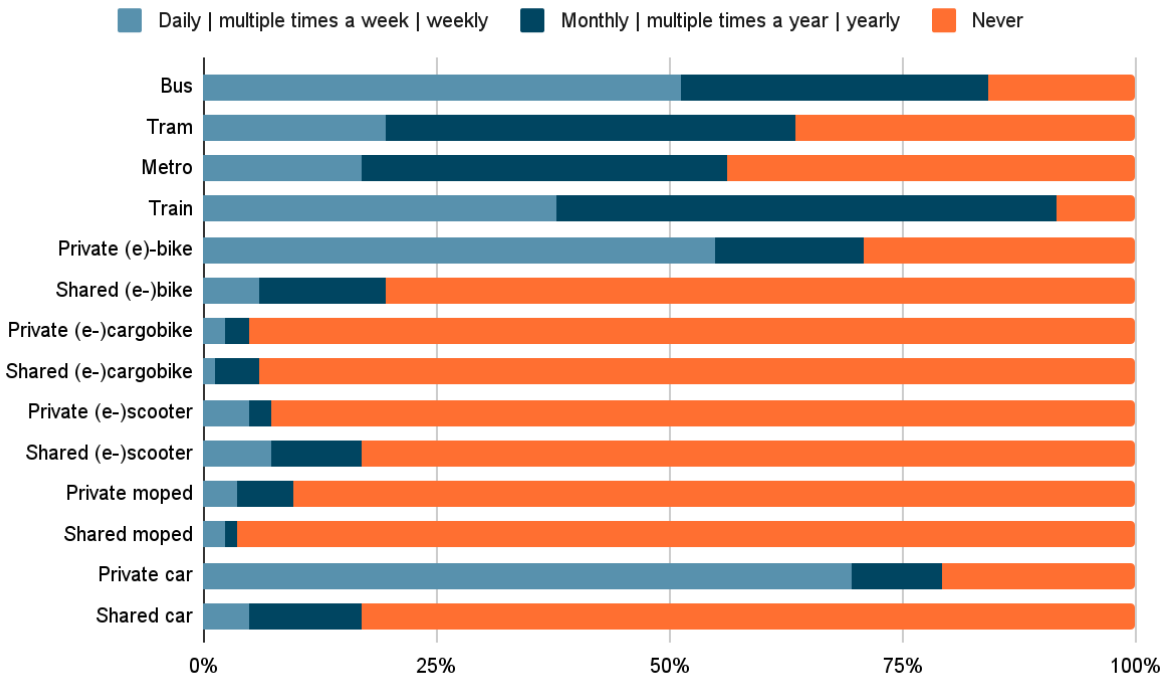
Per mode, the participants had to select the option that resembles their situation most.

Below, we give an overview of the results for the entire population, for men and for women.

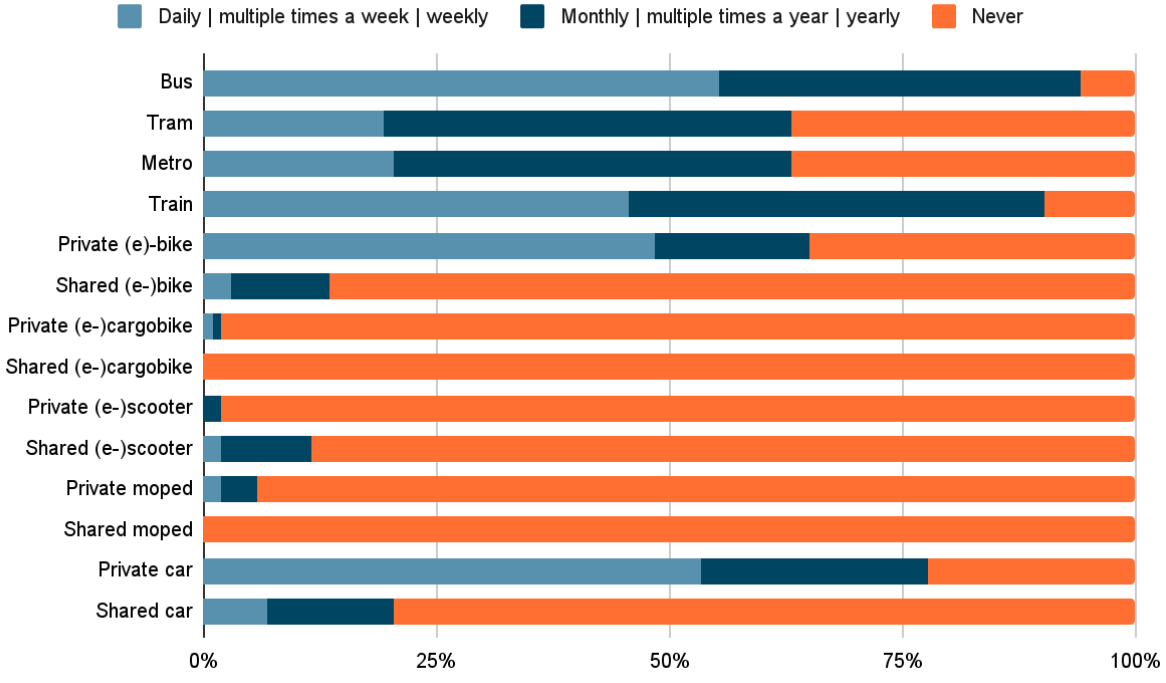
Mode usage for the entire group of participants.



Mode usage among male participants.



Mode usage among female participants.



2 Service offer

2.1 Modes perceived as handy and easy in general

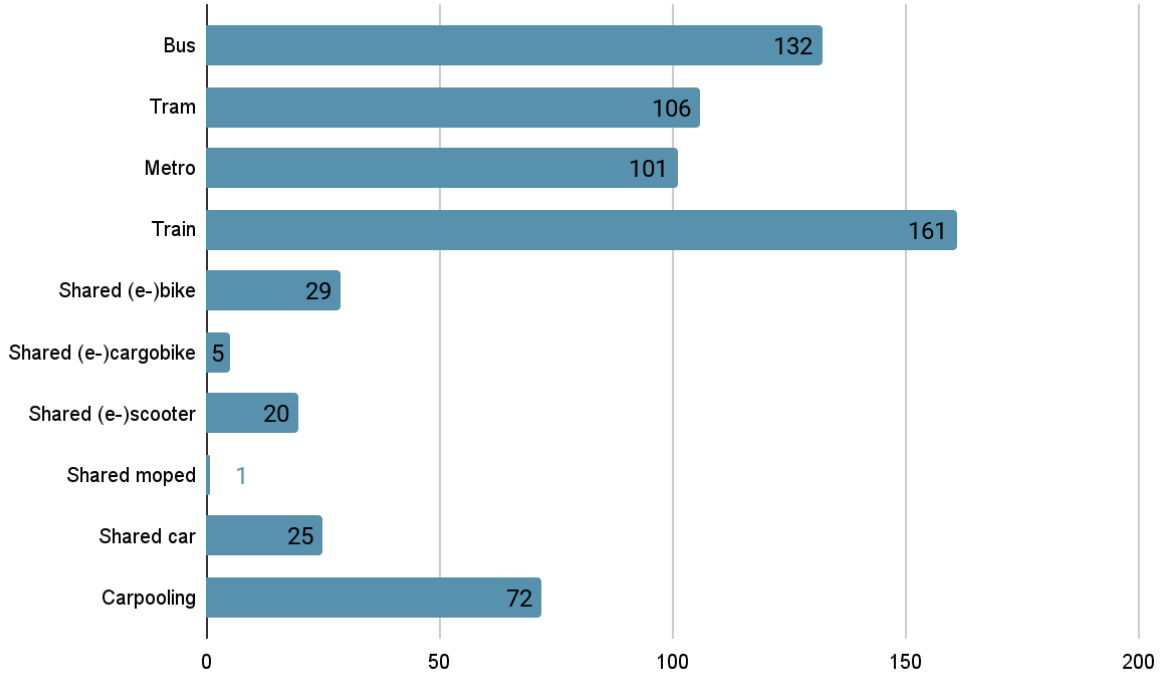
We asked the participants the following question:

- Which shared modes do you find handy to use in general?
- Welke gedeelde vervoersmodi vind je in het algemeen handig om te gebruiken?
- Quels modes partagés trouvez-vous faciles à utiliser en général ?

The participants could select multiple options.

Below, we give an overview of the results for the entire population, for men and for women.

Modes perceived as handy in general by the entire group of participants (absolute figures).



Modes perceived as handy in general by men and women, ranked in descending order per gender (absolute and relative figures).

Men			**Women**		
Train	69	84.1 %	Train	85	82.5 %
Bus	54	65.9 %	Bus	73	70.9 %
Tram	47	57.3 %	Tram	55	53.4 %
Metro	44	53.7 %	Metro	51	49.5 %
Carpooling	28	34.1 %	Carpooling	41	39.8 %
Shared (e-)bike	15	18.3 %	Shared car	15	14.6 %
Shared (e-)scooter	12	14.6 %	Shared (e-)bike	13	12.6 %
Shared car	10	12.2 %	Shared (e-)scooter	8	7.8 %
Shared (e-)cargobike	3	3.7 %	Shared (-e)cargobike	2	1.9 %
Shared moped	1	1.2 %	Shared moped	0	0 %

2.2 Modes perceived as handy and easy for transporting goods

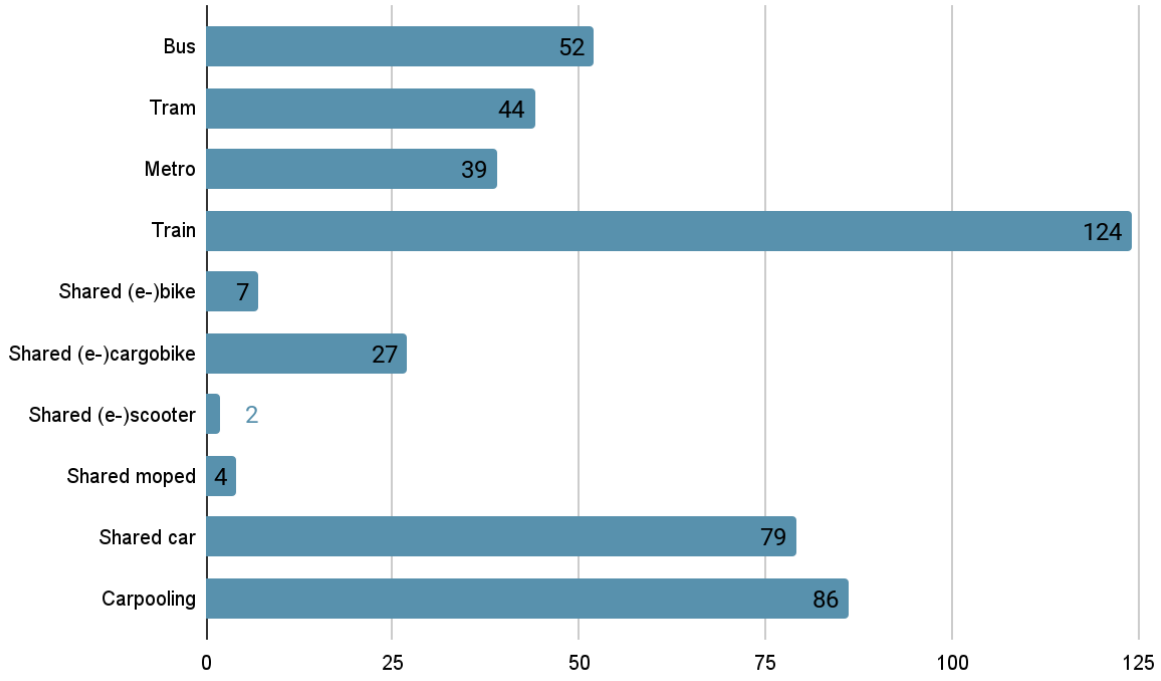
We asked the participants the following question:

- Which shared modes do you find handy for transporting goods (luggage, shopping bags,...)?
- Welke gedeelde vervoersmodi vind je handig voor het vervoeren van goederen (koffers, boodschappentassen,...)?
- Quels modes partagés trouvez-vous utiles pour transporter des marchandises (bagages, sacs de courses,...) ?

The participants could select multiple options.

Below, we give an overview of the results for the entire population, for men and for women.

Modes perceived as handy for transporting goods by the entire group of participants (absolute figures).



Modes perceived as handy for transporting goods by men and women, ranked in descending order per gender (absolute and relative figures).

Men			**Women**		
Train	52	63.4 %	Train	66	64.1 %
Carsharing	33	40.2 %	Carpooling	52	50.5 %
Carpooling	30	36.6 %	Carsharing	44	42.7 %
Bus	21	25.6 %	Bus	30	29.1 %
Metro	15	18.3 %	Tram	29	28.2 %
Tram	15	18.3 %	Metro	24	23.3 %
Shared (e-)cargobike	15	18.3 %	Shared (e-)cargobike	12	11.7 %
Shared (e-)bike	3	3.7 %	Shared (e-)bike	3	2.9 %
Shared moped	3	3.7 %	Shared (e-)scooter	1	1 %
Shared (e-)scooter	1	1 %	Shared moped	1	1 %

2.3 Modes perceived as suited for travelling with children

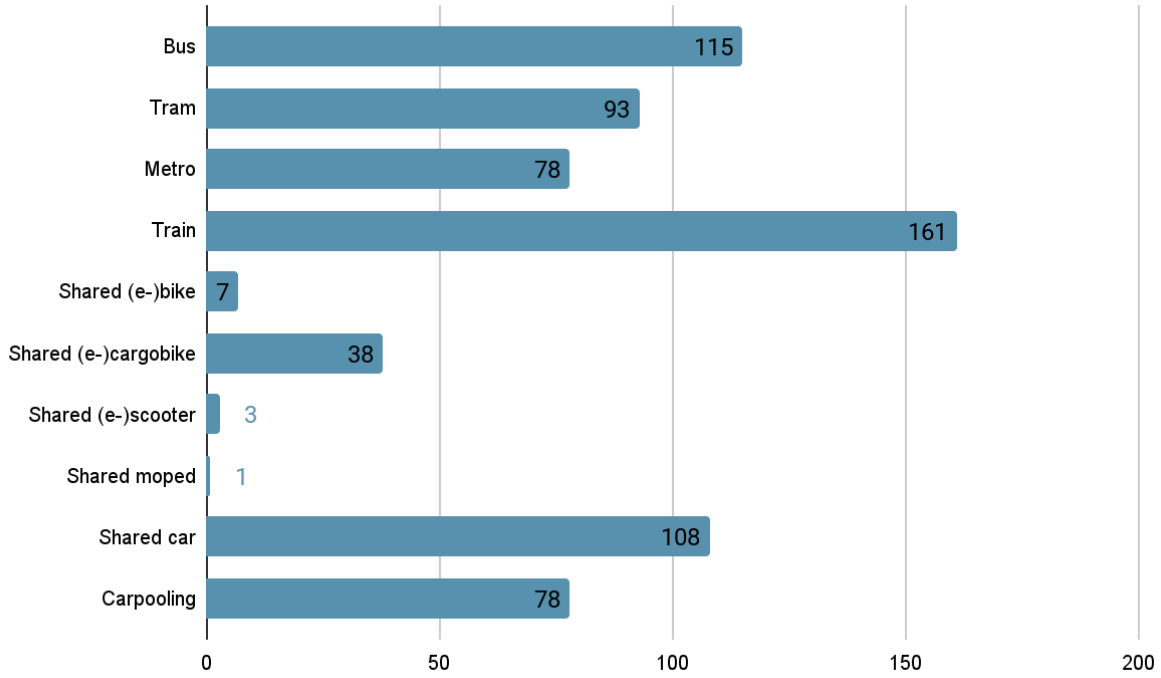
We asked the participants the following question:

- Which shared modes do you find suited for travelling with children?
- Welke gedeelde vervoersmiddelen vind je geschikt voor reizen met kinderen?
- Quels modes partagés trouvez-vous adaptés pour voyager avec des enfants ?

The participants could select multiple options.

Below, we give an overview of the results for the entire population, for men and for women.

Modes perceived as suited for travelling with children by the entire group of participants (absolute figures).



Modes perceived as suited for travelling with children by men and women, ranked in descending order per gender (absolute and relative figures).

Men			**Women**		
Train	67	81.1 %	Train	89	86.4 %
Bus	48	58.5 %	Bus	62	60.2 %
Carsharing	44	53.7 %	Carsharing	59	57.3 %
Tram	37	45.1 %	Tram	52	50.5 %
Metro	30	36.6 %	Carpooling	46	44.7 %
Carpooling	27	32.9 %	Metro	44	42.7 %
Shared (e-)cargobike	12	14.6 %	Shared (e-)cargobike	24	23.3 %
Shared (e-)bike	2	2.4 %	Shared (e-)bike	3	2.9 %
Shared (e-)scooter	1	1.2 %	Shared (e-)scooter	1	1 %
Shared moped	0	0 %	Shared moped	1	1 %

2.4 Modes perceived as being safe

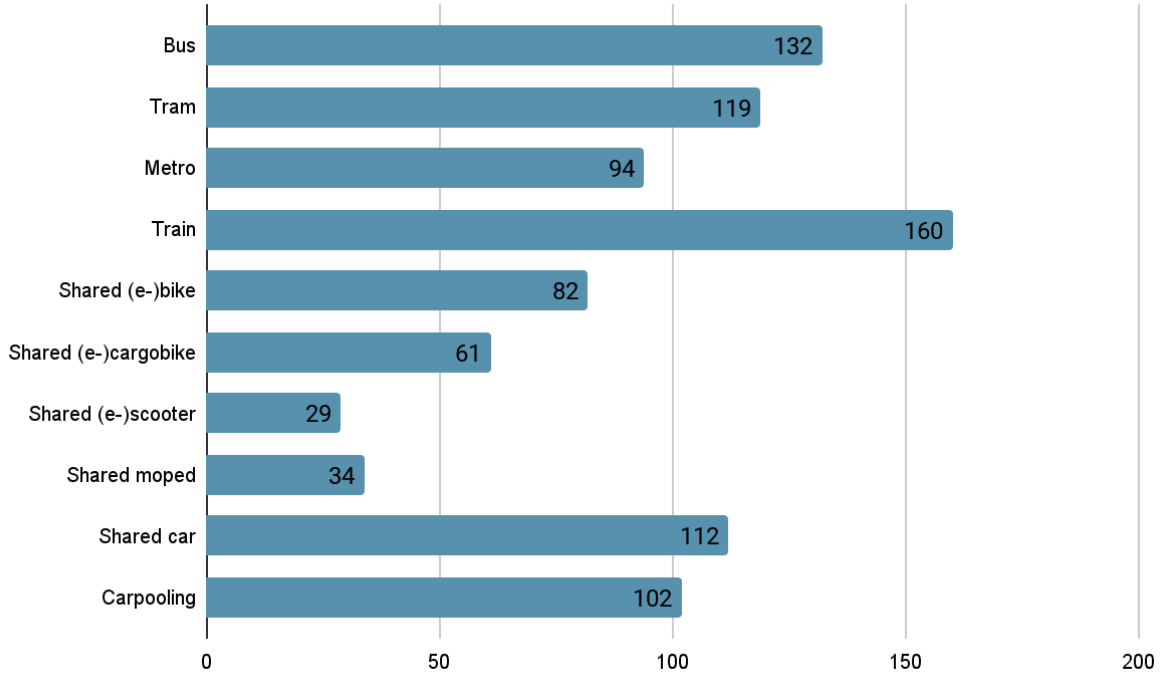
We asked the participants the following question:

- Which shared modes do you find safe?
- Welke gedeelde vervoersmodi vind je veilig?
- Quels modes partagés trouvez-vous sûrs (par rapport à votre sécurité) ?

The participants could select multiple options.

Below, we give an overview of the results for the entire population, for men and for women.

Modes perceived as safe by the entire group of participants (absolute figures).



Modes perceived as safe by men and women, ranked in descending order per gender (absolute and relative figures).

Men			**Women**		
Train	72	87.8 %	Train	83	80.6 %
Bus	64	78.0 %	Bus	63	61.2 %
Tram	61	74.4 %	Carsharing	60	58.3 %
Metro	50	61.0 %	Carpooling	54	52.4 %
Carsharing	47	57.3 %	Tram	54	52.4 %
Carpooling	42	51.2 %	Shared (e-)bike	42	40.8 %
Shared (e-)bike	36	43.9 %	Metro	41	39.8 %
Shared (e-)cargobike	27	32.9 %	Shared (e-)cargobike	31	30.1 %
Shared moped	18	22.0 %	Shared (e-)scooter	15	14.6 %
Shared (e-)scooter	12	14.6 %	Shared moped	15	14.6 %

2.5 Modes perceived as affordable

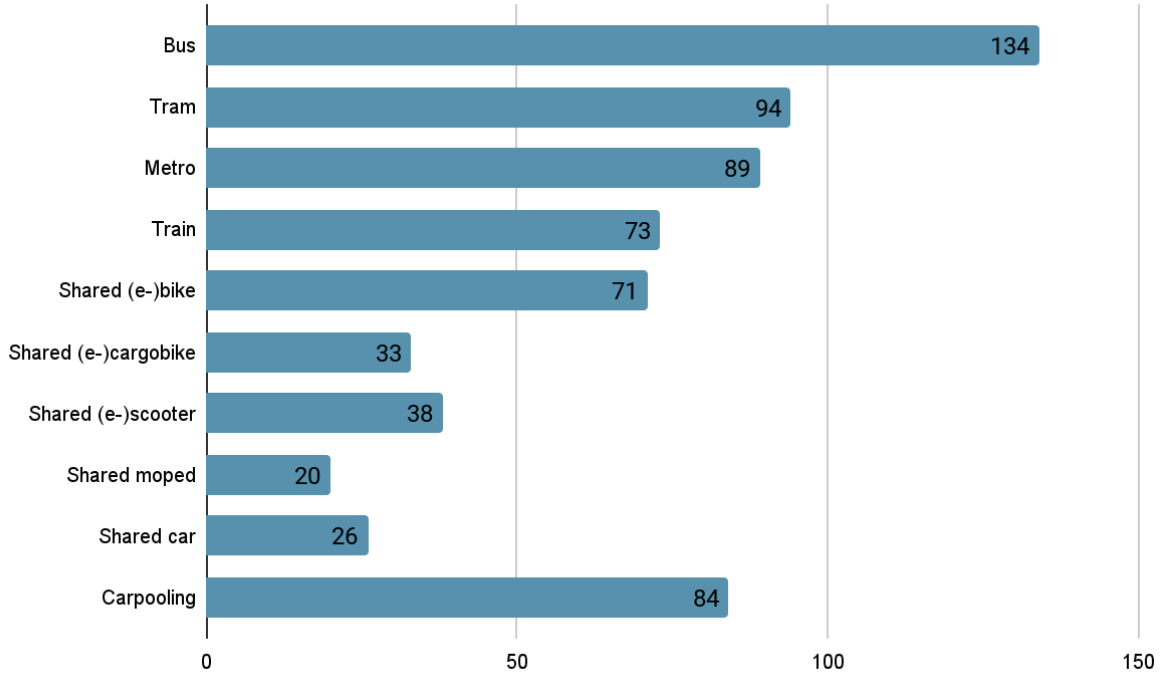
We asked the participants the following question:

- Which shared modes do you find affordable?
- Welke gedeelde vervoersmodi vind je betaalbaar?
- Quels modes partagés trouvez-vous abordables (bon marché) ?

The participants could select multiple options.

Below, we give an overview of the results for the entire population, for men and for women.

Modes perceived as affordable by the entire group of participants (absolute figures).



Modes perceived as affordable by men and women, ranked in descending order per gender (absolute and relative figures).

Men			**Women**		
Bus	63	76.8 %	Bus	65	63.1 %
Tram	49	59.8 %	Carpooling	45	43.7 %
Metro	44	53.7 %	Metro	42	40.8 %
Train	40	48.8 %	Tram	40	38.8 %
Carpooling	35	42.7 %	Shared (e-)bike	39	37.9 %
Shared (e-)bike	28	34.1 %	Train	30	29.1 %
Carsharing	13	15.9 %	Shared (e-)scooter	25	24.3 %
Shared (e-)cargobike	12	14.6 %	Shared (e-)cargobike	19	18.4 %
Shared scooter	12	14.6 %	Shared moped	12	11.7 %
Shared moped	7	8.5 %	Carsharing	11	10.7 %

2.6 Solutions to make the service offer more accessible to women

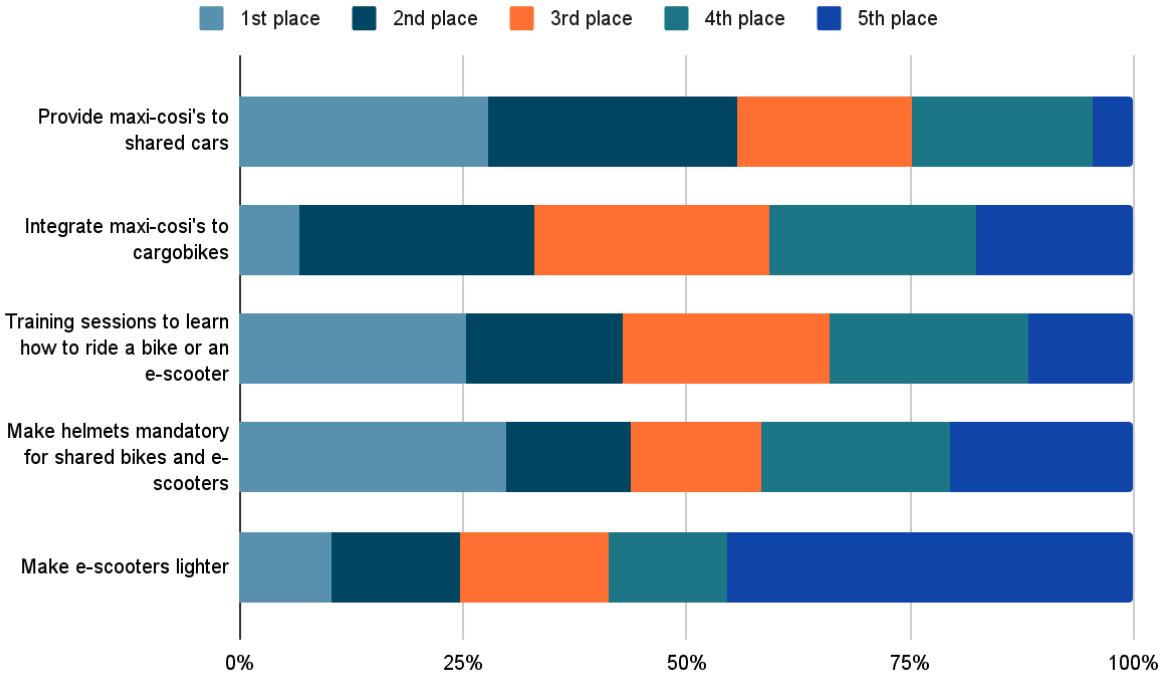
We asked the participants the following question:

- Some measures can increase gender equality in shared mobility. Which of the following solutions would you find the most useful? Please rank them.
- Sommige maatregelen kunnen de gendergelijkheid in deelmobiliteit vergroten. Welke van de volgende oplossingen vind je het nuttigst? Rangschik ze.
- Certaines mesures visent à accroître l'égalité des sexes dans la mobilité partagée. Parmi les solutions suivantes, laquelle serait selon vous les plus utiles ? Veuillez les classer.

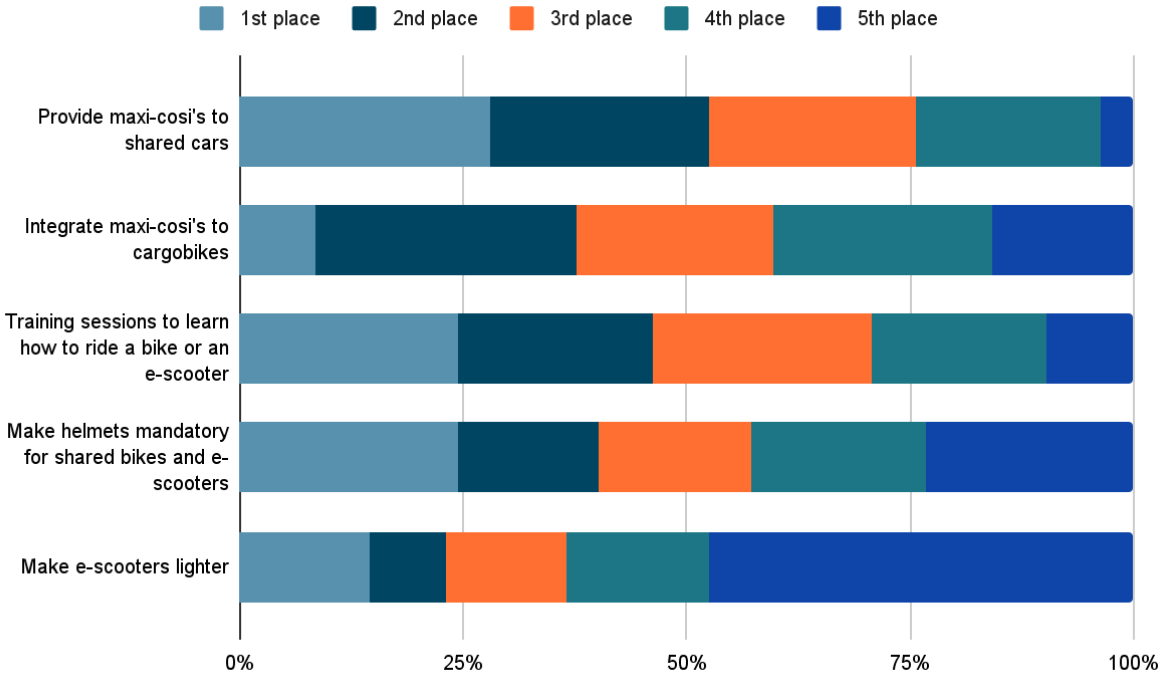
The participants had to rank the options from one to five, putting the best solution (according to them) first in their ranking. The solutions proposed in the survey were based on insights from the literature study.

Below, we give an overview of the results for the entire population, for men and for women.

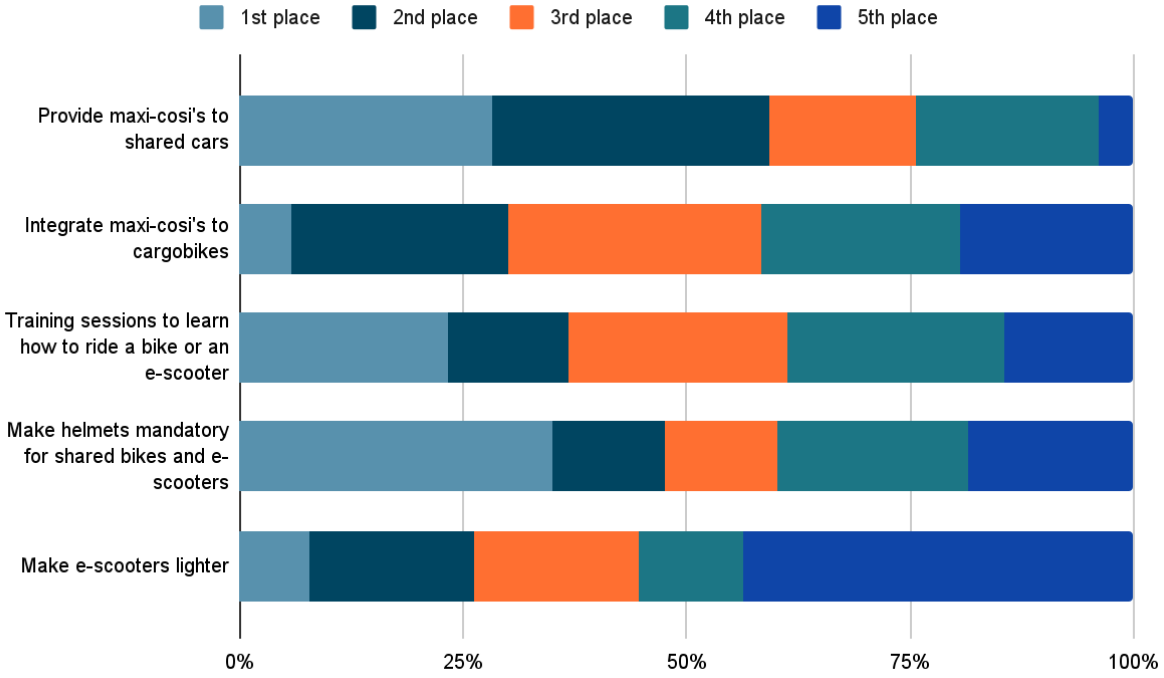
Ranking of potential solutions to make shared mobility more accessible to women, according to the entire group of participants.



Ranking of potential solutions to make shared mobility more accessible to women, according to the male participants.



Ranking of potential solutions to make shared mobility more accessible to women, according to the female participants.



3 Digitalisation

3.1 Most popular mobility applications

We asked the participants the following question:

- Which of the following mobility apps have you used over the past year?
- Welke van de volgende mobiele apps heb je het afgelopen jaar gebruikt?
- Parmi les applications de mobilité suivantes, lesquelles avez-vous utilisées au cours de l'année écoulée ?

The participants could select multiple options.

Below, we give an overview of the results for the entire population, for men and for women.

Most used mobility applications for smartphones, ranked in descending order for the entire population and per gender (absolute and relative figures).

All			**Men**			**Women**		
Google Maps	190	97.9 %	Google Maps	80	97.6 %	Google Maps	102	99.0 %
SNCB-NMBS	154	79.4 %	SNCB-NMBS	64	64.0 %	SNCB-NMBS	82	79.6 %
STIB-MIVB, De Lijn, ou TEC	150	77.3 %	STIB-MIVB, De Lijn, TEC	63	63.0 %	STIB-MIVB, De Lijn, TEC	79	76.7 %
Bike sharing	21	10.8 %	Scooter sharing	14	17.1 %	Bike sharing	12	11.7 %
Scooter sharing	20	10.3 %	Carsharing	9	11.0 %	Other	8	7.8 %
Carsharing	15	7.7 %	Bike sharing	8	9.8 %	Scooter sharing	5	4.9 %
Other	11	5.7 %	Other	3	3.7 %	Carsharing	4	3.9 %
Cargobike sharing	2	1.0 %	Cargobike sharing	1	1.2 %	Cargobike sharing	0	0.0 %

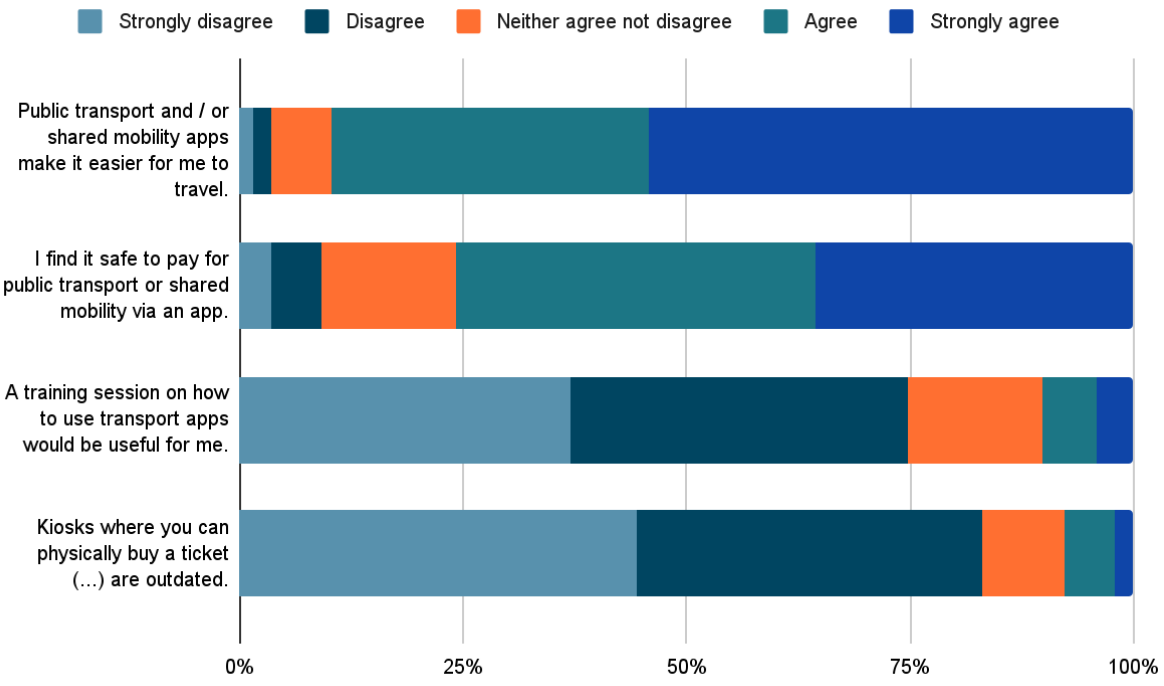
3.2 Opinions regarding digitalisation

We gave the participants a set of statements to understand how they feel about the increased digitalisation in the field of mobility.

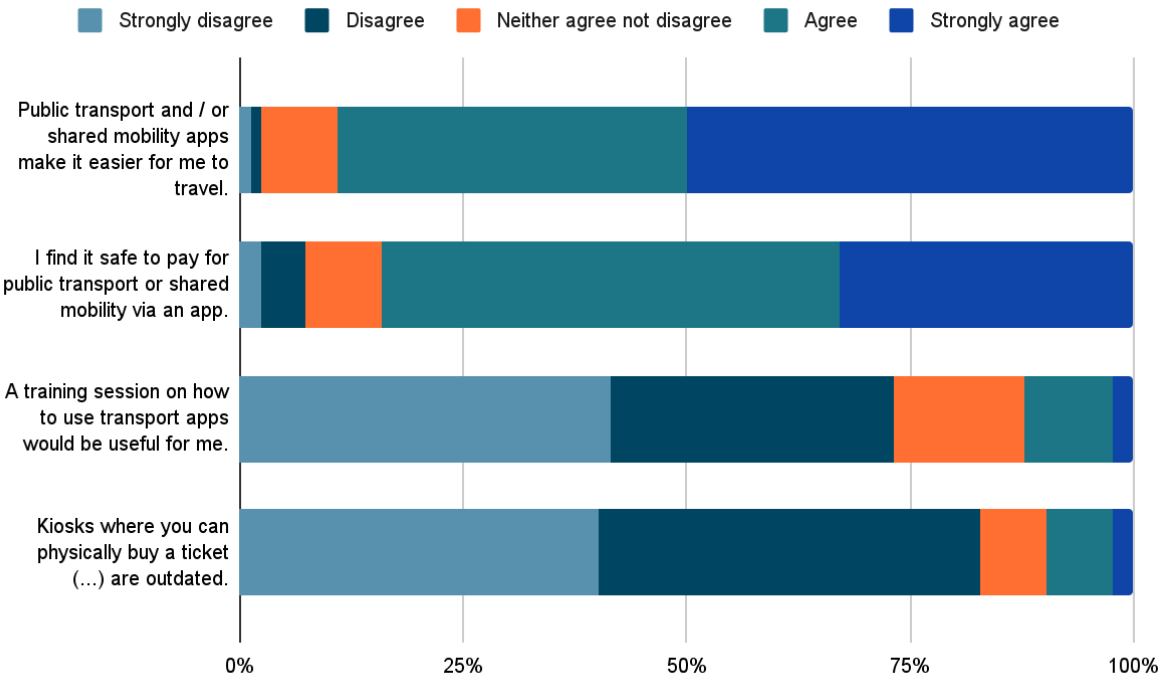
The participants had to indicate to which extent they did (not) agree with these statements.

Below, we give an overview of the results for the entire population, for men and for women.

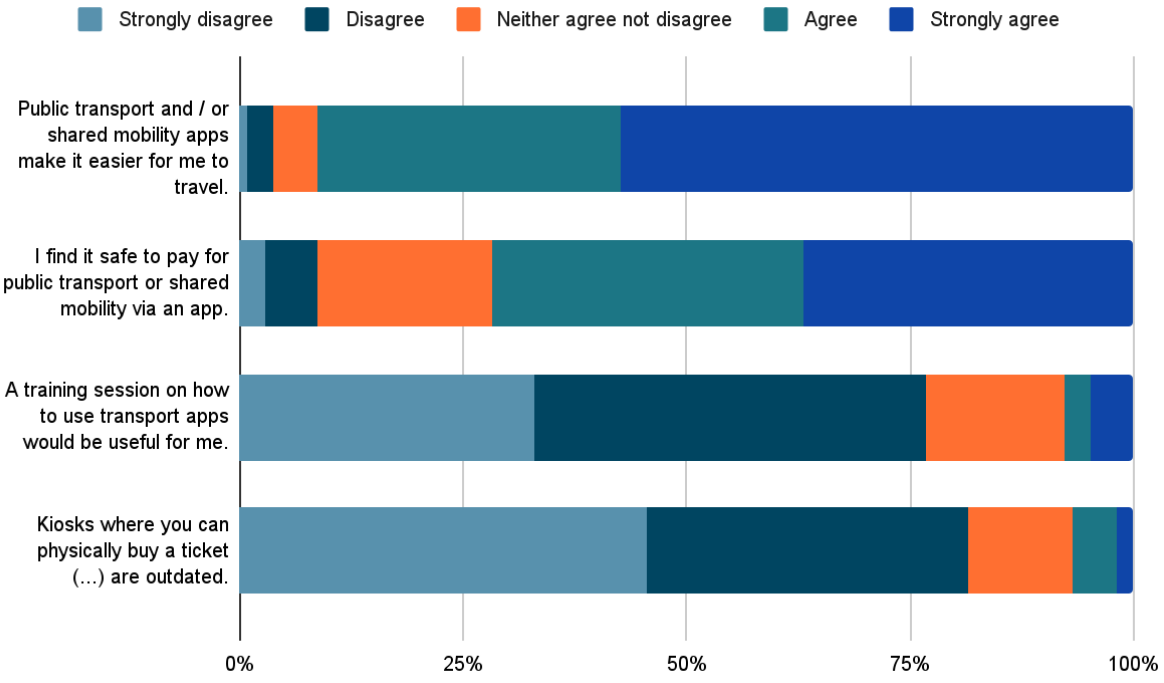
Extent to which all participants (dis)agree with statements regarding digitalisation.



Extent to which male participants (dis)agree with statements regarding digitalisation.



Extent to which female participants (dis)agree with statements regarding digitalisation.



4 Insecurity and harassment

4.1 Fear of being harassed

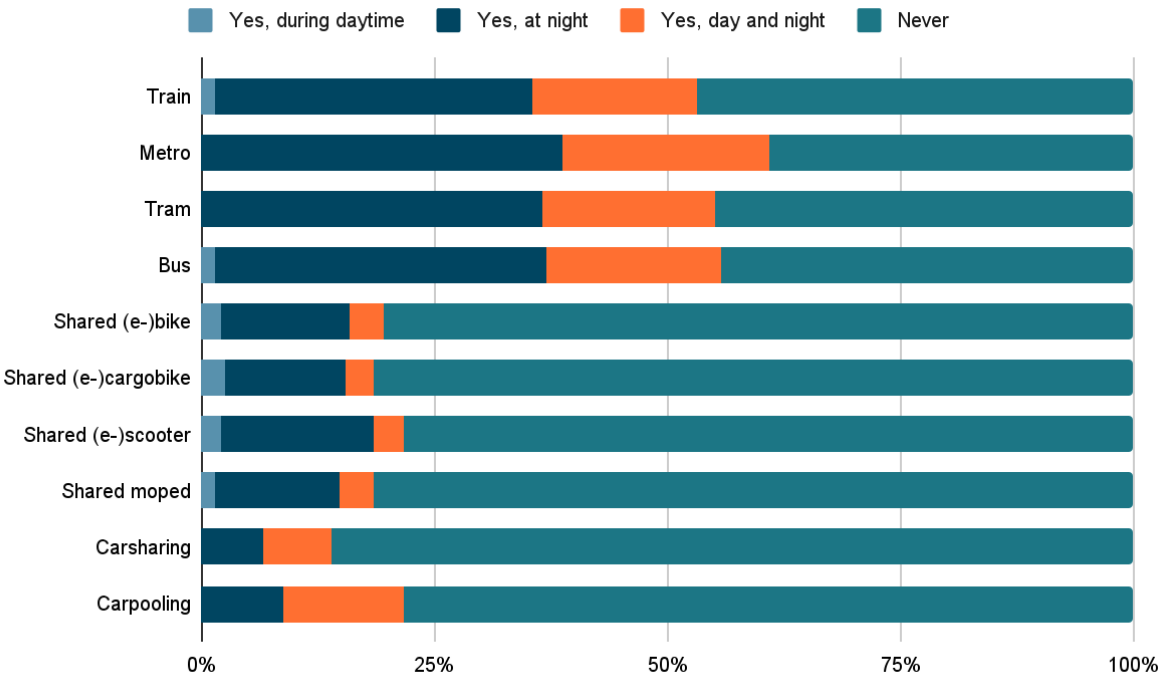
We asked the participants the following question:

- Do you fear being (sexually) harassed when using one of the following transport solutions:
- Ben je bang om (seksueel) lastiggevallen te worden bij het gebruik van één van de volgende vervoersmiddelen:
- Avez-vous peur d'être harcelé·e (sexuellement) lorsque vous utilisez l'une des solutions de transport suivantes :

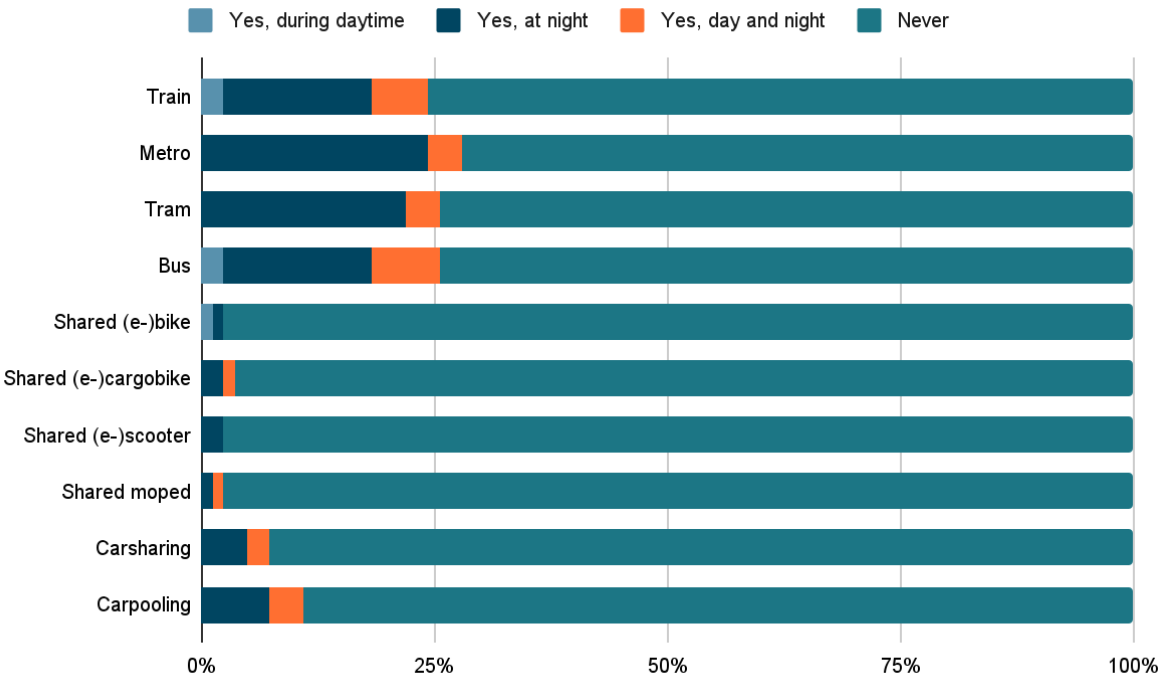
Per mode, the participants had to select the option that resembles their situation most.

Below, we give an overview of the results for the entire population, for men and for women.

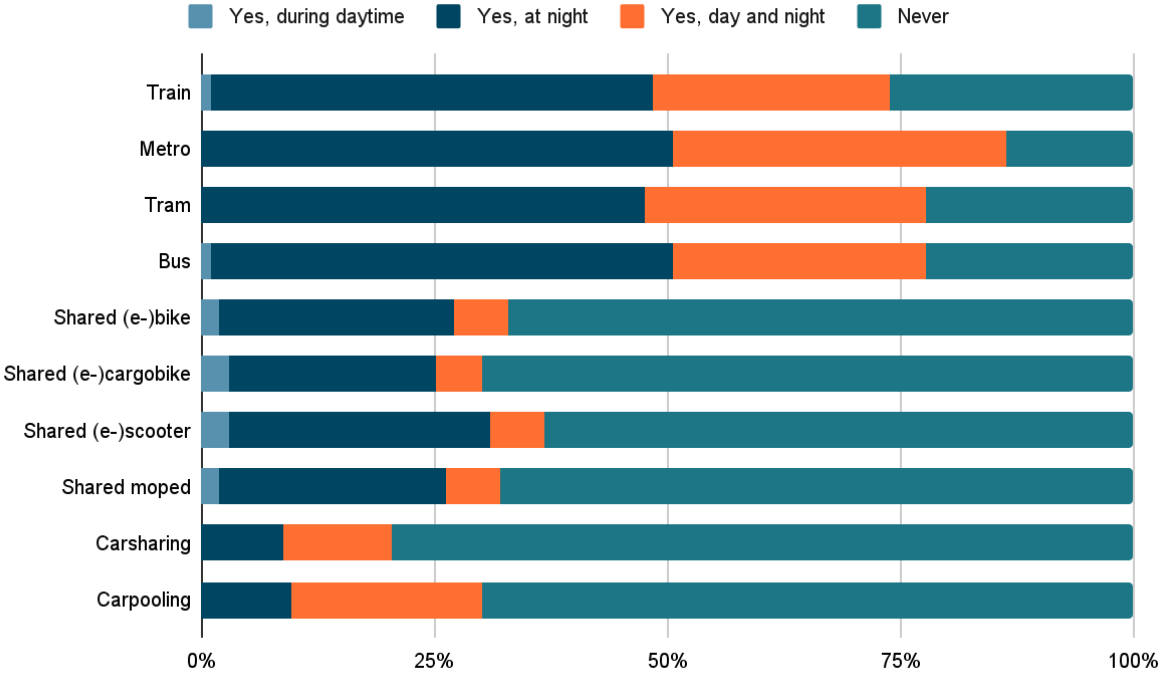
Fear of being harassed among all participants.



Fear of being harassed among male participants.



Fear of being harassed among female participants.



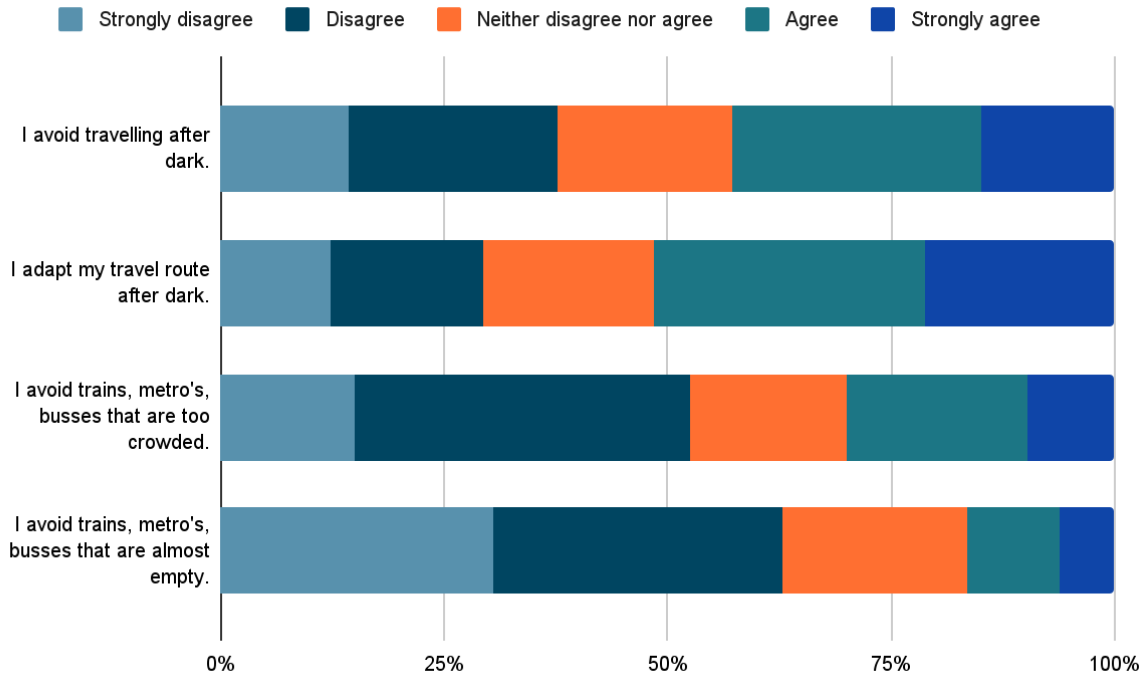
4.2 Adapting travel behaviour

We gave the participants a set of statements to understand how specific situations affect their travel behaviour.

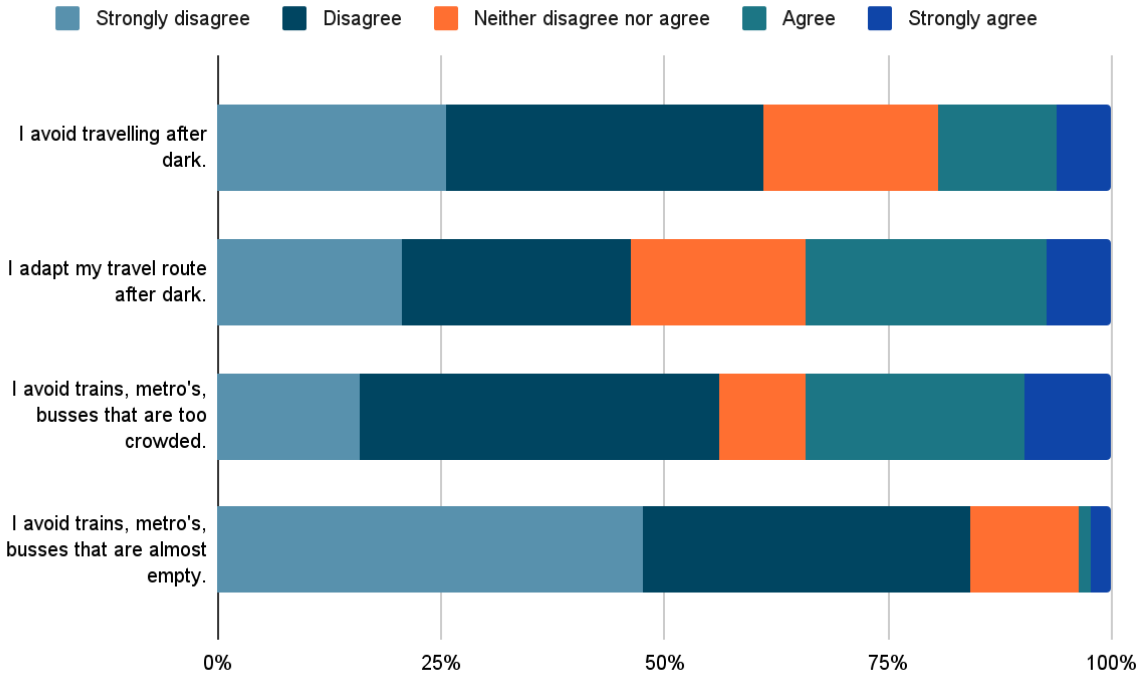
The participants had to indicate to which extent they did (not) agree with these statements.

Below, we give an overview of the results for the entire population, for men and for women.

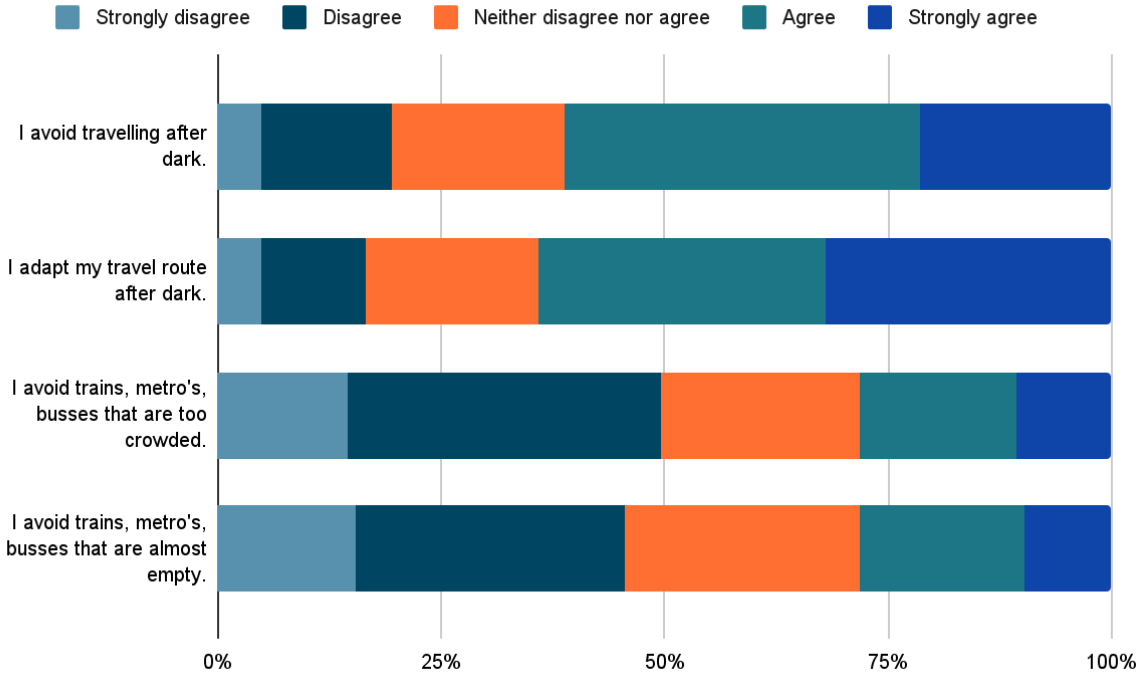
Extent to which all participants (dis)agree with statements on how specific situations influence travel behaviour.



Extent to which male participants (dis)agree with statements on how specific situations influence travel behaviour.



Extent to which female participants (dis)agree with statements on how specific situations influence travel behaviour.



4.3 Harassment while using public transport and/or shared mobility

We asked the participants the following question:

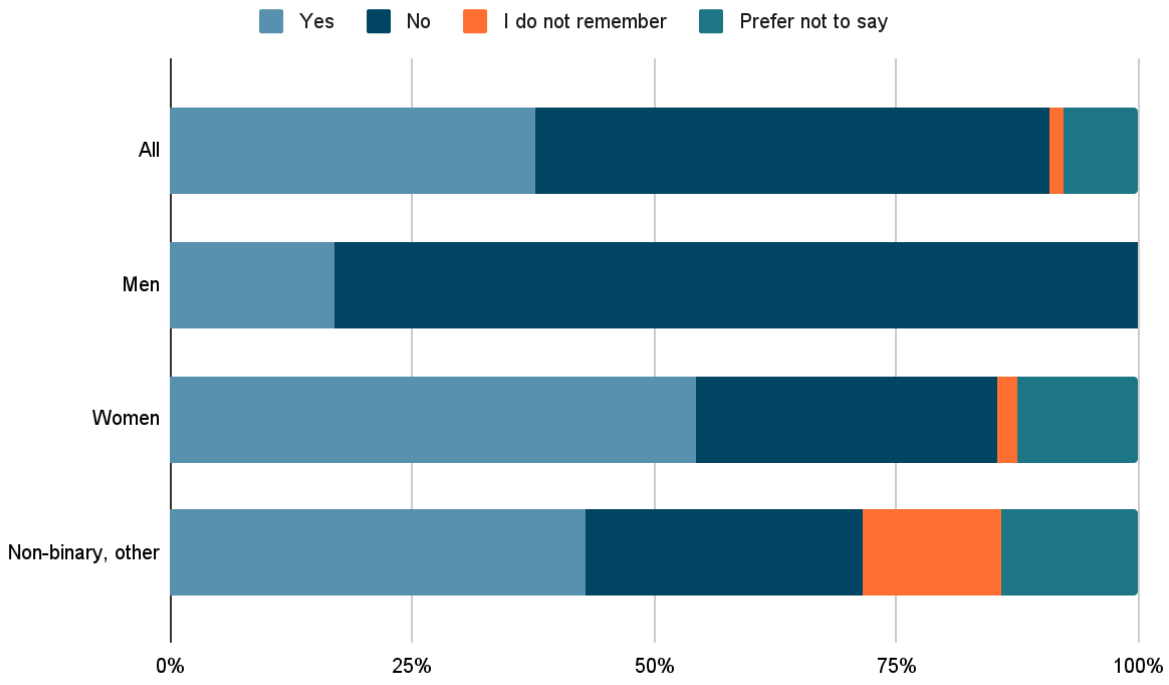
- Have you already been (sexually) harassed on public transport or when using shared mobility?
- Ben je al (seksueel) lastiggevallen in het openbaar vervoer of bij het gebruik van deelmobiliteit?
- Avez-vous déjà été harcelé·e (sexuellement) dans les transports en commun ou lors de l'utilisation de la mobilité partagée ?

Per mode, the participants had to select the option that resembles their situation most.

Below, we give an overview of the results for the entire population, for men and for women, and for people identifying as ‘non-binary’ or ‘other’.

Note that we only have 7 respondents in the last category and should thus be analysed with caution.

Participants having been harassed on public transport or while using shared mobility.



4.4 Transport modes on which the harassment took place

We asked the participants who answered 'yes' to the forgoing question, the following:

- On which of the following modes did the harassment take place?
- Op welke van de volgende vervoersmiddelen vond het grensoverschrijdend gedrag plaats?
- Dans lequel des modes de transport suivants le harcèlement a-t-il eu lieu ?

The participants could select multiple modes.

Below, we give an overview of the results for the entire population, for men and for women.

Note that the results are skewed towards public transport. This is a logical consequence of the fact that the participants to this survey make much more use of public transport than of other shared modes of transport. This is not a problem *per se*, because our goal is to make a comparison between the experiences of men and women while travelling.

Modes on which the harassment took place, ranked in descending order for the entire population and per gender (absolute and relative figures).

All			**Men**			**Women**		
Train	48	24.7 %	Train	8	9.6 %	Train	37	35.9 %
Bus	40	20.6 %	Bus	7	8.5 %	Bus	32	31.1 %
Metro	22	11.3 %	Metro	3	3.7 %	Metro	19	18.4 %
Tram	15	7.7 %	Tram	3	3.7 %	Tram	12	11.7 %
Private (e-)bike	6	3.1 %	Private (e-)bike	1	1.2 %	Private (e-)bike	5	4.9 %
Shared (e-)bike	1	0.5 %	Other modes	0	0 %	Shared (e-)bike	1	1 %
Shared (e-) scooter	1	0.5 %				Shared (e-) scooter	1	1 %
Private car	1	0.5 %				Private car	1	1 %
Other modes	0	0 %				Other modes	0	0 %

4.5 Location where the harassment took place

We asked the participants the following question:

- In which city or region were you harassed?
- In welke stad of regio werd je lastiggevallen?
- Dans quelle ville ou région avez-vous été harcelé·e ?

It was not mandatory to answer this open question.

Below, we give an overview of the cities and regions (*) within Belgium that were mentioned.

Note that the higher number of mentions from cities in Limburg is due to the fact that most participants to the survey are based at the University of Hasselt.

Absolute number of mentions of harassment per city or region in Belgium.

Aalst	1
Antwerp	15
Ghent	5
Brabant-Wallon (*)	1
Brussels (*)	30
Charleroi	1
Diest	1
Genk	5
Hasselt	8
Hoogstraten	1
Leuven	5
Liège	1
Limburg (*)	8
Neerpelt	1
Sint-Truiden	1
Vlaams-Brabant (*)	1
West-Vlaanderen (*)	1

4.6 Female-only transport services

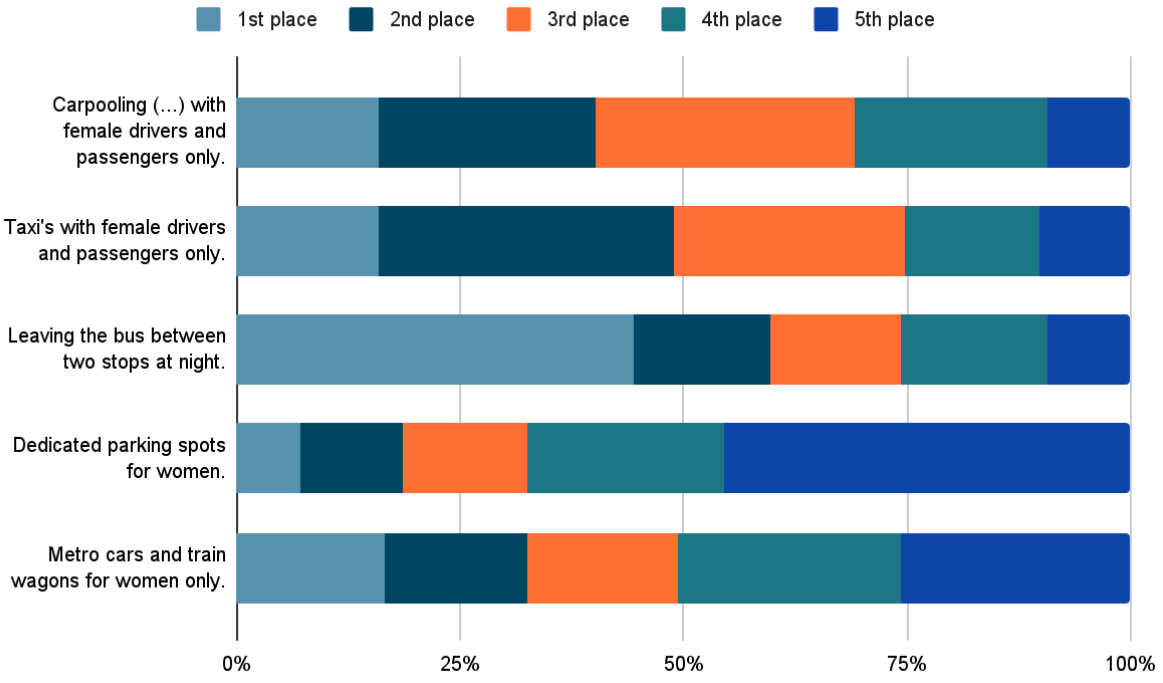
We asked the participants the following question:

- Some cities are developing 'women-only' transport services. Which of the following solutions would you find the most useful? Please rank them.
- Sommige steden ontwikkelen vervoersmiddelen die enkel voor vrouwen bedoeld zijn. Welke van de volgende oplossingen vind je het nuttigst? Rangschik ze.
- Certaines villes développent des services de transport « réservés aux femmes » . Parmi les solutions suivantes, laquelle serait selon vous les plus utiles ? Veuillez les classer

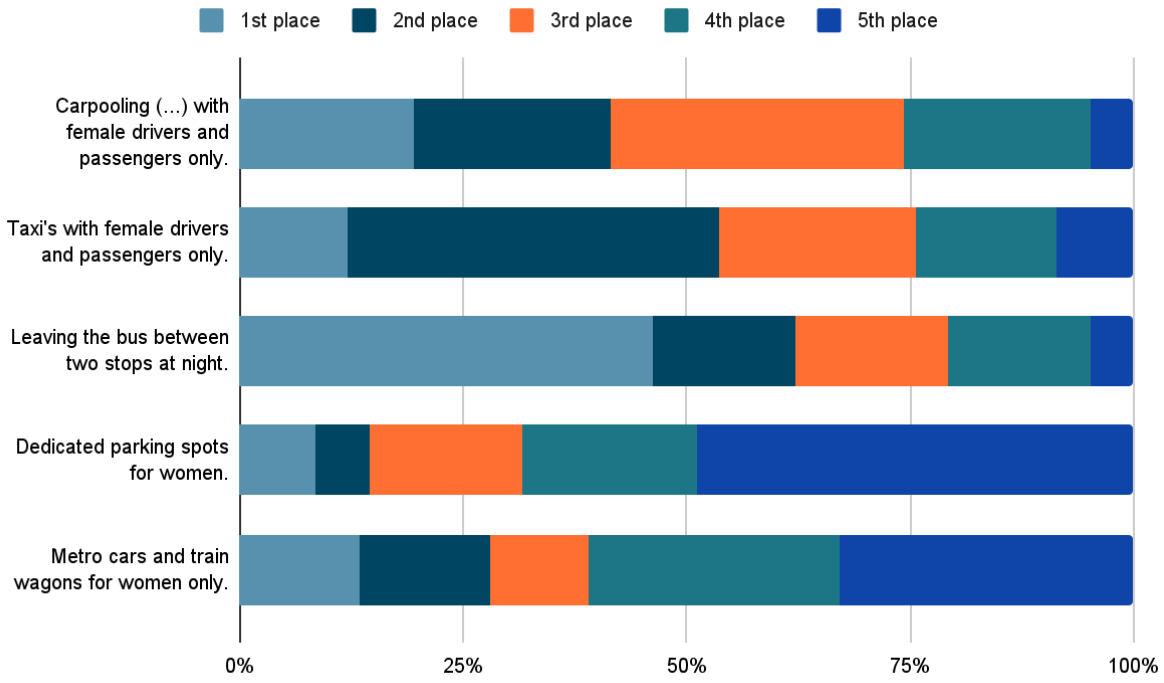
The participants had to rank the options from one to five, putting the best solution (according to them) first in their ranking. The proposed solutions are based on insights from the literature study.

Below, we give an overview of the results for the entire population, for men and for women.

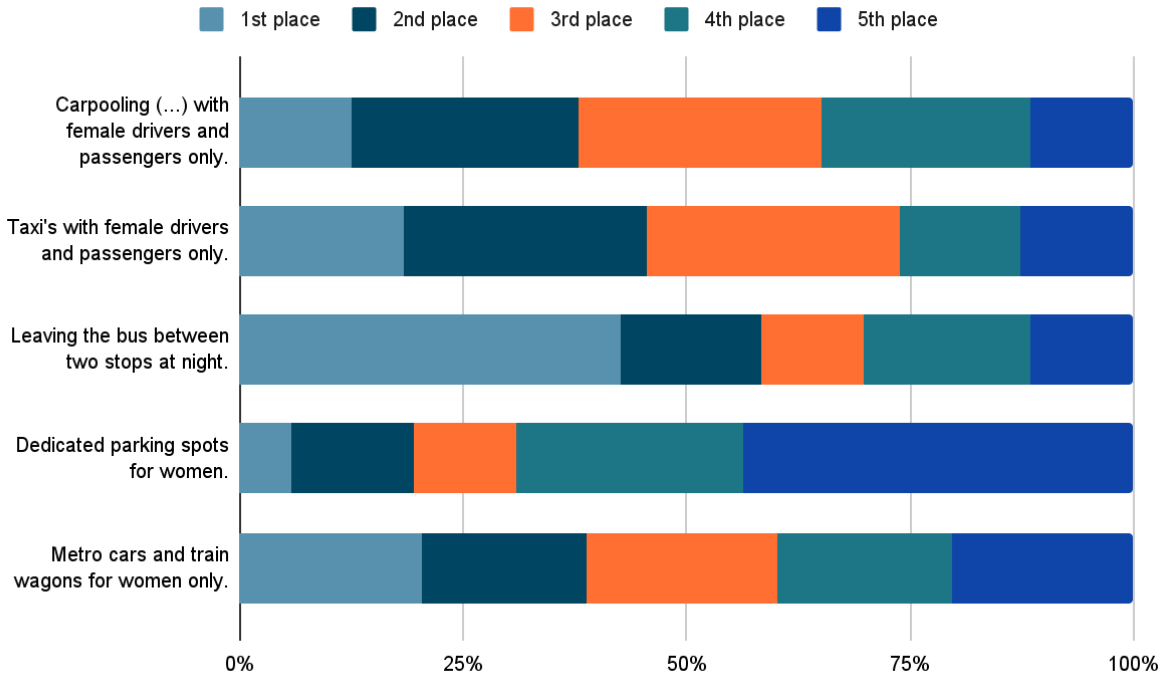
Ranking of potential female-only transport services according to the entire group of participants.



Ranking of potential female-only transport services according to the male participants.



Ranking of potential female-only transport services according to the female participants.



5 Careers in mobility and transport

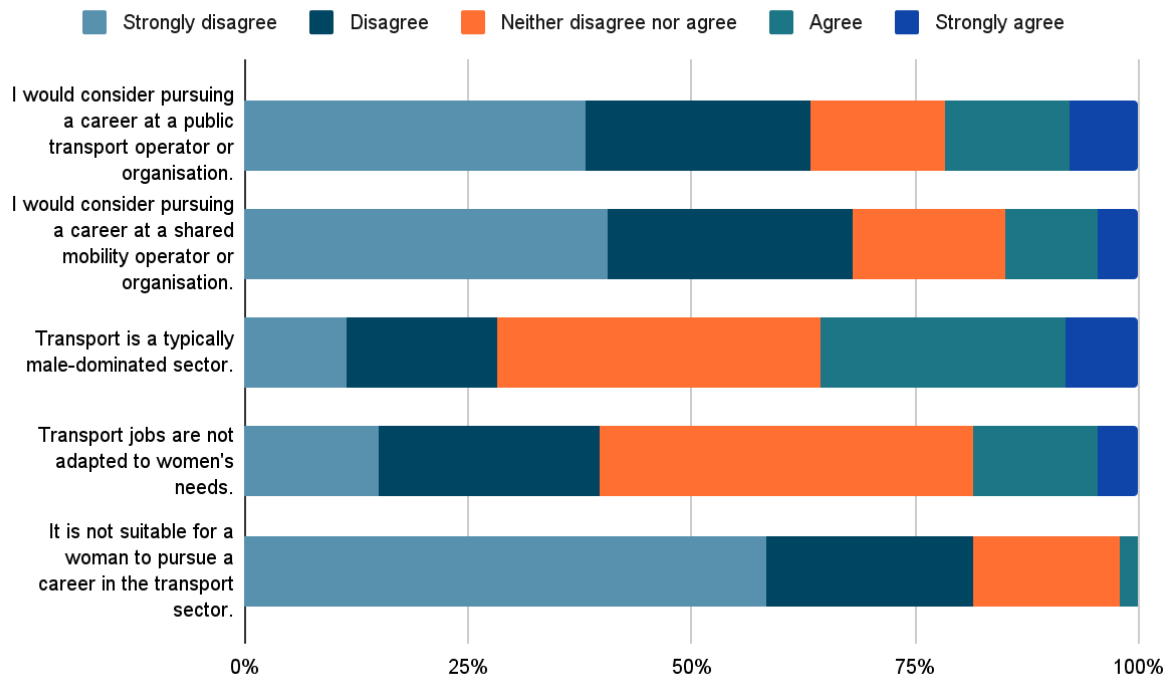
5.1 Opinions regarding careers in the mobility and transport sector

We gave the participants a set of statements to understand how they perceive the transport sector.

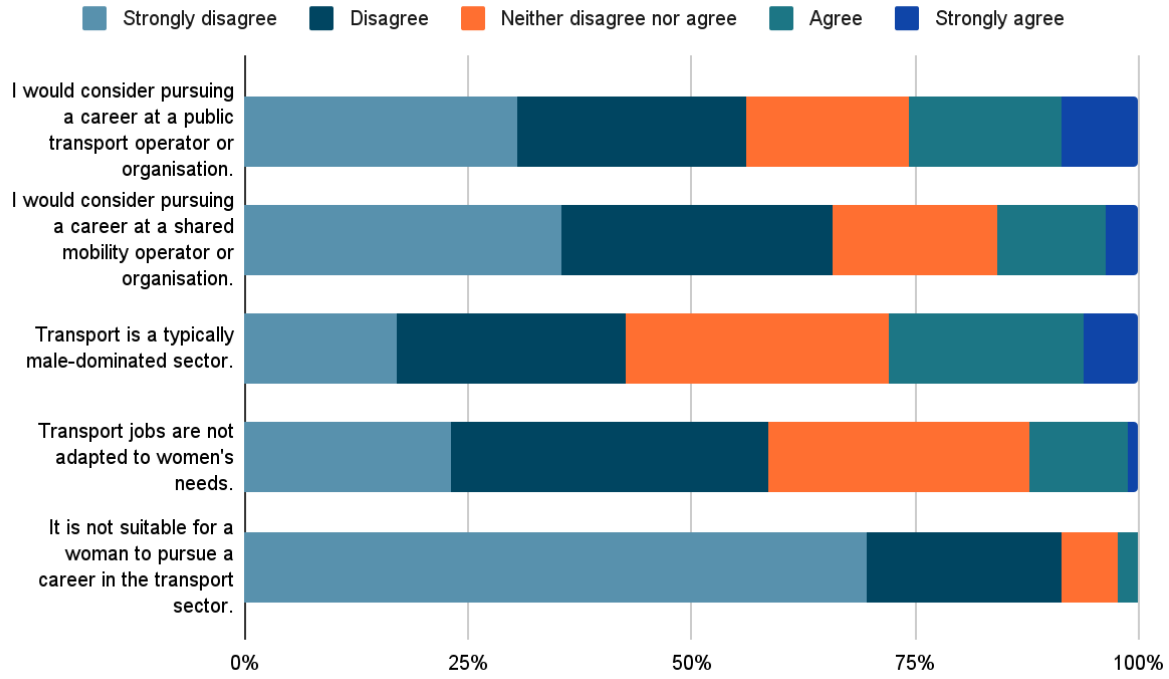
The participants had to indicate to which extent they did (not) agree with these statements.

Below, we give an overview of the results for the entire population, for men and for women.

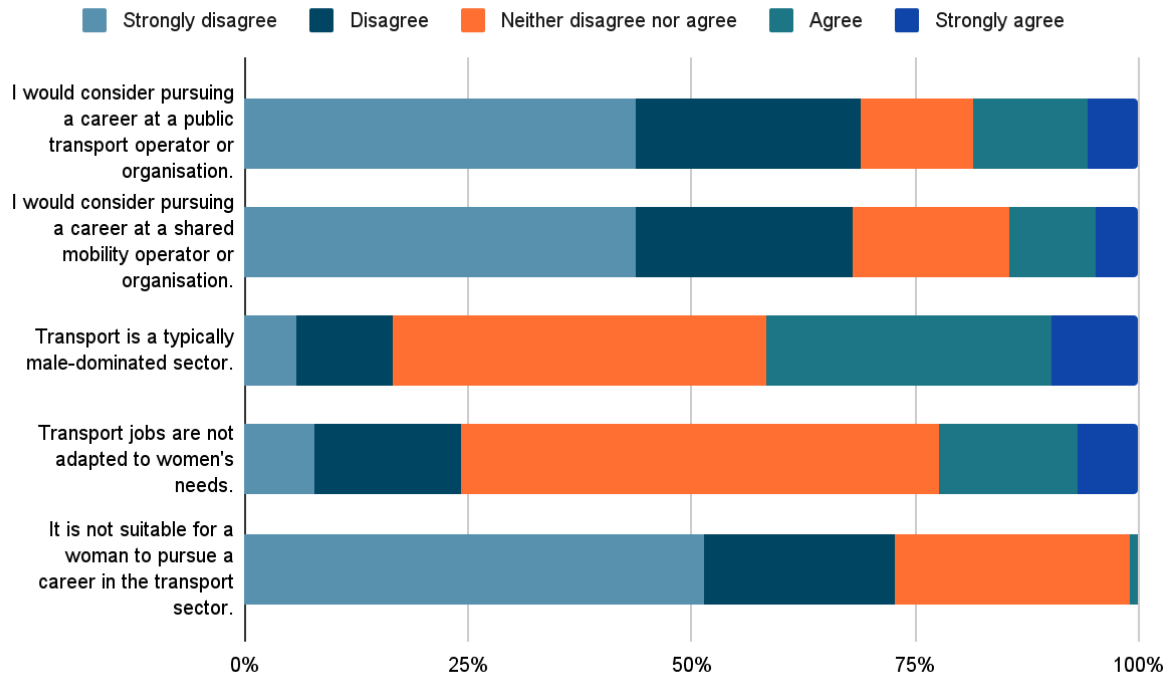
Extent to which all participants (dis)agree with statements regarding careers in mobility and transport.



Extent to which male participants (dis)agree with statements regarding careers in mobility and transport.



Extent to which female participants (dis)agree with statements regarding careers in mobility and transport.



5.2 Solutions to increase female employment in mobility and transport

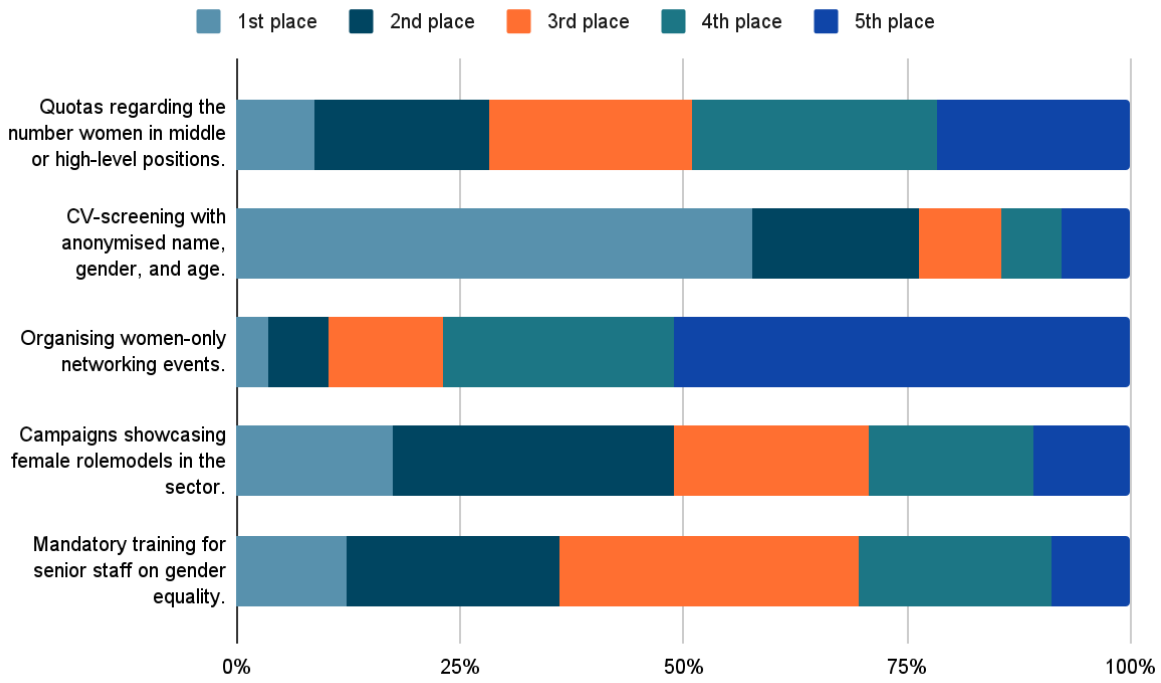
We asked the participants the following question:

- Some transport operators are taking measures to increase the number of women in middle and top management positions. Which of the following solutions would you find the most useful? Please rank them.
- Sommige mobiliteitsbedrijven nemen maatregelen om het aantal vrouwen in midden- en topmanagementposities te vergroten. Welke van de volgende oplossingen vind je het nuttigst? Rangschik ze.
- Certains opérateurs de transport prennent des mesures pour augmenter le nombre de femmes à des postes de management intermédiaires et supérieurs. Parmi les solutions suivantes, laquelle serait selon vous les plus utiles ? Veuillez les classer.

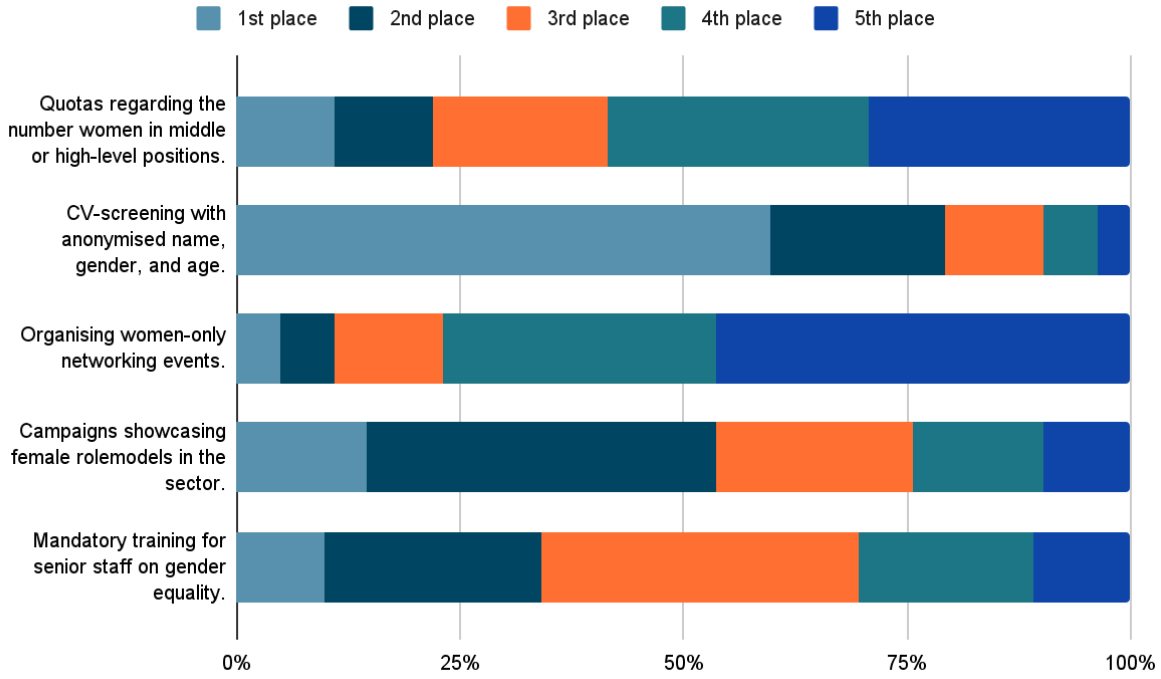
The participants had to rank the options from one to five, putting the best solution (according to them) first in their ranking. The proposed solutions are based on insights from the literature study.

Below, we give an overview of the results for the entire population, for men and for women.

Ranking of potential solutions to increase female employment in mobility and transport according to the entire group of participants.



Ranking of potential solutions to increase female employment in mobility and transport according to the male participants.



Ranking of potential solutions to increase female employment in mobility and transport according to the female participants.