

Public Transport Appreciation: A Comprehensive Analysis of User Perceptions and Influencing Factors in Italian Urban Contexts

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Abstract

Systems of public transportation are essential to urban mobility because they provide social, economic, and environmental advantages. To improve service quality and advance sustainable transportation, it is crucial to comprehend how users perceive these systems. This paper explores the many facets of appreciating public transportation, in Italian urban contexts looking at elements like affordability, accessibility, service quality, environmental impact, and technological integration. This study uses information gathered from a nationwide survey to examine how the public and local public transportation users in Italy are perceived. The purpose of the study is to provide indications and to evaluate how frequent and infrequent users value several facets of public transportation services, such as accessibility, cost, frequency, cleanliness, timeliness, and environmental impact. A wide range of demographic samples contributed responses, offering a thorough picture of regional variations and shared issues. We seek to give a thorough overview of the factors influencing public transportation enjoyment and its implications for practice and policy by synthesizing recent research and empirical data.

The findings highlight the significant challenge of changing travel habits, given that 72% of respondents own a car and 87% prefer private transportation over public options. This underscores the importance of

promoting more sustainable. mobility options through advancements in public transportation infrastructure, safety perceptions, and urban design. In the end, a major obstacle in determining Italy's transportation future is striking a balance between environmental objectives and ease.

Keywords: Public Transport, Travel Behavior, User Perception, Social Justice

Introduction

Systems of public transportation are essential for influencing urban mobility, encouraging sustainable growth, and improving social justice. With cities throughout the world grappling with problems like air pollution, traffic, and unequal access to economic opportunities, the need for efficient, inclusive, and well-integrated public transit has increased. The demand for and accessibility of public transportation are two interconnected aspects that are essential to comprehending and enhancing the effectiveness of transit systems. In a certain geographic and temporal setting, the number and characteristics of people (users) using transit services is referred to as the demand for public transportation. Numerous factors impact this demand, such as competing transportation modes, urban form, economic conditions, fare structures, service quality, and demographic changes. For the purposes of service design, policy evaluation, and infrastructure development, demand must be accurately modeled and predicted. In the context of public transportation, accessibility refers to how simple it is for people to go to their intended locations - such as places of employment, educational institutions, medical facilities, and recreational areas - through the transit system. It takes into account factors including trip duration, service frequency, intermodal connection, and the cost of other transportation options in addition to physical proximity to transit services. Improved quality of life, decreased reliance on cars, and higher ridership are all linked to high accessibility, particularly for underprivileged groups. Despite their significance, accessibility differences continue to exist across geographic and socioeconomic boundaries, resulting in irregular demand patterns for public transportation. An integrated strategy that incorporates inclusive urban planning and quantitative research is needed to address these inequities.

A vital component of urban mobility in Italy, public transportation affects social justice, economic activity, and environmental sustainability. Italy's urban regions, which are home to more than 60 million people, are distinguished by notable regional differences in the quality of transportation infrastructure and services. It is essential to comprehend how accessibility and demand for public transportation interact in order to create policies that support inclusive and sustainable mobility. The demand for public

transportation in Italy has varied by region. Around 37.2 million Italians aged 12 and older made daily excursions, average 2.54 trips per person per day, equaling nearly 94 million daily trips, according to the Ministry of Infrastructure and Transport's 2024 report. However, ridership is still 12% to 21% below 2019 numbers, indicating that local public transportation services have not fully recovered to pre-pandemic levels. Public transportation accessibility varies greatly throughout Italy. Municipalities are categorized by the National Strategy for Inner Areas (SNAI) according to how close they are to public transportation and other necessary public services. Access to dependable public transportation is a problem in many rural and outlying places, which has an impact on the mobility and standard of living of the local population. The modal share and infrastructure development clearly show regional disparities. In 2023, 93.7% of Italy's interior passenger kilometers were transported by road, with buses and coaches accounting for 10.9% of this total. On the other hand, large metro and bus networks in cities like Milan and Rome enable greater use of public transportation. Accessibility is also being shaped by technological integration. Many Italian towns, including Milan, Florence, and Genoa, have adopted Demand-Responsive Transport (DRT) systems, which modify routes in response to current demand. These systems seek to increase general accessibility and service coverage in low-density areas.

The purpose of this study is to investigate the dynamic relationship between accessibility and demand for public transportation, identifying the main factors, regional differences, and possible solutions that can improve system equity and efficiency in Italy. With an emphasis on regional differences, infrastructure development, and the impact of technological advancements, this study attempts to investigate the intricate relationship between public transportation demand and accessibility in Italy. By examining these variables, the study aims to provide guidance for national policies that support sustainable and equitable urban mobility.

Literature review

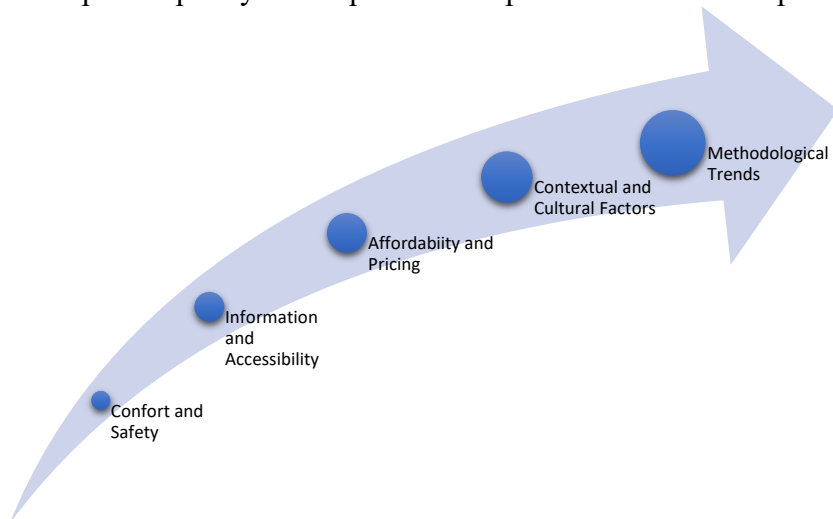
Public transportation is a daily experience that affects how people engage with their cities, communities, and surroundings; it is more than just a way to go from one location to another. More than just a means of getting from one place to another, public passenger transportation is a daily experience that influences how individuals interact with their cities, communities, and surrounds. When we talk about the value of public transportation, we're not just talking about riding numbers or technological efficiency; we're also talking about how people feel about their trip, including whether they trust the system, whether they find it convenient and approachable, and whether they would recommend it to others. When we

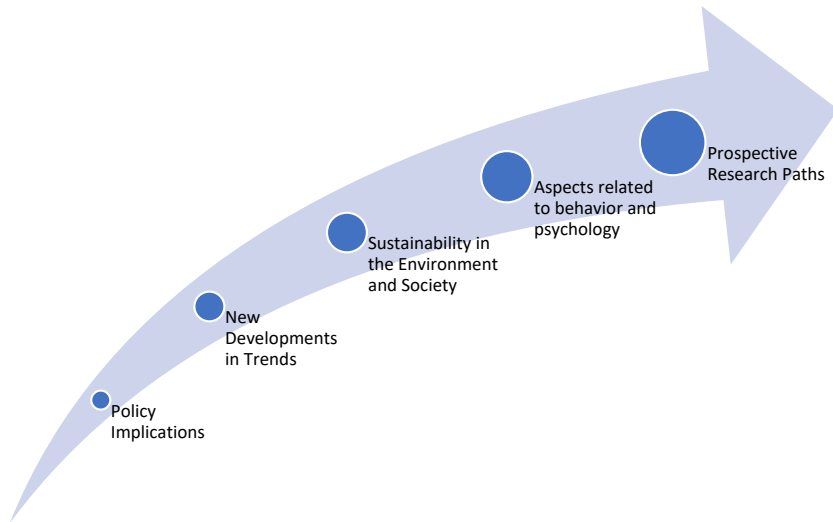
discuss the value of public transportation, we are not simply talking about ridership figures or technological effectiveness; we are also talking about how people feel about their trip: Do they have faith in the system? Do they think it is approachable and convenient? Would they tell others about it? Appreciation is typically high in cities with regular, punctual bus, train, and tram service as well as clean, secure stations. When people can schedule their days around dependable services, they feel satisfied and dependable. This sense of usability and trust is increased by features like smartphone ticketing, real-time arrival information, and well-connected routes (De Vos et al., 2023, Drabicki, et al., 2023). When services are easy to use, public transportation becomes a preferred way to travel, even for individuals who can afford other options, rather than only a fallback option for people without automobiles. However, there are differences in appreciation. In many places, particularly in rural or low-income communities, public transportation may be scarce, erratic, or badly maintained. People may not appreciate buses or trains in these situations, even if they depend on them extensively, because they are frustrated or inconvenienced. Public impression is influenced by a number of delicate elements, including how well-kept cars are, how courteous drivers are, and how simple it is for the elderly or those with impairments to access them (Lin, & Cui, 2021, Kusi et al., 2024, Zakaria et al., 2024). Crucially, appreciation is linked to more general values as well. Passengers who care about the environment might be more supportive of transportation systems that use hybrid or electric cars or that reduce carbon emissions. In a similar vein, people who see public transportation as a means of fostering social inclusion might appreciate initiatives that support equitable access to the city and cater to a variety of populations. Local customs and cultural expectations also come into play. Some cities, like Tokyo, Singapore, or Zurich, take great pleasure in their public transportation systems. Buses are renowned for their comfort, networks for integration, and trains for accuracy (McKinsey & Company, 2018). In contrast, public transportation may be stigmatized in more car-centric communities as a sign of poverty or inconvenience rather than as a shared benefit. As a result, public appreciation is dynamic. It illustrates how subjective experience and objective service quality interact. It changes as a result of improvements in urban planning, infrastructure, and public perceptions of social justice, mobility, and climate responsibility. Promoting a greater appreciation for public transportation is a practical and cultural challenge as cities continue to expand, and environmental concerns grow. It calls for more than just building more buses or trains; it also calls for developing systems that people truly value, trust, and even enjoy using (Litman, T., 2023).

Appreciation of public transportation is a multifaceted concept that reflects passengers' general attitudes, contentment, and devotion to transit

services. A thorough analysis of empirical research emphasizes how crucial service quality is as the foundation for appreciating public transportation. Eboli and Mazzulla (2007) state that the best indicators of user satisfaction are consistently service quality elements including dependability, frequency, and punctuality. Their analysis showed that, in line with the prevailing opinion in transportation research, these elements have an indirect impact on loyalty by raising perceived satisfaction. In order to enhance public transportation services in metropolitan areas, Rima et al. (2024) and Al-Jameel, et al. (2023) assess user satisfaction using some indicators. Therefore, they examine consumer satisfaction when using buses in Kota Kinabalu, Sabah, Malaysia, through the analysis of bus facilities, bus accessibility, safety, and fare which are considered as crucial factors. The findings indicate that bus accessibility and public transportation facility considerations should be prioritized. In order to improve bus services and increase the usage of public transportation generally, their study helps transportation authorities address regions where customer satisfaction is low.

Below we consider the essential elements that characterize the appreciation of public transport services, also considering the point of arrival with respect to policy developments. Graph 1 summarizes the paths.





Graph 1: Paths to appreciation of public transport services

Comfort and Safety: These two factors have drawn more attention than operating performance. Physical comfort - seat availability, cleanliness, and vehicle conditions - plays a crucial part in determining the user experience, according to Cao and Mokhtarian (2005). Furthermore, building trust and a favorable attitude toward public transportation depends on perceived safety, which includes protection from mishaps and criminal activity both on board and at stations. Safety issues can discourage potential users, particularly vulnerable populations like women and the elderly, according to studies done in urban settings (Currie, 2010, Lin, & Cui, 2021, Stjernborg, 2024, Kusi et al, 2024, Zakaria et al., 2024).

Information and Accessibility: Accessibility encompasses both the availability and clarity of information as well as physical access (such as being close to stations or having a barrier-free design). Easy access and real-time information promote convenience and lower ambiguity, which in turn boost happiness, according to Vuchic (2005) and Drabicki, et al. (2023). By allowing consumers to proactively plan and modify their travels, digital technologies such as electronic displays and mobile apps have demonstrated encouraging effects on perceived service quality (Tirachini & Hensher, 2011, Cao & Mokhtarian, 2005, De Vos et al., 2023, Ho et al., 2021, Rima et al., 2024).

Affordability and Pricing: The effect of fare structures on user appreciation is a recurrent issue in writing on public transportation. Fare affordability affects both pleasure and equity in transportation accessibility, as noted by Currie and Delbosc (2011) and by Wang, et al. (2021). For transit agencies, striking a balance between reasonable pricing and financial viability

is still a constant struggle in environments where operating costs are on the rise (Ho et al., 2021).

Contextual and Cultural Factors: Research indicates that the appreciation of public transportation depends on the surroundings. Pojani and Stead (2015) highlight how user perceptions are adversely impacted by the overcrowding and infrastructure deficiencies that are common in underdeveloped nations. On the other hand, research from developed cities places more emphasis on integrated mobility alternatives, service frequency, and environmental considerations (Buehler & Pucher, 2012). Furthermore, Hensher and Rose (2007) investigate how social norms, and cultural attitudes impact public transportation preferences, arguing that effective marketing and communication tactics need to be attentive to cultural differences.

Methodological Trends: Most of the empirical research on the appreciation of public transportation uses quantitative techniques, and SEM is a preferred instrument because it can model intricate relationships between latent constructs like loyalty, satisfaction, and service quality (Eboli & Mazulla, 2007; Cao & Mokhtarian, 2005; Rima et al., 2024). Nonetheless, qualitative methods like focus groups and interviews offer insightful information about user motivations and emotional reactions that may be missed by using only quantitative data (Shaheen et al., 2013). It is becoming more widely acknowledged that mixed-method studies that combine the two methodologies provide a deeper understanding of user appreciation.

Policy Implications: The body of evidence from the literature emphasizes how important it is for transit organizations to take a user-centered approach. Enhancing service dependability, guaranteeing safety, boosting comfort, and offering clear and reasonably priced fare systems should be the top priorities of policies (Tyrinopoulos & Antoniou, 2008, De Vos et al., 2023, Rima et al., 2024, Stjernborg, 2024). Enhancements in accessibility and real-time information technology have the potential to significantly increase user happiness (Ho et al., 2021). Designing successful interventions that appeal to a variety of user groups also requires resolving sociocultural quirks and context-specific difficulties (Drabicki, et al., 2023).

New Developments in Trends: Recent research emphasizes how the appreciation of public transportation is being shaped by the increasing impact of digital transformation and smart mobility. User expectations and experiences are changing as a result of the integration of technologies like data-driven demand management, real-time tracking, and mobile ticketing (Drabicki, et al., 2023). Tirachini and Hensher (2019), for instance, show how digital tools improve perceived service transparency and dependability, both of which are important for contemporary riders. Additionally, by highlighting convenience and flexibility, the emergence of Mobility-as-a-Service (MaaS) platforms - which integrate many modes of transportation into smooth

journeys - is establishing new standards for customer appreciation (Jittrapirom et al., 2017, De Vos et al., 2023, Rima et al., 2024).

Sustainability in the Environment and Society: Concerns about sustainability are having a bigger impact on how the general public views and values transit systems. Cities that prioritize environmental goals by investing in public transportation infrastructure and promoting active mobility options (such as walking and bicycle integration) tend to enjoy better levels of public support and satisfaction, according to studies by Buehler and Pucher (2012). Another important factor that comes up is social equity: making transportation accessible to marginalized groups not only increases understanding but also supports larger objectives of social inclusion (Lucas, 2012, Wang, et al. (2021).

Aspects related to behavior and psychology: In addition to functional characteristics, psychological elements like as social conventions, perceived control, and habit formation have a big impact on how much people enjoy public transportation. According to Gardner and Abraham's (2008) research, regular users of public transportation prefer to give it higher ratings because of its familiarity and perceived ease of use. By portraying public transportation as a socially responsible option, social marketing initiatives that uphold positive community norms around its use can also increase appreciation (Steg & Vlek, 2009).

Prospective Research Paths: Although the material currently in publication offers a strong basis, there are still several gaps. For instance, additional longitudinal research is required to comprehend the long-term effects of policy initiatives or service quality modifications on customer satisfaction (Eboli & Mazzulla, 2007, Rima et al., 2024). Furthermore, given how quickly transportation technology is developing, studies must examine how new developments like electric buses and driverless cars affect public happiness and views. Lastly, further research in rural and low-income areas will aid in the development of inclusive transportation systems that meet the needs of a wide range of users.

In conclusion, by lowering greenhouse gas emissions, easing traffic, and enhancing air quality, public transportation networks are essential to the advancement of sustainable urban development (Buehler & Pucher, 2012). Their effective operation promotes fair mobility access, which is necessary for both economic productivity and social participation. The need for ongoing investment and innovation in public transportation networks is highlighted by the recognition of its many advantages, which range from societal to environmental. Informed policymaking and public support are fostered by this appreciation, which eventually advances healthier, more resilient communities around the world.

Methodologies and empirical investigation

This section presents an analysis of the data collected through the "Public Services Satisfaction Survey" questionnaire. The primary objective of this study is to assess the level of satisfaction among Italian citizens regarding currently available public mobility services and to elucidate the underlying reasons for the prevalent preference for private transportation. Furthermore, we aimed to identify the principal factors contributing to user satisfaction or dissatisfaction with both public and private transport modes.

The questionnaire comprised 40 questions, systematically divided into three main sections:

- **Socio-demographic Data:**

The initial section focuses on gathering personal information, including age, marital status, area of residence, and income. These demographic variables are deemed crucial as they can significantly influence individual transportation choices.

- **Mobility and Transport Preferences:**

The second section of the questionnaire investigates respondents' mobility habits. It explores transport preferences for various purposes such as work, leisure, and errands. This provides insights into how individuals select their modes of transport based on differing needs. For instance, while commuting to work, most individuals might favor public transport or private cars, recreational activities might lead to choices like walking or cycling.

- **Evaluation:**

The final section, employing Likert scales, gathers respondents' evaluations of various aspects of the services offered (e.g., speed, safety, comfort, cleanliness, punctuality, price, frequency). These elements are considered paramount because, in making transport decisions, individuals account for all service attributes, not solely their inherent transport preferences, but also the perceived quality of the service provided (Stjernborg, 2024). An extensive literature review conducted by Jamei et al. (2022) reveals that the concept of perceived accessibility within the transport context is considerably more complex than simple measurements of distance or time might suggest (Pyrialakou et al., 2016, Ho et al., 2021, De Vos et al., 2023). Their research highlights the interplay of multiple factors, ranging from individual characteristics (e.g., age or disability) and environmental conditions (e.g., safety or infrastructure status) to specific transport system attributes (e.g., reliability and cost), and psychological and social dimensions (e.g., comfort and freedom of movement). The authors conclude that an adequate understanding of these subjective dynamics is fundamental for designing transport solutions that are not only effective but also inclusive and capable of tangibly improving users' experiences and quality of life (Stjernborg, 2024, Twardzik, 2024).

The questionnaire was administered using Google Forms and disseminated via major social networks (e.g., Facebook groups, Instagram) and messaging applications (e.g., WhatsApp, Telegram). Data collection occurred between October 28, 2023, and December 28, 2023, yielding a total of 506 responses. As will be discussed subsequently, the reliance on digital tools such as messaging applications and social networks for questionnaire distribution may have introduced a sampling limitation, potentially excluding older age demographics from the survey population.

Raw data, obtained from Google Forms, were imported into a new spreadsheet and meticulously cleaned to ensure the accuracy of subsequent processing. Cross-sectional analysis of variables via pivot tables revealed interesting patterns in respondents' mobility habits, highlighting significant trends.

A cross-tabulation of age with public transport usage frequency indicated that younger individuals tend to favor more flexible and accessible transport options, such as metro, bus, carpooling, and car-sharing. Conversely, older individuals with higher incomes might exclusively utilize private transportation. In addition to the relationship between age and public transport usage frequency, a significant correlation was observed between the level of service satisfaction and usage frequency.

Furthermore, by cross-referencing transport mode choice with area of residence, we identified significant differences in preferences between urban and rural areas. In summary, the survey provides a comprehensive overview of respondents' socio-demographic characteristics and mobility habits, thereby enabling the identification of factors influencing individual transport choices. For the most part, the collected data were analyzed and interpreted using histograms and pie charts, tools that facilitate immediate and visual comprehension of the information. To achieve a more comprehensive understanding, we also opted to compare some of the obtained data with results published by Istat in 2022.

The dissemination and collection of information allowed us to perform a series of descriptive statistical analyses aimed at understanding the main strengths and weaknesses of Italian public transport, as well as the potential propensities or reticence of various users/citizens.

The following pages will present the questionnaire subjected to the analyses described above, offering a comprehensive overview of the questions posed to respondents, followed by the obtained results.

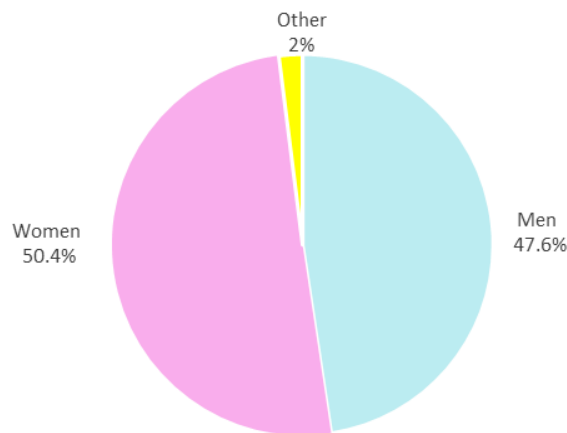
Discussion

Sociodemographic analysis of the respondents

This initial exploratory investigation, conducted through an in-depth analysis of marginal and conditional distributions, allowed for the collection

of a wide range of information regarding the questionnaire participants. The primary objective was to delineate the sociodemographic profile of the interviewees and to explore how their individual characteristics influence behaviors and decisions within the logistical context. Such an analysis is crucial for understanding the impact of variables such as age, gender, education level, income, and occupation on the choices made, thereby providing a solid foundation for future investigations and targeted interventions in the sector.

Graph 2: Pie chart on the composition of respondents by gender



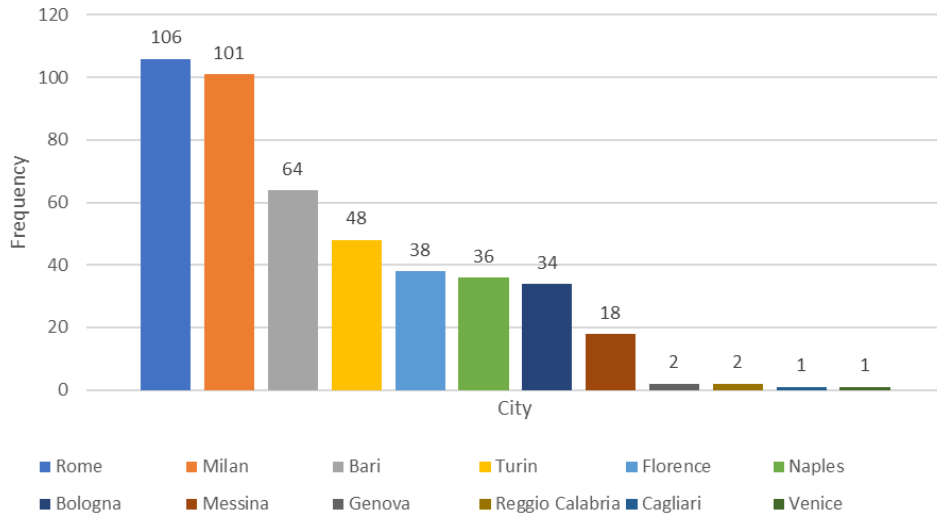
Sources: personal database from the questionnaire

The analyzed sample comprises a total of 506 participants, divided into 241 men (47.6%) and 255 women (50.4%), indicating a slight predominance of the female component. An additional 2% of respondents opted not to declare their gender, highlighting a small, albeit present, proportion of individuals who chose not to disclose this information. This demographic distribution reflects relative homogeneity between genders, albeit with a slight female prevalence. This aspect may become significant in the subsequent analysis of behavioral variables, enabling investigation into potential gender-based differences in preferences and choices within the logistical domain.

Beyond gender distribution, participant residence is another particularly relevant variable in the analysis. The decision to include this parameter stems from the presumed correlation between urban context size and the usability of public transportation, a key element for daily mobility. The collected data reveals that residents in large cities, characterized by an extensive network of efficient services and infrastructure, tend to evaluate public transportation positively. This phenomenon is attributable to substantial investments by local administrations aimed at ensuring a balanced correspondence between mobility demand and supply. Conversely, in small

urban centers, where such investments are more limited, public transportation services often appear deficient. This inadequacy translates into general user dissatisfaction, caused by reduced service frequency and a lack of adequate connections to enable efficient travel via Public Local Transport (PLT) compared to Private Transport (PT) solutions.

Graph 3: Histogram - Where do respondents live?



Sources: personal database from the questionnaire

An histogram illustrates the response frequencies based on participants' city of residence. Currently, Italian law (Article 1, comma 5 of Law no. 56/2014) identifies 10 metropolitan cities as broad territorial entities with specific general institutional purposes:

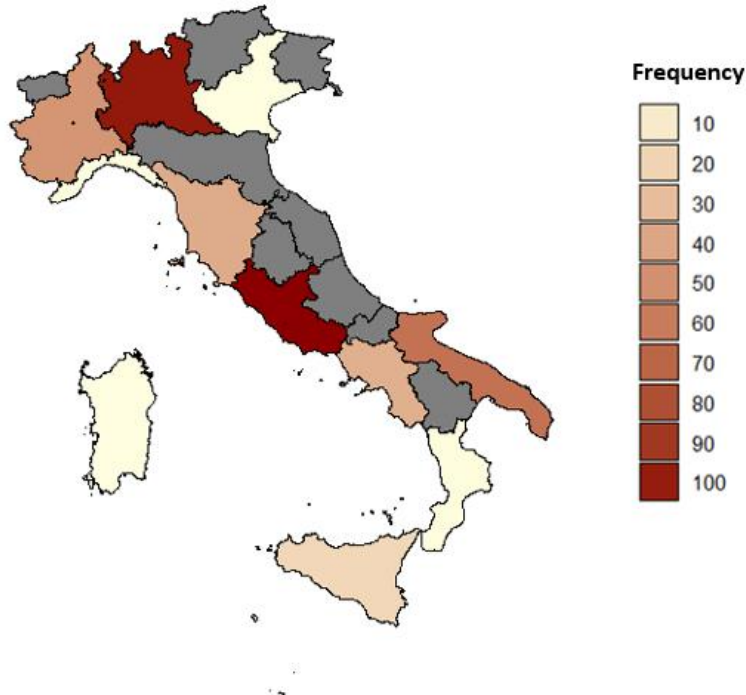
- Strategic territorial development;
- Promotion and integrated management of services, infrastructure, and communication networks within metropolitan cities;
- Management of institutional relations.

Therefore, in Italy, a metropolitan city refers to one of the following: Turin, Milan, Venice, Genoa, Bologna, Florence, Bari, Naples, Reggio Calabria, and Rome.

The histogram was chosen to represent this categorical data, specifically the distribution of respondents across cities, for immediate readability. The analysis highlights a significant concentration of respondents in metropolitan cities; indeed, 89% of interviewees reside in one of the aforementioned metropolises, with the remaining portion living elsewhere. Specifically, Rome has the most participants (106 responses), followed by Milan (101), Bari, Turin, etc.

Many individuals today choose to live in these metropolises due to their significant attractiveness, driven by factors ranging from study and work opportunities to the entertainment and leisure options they provide.

Graph 4: Cartogram on frequency of respondents at regional level



Sources: personal database from the questionnaire

To immediately and intuitively represent the geographical distribution of participants in our survey, we opted for a cartogram, a highly effective visual tool for territorial analysis. This method allowed us to precisely identify areas with higher or lower participation, thereby facilitating the interpretation of collected data.

In the cartogram, the frequency of respondents is represented by color intensity, with a scale clearly highlighting regional differences. Areas with the highest number of responses, such as Lombardy and Lazio, are depicted in burgundy, indicating that participation in these zones exceeded 100 individuals. Conversely, regions like Liguria, Calabria, Sardinia, and Veneto appear in a lighter, beige hue, signifying participation below 10 individuals. Finally, areas not covered by the survey - those without responses - are shown in gray, making it easy to identify zones lacking data.

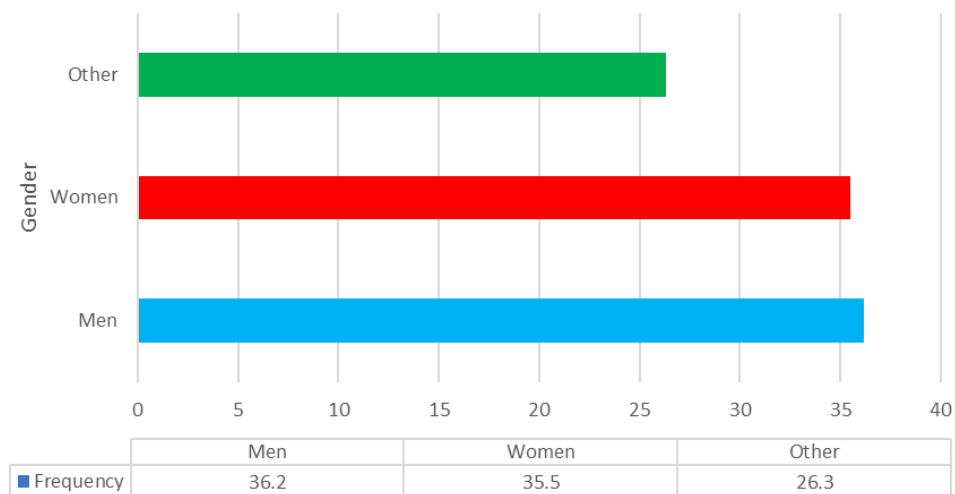
To verify the validity of this intuition, we conducted a statistical association test. Specifically the **Chi-Square (χ^2) Test** confirmed a statistically significant relationship between place of residence and transportation preference. With a χ^2 value of 18.25 (p-value <0,001), the

analysis demonstrated that the tendency of metropolitan residents of prefer public transportation is not a random phenomenon. This result strengthens the hypothesis that the availability and efficiency of urban public services are a decisive influence on citizens' mobility choices.

Within the sociodemographic analysis, participants' age was also considered, as it's hypothesized that this variable can influence mobility choices. For instance, it's assumed that high school or university students would be more inclined to use public transportation compared to employed adults, as younger individuals typically lean towards shared transport solutions over other demographic groups.

From the obtained data, we calculated the average age of respondents. The average age serves as a measure of central tendency, aiming to synthesize the age structure of individuals into a single value.

Graph 5: Average age of respondents by gender

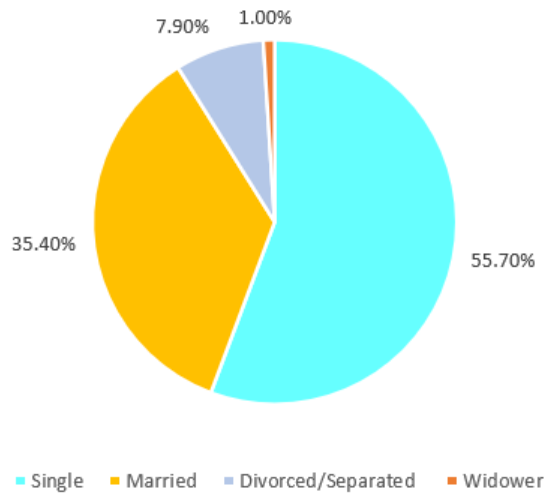


Sources: personal database from the questionnaire

Figure 5 indicates that the average age of men is slightly higher than that of women, with men averaging 36.2 years compared to women at 35.5 years. However, this difference is minimal. The age results might be influenced by the distribution method, which primarily utilized university channels, messaging apps like Telegram and WhatsApp, and various social media groups. Consequently, the sample may have a prevalence of younger individuals, automatically excluding certain segments of the population, such as the elderly, who are less inclined to use these communication tools. Continuing the analysis, after examining participant ages, attention shifted to marital status, considered a key variable influencing individual mobility choices. Figure 6 presents a pie chart illustrating the percentage distribution of

respondents based on their marital status, thereby highlighting the connection between this characteristic and mobility preferences.

Graph 6: Pie chart of the civil status of the individuals interviewed



Sources: personal database from the questionnaire

The chart reveals a clear prevalence of single individuals (55.70%) compared to married respondents (35.40%). This finding aligns with the sample's relatively low average age, which suggests a higher proportion of unmarried individuals or those without a stable partner. This result could be influenced by various cultural, social, and professional contexts, such as a greater focus on career and education, or even a contemporary preference for cohabitation over marriage.

It's also important to consider that individuals are currently leaving their parental homes at later ages than in the past. The reasons for this trend are diverse, including longer educational paths that delay entry into the workforce, low salaries coupled with difficulties in affording rent or mortgages, or instances of unemployment. These observations are consistent with national data from Istat:

Table 1: Dataset - Indicator marriages

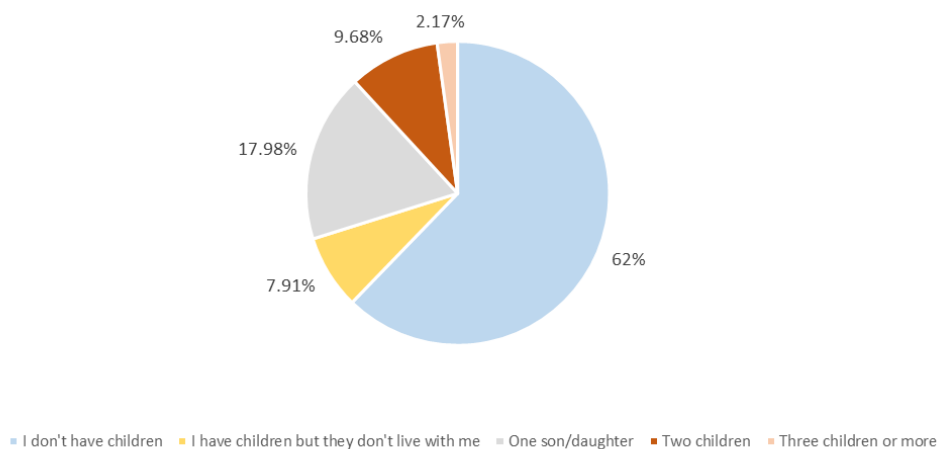
Territory	Italy
Period	2022
Average age at marriage for men	36,53
Average age at marriage for women	33,63

Sources: Istat - Marriages and civil unions- average age of grooms/spouses by civil status- 2022

In 2022, the average age for marriage was approximately 36.53 years for males and 33.63 years for females. This further supports the observation that marriage, at a national level, is occurring increasingly later in life.

This variable was considered of fundamental importance because a single individual has different needs and habits compared to someone who is married/partnered, or especially someone who is married with children. These groups present distinct requirements across various domains, including transportation. Generally, it's hypothesized that single individuals prefer quick and personal modes of transport. In contrast, those with families must accommodate their children's needs, often favoring private cars over collective transport, particularly if they have preschool-aged children. Currently, many of these family responsibilities may fall on the mother, whose need to manage family requirements influences both travel patterns and transportation preferences.

Graph 7: Pie chart - does the respondent have children?



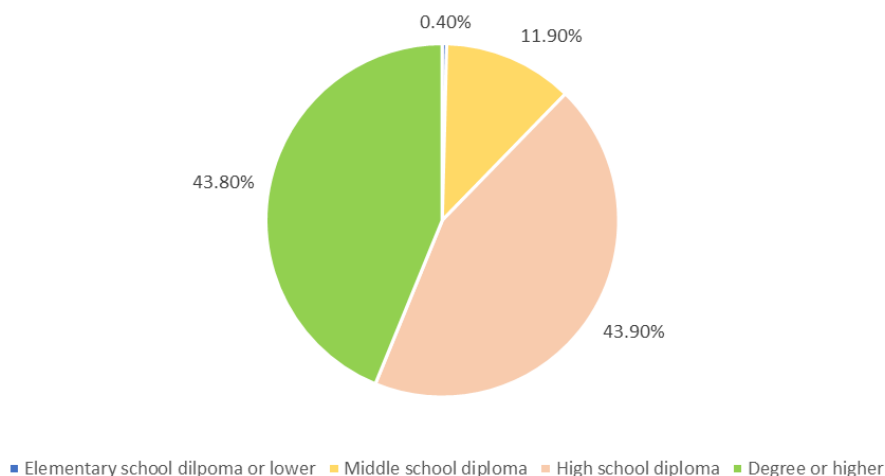
Sources: personal database from the questionnaire

Consistent with observations in Graph 6, the majority of respondents in this analysis, specifically 62%, do not have children.

Another significant finding from the survey is that 29.84% of respondents have one or more children living with them, indicating these individuals may still require ongoing care, support, and upbringing.

Finally, 7.91% of respondents have children who no longer reside with them. These children, being 23 years of age or older, likely live elsewhere for educational or professional reasons.

Graph 8: Educational qualification held



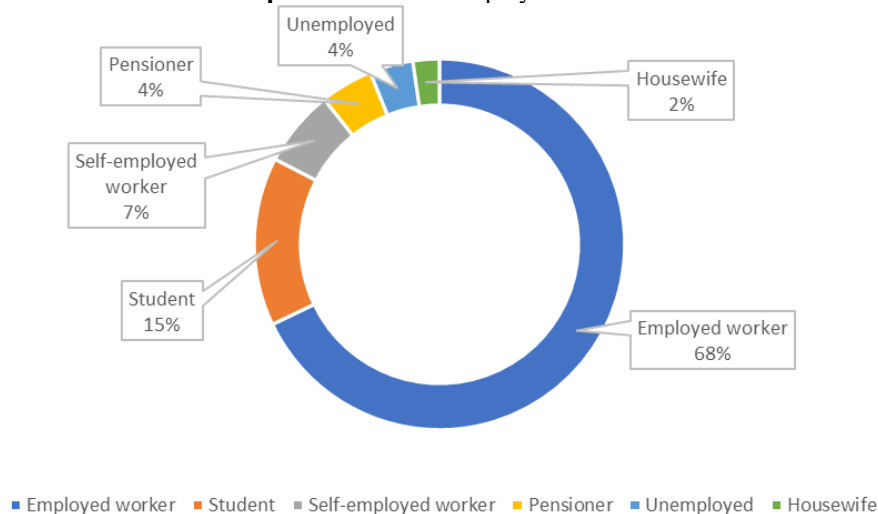
Sources: personal database from the questionnaire

Graph 8 presents a detailed breakdown of educational attainment, distinguishing between elementary school or lower, middle school, high school diploma, bachelor's degree, and postgraduate degrees. This classification of education level is crucial for analyzing the propensity for public transportation, as a correlation is presumed between educational background and mobility choices.

Consistent with initial hypotheses, students, particularly university and high school students, show a greater inclination towards public transport compared to private transport. This is likely influenced by the need for frequent travel and the economic accessibility of collective transport options. Conversely, individuals with a bachelor's degree, generally employed, tend to favor using a personal car or, in some cases, a company vehicle, reflecting a different approach to urban mobility.

It's important to note that this result might be partially influenced by the questionnaire's distribution method, which significantly involved university groups. Nevertheless, the sample composition shows a strong prevalence of individuals with medium-to-high education levels, with 43.80% of respondents holding a high school diploma and 43.90% holding a bachelor's or postgraduate degree. This data confirms the importance of education as an analytical factor in the context of mobility and suggests further investigation into the dynamics influencing transport preferences in relation to users' academic and professional profiles.

Graph 9: Pie chart - Employment Status



Sources: personal database from the questionnaire

The survey revealed an interesting distribution of workforce among respondents. The largest category is employed individuals, who represent 67.9% of all interviewees. In contrast, the percentage of self-employed workers is significantly lower, at 6.7%, indicating that self-employment is less prevalent among survey participants. Consistent with Graph 5, "Average age of respondents by gender," the percentage of retirees is very low, at around 4%.

In this analysis, unemployment constitutes a minority share, with a value of 3.8%. Considering the total of 506 respondents, an estimated 19 individuals are currently unemployed.

Similarly, consistent with the observed data and the fact that most interviewees hold a bachelor's degree or a diploma, data published by Istat for 2022 on the unemployment rate for individuals aged 25 to 34, broken down by educational qualifications, reveals that:

Table 2: Dataset - Unemployment Rate 2022

Class of age	25-34 years
Educational qualification	
No educational qualification, primary or middle school licence	17,48%
Diploma	11,24%
Undergraduate and postgraduate degrees	7,84%

Sources: Istat - Unemployment Rate: Educational Qualification, Age - 2022

Analysis of unemployment distribution among survey participants reveals a clear correlation between education level and employment opportunities.

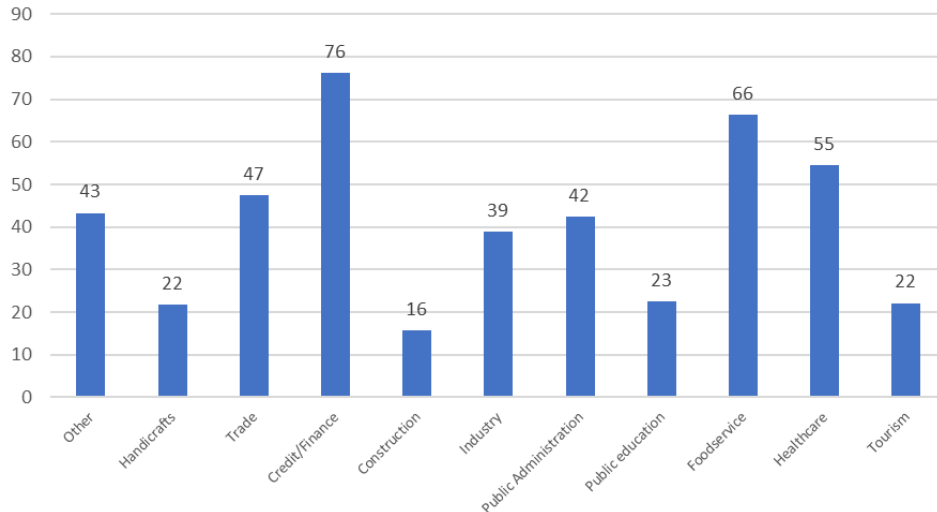
Among graduates, the unemployment rate is 7.84%, a relatively low figure. This outcome could be attributed to recent national economic development, marked by the emergence of new startups and companies that have increased labor demand, particularly qualified profiles aligned with market needs.

For diploma holders, however, the unemployment rate reaches 11.25%, a higher percentage than that observed among graduates. This difference may be explained by the fact that while a diploma provides a solid educational foundation, it does not always guarantee specialized preparation, which is often a decisive factor in the competitiveness of the current market.

Finally, among those with no formal educational qualifications, the unemployment rate rises to 17.48%, reflecting increasing difficulties in accessing the job market for individuals without formal qualifications. In an increasingly selective and competitive employment landscape, the lack of educational credentials can constitute a significant barrier, limiting access to certain roles and professions.

To gain a more complete overview of participant characteristics, respondents were also asked to indicate their specific work area, allowing for an analysis of employment dynamics in relation to the sector of employment and required skills.

Graph 10: Work environment of interviewees



Sources: personal database from the questionnaire

The analysis of participants' employment sectors yielded a total of 451 responses, highlighting the most prevalent professional areas. Among these, the Credit/Finance sector emerged as the most represented, accounting for 16.9% of interviewees, followed by Hospitality (14.7%) and Healthcare

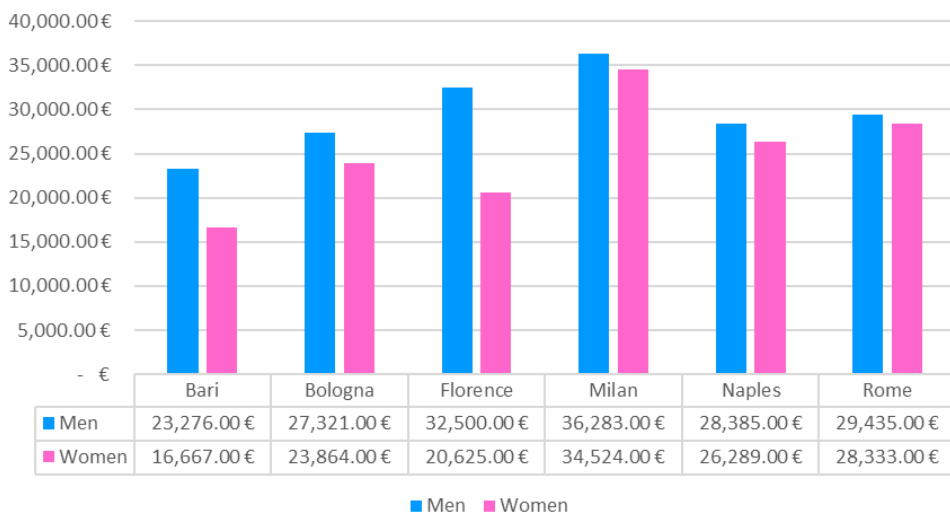
(12.1%). These data suggest a possible correlation between employment type and mobility preferences, as travel requirements vary significantly depending on the activity performed. For instance, financial and IT consultants, who frequently need to visit clients at various locations, tend to prefer using a company or private car to ensure greater flexibility in scheduling and destinations. Similarly, in the healthcare sector, where patient assistance in different facilities or at home is central, a car is often a necessary choice to facilitate travel.

However, in large urban centers like Milan and Rome, characterized by high population density and traffic congestion, public transportation represents a viable alternative. Workers based at fixed locations tend to prefer modes like the subway, which offers faster travel times and avoids issues like traffic jams and parking searches. Furthermore, many companies and startups choose to establish themselves in these metropolises due to their more efficient and extensive public transport networks, enhancing accessibility for employees and collaborators.

Conversely, individuals working in less developed urban contexts are often compelled to rely on private cars due to the limited availability of efficient public transport connections. The lower frequency of public transport services and the limited extension of infrastructural networks can make collective transport a less practical solution compared to private transport, significantly influencing workers' mobility choices.

Considering the two preceding variables - employment status and work sector - attention then shifted to the income bracket of the interviewed participants.

Graph 11: Income category of respondents



Sources: personal database from the questionnaire

The income variable significantly constrains consumer demand, directly influencing citizens' choices. Theoretically, individuals with higher incomes might be more inclined to use their own cars, as the cost of vehicle maintenance could be considered a minor expense. This contrasts with unemployed individuals or students, who, not generating income, might prefer public transportation due to lower costs.

Greater income availability affects every decision, as individuals are also influenced by factors like comfort and time efficiency during the decision-making process. If the choice is based on the time taken to reach a destination, those in significant positions may prefer to spend less time commuting, making a car a more convenient option.

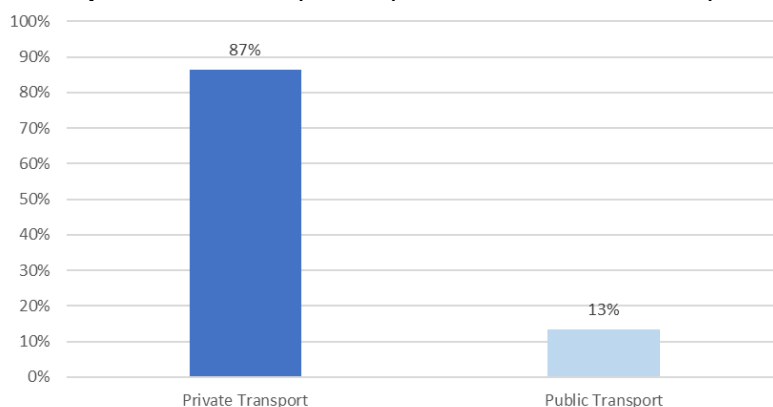
Graph 11, that the average income for workers in northern Italian cities is higher than in southern cities, with Milan holding the top position for average income. This disparity could stem from the fact that Central and Northern Italy are more industrialized, wealthier, and equipped with efficient services, hosting a greater number of large companies. These companies may require highly skilled profiles and consequently offer higher salaries, unlike the less developed and slower-growing South. This contributes to the observed income differences across regions.

Another difference evident in Graph 11 is the persistent Gender Pay Gap in the workplace, showing that the average income of women is lower than that of men. This disparity could be attributed to several factors, such as a higher prevalence of part-time contracts among women, their greater involvement in unpaid activities

Analysis of respondents on mobility choices

In the second phase of analysis, we focused on the logistical preferences of the interviewees, explicitly asking them whether they preferred PT or LPT for their movements, obtaining the data shown in graph 12:

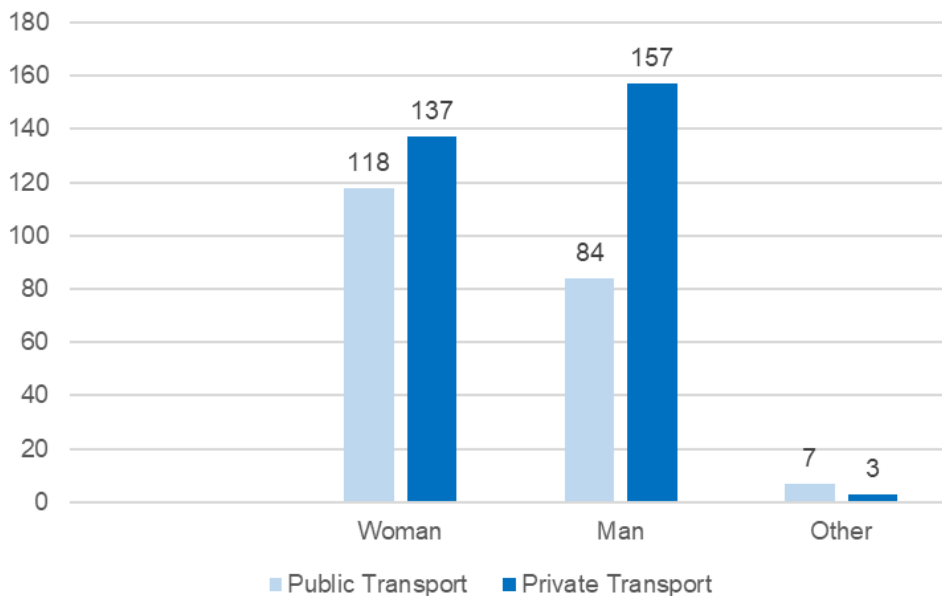
Graph 12: Does the respondent prefer Private or Public Transport?



Sources: personal database from the questionnaire

Analysis of the collected data reveals a clear predominance of private transport (PT) over local public transport (LPT). Eighty-seven percent of respondents indicated PT as their preferred choice for daily mobility, while only 13% opted for LPT. This distribution highlights a strong propensity towards the use of individual modes of transport, with a clear minority of users preferring the public system. These dynamics are further corroborated by the findings of De Oña et al. (2021) in "Public transport users versus private vehicle users: Differences about quality of service, satisfaction and attitudes toward public transport in Madrid (Spain)." Their study examines the relationship between perceived service quality, satisfaction, and attitudes towards public transport, concluding that these factors significantly influence the willingness of private vehicle users to consider LPT. Mobility choices can also vary significantly based on several factors, including gender, as demonstrated in the dedicated histogram. The distribution of preferences between men and women reveals differences that warrant further in-depth analysis to understand the motivations underlying these trends.

Graph 13: Mobility choices: gender differences in means of transport



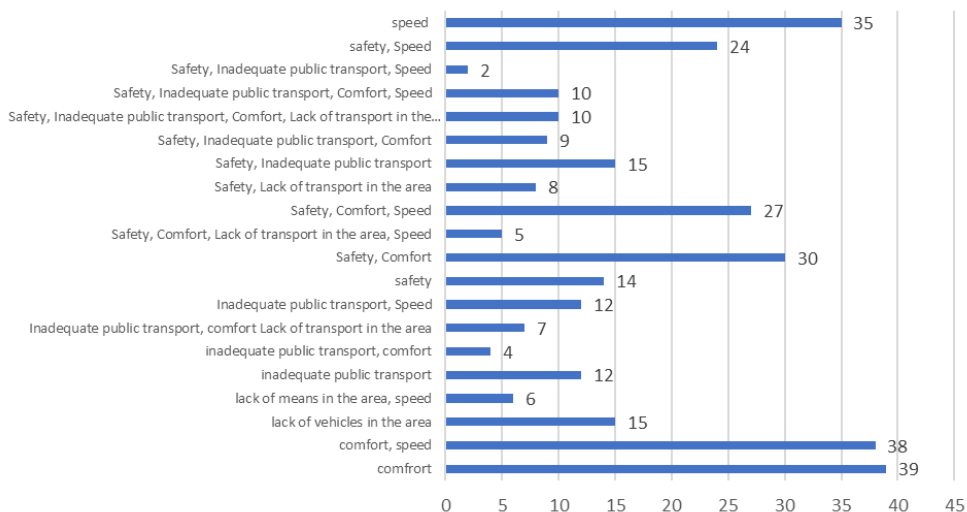
Sources: personal database from the questionnaire

Mobility preferences exhibit significant gender-based distinctions, revealing complex dynamics beyond mere mode choice. Women show a slight predilection for private transportation, with 137 preferences compared to 118 for public transport. This trend suggests a pursuit of greater autonomy and flexibility in travel, often motivated by a perception of superior personal safety, especially during evening hours or in less frequented areas. The

necessity of reconciling multiple commitments, such as work, family appointments, or chauffeuring children, coupled with the ability to transport purchases or items, renders the private vehicle a practical and adaptable solution to their daily needs. The absence of fixed schedules and the freedom to choose routes contribute to this preference, offering more efficient and less constrained time management.

Conversely, men demonstrate an even more pronounced preference for private mobility, particularly car usage, as clearly evidenced by the data. This choice is often driven by a pursuit of speed and efficiency in travel, deemed essential for professional or personal reasons. For many, the car represents not only a means of transport but also a symbol of freedom and control over one's itinerary. The perception of greater command over the journey and the ability to avoid crowds, especially during peak hours, reinforce this inclination. Furthermore, factors such as parking availability and the perceived economic convenience relative to the costs and time of public transport play a crucial role. A detailed survey confirmed this trend, revealing 322 justifications for private transport compared to 64 for public transport. These motivations range from convenience and flexibility - the ability to move freely without dependence on fixed schedules - to perceived safety and privacy. The ease of managing loads or luggage and the perception of time savings, particularly routes underserved by public transport, also significantly influence this choice. In summary, the differing mobility preferences between men and women result from a combination of practical, social, and safety factors that shape their daily commuting decisions.

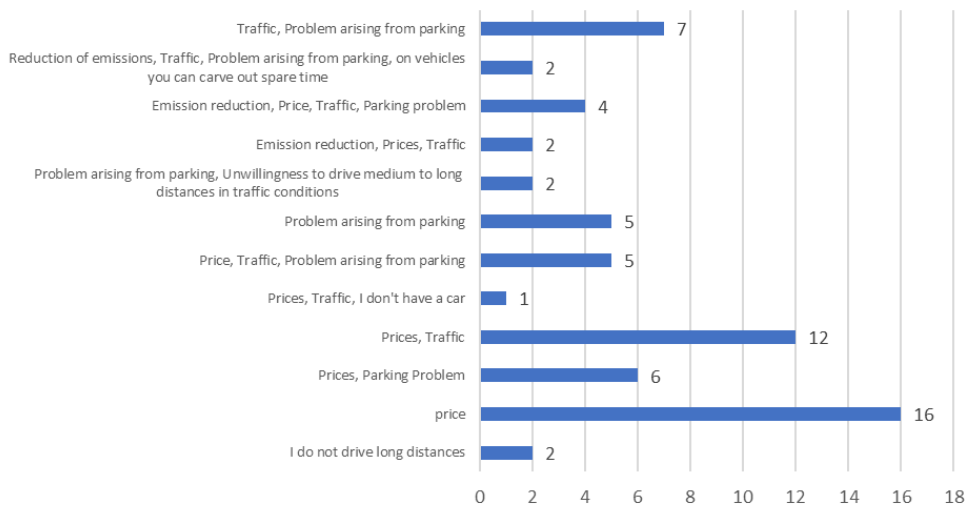
Graph 14: Why does the respondent prefer Private Transport?



Sources: personal database from the questionnaire

The trend confirmed by the survey presented in Graph 14 highlights the primary reasons respondents prefer using private transport. Speed, safety, and comfort emerge as decisive factors, but recurring motivations also include the lack of public transport in the area and the inadequacy of public transportation. These frequently cited aspects underscore how many residents are compelled to rely on cars due to a public transport system that fails to meet their needs. Safety plays a crucial role in transport mode choice: many users perceive their travel experience on certain public transport as negative, leading them to consider their own vehicle as the most reliable option. Furthermore, the absence of efficient services in various urban and rural areas further reinforces this dependence on private vehicles, often making it the most practical solution for daily commuting. As shared by T. Shibayama et al. in *Ensuring Sustainable Mobility in Urban Periphery, Rural Areas and Remote Regions* (2023), sustainable mobility in urban areas is favored by the concentration of services and infrastructure, whereas in peripheral and rural areas, the absence of viable alternatives strengthens reliance on private cars.

Graph 15: Why does the respondent prefer Public Transport?



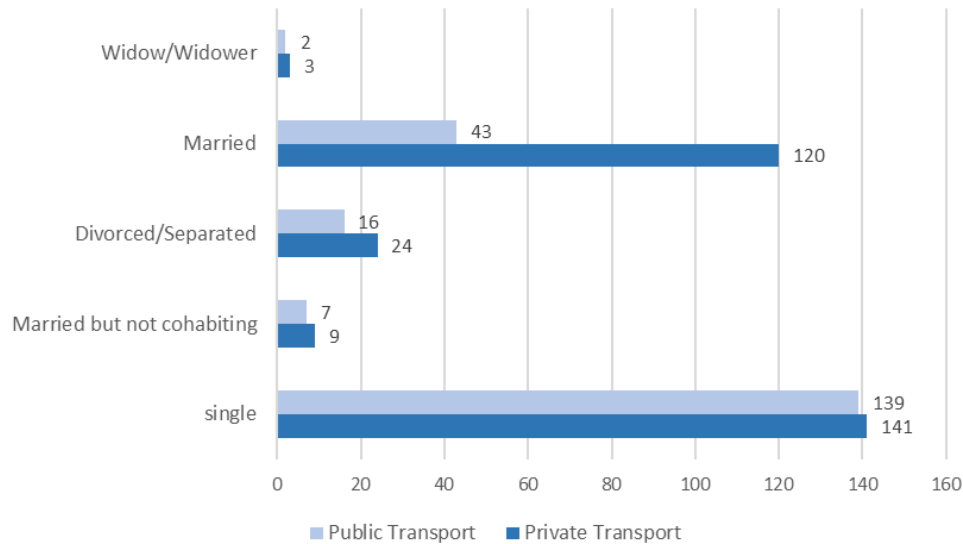
Sources: personal database from the questionnaire

The main factors that drive individuals to prefer public transport over private transport, as also highlighted in Graph 15, include difficulty finding parking, heavy traffic, and the high cost of using a private car. These problems are common in large cities, especially during peak hours, when commuting for work or study makes roads particularly congested and finding parking a real challenge.

Public transport thus proves to be a valid and concrete alternative. Not only does it allow people to avoid the stress and time loss associated with finding a parking space and getting stuck in traffic, but it also offers a more

economical and often more efficient way to get around the city. Given the daily challenges of urban mobility, public transport emerges as an intelligent and sustainable solution for commuters and residents.

Graph 16: Mobility and Civil Status



Sources: personal database from the questionnaire

The analysis of mobility preferences in relation to marital status reveals significant trends suggesting how personal and family needs influence the choice between private transport (PT) and local public transport (LPT).

Among singles, the distribution is almost balanced: 141 preferences for private transport versus 139 for public transport. This balance could stem from the greater flexibility and accessibility of public transport in urban areas, where many young people live and work. However, some respondents might prefer cars for reasons of convenience, autonomy, and time management.

Individuals who are married but not cohabiting show relatively low numbers, with 9 responses for private transport and 7 for public transport. In this case, the choice of transport mode could be influenced by the distance they need to travel to meet their partner, the availability of public transport, and the need to reconcile personal and relational commitments.

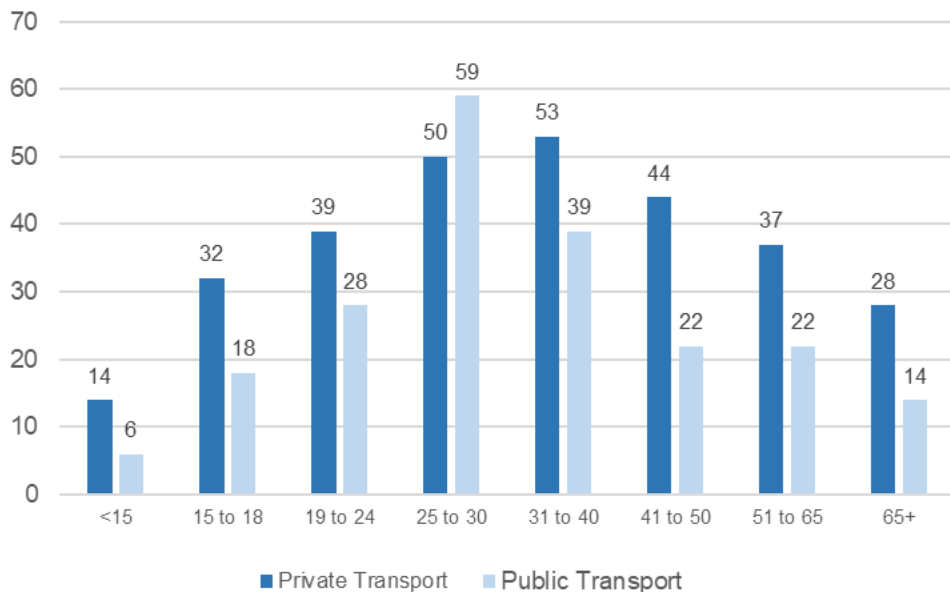
For divorced and separated individuals, there is a greater preference for private transport (24 versus 16). This trend may be linked to new post-separation mobility needs, such as managing travel for family, work, or leisure. A car guarantees greater autonomy and the ability to organize travel independently, a particularly relevant factor for those who need to reconcile various aspects of daily life.

The group of married individuals shows a clear predilection for private transport (120 versus 43). This trend can be explained by family needs: those with a family often use a car to accompany children, shop, manage work, and daily activities. Public transport, though available, may not offer the same flexibility required by a complex and articulated routine.

Finally, among widows/widowers, the number of respondents is very low (3 preferences for private transport versus 2 for public transport), making it difficult to draw definitive conclusions. However, it is plausible that people in this category have reduced mobility needs and that the choice depends on economic, practical, and accessibility factors for transport services.

This analysis highlights the strong link between marital status and mode of travel, showing how individual and family needs profoundly influence the choice between public and private transport. Understanding these aspects is essential for designing more inclusive mobility strategies, capable of responding to the needs of different segments of the population, and fostering a balance between efficiency, convenience, and sustainability. Subsequently, the analysis proceeds to understand which means of transport individuals prefer based on their purposes, distinguishing between work or study commutes and personal and leisure travel. The objective of the analysis is to understand how people decide to travel based on their purpose, and what factors influence these decisions.

Graph 17: Mobility and Age Classes



Sources: personal database from the questionnaire

The analysis of mobility habits across age groups reveals significant variations in transportation needs throughout the lifespan. Key determinants include economic independence, public transport accessibility, family requirements, and travel convenience.

For children and adolescents under 15, transport choices are heavily influenced by reliance on parents or guardians. With 14 preferences for private transport versus 6 for public, travel for school and extracurricular activities predominantly occurs by car, ensuring greater safety.

Between 15 and 18 years, private transport use increases (32 vs. 18), likely due to access to scooters and motorcycles, in addition to family support. However, public transport remains relevant for students residing in cities with efficient services.

In the 19-24 age group, the disparity between private and public transport diminishes (39 vs. 28). Many university students and young workers opt for public transport due to economic and practical considerations. The presence of efficient transport in urban areas plays a fundamental role during this life stage.

The 25-30 age segment is the sole one where public transport surpasses private (50 vs. 59). This can be attributed to a greater propensity for sustainable mobility and urban living, where public transport is more accessible and convenient compared to car ownership.

From 31 to 40 years, private transport again predominates (53 vs. 39). Job and family stability lead to car preference for flexibility and convenience, especially for individuals managing multiple daily activities.

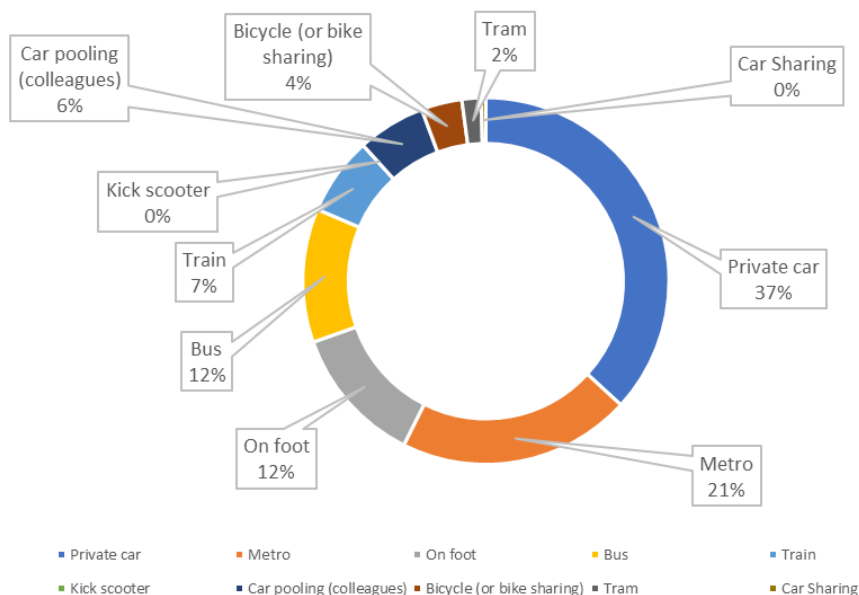
In the 41-50 age group, a decline in public transport use is observed (44 vs. 22). Greater economic availability and the choice to reside in areas less served by public transport favor the car as the primary mode of travel.

Between 51 and 65 years, private transport remains the dominant choice (37 vs. 22), albeit with a slight decrease compared to preceding age groups. This could be due to reduced frequent travel needs, reflecting a greater balance between autonomy and practicality.

Finally, in the 65+ group, an overall decrease in mobility is registered, with private transport still preferred (28 vs. 14). Car use diminishes for reasons related to reduced work and social activities, as well as driving difficulties in advanced age. Public transport remains less utilized, possibly due to physical limitations or inadequate infrastructure.

The analysis confirms that transport preferences evolve based on age and the specific needs of each life stage. Public transport reaches its peak prevalence between 25 and 30 years, while private transport prevails in older age groups due to flexibility and autonomy. Graph 18 presents the results obtained from travel for work or study purposes:

Graph 18: Means used to reach the place of work/study



Sources: personal database from the questionnaire

As illustrated in the pie chart, the automobile remains the primary choice for transportation, accounting for 36.8% of preferences. This outcome was anticipated, as cars are a prevalent mode of mobility, particularly in rural areas and smaller urban centers where public transportation alternatives are limited or inefficient.

The subway emerges as the second most favored option, with 20%, followed by buses and trains. The data indicates that conventional modes of transport continue to be the most frequently utilized. Buses, trains, and trams collectively represent the choice of 21% of interviewed workers, with the subway at 20%. Conversely, more contemporary or innovative options such as car-sharing, bike-sharing, carpooling, and scooters are considerably less popular among respondents, despite their ecological benefits and reduced negative externalities.

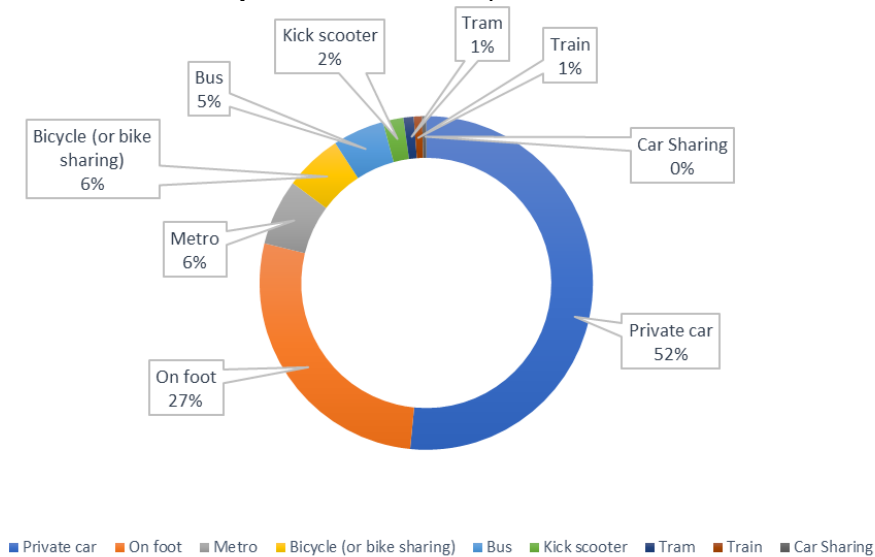
Considering the average distance traveled, students and workers commute approximately 12 km to reach their workplaces or educational institutions. This suggests a high likelihood of utilizing transportation rather than traveling on foot. Furthermore, the responses reveal that cycling is not a common practice among Italians, with only 3.6% finding it a convenient mode of transport. This low adoption rate may be attributed to fragmented cycling paths or safety concerns faced by cyclists on busy roads. In contrast, the "on foot" category indicates that 12% of individuals commute without using any vehicle. It can be inferred that these individuals likely have workplaces or

study locations within a 2 km radius, a pattern more common in smaller towns than in major cities.

Regarding carpooling and car-sharing, individuals aged 18 to 30 are more inclined to utilize shared transport, particularly on weekends.

Shifting focus to the use of transportation for personal activities such as shopping and leisure, the results are presented in Graph 19:

Graph 19: Means used for personal activities



Sources: personal database from the questionnaire

For personal activities, the car remains the preferred choice for approximately 51.6% of respondents, suggesting that more than half of Italians use their cars for non-work-related travel during the day.

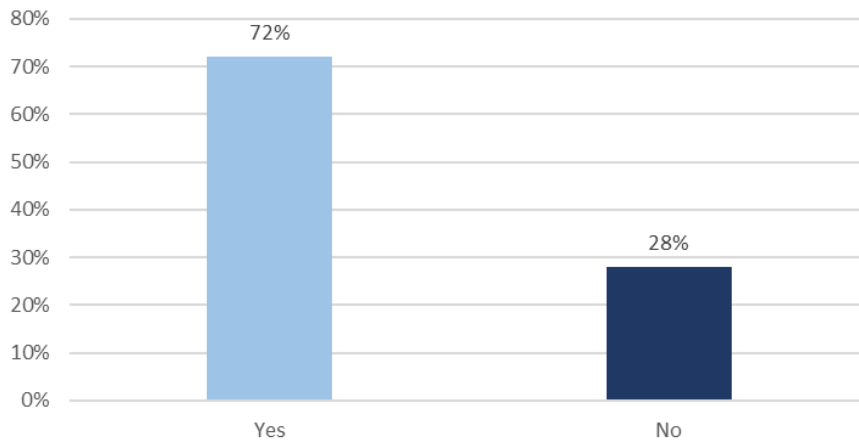
The second most common choice is traveling on foot, accounting for 27%. This preference might be influenced by several factors: some respondents being students, recreational activities and leisure spots being located near their homes, or the concentration of most shopping and leisure activities in city centers.

Conversely, trains, car-sharing, and trams do not achieve high scores. Trains are primarily used for work-related commutes, while car sharing is not yet widespread in smaller cities.

Unlike Graph 18, Graph 19 shows a 14.2% reduction in subway usage for personal purposes. In cities like Milan or Rome, the subway does not operate at night. Additionally, in large cities, people often feel safer using their cars rather than public transport at night due to an increase in vandalism and violence, especially in recent years. Meanwhile, bicycles consistently receive a low percentage as a mobility choice. However, unlike the previous chart, scooters reach 2%, a mode of transport mainly used by young people.

Continuing the analysis of transportation methods, respondents were asked a specific question regarding car ownership. The collected data, summarized in Figure 20, provides an overview of the mobility habits and transportation choices of the individuals involved in the study.

Graph 20: Does the respondent own a car?



Sources: personal database from the questionnaire

The analysis of mobility habits reveals a clear polarization between car owners and non-owners: 72% of respondents report owning a private vehicle, while the remaining 28% do not. This data confirms the central role of the automobile in the Italian transport system, where private vehicle ownership often represents a necessity rather than a choice, especially in areas with limited access to public services. The prevalence of the automobile as a mode of transport is not solely dictated by the convenience and independence it offers, but also by the lack of viable alternatives in many parts of the country. Factors such as flexibility in travel, limited public transport coverage, and the perception of greater efficiency contribute to solidifying the car's primacy. Furthermore, the difficulty of integration between different public transport modes, inflexible schedules, and often insufficient service quality reinforce the choice of private vehicles. Beyond practical aspects, attachment to private cars is often driven by emotional and status considerations, as highlighted by the study by Beirão and Cabral (2007). Car ownership can be perceived as a symbol of autonomy, security, and social prestige, influencing preference over other modes of transport. Advertising and automotive culture also play a significant role, helping to consolidate the idea of the car as an indispensable element in daily life. Finally, the inadequacy of sustainable mobility infrastructure and the lack of concrete incentives for public transport make a significant change in travel habits difficult. Without targeted interventions to

improve the accessibility and efficiency of public transport, the car will continue to be the predominant choice for most of the population.

This trend is further analyzed through a comparison with ISTAT data, in order to understand the evolution of the phenomenon on a national scale and verify whether the preference for cars is homogeneous across different population groups and territories.

Table 3: Vehicle Park

Data type:		Vehicle Park						
Time period:		2022						
Type of vehicle	Cars	Buses and Trolleybuses	Trucks	Tractors	Trailers	Motorbikes	Motorcars	Total
North	18575678	36678	2467722	99976	209345	3475048	103917	24968370
Center	8181779	22420	984413	32267	66258	1587983	61783	10936907
South	8903739	29780	1103441	59324	113397	1378688	108730	11697104
Islands	4535860	11073	601105	22032	55326	858156	55463	6139020
Not indicated	16005	63	2506	132	404	2722	207	22040
TOTAL	40213061	100014	5159187	213731	444730	7302597	330100	53763441

Sources: Istat- Vehicles - Public Vehicle Register – 2022

As highlighted in Table 3, approximately 40 million cars were in circulation in Italy in 2022. This confirms the dominance of the automobile at a national level, mirroring the findings of our survey.

One of the primary reasons for the widespread use of cars could be the country's geographical makeup. Around half the population lives in small urban centers or areas where public transport alternatives are insufficient. In many cases, especially urban and interurban travel, the lack of efficient infrastructure leaves residents with few options other than private car use.

Reducing the number of cars on the road is a complex challenge, but it's becoming increasingly essential for promoting more sustainable and livable urban environments. Strategies such as strengthening public transport, incentivizing shared mobility, and developing alternative infrastructure can help reduce car dependence and foster more efficient transport models.

A further element examined pertains to the frequency of use of the modes of transport surveyed by respondents.

Table 4: Frequency of use of public and private transport

Means	Never	Rarely	A few times a month	A few times a week	Every day
<i>Private car</i>	0,00%	6,18%	4,56%	15,32%	73,94%
<i>Metro</i>	22,18%	23,95%	18,22%	19,80%	14,85%
<i>Tram</i>	25,10%	34,78%	28,06%	9,68%	2,37%
<i>Bus</i>	8,50%	36,36%	29,25%	13,83%	12,06%
<i>Car Sharing</i>	69,37%	19,37%	9,68%	1,19%	0,40%
<i>Kick scooter</i>	55,73%	21,14%	14,82%	7,90%	0,39%
<i>Bicycle (or Bike sharing)</i>	43,28%	23,51%	20,75%	9,48%	2,96%

Sources: personal database from the questionnaire

To clarify the distribution of transportation usage frequency, we've adopted a color scale. Red indicates occasional or almost no use, while orange signifies moderately low usage. Moving up in intensity, yellow denotes medium usage, and green represents the most frequently used modes. In other words, the assigned color reflects its frequency of use: red for low usage, orange for moderate usage, yellow for medium usage, and green for frequent usage.

It can be observed that:

- **Car:** Used by 100% of surveyed individuals, either as a driver or a passenger.
- **Subway:** Only 22.18% of respondents never use it, considering that subways are developed only in certain Italian cities. Meanwhile, 76.82% choose to use this type of collective transport for both work and personal purposes.
- **Tram:** 25.10% never use this mode of transport, but conversely, it is used by 74.89% of respondents for work and/or personal purposes.
- **Bus:** This is the most widespread mode of transport across Italy; indeed, 91.50% confirm its use, distributed between "a few times a month," "a few times a week," and "every day," as opposed to 8.50% who never use it.
- **Car-sharing:** The concept of car-sharing, beyond Milan, Turin, and Rome, is not yet a widely diffused mode of transport among citizens; in fact, 69.37% never use it, and only 30.64% report using it rarely or a few times a month.
- **Kick scooter:** This is a mode of transport whose popularity has spread in recent years, especially among young people. However, the majority of respondents never use it, accounting for 55.73%. Conversely, 44.25% use it rarely, a few times a month, or a few times a week.
- **Bicycle:** In this category, this mode of transport is used by 56.70%, contrasted by 43.28% who never use it.

Public Transport: Comparison of different means

In this section, we analyzed the scores of participants assigned to six fundamental aspects that might influence an individual's logistical choices. The modes of transport under analysis were: Tram, Metro, Bus, Bike Sharing, Car Sharing, and Kick scooter.

Using a Likert scale, respondents assigned a score from 1 to 5 (where 1 indicates a very low level of satisfaction and 5 indicates the highest level of satisfaction), evaluating speed, crowding, safety, price, cleanliness, and punctuality. This analysis allows us to understand respondents' perceptions regarding the quality of services currently offered by each mode of

transportation, as synthesized in the following table with the mean satisfaction scores.

Table 5: Average satisfaction scores

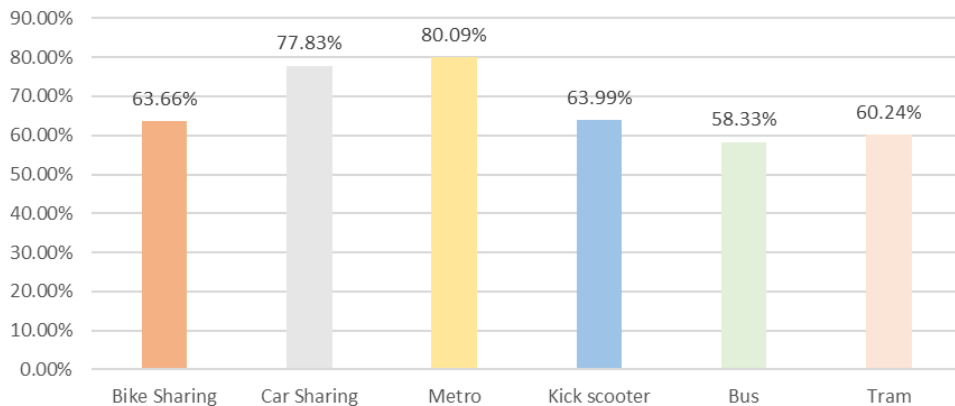
Means	Speed	Crowding/Queue	Security	Price/Cost	Cleaning	Punctuality
Metro	4.01	2.56	2.98	3.89	2.87	4.11
Bus	3.12	3.25	3.15	3.95	2.91	2.88
Tram	3.09	3.31	3.20	3.98	2.89	2.95
Car Sharing	3.28	4.21	3.45	2.50	4.23	3.87
Bike Sharing	3.15	4.10	3.01	4.20	4.15	4.05
Kick scooter	3.22	4.05	3.05	2.75	4.18	3.90

Sources: personal database from the questionnaire

As can be observed, these mean values serve as an effective summary of the percentage distributions illustrated in the histograms.

From the scores obtained, it's evident that:

Graph 21: Score Speed (%)



Sources: personal database from the questionnaire

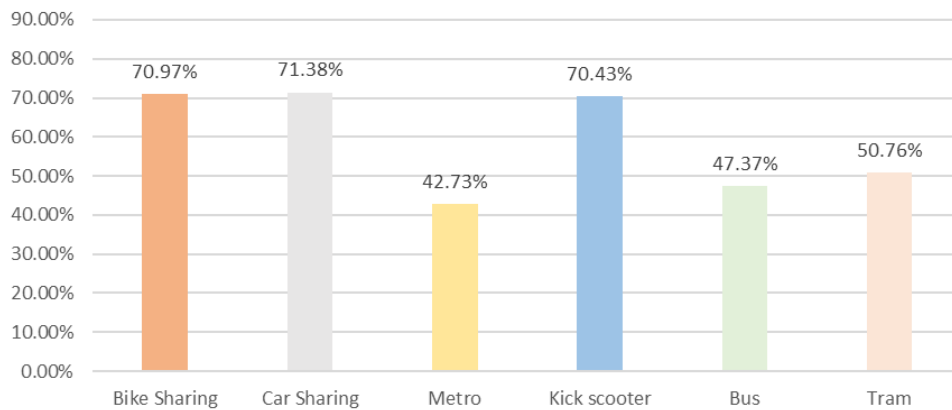
As illustrated in Chart 21, the subway is the preferred public transport mode among respondents in terms of speed. Where available, it confirms itself as the most efficient transport system, scoring 80.09%. This data reflects reality, as unlike road-based transport - such as buses, cars, scooters, and trams - the subway is not subject to traffic, traffic lights, queues, or other criticalities along its route.

A further advantage lies in the fact that all subway lines have dedicated lanes, ensuring rapid connections between stops in just a few minutes. The difference in scores obtained further confirms this: the subway reaches 80.09%, compared to 58.33% for buses and 60.24% for trams. If the choice of transport were based solely on speed, the subway would clearly emerge as the optimal solution.

Similar results are recorded for bike-sharing (63.33%) and kick scooters (64%). However, since both modes operate on roads and, in many

cases, without dedicated lanes, their speed depends on traffic conditions and unforeseen events along the route.

Graph 22: Crowding/queue scores



Sources: personal database from the questionnaire

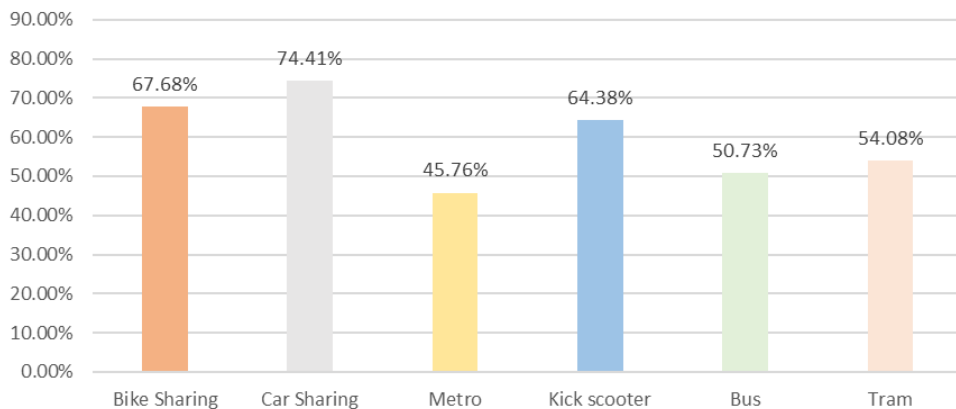
Regarding crowding, the subway is the most congested mode. As a high-capacity public transport system, it moves many people, but often becomes excessively full, limiting space for entry, exit, and internal movement, especially during peak morning hours.

This phenomenon could be attributed to its cost-effectiveness and speed. Subway lines, extending across much of the urban area, are highly accessible, particularly for those living near stations. Additionally, the lack of equally efficient alternatives further contributes to the high number of passengers.

It's also worth noting that in the last year, some companies have, to a limited extent, reduced the number of services due to increased operational costs. This has led to longer waiting times, further exacerbating the crowding issue.

The bus, despite being widely used, scores low, likely due to its lower appeal, often perceived as a forced choice in the absence of more efficient alternatives. Conversely, bike-sharing, car-sharing, and kick scooters score highly, thanks to their widespread availability and ease of rental via apps.

Graph 23: Security Score



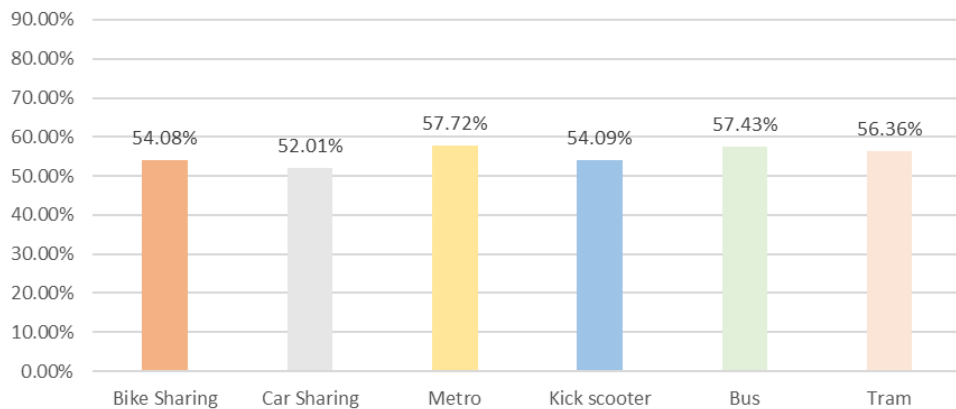
Sources: personal database from the questionnaire

Graph 23 illustrates the perceived safety of various transportation modes. According to respondents, the subway is considered the riskiest mode, particularly in large urban areas. This perception likely stems from the high population density, which increases the likelihood of opportunistic crimes such as theft, snatching, and, in severe cases, assault. This trend has become particularly noticeable in recent years.

Another contributing factor to perceived safety issues is the condition of some subway stations, which are often described as degraded, unclean, and unsafe. Buses and trams also do not achieve particularly high scores for perceived safety, registering 50.73% and 54.08%, respectively. A Pearson correlation analysis was conducted to examine the relationship between participants' age and their perceived safety of the subway. The results revealed a moderate negative correlation ($r=-0.31$; $p\text{-value} < 0.05$). This data suggests a statistically significant tendency for the perceived safety rating of this mode of transportation to decrease as the age of the respondents increases. This relationship indicates a potential differentiation in the perception of risk and comfort based on age.

Conversely, individual transportation modes exhibit higher safety scores. The automobile, in particular, ranks highest with 74.41%. This outcome may be influenced by respondents' tendency to prioritize the risk of criminal incidents on public transport, such as theft and snatching, while potentially underestimating the risk of adverse events related to road traffic, such as accidents.

Graph 24: Price/Cost Score



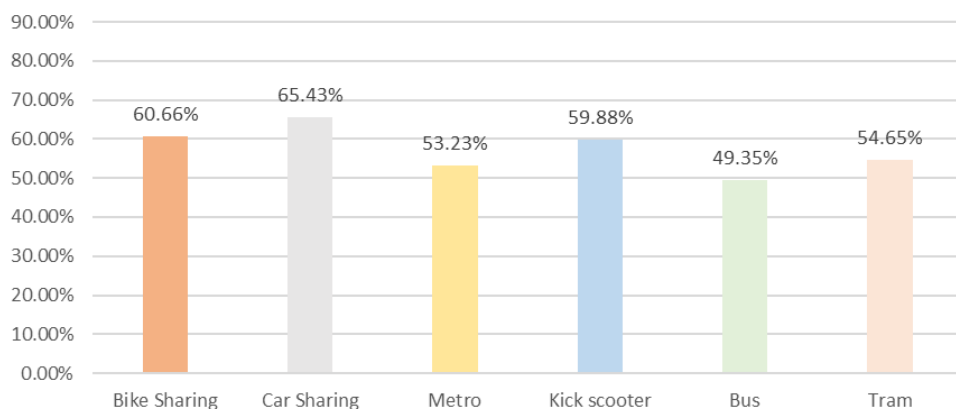
Sources: personal database from the questionnaire

In Chart 24, different transportation methods were compared based on the cost incurred by users.

Individual mobility solutions, such as bike sharing, car sharing, and kick scooters, prove to be the most expensive. This is due to their hourly or daily rental systems. However, these prices can be justified by the operational costs borne by the managing companies, including vehicle recharging or refueling (electricity, fuel), maintenance expenses, and the personnel required to manage the service.

Conversely, collective transportation methods, such as the subway, coach, and bus, remain the most affordable options. This is primarily thanks to the availability of subscriptions and discounted fares, which are often adaptable based on user categories.

Graph 25: Cleaning Score



Sources: personal database from the questionnaire

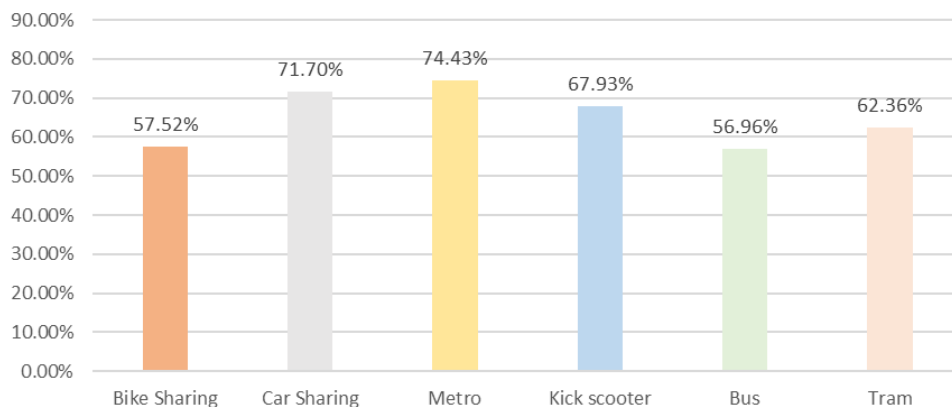
In Chart 25, car sharing emerges as the cleanest mode of transport. This is attributed to its limited user base and regular maintenance operations, which ensure a hygienic and comfortable environment.

The bicycle ranks second in terms of cleanliness, slightly outperforming the scooter. However, both bicycles and scooters are frequently subject to vandalism and improper abandonment, which can compromise their condition.

Finally, collective transport modes, due to the high number of daily journeys and often uncivil behavior from users, tend to be perceived as less clean and are at a higher risk of harboring viruses, bacteria, and other pathogenic microorganisms.

A second correlation analysis was conducted to assess whether age influences the perception of bus cleanliness. The calculated Pearson coefficient showed a value of -0.05, indicating a very weak and not statistically significant correlation ($p\text{-value} > 0.05$). This result suggests that the perception of cleanliness for this mode of transport is not linearly correlated with the user's age. Other factors, not included in this specific analysis, are likely the main drivers of satisfaction regarding this aspect.

Graph 26: Punctuality Score



Sources: personal database from the questionnaire

In this final analysis, the factor examined is punctuality. The results indicate that the subway is the most reliable mode, with a score of 74.43%. This punctuality is attributed to the high number of daily runs and dedicated tracks, which ensure unimpeded routes. This phenomenon is particularly evident in cities like Rome and Milan.

Sharing services, such as bikes, cars, and scooters, also stand out for their efficiency, as vehicle search and booking are quick. The time available between booking and using the vehicle, combined with the widespread distribution of units across the city, helps ensure a timely service.

Conversely, buses and trams are the most prone to delays. This is due to external factors like traffic, adverse weather conditions, numerous stops for passenger boarding and alighting, and unforeseen incidents along the route.

Conclusions and future research paths

This analysis clearly highlights a strong preference for private transportation among the survey respondents. Specifically, the car is confirmed as the primary choice for mobility needs, with 37% of respondents using it for work-related reasons and 52% for personal purposes.. This choice is primarily driven by the perceived advantages of speed, safety, and comfort.

Although public transportation remains a necessary alternative in congested urban areas, it is overall less favored. This preference is reinforced by a high rate of car ownership (72%), which reflects both practical needs and cultural habits in Italy. Despite the environmental benefits and the growing availability of shared and active mobility options, such as car sharing, cycling, and e-scooters, these modes have not yet achieved significant adoption, especially outside major cities.

The results underscore the complexity of changing travel behaviors, emphasizing that improvements in public transport infrastructure, safety perception, and urban planning are crucial for encouraging more sustainable mobility choices. Ultimately, balancing convenience with environmental goals remains a key challenge in shaping the future of transportation in Italy.

An evaluation of the key satisfaction factors across different transport modes reveals a clear pattern of perception among respondents. The metro stands out for its superior speed and punctuality, benefiting from dedicated routes free from typical traffic delays, though it suffers from high crowding and safety issues related to urban density and station conditions. Specifically, on a 1–5 Likert scale, metro safety received the lowest average score, at 2.98.

In contrast, individual mobility options like bike sharing, car sharing, and e-scooters are valued for their cleanliness and lower crowding but are generally perceived as more expensive and less reliable in terms of speed due to their dependence on traffic. Public transport modes such as buses and trams, while economical and widely used, receive lower scores for cleanliness, punctuality, and user satisfaction, largely due to external delays and maintenance issues. Confirming this, the perceived speed of buses and trams received the lowest average scores (3.12 for buses and 3.09 for trams, respectively), unlike other modes of transportation.

Overall, these observations highlight the trade-offs that surveyed users face between efficiency, safety, cost, and comfort when choosing their mode of transport, underscoring the need for targeted improvements in public transport services to better meet user expectations.

Future research directions, in our idea, are the followings:

1. **Comprehensive Safety Perception Studies:** To better understand concerns about crime, cleanliness, and station infrastructure, future research could examine the precise factors influencing passengers' perceptions of safety on public transportation. Qualitative techniques like focus groups or interviews could be used in these studies. This would assist in creating focused interventions to raise public transportation's perceived and real safety.
2. **Influence of Service Frequency and Crowding on User Satisfaction:** More research could quantitatively evaluate the effects of changes in service frequency and crowding levels on user satisfaction, travel habits, and mode preference, especially for buses and metros. Passenger flow analysis and real-time data collection via smart sensors may be required for this.
3. **Cost-Benefit Analysis of Shared Mobility:** Policymakers seeking to support sustainable transportation options would benefit greatly from comparative studies of shared mobility options (bike sharing, car sharing, kick scooters) that concentrate on user acceptability, environmental impact, and economic viability.
4. **Integration of Multimodal Transport Systems:** With an emphasis on technological solutions like mobility-as-a-service (MaaS) platforms, research could examine how combining established public transportation with new shared and micro-mobility options impacts overall urban mobility, user convenience, and environmental outcomes (Twardzik, 2024).
5. **Infrastructure and Urban Planning for Active Mobility:** Research on how the quality of urban infrastructure, such as the existence and upkeep of bike lanes and pedestrian zones, affects the adoption of active transportation could help improve urban planning techniques to boost the rates of walking and bicycling (Litman, T., 2023).
6. **Behavioral Patterns by Demographic Segments:** To help establish customized transportation regulations, longitudinal study could examine how transportation choices and satisfaction change over time across various demographic groupings (age, occupation, and location).
7. **Effects of External Factors on Public Transport Punctuality:** Researching how weather, traffic jams, and unforeseen delays affect the dependability and timeliness of buses and trams can help direct enhancements to real-time passenger information systems and scheduling.

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Appendix

Questionnaire used for the survey

1. Do you live in one of these Italian metropolitan cities?							
☐ Bari							
☐ Bologna							
☐ Cagliari							
☐ Catania							
☐ Florence							
☐ Genova							
☐ Messina							
☐ Milan							
☐ Naples							
☐ Reggio Calabria							
☐ Rome							
☐ Turin							
☐ Venice							
☐ No							
2. How old are you?							
☐ <15							
☐ 15 to 18							
☐ 19 to 24							
☐ 25 to 30							
☐ 31 to 40							
☐ 41 to 50							
☐ 51 to 65							
☐ 65+							
3. With which gender do you identify?							
☐ Man							
☐ Woman							
☐ Other							
☐ I prefer not to declare it							
4. What is your marital status?							
☐ Single							
☐ Married							
☐ Married but not cohabiting							
☐ Divorced/Separeted							
☐ Widowed							
5. Do you have children living with you? If yes, how many:							
☐ I don't have children							
☐ I have children but the don't live with me							
☐ 1							
☐ 2							
☐ 3							
☐ 4							
☐ 5							
☐ More than 5							
6. How old are your children?							
	From 0 to 3	From 4 to 7	From 8 to 11	From 12 to 15	From 16 to 18	From 19 to 22	From 23+
Child 1							
Child 2							
Child 3							
Child 4							
Child 5							
7. What is your citizenry?							
☐ Italian							
☐ European							
☐ Extra-European							
☐ Dual Citizenship							
8. What is your education level?							
☐ None							
☐ Elementary school diplome or lower							
☐ Middle school diploma							
☐ High school diploma							
☐ Degree or higher							
9. Indicate your employment situation							
☐ Employee							
☐ Self-employed							

☐ Student
☐ Unemployed but looking for work
☐ Pensioner
☐ Housewife
10. In what field do you work in?
☐ Agriculture
☐ Handicrafts
☐ Trade
☐ Finance/Credit
☐ Construction
☐ Industry
☐ Food service
☐ Public administration
☐ Public education
☐ Healthcare
☐ Tourism
☐ Other/none
11. Please indicate your income:
☐ From 0€ to 9.999€
☐ From 10.000€ to 14.999€
☐ From 15.000€ to 19.999€
☐ From 20.000€ to 24.999€
☐ From 25.000€ to 34.999€
☐ From 35.000€ to 49.999€
☐ From 50.000€ +
12. How far is your place of work/study from your home?
☐ Less than 1 km
☐ From 1 km to 5 km
☐ From 6 km to 10 km
☐ From 11 km to 50 km
☐ From 50km +
13. What means do you mainly use to reach your place of work/study?
☐ By foot
☐ Tram
☐ Metro
☐ Trenó
☐ Bus
☐ Taxi
☐ Kick scooter
☐ Bike sharing
☐ Car sharing
☐ Private car
☐ Carpooling (with colleagues)
14. Which means do you prefer to use for daily travel? (non-work or study, e.g. leisure, shopping, recreation, etc.).
☐ By foot
☐ Tram
☐ Metro
☐ Trenó
☐ Bus
☐ Taxi
☐ Kick scooter
☐ Bike sharing
☐ Car sharing
☐ Private car
☐ Car pooling
15. Do you own a car?
☐ Yes
☐ No
16. How often do you use your car?
☐ Never
☐ Rarely
☐ A few times a month
☐ A few times a week
☐ Every day
17. How often do you use the following means of public transport?

	Never	Rarely	A few times a month	A few times a week	Every day	
Tram						
Metro						
Bus						
Car sharing						
Bike sharing						
Kick scooter						
18. What type of transport do you prefer to use?						
o Public Transport						
o Private Transport						
19. If you prefer to use public mobility services, please indicate the reason:						
o I prefer to use private transport						
o Reduction of emissions						
o Pricing						
o Traffic						
o Problem arising from parking						
o Other...						
20. However, if you do not use public mobility services, why would you prefer to use your car?						
o Security						
o Inadequate public transport						
o Comfort						
o Absence of vehicles in the area						
o Speed						
21. From 1 to 10, how satisfied would you say you are, in general, with the public transport systems in the city where you live?						
Extremely dissatisfied	1	2	3	4	5	Extremely satisfied
22. If you have used the following public services in the last 12 months, what grade would you give from 1 to 5 to each of these services for: speed						
	1	2	3	4	5	
Tram						
Metro						
Bus						
Car sharing						
Bike sharing						
Kick scooter						
23. If you have used the following public services in the last 12 months, what grade would you give from 1 to 5 to each of these services for: punctuality						
	1	2	3	4	5	
Tram						
Metro						
Bus						
Car sharing						
Bike sharing						
Kick scooter						
24. If you have used the following public services in the last 12 months, how would you rate from 1 to 5 each of these services for: cleanliness						
	1	2	3	4	5	
Tram						
Metro						
Bus						
Car sharing						
Bike sharing						
Monopattino						
25. If you have used the following public services in the last 12 months, what grade would you give from 1 to 5 to each of these services for: crowdedness (where 1 indicates very crowded and 5 indicates uncrowded)						
	1	2	3	4	5	
Tram						
Metro						
Bus						
Car sharing						
Bike sharing						
Kick scooter						
26. If you have used the following public services in the last 12 months, what grade would you give from 1 to 5 to each of these services for: seats (where 5 indicates a vehicle with many seats)						
	1	2	3	4	5	
Tram						
Metro						
Bus						

27. If you have used the following public services in the last 12 months, what grade would you give from 1 to 5 to each of these services for: frequency						
	1	2	3	4	5	
Tram						
Metro						
Bus						
28. If you have used the following public services in the last 12 months, what grade would you give from 1 to 5 to each of these services for: price						
	1	2	3	4	5	
Tram						
Metro						
Bus						
Car sharing						
Bike sharing						
Kick scooter						
29. If you have used the following public services in the last 12 months, how would you rate from 1 to 5 each of these services for: safety						
	1	2	3	4	5	
Tram						
Metro						
Bus						
Car sharing						
Bike sharing						
Kick scooter						
30. How can the following public services be improved?						
	Punctuality	Speed	Security	Cleaning	Other	
Tram						
Metro						
Bus						
Car sharing						
Bike sharing						
Kick scooter						
31. From 1 to 5, how would you rate the quality of customer service and staff?						
Very low	1	2	3	4	5	Very high
32. How fair do you think ticket prices for using public mobility services are?						
Not at all	1	2	3	4	5	A lot
33. From 1 to 5, how satisfied are you with the payment methods (cash, credit/debit cards, app, etc.) for purchasing tickets/subscriptions for the public mobility service?						
Extremely dissatisfied	1	2	3	4	5	Extremely satisfied
34. From 1 to 5, how attentive do you think the public transport service is to the needs of people with disabilities?						
Not at all attentive	1	2	3	4	5	Very attentive
35. From 1 to 5, please indicate your level of satisfaction with real-time information on delays, route changes, etc.						
Not at all satisfied	1	2	3	4	5	Very satisfied
36. From 1 to 5, how would you rate the transport app or website of the city you live in?						
Inefficient	1	2	3	4	5	Extremely efficient
37. From 1 to 5, how much would the presence of possible discounts for certain categories of users affect your choice to use public transport?						
Not at all	1	2	3	4	5	A lot
38. From 1 to 5, how willing would you be to pay slightly higher prices for single tickets or season tickets in order to improve environmental sustainability?						
Not at all disposed	1	2	3	4	5	Very disposed
39. Do you think that advertising campaigns to promote public mobility are sufficient and efficient?						
☐ No, they are not enough ☐ They are efficient but must be improved ☐ They are only sufficient if supported by discounts and concessions ☐ They are enough and efficient						
40. How likely would you be to use technological and/or automated public mobility services? (without drivers)						
Not at all inclined	1	2	3	4	5	Very inclined