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Sustainable cities and the e-scooter micromobility from the providers point of view: the case of BIT and Reby

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1. *Mobility practices and the role of micromobilities: an introduction*

The rapid development of Information and Technologies as well as the new business models based on the sharing economy are changing the transport supply and thereby causing impacts on travel behaviour (Aria-Molinares *et alii*, 2021, p. 2). This development has allowed the spread of location-based services and the use of on-demand travel services, such as ride-sourcing, which has caused significant impacts on urban travel (Tu *et alii*, 2021). This has allowed a proliferation of micromobilities, and cars and pedestrians are often described as unbalanced competitors for the urban space (Bahrami, Rigal, 2022; Aria-Molinares *et alii*, 2021; Laa, Leth, 2020). Furthermore, new environmental/mobile subjects have produced a transformation of socio-spatial relationships due to networks of heterogeneous actors (Lin, Spinney, 2021 p. 2097).

Before the COVID-19 pandemic, micromobility offered a flexible transport option, thereby encouraging intramodality with mass transit (Aguilera-Garcia *et alii*, 2020).

COVID-19, as in all other pandemics throughout history, has changed the way people behave in urban activities, showing cities can react to sudden events even in modern times (Romanillos *et alii*, 2021; Wang, Pose, 2021). At

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the same time, the COVID-19 pandemic has had a strong impact on public transportation due to the restrictions imposed by governments because of the fear of becoming infected (Dias *et alii*, 2021; Tuli *et alii*, 2023). It drove individuals to seek private transportation solutions which in the long run can increase economic and social inequalities (Buck, Nurse, 2023). In fact, the dominance of private vehicles is influenced by cultural, gendered, racialised, ideological, material, spatial factors and power relations (Davidson, 2021; Laa, Leth, 2020; Teixeira *et alii*, 2023).

However, the pandemic underscored the importance of safe, flexible and sustainable travel options, and it has produced an acceleration in the use of technological innovation highlighting the paradigm that associates movement with collective and individual progress (Chatterton, 2020; Weicker, Sgibnev, 2020; Fistola *et alii*, 2022; Tuli *et alii*, 2023; Turoń *et alii*, 2023). Moreover, after the pandemic, societies have put a strong emphasis on the need for sustainability and citizens are becoming more and more active and independent participants in controlling the environment and mobility (Fitt, Curl, 2020; Lin, Spinney, 2021). Post pandemic urban policies are changing, and activities such as walking and cycling are being promoted through an emphasis on green and blue spaces (Jellard, Bell, 2021; Jensen *et alii*, 2021; Dobson, 2021).

Most of the academic literature focuses on cycling as a mobility system, and the more diverse understanding of e-mobility (Van der Meulen, Mukhtar-Landgren, 2021; Shin, 2021; Behrendt, 2018; Rérat, 2021; Buck, Nurse, 2023; Melia, Bartle, 2021; Cooper *et alii*, 2019). Behrendt (2018) supports a shift of strategies and policies towards more active and sustainable use as well as less expensive modes of e-mobility than electric cars. The concept of "Mobility-as-a-Service" has been recognised (Cooper *et alii*, 2019) and the logics of "communing" show the potential of reconsidering mobility freedom as a collective good. Transportation and location data introduce the concepts of users' sharing data and privacy (Martelli *et alii*, 2020). A substantial push towards urban sustainability transport has been produced by government policies through providing support for the purchase and use of micromobility vehicles, such as (e-)bikes and e-scooters.

The e-scooter is like the bicycle in terms of travelled speed and distances (Schwinger *et alii*, 2022), even if bicycle forces people to pedal while the e-scooter allows them to minimise movement (Kazemzadeh, Sprei, 2022). For this reason, it's proved that, for business customers, minimised movement is a great advantage (Di Fazio, Paradiso, 2022). The benefits associated with the use of bikes are universally recognised in terms of environmental sustainability and the effects on physical well-being, even though e-scooters have been criticised by public opinion since they are considered unsafe and unhealthy (Ignaccolo *et alii*, 2022; Kazemzadeh, Sprei, 2022).

Shared e-scooters can help cities achieve resilient principles, such as reflectiveness, robustness, redundancy, flexibility, resourcefulness, inclusiveness and integration (Dias *et alii*, 2021, p. 5). Shared e-scooter systems have gained popularity as environmentally friendly transport in a joining and

intramodality way (e.g. a commuter who routinely uses the train and metro could replace the use of the latter with one of the means offered by shared micromobilities).

In particular, the diffusion of e-scooter services in Italian urban contexts has gained significant momentum in recent years, positioning micromobility as a viable component of sustainable urban transport. This trend has been further accelerated by the COVID-19 pandemic, which prompted a reconsideration of urban mobility habits and highlighted the need for more sustainable and individualized forms of transport. In this context, Italian municipalities began to invest in cycling infrastructure and to restrict car traffic, paving the way for a more extensive adoption of micromobility solutions.

At the regulatory level, the introduction of e-scooters into public spaces was initially governed by the 2019 "Decreto Toninelli," which enabled limited and localized experimentation (Ignaccolo *et alii*, 2022). In the pilot programme of shared e-scooter systems in Milan, attention was given to investment in physical mobility infrastructure for mobility devices in order to improve physical mobility and create more accessible roads for everyone (Dias *et alii*, 2021; Teixeira *et alii*, 2023). The infrastructure Decree (DL 121/2021), converted into Law 156/2021, which allowed e-scooters to circulate similarly to bicycles, was subsequently issued. However, growing public concern over safety issues led to a draft reform of the Highway Code in 2023, which introduced new restrictions and safety-oriented provisions (Rovito, 2023).

Compared to the pre-pandemic period, in post-pandemic, the number of e-scooter rentals in Italy more than tripled from 7 million in 2020 to 24 million in 2023 (Ciuffini *et alii*, 2024).

In this framework several studies have thus far addressed the topic of users' characteristics and spatial patterns transit (Bretones, Marquet, 2023; James *et alii*, 2019; Kazemzadeh, Sprei, 2022; Teixeira *et alii*, 2023; Aguilera-Garcıa *et alii*, 2020; Fistola *et alii*, 2021; Fitt, Curl, 2020; Ignaccolo *et alii*, 2022; Laa, Leth, 2020; Melia, Bartle, 2021) highlighting the intermodal mobility network, as comfortable and "unsafe". In contrast, providers' operational modes and how policymaking should improve governance and relationships with providers are neglected perspectives underlining a significant gap in investigating further strategies as well as assessing the sustainability of e-scooters.

The research therefore aims to respond to this gap in the literature by assessing the behaviour of micro-mobility service providers, with specific reference to e-scooters. We argue that specifically investigating e-scooters providers' experience may have disclosure effects and implications for sustainable urban mobility which complement or are alternative to the considerations stemming from the mainstream literature examining e-bikes and users.

Sustainable mobility will depend a great deal on whether stakeholders act according to the opportunities they have access to. To critically enquire about the sustainable dimensions of e-scooters in comparative terms of enterprises and policymaking behaviour may provide helpful insights for the governance of micromobility.

Compared to most peer reviewed studies and consulting reports which analysed a data set for the usage patterns of e-scooters (Laa, Leth, 2020; James *et alii*, 2019; Smith, Schwierman, 2018, French 6t-bureau de recherche 2019; Hollingsworth *et alii*, 2019; Teixeira *et alii*, 2023; Kazemzadeh, Sprei, 2022; Turoń *et alii*, 2023), a qualitative approach has been chosen for this research. More in detail, semi-structured interviews were conducted with two operators in Italy: BIT and Reby. The paper within this framework critically examines, explores and discusses this emergent urban practice of micromobility, specifically e-scooters, the providers' behaviours and assesses the gaps and opportunities for urban governance in regulating sharing mobility from several perspectives. E-scooters do not just represent a solution to the "last-mile problem" (Mathew *et alii*, 2019; Zuniga-Garcia, Machemehl, 2021), they can reduce traffic congestion and environmental impacts. They also represent an enjoyable way of discovering a city in a sustainable way while respecting social distance (Roig-Costa *et alii*, 2024).

With this aim the paper is organised as follows: Section 2 provides the Data and Methods; section 3 provides the Results; section 4 presents the Discussion; finally, section 5 presents the conclusions.

2. *Data and Methods*

2.1 - *Context: Micromobility in Italy.* – According to the 8th National Report on Sharing Mobility (Ciuffini *et alii*, 2024), Italy saw a reduction in overall supply of sharing mobility, both in terms of the number of services (from 211 in 2022 to 143 in Q1 2024) and vehicles available (from 113,000 in 2022 to 81,000 in Q1 2024). However, in 2023, shared micromobility services recorded over 44 million trips compared to 15 million of 2020, with e-scooter representing 55% of these.

The decrease of the last two years is primarily attributed to a structural reorganisation of the shared e-scooter segment, which had previously undergone a period of rapid and unregulated expansion. Despite the reduction in supply, key indicators such as the number of rentals and the total mileage covered have remained relatively stable. A simultaneous decrease in accident rates has also been observed, likely reflecting increased user familiarity and safer practices over time.

In contrast to the declining trend in other segments, the bike sharing sector registered the most significant growth in 2023. This growth has been characterised by a marked increase in the number of electric bicycles, particularly within free-floating systems, many of which are operated by companies also active in the shared scooter market. This trend was accompanied by a 12% increase in rental volumes compared to 2022 (Ciuffini *et alii*, 2024, p. 34). Station-based bike sharing systems, however, remained largely stable, maintaining an annual average of approximately four million rentals.

The year 2023 also marked a turning point for e-shared scooters in Italy. Following their rapid proliferation from 2019 onwards, the market reached a

saturation point, prompting a phase of rationalisation. This process involved the termination of various pilot projects, the withdrawal of several operators from the Italian market, and the launch of new municipal tenders aimed at limiting both the number of service providers and the size of vehicle fleets. The impact of this rationalisation has been substantial, leading to a reduction of approximately 18,000 e-scooters between 2022 and the first quarter of 2024, resulting in a total fleet size of around 30,000 vehicles.

Despite the decreasing number of vehicles, usage levels have remained stable, with approximately 25 million e-scooter rentals recorded annually. However, the average distance per trip decreased from 2.5 km in 2022 to 2.1 km in early 2024. The number of provincial capitals hosting active e-scooter sharing services also declined significantly, from 47 in 2022 to 35 in 2023 (Ciuffini *et alii*, 2024, p. 40).

Moped sharing services experienced an even more pronounced contraction. The number of active services dropped from 22 in 2022 to just 10 in 2023, and the total number of vehicles fell by more than half by early 2024. The evolution of these services highlights an unpredictable trajectory: from 11 services in 2019, the number increased to 64 in 2020, 84 in 2021, and peaked at 99 in 2022 before declining to 79 in 2023 and 53 in early 2024 (Ciuffini *et alii*, 2024, p. 7). The reduction reflects both market exits by operators and the discontinuation of services in cities where trial periods had ended. Furthermore, many municipalities contributed to this trend by imposing strict limits on the maximum number of authorised service providers.

In this framework e-scooter emerged as micromobility vehicle most used despite a substantially reduced vehicle fleet, highlighting an ongoing growth of the sector and suggesting the need to more in-depth studies on it.

2.2 - *Methods* – The qualitative method of semi-structured interviews has been chosen as analytical tool (von Benzon, O' Sullivan, 2021; Dunn, 2021) and was conducted with the two providers of e-scooters, BIT Mobility and Reby. Both companies are frequently cited in national mobility reports and were selected based on their geographic coverage, and innovation in sustainability practices.

The semi-structured interviews were conducted with CEOs, who then involved Representative members (for BIT Mobility: BIT Mobility Administrator; for Reby: VP Expansion & Communications). This allowed to capture operational, environmental, and strategic perspectives regarding the deployment of e-scooter services. Interviews were conducted via Zoom and lasted approximately 45 to 60 minutes each. The interviews were audio-recorded (with prior consent), transcribed, and then coded thematically using qualitative data analysis methods.

During the interviews, there was a note taker in the virtual room, and it was also recorded with the right to proceed by the providers (Kitchin, Tate, 2000; Miles *et alii*, 2019). Immediately after the interviews transcriptions were made to reduce the risk of bias. The interviews started in 2020 (pre-pandemic period) and finished in July 2022 (post-pandemic period), called the "new

normal". We also assessed knowledge from national data sources and reports (Ciuffini *et alii*, 2020, 2022) on sharing micromobility.

BIT is an e-scooter company based in Verona, is present in 19 Italian cities and it launched the first e-scooter sharing service in Italy.

Reby, on the other hand, is a Spanish-based operator that produces and distributes e-vehicles and has been in several Italian cities since 2020 (3 as of 2025). Reby has its registered office in Milan, while its headquarters is in Barcelona, Spain. Reby has a secondary office in Bergamo, while the operational offices are present in the three cities.

A pre-interview meeting was held to explain in a broad sense our fieldwork objectives and as a warmup to the interview in the future. Firstly, issues of privacy, cybersecurity and ethical use of data were addressed and resolved with the companies and then a semi-structured interview was designed and sent out to them. The second phase involved interviewing the staff virtually to grasp the multiple aspects that a new topic might present. The interview was designed in the form of 17 questions focused on "sustainable mobility", "sustainable cities" and "sustainable environment" (see tab. 1).

To evaluate the sustainable mobility in urban areas, it has been decided to focus on the benefits of investing in e-scooters in cities as well as to explore the users' profiles and the urban morphological features. For this reason, the first set of questions have explored how micromobility contribute to sustainable mobility, such as logistical difficulties in the organisation of the fleets, the externalities of infrastructures, digital sustainability, pickup, sanitisation and redistribution of floating, the logic of recycling as well as the type of users and development in Italy.

The second set of questions focuses on sustainable cities and the expansion of the service in Italy; specifically, it was explored the issue of urban governance and styles in enabling service introduction and its regulation as well as the urban infrastructures. The hypothesis is that micromobilities present environmental benefits. The challenges and opportunities include safety concerns, curb space management, first-and-last mile usage and pilot programmes. The sustainable cities questions focused on sustainable organisation regarding congestion avoidance, optimisation of use as well as recycling of batteries.

The last set of questions focused on securing a sustainable environment which opens the debate on the extent to which companies that become bearers of ecological values are responsible for the methods used in production processes as well as service deployment in the current urban fabrics.

The questions were generally extensive to enable the interviewee to describe their commitments and values *vis-à-vis* sustainability issues.

Tab. 1 – List of questions of the semi-structured interview.

SUSTAINABLE MOBILITY
1. Of the three electric vehicles available (e-bike, e-scooter, e-moped), which is the most used and why?
2. What were the problems/challenges you faced when electric mobility was launched in Italy compared to other European countries?
3. How has the lack of a legal framework of the e-sharing sector impacted your organisation regarding the floating of e-scooters?
4. Comparing the externalities of infrastructure and the geography of Italy, a substantial difference has emerged between the sharing of electric scooters compared to the bike sharing station-based scheme – especially the presence of cycle paths. What can you add to this?
5. E-scooters are repositioned in the cities daily by the operators or taken for sanitisation or a battery change. Are these operations entrusted to the same company or to an external company? What obstacles do you encounter in a logistics organisation?
6. What are the differences noticed between the cities in northern, central and southern Italy?
7. The objective of companies is to cut across different age groups, but despite this, most users are aged 20 to 35. Can you explain why this is the trend?
8. Based on gender, are e-scooters used more by men or women? We know that bicycles are mostly used by men. Is this also the same with e-scooters?
9. Are there any gender differences on the use of e-scooters in the various Italian cities where you currently operate?
10. In which Italian cities is there a greater/smaller number of rentals? Why?
11. What type of displacement do users of e-scooters cause?
12. Are scooters 100% recycled?
SUSTAINABLE CITIES
13. Regarding sustainable mobility use in Milan or Naples, what do you think is important to highlight compared to other Italian cities?
14. As far as urban pollution is concerned, the collection and sanitisation of e-scooters is not entirely "green" because of the daily van transport and idling in heavy traffic. These are sources of air pollution. Clarify what your solution to these problems is.
15. How many Italian cities are you operating in currently? Is expanding to other cities in Italy already planned? If so, where and why?
SUSTAINABLE ENVIRONMENT
16. What could you tell us about the seasonality of the service? What is the effect of the climate characteristics of each region?
17. This question opens a debate: To what extent are the companies that have ecological values really committed to the methods used in production processes or logistics?

Source: Authors' elaboration.

3. *Results*

In general terms, the answers highlight a major challenge, which has been identified by both operators regarding the lack of a coherent regulatory framework and a fragmented implementation across municipalities. For example,

while some cities supported micromobility initiatives, others have failed to define basic parameters such as fleet caps or parking zones. Another challenge is the different idea of sustainability that companies have, which translates into different production lines, materials used, charging methods, vehicle sanitisation and optimisation of journeys. Finally, the use of e-scooters is mainly determined from cultural and climate variables, i.e. the younger population is more inclined to use innovative and enjoyable mobility systems and a mild climate, typical of southern regions. They also favour the use of mobility systems allowing for direct interaction with the environment.

Further points arise when analysing the specific answers to the semi-structured interviews (tab. 1).

In response to the first question, it has emerged that, for BIT, the most used vehicles are bikes and e-scooters, thereby underlining that service price represents the main factor in choosing between different micro-mobility solutions. Reby differently argues that the most used vehicle in Italy is the e-scooter because of its intergenerational character. In further detail, the Reby representative highlights that, from the beginning of their service in Italy, they have carried out 967,906 trips with e-scooters compared to 38,753 trips with scooters, and 5,708 with bicycles, due to the distribution of the service and the fleets.

Regarding questions 2 and 3, it has emerged that, ever since BIT launched the service, it faced some problems regarding the lack of adequate legislation in terms of contractual terms with the municipalities, charging points localization, vehicles' parking areas which resulted in safety and decorum issues as well as the need to change the urban fabric and citizens' education regarding proper conduct (governance sustainability). Similarly, one of the main problems faced by Reby is the site of e-scooters in relation to other vehicles in use in the city. There were also difficulties with respect to regulations and the way contracts are awarded as they were not uniform between municipalities and that created problems in terms of competition and urban decorum.

Regarding question 4, it has emerged that the e-scooter, as it does not force people to cycle, is more advantageous for business customers. From an infrastructural point of view, the BIT representative also notes that, even if free floating exists, it would be better for cities to create several base stations to park vehicles, so as not to constitute an obstacle to urban traffic, while Reby emphasises the need for bicycle lanes as fundamental tools to increase the use of e-scooters.

Focusing on question 5, it has emerged that urban morphologies are not only important for the user's experience but also for the work of the operators themselves. BIT e-scooters are repositioned daily in the cities by the operators or taken to be sanitised or to replace worn-out batteries. To do these operations, a sharing company can choose to rely on an external company or to carry out the tasks with its own staff. BIT chose the latter solution. BIT is working with local people and their managers to help in coordinating the services mainly in the night hours when there

is no traffic. They have e-scooter recovery workers in vans and this type of movement can face some obstacles in cities like Milan or Florence. In Milan, for example, the traffic hinders the use of vans for the recovery of e-scooters. Sometimes it was necessary to create new parking zones, which are reserved for the vans of operators, in order to allow them to easily carry out their own assignment.

Companies seek to minimise the need of logistics teams. In this regard, Reby has implemented a system in which the user will be encouraged to move the e-scooter on their own to a more suitable parking area. An app detects if the parking lots are full, and Reby then proposes to reward users who choose to make their trip with the vehicles indicated by them. In this way, it rebalances its service and controls the best positioning of its vehicles in the city.

Reby uses the operating offices located in strategic positions where they rely on local partners for the management of battery as well as sanitisation up to several times a day. In Naples, their Partner is KCity, which offers professional services for the definition of plans and projects as well as the management of interventions and initiatives in the field of urban regeneration. KCity takes care of parking, stops, sanitisation and battery charging that uses solar panels. The operational centre in Barcelona remotely controls all markets 24 hours a day, gives operational assistance to each city, knows the status of battery use in real time and the need for a battery change.

Regarding questions 6, 10 and 15, it has emerged that BIT has fleets in nine cities of southern Italy, and 15 in northern Italy, and Reby has fleets in eight cities of southern Italy, four in northern Italy and they are scheduling new fleets in three cities in southern Italy.

Regarding questions 7, 8 and 9, it has emerged that, in Reby, more men than women use scooters (9,321 registered male users/3,287 registered female ones). The average age of e-scooter users is 29 years old. Moreover, in Spain, Reby noted that more men than women use scooters (24,665 male registered users/9,206 female registered users). The average age of scooter users is 32 years old. The trend for bicycles is not different as they are used primarily by men.

They observe that, in Italy, the age of the users is between 20 and 40 years. However, users are primarily 27 years old. On a general level, also referring to other countries, the age of the majority of users is between 20 and 35 years. However, users are primarily 21 years old.

Regarding question 11, Reby's users experience confirms that e-scooters are used to go to work, for fun or for small intermodal trips.

Regarding the last question about sustainable mobility that opened a debate on the percentage of recycled e-scooters, it has emerged that Reby is able to integrate the logic of recycling into the design from the very beginning, ensuring that the components could be easily disassembled with the right equipment and competent personnel. Thus, the entire e-scooter can be disassembled into individual parts, enabling the recycling of batteries, aluminium and all the plastic components of e-scooters. In this way,

100% of e-scooters are recycled at the end of their life cycle and 90.31% of the components of e-scooters are recyclable. Meanwhile, BIT experience does not affirm the percentage of recycled e-scooters because it is collected in China.

Regarding question 13 it has emerged that Neapolitans are much more predisposed to use a private vehicle than public transport, thereby securing greater flexibility. Sharing micromobility represents the possibility of moving in a fast, flexible, sustainable and autonomous way.

The issue of urban pollution which is produced during the various stages of either recovering or replacing batteries using vans is faced in question 14. BIT uses e-vehicles to move e-scooters and change batteries to reduce pollution by vans, and it is planning to use digital technologies to reduce pollution. Differently, the Department of Data Analysis of Reby located in Barcelona is involved in creating "pollution maps" and new solutions for battery charging optimising according to the hours of the day, place and habits of the users. To solve this problem, Reby created an algorithm that allows for the optimisation of the paths of the batteries. In addition, based on experience and after analysing the territory, a Reby operator could change a total of 8 batteries per hour, following the route and, therefore, they would be able to change 64 batteries per day. To ensure optimisation in the operations of withdrawal, sanitisation and redistribution of the fleet, Reby proposed several measures that were implemented in different European cities. In parallel with the installation and consolidation of this technology throughout its fleet, Reby is working on the development of new technologies that allow for battery charging with solar panels, charging mobile phones on the scooter itself or real-time detection of road signs.

Regarding questions 15 and 16, it has emerged that, for both providers, the service is expanding in Italy and that the summer and spring represent the better seasons to use micromobilities.

Finally, the last question opens a debate on the companies' ecological values regarding their commitment in the methods used in the production processes or logistics. Regarding the Reby case, it was ensured that e-scooters have a lifespan of more than 48 months and that, when unusable, they had a 90% lifespan and a useful life of up to 48 months, whereas BIT does not have information on this topic because it does not produce its e-scooters but rather buys them in China.

A summary of the main results emerging from the semi-structured interviews is presented in tab. 2.

Tab. 2 – Comparison of the providers' answers.

Theme	BIT	Reby	Implications for Urban Governance
Most used vehicle	E-scooter, due to convenience and pricing	E-scooter (over 960,000 trips), significantly more than bikes or mopeds	E-scooters dominate the market and need regulation as a priority
Initial challenges	Lack of national legal framework, technical issues, competition, urban decorum	Difficulty adapting to uneven city regulations; Fragmentation in service implementation across municipalities.	A national legal framework is needed for e-mobility
Infrastructure and logistics	Base stations suggested to avoid obstacles; traffic challenges (e.g. Milan)	Incentives via app to guide parking, local partners, remote control	Smart infrastructure and sustainable logistics are essential
Sanitisation and battery replacement	Internal management with e-vans; night operations preferred	Local partners, algorithm-based optimisation, solar energy	Promote innovation and public-private cooperation in logistics
User profile (age/gender)	Age range 20–40, mostly male	Average age 29, significantly more male users	Promote gender equity and user inclusiveness
Trip type	(Not directly specified)	Short, intermodal, leisure and work trips	Integration with local public transport (LPT) is key
Recycling and sustainability	Not quantified; production in China	100% recyclable, 90% of components recyclable, lifespan >48 months	Encourage green procurement and circular economy standards within a legal framework
Pollution from logistics	Transitioning to e-vans	Algorithms to optimise routes, solar panels, flexible teams	Push towards low-emission logistics through an effective regulatory framework
Seasonality	Higher use in spring and summer	Higher use in spring and summer	Flexible service and seasonal promotions may be useful
Ecological company values	In development	Strongly integrated in design and operations	Support business models that align with sustainability goals

Source: Authors' elaboration.

4. *Discussion*

The first part of the research highlights that contextual factor, such as COVID-19, accelerated micromobility's deployment, leading to an increase of transfers from mobility public transport towards private sharing e-scooters. The COVID-19 pandemic was thought of by Italian administrations as a moment for rethinking mobility habits and to invest in sustainability. Several cities have decided to build new cycling infrastructure and to take restrictive measures for the circulation of cars. The data and the interview answers confirm that the e-scooter remains the most widely used electric microvehicle, favoured for its practicality and user affordability. However, the data also point to critical disparities between cities and providers. Particularly, the results from the interviews with BIT and Reby highlight the complexity and dynamism of the micromobility sector in Italy.

One of the most pressing issues that emerges is the lack of a coherent regulatory framework at the national level, coupled with highly fragmented implementation at the municipal level. While some cities have embraced micromobility and put forward supportive policies, other cities still lack basic provisions such as fleet caps or designated parking zones. This inconsistency has created significant operational challenges for companies, making it difficult to plan investments or scale services with confidence. As a result, providers often find themselves having to adapt to a patchwork of local rules, which not only complicates logistics but also undermines the overall quality and coherence of the service offered to users.

In parallel with the regulatory challenges, the interviews highlight a structural divergence in how providers define and approach sustainability. For instance, Reby has adopted a clear strategy that incorporates environmental concerns into the design of their e-scooters from the outset, ensuring that all components can be easily dismantled and recycled. Their operations are supported by solar-powered charging infrastructure and a sophisticated data system that monitors battery use and guides logistical decisions. In contrast, BIT's model appears less detailed, particularly with regard to end-of-life recycling, which they admit is managed abroad, primarily in China. This contrast suggests that sustainability practices across the sector remain uneven, often depending on company philosophy and resources rather than standardized norms.

Cultural and climatic factors also play a major role in shaping micromobility usage in Italy. The interviews confirm that younger populations are generally more open to using innovative and enjoyable mobility options like e-scooters. Furthermore, cities in southern Italy, where the climate is milder, tend to be more conducive to outdoor, open-air modes of transport. This has led to a higher uptake of micromobility solutions in these regions, especially during spring and summer. Nonetheless, disparities persist in terms of gender usage: both Reby and BIT note that men are more frequent users than women, a pattern observed in both Italy and Spain. This suggests that issues of safety, accessibility, and social perceptions may still limit broader demographic engagement.

Operationally, both companies offer interesting insights into how micromobility services are managed day-to-day. BIT relies on internal teams to reposition, sanitize, and maintain their fleet, with operations typically taking place at night to avoid traffic disruptions. However, this model faces logistical constraints in dense urban centres like Milan. On the other hand, Reby takes a more decentralized and user-driven approach, encouraging riders to help reposition scooters through app-based incentives. This model is supported by partnerships with local operators like KCity in Naples, and by remote oversight from a central data team in Barcelona. Their use of technology to track fleet conditions and plan battery swaps has enabled them to reduce inefficiencies and environmental impacts associated with their operations.

Interestingly, while e-scooters and bicycles serve overlapping purposes, the companies note key differences in user behaviour. For example, BIT highlights that e-scooters require minimal physical effort and are therefore more attractive to business customers or those making short, practical trips. Reby also stresses the importance of dedicated cycling infrastructure, such as bike lanes, which can significantly increase usage and safety. Both companies agree that infrastructure and urban morphology not only shape the user experience but also directly affect how easily providers can manage and maintain their fleets.

From a growth perspective, both companies are expanding in Italy, although their geographic footprints differ. BIT is more present in northern and central Italy, whereas Reby is increasingly targeting southern cities. Their respective experiences confirm that the demand for micromobility is rising, especially during warmer months. Furthermore, e-scooters are primarily used for commuting, leisure, and short intermodal connections, suggesting that they complement public transport rather than replace it.

Environmental sustainability continues to be a major point of focus—and tension. Both providers acknowledge that their logistical operations, especially those involving vans, can generate pollution. BIT is gradually transitioning to electric vehicles for these tasks, while Reby has gone a step further by integrating data analysis, route optimisation, and solar-powered charging. Their aim is to create "pollution maps" and implement AI-driven solutions that can help reduce the carbon footprint of maintenance activities. Reby's operational model is clearly more technologically advanced in this regard, demonstrating the potential for innovation to align business efficiency with environmental responsibility. Integrating the recycling and sustainability of the mobilities' services and the production is the key for sustainable mobility. Possible ways to enhance sustainable productive processes are joint ventures with local companies to take advantage of their spatial tacit knowledge and the creation of operational offices in strategic locations to limit the presence of vans for the collection and the replacement of vehicles, and all the related activities.

Finally, the issue of lifecycle sustainability is one where Reby again stands out. They claim that their e-scooters are built to last more than four years, and that nearly all components are recyclable. In contrast, BIT does not provide clear data on the recyclability of their products, which raises questions

about the transparency and depth of their environmental commitments. This contrast illustrates a broader trend in the micromobility industry: while many companies promote sustainability in their messaging, their actual practices and investments vary considerably.

The interviews reveal a sector full of potential but still facing substantial growing issues. Without a clearer national policy framework and more consistent local governance, operators are left to navigate a challenging landscape on their own. At the same time, the examples of Reby and BIT show that with the right mix of technology, local partnerships, and user engagement, micromobility can become a powerful tool for sustainable urban transport.

However, to fully realize this potential, sustainability must be embedded not just in branding, but in every aspect of operations—from design and production to fleet management and end-of-life disposal. Only then can micromobility evolve from a niche service to a truly integrated part of the urban mobility ecosystem.

5. *Conclusions*

This study has examined the role of micromobility within the broader context of sustainable urban mobility, with a specific focus on e-scooter providers' perspectives regarding environmental, logistical, and regulatory dimensions. The research investigated and assessed the sustainable mobility of e-scooters in e-scooters providers' experience vis-à-vis city government innovation.

As cities strive for a transition towards sustainability, micromobility services such as e-scooters emerge as both a challenge and an opportunity. While they offer potential benefits in terms of emission reduction, flexibility, and integration with public transport—particularly in underserved areas—they also raise critical concerns regarding infrastructure, policy fragmentation, and the environmental costs of production and logistics.

Our findings show that sustainability in micromobility must encompass the entire operational chain, including the sourcing of materials, vehicle lifecycle management, and the optimisation of fleet logistics. Providers that incorporate local partnerships, renewable energy, and digital innovations—such as incentive-based parking or remote fleet monitoring—demonstrate higher efficiency and alignment with environmental goals.

The research proved that transport sustainability differences among providers and consequently sustainability in cities are linked to recycling and production issues as well as the local cooperation of local couverture and city governments policies. In terms of social-economic sustainability, a main insight for policies is that companies that started local cooperation show more ease in their fleet organisation, optimise logistic trips, reduce unneeded congestion and mobility pollution. Companies' outsourcing increases the attention paid to the sustainability phases: The concept of sustainability regarding the e-scooter is visible from its optimisation in racing. The presence of operational offices in strategic places supports environmental sustainability as it limits

the presence of vans for the collection of vehicles for a prolonged period for the replacement and all the related activities.

Today, the sustainable transportation technology approach focuses on making each form of mobility more sustainable by reducing its resource use and pollution. In terms of cooperation between micromobility providers and local institutions, micromobility providers can offer new geolocalised data that can help monitor urban sustainability and improve it for city governments. E-scooter micromobilities can partially compete with public transport as the trips are often substantially faster. Furthermore, in areas with low public service coverage, micromobility also largely complements the service. This indicates that e-scooters are often used for journeys to places where public transportation is not well-developed. This is well identified in Naples where it is a mode of transport that is championed by the younger generation which is showing different travel habits than the older generations.

However, the potential for these new modes of transport to aid climate change efforts or generate more equitable transport systems remains under debate (Roig-Costa *et alii*, 2024) and the study highlighted that companies with ecological values are not completely committed to the method used in the production process or logistics. For carrying out the research, the suppliers' point of view was chosen to evaluate mainly fleet production and maintenance, spatial organisation and management impacts.

Furthermore, the analysis shows e-scooters use is linked to the sensitivity of the users, and sustainable mobility will depend a great deal on whether stakeholders act according to the opportunities they have access to. Critically enquiring about the sustainable dimensions of e-scooters in comparative terms of enterprises and policymaking behaviour may provide helpful insights for the governance of micromobility which have been neglected so far.

Finally, the study proves that the role for policymaking - to increase local sustainability and virtuous development - should devote special attention to geoeconomic diversity and the spillover of cooperations and startups through partnerships between providers and their logistic suppliers. Moreover, policymaking should rethink urban governance in terms of urban fabric renovation for enhancing shared urban micromobility, showed issue renovated urban plans which consider and integrate public, private and shared-private mobility as well as structure bids which standardise the criteria in logistics and homogeneous sustainable operational modes for all companies and cities and not least affirm a fair temporal basis for private investor operations which can ensure financial convenience for performing high sustainable standards in recycling the fleet production and maintaining it.

The expansion of e-scooter services in Italy highlights both the opportunities and challenges of sustainable urban micromobility. A national regulatory framework improved urban infrastructure and investment in green logistics are necessary to support the ecological transition. Moreover, ensuring inclusivity and equity – across gender, geography, and socioeconomic factors – remains a critical goal for sustainable cities.

Future research should adopt a transdisciplinary approach involving key stakeholders to innovate urban mobility plans and city planning strategies that support sustainable intermodal mobility, including e-scooters and other forms of shared transport. Additionally, comparative case studies across different contexts, European for example, are needed to better understand how behavioural and operational data from providers can be responsibly leveraged to enhance sustainable mobility planning at the urban scale.

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References

Aguilera-Garcia A., Gomez J., Sobrino N., «Exploring the adoption of moped scooter-sharing systems in Spanish urban areas», in *Cities*, 96, 102424, 2020, pp. 1-13, https://doi.org/10.1016/j.cities.2019.102424.

Aria Molinares D., Romanillos G., García- Palomares J.C., Gutiérrez J., «Exploring the spatio-temporal dynamics of moped-style scooter sharing services in urban areas», in *Journal of Transport Geography*, 96, 103193, 2021, pp. 1-14, https://doi.org/10.1016/j.jtrangeo.2021.103193.

Bahrami F., Rigal A., «Planning for plurality of streets: a spheric approach to micromobilities», in *Mobilities*, 17, 1, 2022, pp. 1-18, DOI: 10.1080/17450101.2021.1984850.

Behrendt F., «Why cycling matters for electric mobility: towards diverse, active and sustainable e-mobilities», in *Mobilities*, 13, 1, 2018, pp. 64-80, DOI: 10.1080/17450101.2017.1335463.

Bretones A., Marquet O., «Riding to health: Investigating the relationship between micromobility use and objective physical activity in Barcelona adults», in *Journal of Transport and Health*, 29, 101588, 2023, pp. 1-14, https://doi.org/10.1016/j.jth.2023.101588.

Buck M., Nurse A., «Cycling in an 'ordinary city': A practice theory approach to supporting a modal shift», in *International Journal of Sustainable Transportation*, 17, 1, 2023, pp. 65-76, DOI: 10.1080/15568318.2021.1983674.

Chatterton P., «Coronavirus: we're in a real-time laboratory of a more sustainable urban future», in *The Conversation*, April 2020. https://theconversation.com/coronavirus-were-in-a-real-time-laboratory-of-a-more-sustainable-urban-future-135712 (last access: 2023/07/10).

Ciuffini M., Asperti S., Gentili V., Orsini R., Refrigeri R., *4° Rapporto sulla Sharing Mobility (The 4° Italian Report on Sharing Mobility)*, Mobilità della Fondazione per lo sviluppo sostenibile, 2020, https://osservatoriosharingmobility.it/wp-content/uploads/2020/12/IV-RAPPORTO-SHARING-MOBILITY.pdf (last access: 2023/07/10).

Ciuffini M., Asperti S., Gentili V., Orsini R., Refrigeri R., *6° Rapporto sulla Sharing Mobility (The 6° Italian Report on Sharing Mobility)*, Mobilità della Fondazione per lo sviluppo sostenibile, 2022, https://osservatoriosharingmobility.it/wp-content/uploads/2022/10/6-Rapporto-Nazionale-sharing-mobility.pdf (last access: 2023/07/10).

Ciuffini M., Asperti S., Gentili V., Orsini R., Refrigeri R., *8° Rapporto sulla Sharing Mobility (The 8° Italian Report on Sharing Mobility)*, Mobilità della Fondazione per lo sviluppo sostenibile, 2024, https://osservatoriosharingmobility.it/wp-content/uploads/2024/12/Rapporto-sharing-mobility-2024.pdf (last access: 2025/01/05).

Codina O., Maciejewska M., Nadal J., Marquet O., «Built environment bikeability as a predictor of cycling frequency: lessons from Barcelona», in *Transportation Research Interdisciplinary Perspectives*, 16, 100725, 2022, https://doi.org/10.1016/j.trip.2022.100725.

Cooper P., Tryfonas T., Crick T., Marsh A., «Electric Vehicle Mobility-as-a-Service: Exploring the "Tri-Opt" of Novel Private Transport Business Models», in *Journal of Urban Technology*, 26, 1, 2019, pp. 35-56, https://doi.org/10.1080/10630732.2018.1553096.

Davidson A.C., «Radical Mobilities», in *Progress in Human Geography*, 45, 1, 2021, pp. 25-48, https://doi.org/10.1177/0309132519899472.

Di Fazio C., Paradiso M., «Mobilità urbane emergenti. Valutazione critica della micromobilità di bici e monopattini tra individualità, pubblico e privato» (Emerging urban mobility. Critical evaluation of micromobility of bikes and e-scooters between individuality, public and private), in *Documenti Geografici. Poli- Thema*, 2, 2022, pp. 515-532, http://dx.doi.org/10.19246/DOCUGEO2281-7549/202202_26.

Dias G., Arsenio E., Ribeiro P., «The Role of Shared E-Scooter Systems in Urban Sustainability and Resilience during the Covid-19 Mobility Restrictions», in *Sustainability*, 13, 7084, 2021, pp. 1-19, https://doi.org/10.3390/su13137084.

Dobson J., «Wellbeing and blue-green space in post-pandemic cities: Drivers, debates and departures», in *Geography Compass*, 15, 10, e12593, 2021, pp. 1-15, https://doi.org/10.1111/gec3.12593.

Dunn K., «Interviewing», in Hay, I., Cope, M. (eds), *Qualitative Research Methods in Human Geography* (5th edition), Don Mills, ON, Oxford University Press, 2021, pp. 148-185.

Fistola R., Gallo M., La Rocca R.A., «Cities between smartness and emergencies: exploring the role of e-scooter in the transition era», in *European Transport*, 85, 15, 2021, pp. 1-15, https://doi.org/10.48295/ET.2021.85.11.

Fistola R., Gallo M., La Rocca R. A., «Micro-mobility in the "Virucity". The effectiveness of e-scooter sharing», in *Transportation Research Procedia*, 60, 2022, pp. 464-471, https://doi.org/10.1016/j.trpro.2021.12.060.

Fitt H., Curl A., «The early days of shared micromobility: A social practices approach», in *J. Transp. Geogr.*, 86, 102779, 2020, pp. 1-10, https://doi.org/10.1016/j.jtrangeo.2020.102779.

French 6t-bureau de recherche, *Usages et Usagers des Trottinettes Electriques en Free Floating en France*, 2019, https://www.ville-rail-transports.com/

wp-content/uploads/2019/06/6t-trottinettes-synthese-vf.pdf (last access: 2023/07/10).

Hollingsworth J., Copeland B., Johnson J.X., «Are e-scooters polluters? The environmental impacts of shared dockless electric scooters», in *Environmental Research Letters*, 14, 8, 2019, pp. 1-11, https://doi.org/10.1088/1748-9326/ab2da8.

Ignaccolo M., Inturri G., Cocuzza E., Giuffrida N., Le Pira M., Torrisi V., «Developing micromobility in urban areas: network planning criteria for e-scooters and electric micromobility devices», in *Transportation Research Procedia*, 60, 2022, pp. 448–455, https://doi.org/10.1016/j.trpro.2021.12.058.

James O., Swiderski J.I., Hicks J., Teoman D., Buehler R., «Pedestrians and Escooters: an initial look at E-scooter parking and perceptions by riders and non-riders», in *Sustainability*, 11, 20, 5591, 2019, pp 1-13, https://doi.org/10.3390/su11205591.

Jellard S., Bell S.L., «A fragmented sense of home: Reconfiguring therapeutic coastal encounters in Covid-19 times», in *Emotion, Space and Society*, 40, 100818, 2021, pp. 1-8, https://doi.org/10.1016/j.emospa.2021.100818.

Jensen O.B., Martin M., Löchtefeld M., «Pedestrians as floating life - On the reinvention of the pedestrian city», in *Emotion, Space and Society*, 41, 100846, 2021, pp. 1-7, https://doi.org/10.1016/j.emospa.2021.100846.

Kazemzadeh K., Sprei F., «Towards an electric scooter level of service: A review and framework», in *Travel Behav. Soc.*, 29, 2022, pp. 149-164, https://doi.org/10.1016/j.tbs.2022.06.005.

Kitchin R., Tate N., *Conducting Research in Human Geography: Theory, Methodology and Practice*, London, Routledge, first ed., 2000.

Laa B., Leth U., «Survey of E-scooter users in Vienna: Who they are and how they ride», in *Journal of Transport Geography*, 89, C, 102874, 2020, pp. 1-8, https://doi.org/10.1016/j.jtrangeo.2020.102874.

Lin W.I., Spinney J., «Mobilising the dispositive: Exploring the role of dockless public bike sharing in transforming urban governance in Shanghai», in *Urban Studies*, 58, 10, 2021, pp. 2095-2116, DOI: 10.1177/0042098020937945.

Martelli F., Renda M.E., Zhao J., «The Price of Privacy Control in Mobility Sharing», in *J. Urban Technol.*, 2020, pp. 1-26, DOI: 10.1080/10630732.2020.1794712.

Mathew J.K., Liu M., Bullocket D.M., «Impact of Weather on Shared Electric Scooter Utilization», *IEEE Intelligent Transportation Systems Conference (ITSC)*, Auckland, New Zealand, 2019, pp. 4512-4516, doi: 10.1109/ITSC.2019.8917121.

Melia S., Bartle C., «Who uses e-bikes in the UK and why? », in *International Journal of Sustainable Transportation*, 16, 11, 2021, pp. 965-977, DOI: 10.1080/15568318.2021.1956027.

Miles M.B., Huberman A.M., Saldana J., *Qualitative Data Analysis. A Methods Sourcebook (4th edition)*, Thousand Oaks, CA, Sage, 2019.

Rérat P., «The rise of the e-bike: Towards an extension of the practice of cycling? », in *Mobilities*, 16, 3, 2021, pp. 423-439, DOI:10.1080/17450101.2021.1897236.

Roig-Costa O., Miralles-Guasch C., Marquet O., «Shared bikes vs. private e-scooters. Understanding patterns of use and demand in a policy-con-

strained micromobility environment», in *Transport Policy*, 146, 2024, pp. 116-125, https://doi.org/10.1016/j.tranpol.2023.11.010.

Romanillos G., García-Palomares J.C., Moya-Gómez B., Gutiérrez J., Torres J., López M., Cantú-Ros O.G., Herranz R., «The city turned off: Urban dynamics during the COVID-19 pandemic based on mobile phone data», in *Applied Geography*, 134, 102524, 2021, pp. 1-14, https://doi.org/10.1016/j.apgeog.2021.102524.

Rovito P., *Interview to the Innovation and Research Manager of the Ente Autonomo Volturno (EAV)* - a Company that operates in the sector of public transport by road, rail, and cableway, in the Campania Region -, 2023, 2023/07/10.

Schwinger F., Tanriverdi B., Jarke M., «Comparing Micromobility with Public Transportation Trips in a Data-Driven Spatio-Temporal Analysis», in *Sustainability*, 14, 8247, 2022, pp. 1-27, https://doi.org/10.3390/su14148247.

Shin E.J., «A comparative study of bike-sharing systems from a user's perspective: An analysis of online reviews in three U.S. regions between 2010 and 2018», in *International Journal of Sustainable Transportation*, 15, 12, 2021, pp. 908-923, DOI:10.1080/15568318.2020.1830320.

Smith C.S., Schwieterman J.P., *E-Scooter Scenarios: Evaluating the Potential Mobility Benefits of Shared Dockless Scooters in Chicago*, IL, Chicago, Chaddick Institute Policy Series, DePaul University, 2018. E-ScooterScenariosMicroMobilityStudy_FINAL_20181212.pdf (depaul.edu) (last access: 10/07/2023).

Teixeira J.F., Diogo V., Bernát A., Lukasiewicz A., Vaiciukynaite E., Sanna V.S., «Barriers to bike and e-scooter sharing usage: An analysis of non-users from five European capital cities», in *Case Studies on Transport Policy*, 13, 101045, 2023, https://doi.org/10.1016/j.cstp.2023.101045.

Tu W., Santi P., He X., Zhao T., Liu X., Li Q., Wallington T. J., Keoleian G. A., Ratti C., «Understanding Ridesourcing Mobility and the Future of Electrification: A Comparative Study in Beijing», in *Journal of Urban Technology*, 28, 1-2, 2021, pp. 217-236, https://doi.org/10.1080/10630732.2020.1761755.

Tuli F.M., Nithila A.N., Mitra S., «Uncovering the spatio-temporal impact of the COVID-19 pandemic on shared e-scooter usage: A spatial panel model», in *Transportation Research Interdisciplinary Perspectives*, 20, 100843, 2023, https://doi.org/10.1016/j.trip.2023.100843.

Turoń K., Kubik A., Folęga P., Chen F., «Perception of Shared Electric Scooters: A Case Study from Poland», in *Sustainability*, 15, 12596, 2023, https://doi.org/10.3390/su151612596.

Van Der Meulen J., Mukhtar-Landgren D., «Deconstructing accessibility – discursive barriers for increased cycling in Sweden», in *Mobilities*, 16, 4, 2021, pp. 493-508, DOI: 10.1080/17450101.2021.1902240.

Von Benzon N., O'Sullivan K., «Analysing messy data», in Von Benzon N., Holton M., Wilkinson C., Wilkinson S. (eds), *Creative Methods for Human Geographers*, London, Sage, 2021, pp. 351-364.

Wang H., Pose A.R., «Local institutions and pandemics: City autonomy and the Black Death», in *Applied Geography*, 136, 102582, 2021, pp. 1-18, https://doi.org/10.1016/j.apgeog.2021.102582.

Weicker T., Sgibnev W., «Public transport in times of Covid-19: disruption and continuity in urban mobility», in *Geography Directions*, 2020, 2020.06.09, https://blog.geographydirections.com/2020/06/09/public-transport-in-times-of-covid-19-disruption-and-continuity-in-urban-mobility/ (last access: 2023/07/10).

Weiss M., Dekker P., Moro A., Scholz H., Patel M.K., «On the electrification of road transportation–a review of the environmental, economic, and social performance of electric two-wheelers», in *Transportation Research Part D: Transport and Environment*, 41, 2015, pp. 348–366, https:// doi.org/10.1016/j.trd.2015.09.007.

Zuniga-Garcia N., Ruiz Juri N., Perrine K.A., Machemehl R.B., «E-scooters in urban infrastructure : Understanding sidewalk, bike lane, and roadway usage from trajectory data», in *Case Studies on Transport Policy*, 9, 3, 2021, pp. 983–994, https://doi.org/10.1016/j.cstp.2021.04.004.

Sustainable cities and the e-scooter micromobility from the providers point of view: the case of BIT and Reby

Crossing cities, it is noticeable that e-scooters, a new silent and highly technological means of transport, are becoming part of traditional urban transport, dominated by cars and private vehicles or public transport. Investigating e-scooter experiences within public and private paradigms can reveal insights for sustainable urban mobility, addressing the overlooked role of private providers in organization, decision-making, and governance opportunities. This paper explores, and discusses, this emergent urban practice of micro-mobility, in light of providers' operations. Authors carried out semi-structured interviews with two of the leading providers of e-scooters in Italy. The findings provide policymakers with a framework for policies to be adopted in the governance of micromobility.

Città sostenibili e micromobilità dei monopattini elettrici dal punto di vista dei fornitori: il caso di BIT e Reby

Attraversando le città, si può notare come i monopattini, nuovi mezzi di trasporto, high-tech e silenziosi, si stiano affiancando ai tradizionali sistemi di mobilità urbana, dominati da automobili, veicoli privati e trasporto pubblico. L'analisi dell'esperienza dei monopattini elettrici nei paradigmi pubblico e privato può fornire spunti significativi per la mobilità urbana sostenibile, evidenziando il ruolo, spesso trascurato, dei fornitori privati in termini di organizzazione, scelte decisionali e opportunità di governance. Questo studio esplora e discute questa emergente pratica urbana della micro-mobilità alla luce delle operazioni dei fornitori. Gli autori hanno condotto interviste semi-strutturate con due dei principali fornitori di monopattini in Italia. I risultati offrono ai decisori politici un quadro di riferimento per le politiche da adottare nella governance della micromobilità.

Les villes durables et la micromobilité par trottinette électrique du point de vue des fournisseurs : le cas de BIT et Reby

En traversant les villes, on remarque que les trottinettes électriques, nouveaux moyens de transport high-tech et silencieux, viennent s'ajouter aux systèmes de mobilité urbaine traditionnels, dominés par les voitures, les véhicules privés et les transports publics. L'analyse de l'expérience des trottinettes électriques dans les paradigmes public et privé peut fournir des informations importantes pour la mobilité urbaine durable, en mettant en évidence le rôle, souvent négligé, des fournisseurs privés en termes d'organisation, de prise de décision et d'opportunités de gouvernance. Cette étude explore et examine cette pratique urbaine émergente de la micro-mobilité à la lumière des activités des fournisseurs. Les auteurs ont mené des entretiens semi-structurés avec deux des principaux fournisseurs de trottinettes en Italie. Les résultats offrent aux décideurs politiques un cadre de référence pour les politiques à adopter en matière de gouvernance de la micro-mobilité.