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# Green Transition and State-Level Actions to Scale Up Mobility-as-a-Service Initiatives: Discussing Universities' Role and Relevance

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## Abstract

The decarbonisation of the transport sector is a cornerstone of the European Green Deal, necessitating a transition toward integrated, digital, and sustainable mobility solutions such as Mobility-as-a-Service (MaaS). While early MaaS implementations were characterised by local bottom-up experiments, recent state-level actions mark a shift toward large-scale systemic deployment. This paper investigates the evolving role of universities within this transition, using *MaaS4Italy* initiative as a primary case study. Through a qualitative analysis of 11 pilot projects, conducted between January and July 2025, the research examines how academic institutions have been integrated into the national governance framework, transitioning from traditional living labs for technical testing to pivotal institutional anchors and governance buffers. The findings reveal a dual role for universities: as scientific partners and as neutral mediators. However, a relevant paradox is highlighted as well: while the institutionalisation of universities de-risks public investment and fosters data-sharing trust, it may simultaneously limit their potential as high-density operational testbeds for innovative Corporate MaaS (CMaaS) solutions. Present research supports a broader understanding for policymakers, thus underscoring the importance of formalising the role of intermediary institutions to ensure the long-term sustainability and scalability of smart mobility ecosystems. These insights prove to be pivotal towards the implementation of multi-level environmental governance mechanisms and the strategic use of recovery funds to catalyse the transition toward climate neutrality.

**Keywords:** sustainable mobility governance; green transition and climate neutrality; state-level initiatives; Mobility-as-a-Service (MaaS); university partnership

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## 1. Introduction

EU transport decarbonisation constitutes a core pillar of the European Green Deal, which sets the ambitious target of reducing transport greenhouse gas (GHG) emissions by 90% by 2050 compared to the 1990 levels to achieve climate neutrality. The Commission's transport and Green Deal agenda is operationalised through the *Fit for 55* package and the Sustainable and Smart Mobility Strategy (SSMS) [1], which align transport, energy, taxation, and digital policies with these climate targets. According to the European

Climate Law [2], transport—as a hard-to-abate sector—must reduce emissions by around 90% by 2050 relative to the 1990 levels to keep the EU’s overall climate trajectory on track. Transport climate policy must therefore integrate technology-oriented measures (e.g., standards, fuels, infrastructure) with demand-side and behavioural instruments, including pricing, urban mobility planning, and digital services such as Mobility-as-a-Service (MaaS).

From a planning and governance perspective, EU climate and environmental policies address MaaS solutions as part of the “smart and sustainable choices” pillar [3], supporting both widespread modal shift [4] and more efficient demand management [5]. As Orozco-Fontalvo and Moura [6] highlight, recent scientific debate underscores that MaaS’s prevailing role should rely substantially on its potential to shift individual preferences. Multi-modal network optimisation should thus represent the primary goal, countering private motorisation through accessibility gains rather than mere service competitiveness. Societal outcomes—such as increased transport equity and accessibility for all, as advocated by Butler et al. [7]—can reinforce environmental and climate objectives like transport decarbonisation by directly influencing users’ perceptions and behaviours [8]. Sochor et al. [9] already identified MaaS’s final step toward full maturity—transitioning from pilots to regular operations (Level 4)—as integrating societal outcomes into service offerings.

While market-driven scenarios pursue comprehensive financial viability through integration with non-mobility services [10], which may offset the inherent lack of competitiveness in certain transport market segments—thus targeting the so-called Mobility-as-a-Feature (MaaF) model [11]—public-controlled scenarios treat transport supply as a regular service requiring broad (or universal) accessibility for citizens. This necessitates strong public intervention to ensure the proposal’s overall sustainability [12]. A similar refocusing process—as discussed by Orozco-Fontalvo and Moura [6]—is reshaping MaaS, shifting it from a strictly business-oriented perspective to a broader one involving greater public institutional engagement. Hence, scholars have primarily focused on public actors at the local level (e.g., local governments, transport authorities, and universities), even though a multi-level perspective is advocated as essential for MaaS’s widespread adoption and consolidation [13]. Moreover, Mukhtar-Landgren and Smith [14], in their comparative study of public actor involvement in MaaS pilots in Sweden and Finland, demonstrated how regional and local commitment is strongly linked to state-level initiatives.

### *Research Gaps and Assumptions*

Within this multi-scalar framework, the present research addresses two gaps. First, it examines how Member State policies have incorporated European Commission guidance on MaaS implementation following approval of the SSMS. Further deepening of the different best-practices showed three main ways to approach similar policies: i. from a legal perspective, thus introducing shared standards, ii. through a pilot-driven strategy, iii. combining both. In this direction, post-SSMS policies appear to belong mostly to the third cluster, thus showing a more structured and comprehensive approach to MaaS.

Secondly, it explores the local perspective within this third scenario through the lenses of public universities, viewed as frontrunners within local communities [15] in MaaS adoption. Their strong networking potential may play a key-role in MaaS initiatives coordination at the national level [16], thus bypassing the local fragmentation of pilots and assuring the territorial spread of similar solutions.

In this direction, the present research aims at answering two corresponding research questions:

RQ1: How have Member States approached nationwide MaaS initiatives, and can an evolutionary trend be identified?

RQ2: What role could universities play in nationwide MaaS initiatives, and what potential risks should be considered?

To understand both paths to a national scale MaaS, the potential role of universities will be assessed through the analysis of a specific case study: the MaaS4Italy project, launched in Italy in 2021 and funded by *NextGenerationEU*, thus belonging to the third group of state-level MaaS. This direct EU funding programme represents a unique national application of European Commission directives on multi-modal and integrated mobility. To this end, a qualitative survey was conducted among Mobility Managers at twelve involved Italian universities during the pilot phase (January–July 2025), yielding eleven valid responses that provide a comprehensive profile of Italian universities' commitment to this state-level initiative.

This research thus begins with an analysis of Member State-level MaaS policies implemented within the EU framework before and after SSMS approval (Section 2), followed by an examination of universities' potential roles in MaaS initiatives. Section 3 presents the survey results on university involvement across different contexts. Section 4 investigates the specific case of university engagement in MaaS4Italy, referencing other national-scale MaaS initiatives. Finally, Section 5 discusses potential further steps to foster effective multi-scalar national MaaS policies.

## 2. Literature Review

### 2.1. MaaS Member State-Level Initiatives

The *Smart and Sustainable Mobility Strategy* was launched by the European Commission during the COVID-19 healthcare emergency [1], explicitly mentioning MaaS as an innovative tool to support the integration of shared and collaborative alternatives, facilitating the consolidation of intermediary platforms.

Similar institutional initiatives should have faced a potential setback of shared and collective sustainable alternatives during the pandemic emergency [17]. Nevertheless, subsequent extraordinary funding from NextGeneration EU [18] translated into coordinated national-level MaaS action only once (e.g., for the MaaS4Italy initiative that will be discussed in the following paragraph). In parallel, other Member State-level initiatives have been implemented following European Commission input, thus without benefitting from dedicated European Commission funds.

In this direction, it could be interesting to trace how relevant Member State-level MaaS policies were implemented before SSMS was launched [19] within the European Union framework.

- i. A standard-setting approach has led several Member States to act on a legal level, thus providing existing and future MaaS providers and operators shared and common standards both in terms of regulatory and digital aspects. Finland, for instance, introduced through the *Act of Transport Services* the requirement for passenger transport service providers to deliver open data to users, thus implementing open, standard and accessible interfaces [20]. France followed the same path through the *Loi d'Orientation des Mobilités* (e.g., namely the national Mobility Guidelines) where open-data accessibility and MaaS applications were explicitly mentioned in 2019 as enabling drivers to sustainable mobility transition, thus identifying in the central government the main enabler, coordinator and promoter of local pilots [21]. Belgium and the United Kingdom (at that time, part of the EU) opted for the approval of a code of practice, supporting the spread of regional and local initiatives. The UK code discusses and integrates the best practices implemented worldwide to set up a national standard for punctual critical aspects such as accessibility and inclusion, enabling active and sustainable travel, data, multi-modal ticketing, consumer protection

and competition [22]. A participatory approach to define a similar code of practice was chosen by the Flemish Government in Belgium, where in 2022, a common agreement framework was defined as a part of a (multi-year) co-creation process, including users, MaaS and transport providers, local authorities and data brokers, thus coordinating and integrating multiple MaaS local initiatives [23].

- ii. A *pilot-driven* approach was implemented by the Netherlands, where in 2019, the national Ministry of Infrastructures and Water Management defined an agreement launching seven regional MaaS pilots responding to specific use-case experiments [24]. The idea was to collect data from each of the pilots to identify the most successful use cases from a market perspective. The state involvement was as an enabler of multiple private initiatives. Nevertheless, the subsequent COVID-19 outbreak hampered the pilots' development and evaluation process [25].

As discussed by Surakka et al. [26], the pre-COVID-19 EU approach considered regulation and coordination as the core interest and space for Member State central governments. Nevertheless, in this direction, some relevant gaps emerged:

- An uneven distribution of MaaS initiatives, thus exacerbating territorial inequalities [27] and accessibility gaps, as highlighted by Lopes et al. [28], contradicting the idea of the sustainable and widespread development of digital and green MaaS initiatives;
- The fragmentation of local experiences, thus hampering the up-scaling potential, also due to the multiple local transport providers and actors to be involved [29], thus translating into loose central control and coordination [30], which, in fact, conflicted with the consolidation of similar paradigms.

It is not surprising that the only MaaS initiative descending directly from *NextGenerationEU* funding programme aimed at targeting both criticalities through a hybrid approach. Technical standards and data-sharing platforms would be provided centrally at the state level, as well as pilot selections according to an even territorial distribution across the country.

## 2.2. The Opportunity for University Pilots

Once state-level commitment has been framed, it is necessary to point out why universities have been selected as local actors to be targeted within the present research. As previously stated, their networking potential at the national level (and beyond) constitutes one of the prevailing factors, although not the only one.

When speaking of disruptive innovation especially in digital and sustainable terms, university campuses and communities are often addressed as unique case studies [31]. The availability of a well-identified community that may be targeted as a young, highly educated, environmentally conscious, and tech-savvy group [32] represents an extremely favourable context to investigate the potential willingness to adopt MaaS [33].

Moreover, whenever mobility services are at stake, university commuting may constitute a key use case due to several factors.

Universities may act as ideal living labs and testbeds, due to the presence of a controlled environment [34] that may resemble the functioning of a smaller city due to the high differentiation of mobility needs [35], as well as socio-economic factors such as income and mobility capital [36]. This enables the rapid deployment, demonstration, and iteration of MaaS concepts in a real-world setting with controllable parameters [37]. The multiple presence of different stakeholders collaborating within the same environment, thus enabling public-private partnerships, is a key aspect to foster innovation [38].

At the same time, universities may represent a rich source of data, given a large base of students and employees, which may support effective transportation modelling [39], as

well as informing tailored policymaking; from an institutional point-of-view, universities may work also as effective infrastructures for innovation [35].

In this direction, universities' MaaS may be seen as a peculiar kind of Corporate MaaS (CMaaS) [40], where the employee component is complemented by students. Nevertheless, schedules and patterns may effectively reflect companies' functioning and behaviours [41].

From a strategic perspective, Kriswardhana and Esztergár-Kiss highlight how universities may be a fertile ground to cultivate early adopters—as Cassar states as well [42]—and nudging sustainable mobility behaviours, due to the demographic advantage [43] of younger generations showing more flexible usage of transport solutions [44]. Community homogeneity [45], as well as higher environmental awareness [46], may constitute significant drivers in this direction. Moreover peer-to-peer community mechanisms could contribute to widespread MaaS adoption within such a group and beyond [46].

Setting the initial implementation of an MaaS proposal within academic communities could contribute as well to shaping more sustainable travel preferences in the long-term [39], thus supporting more virtuous trends, consolidating current relations linking such users to a widespread use of public transport [47], and favouring their higher willingness-to-pay for more integrated and seamless services [46].

Finally, universities may contribute with their know-how to the design and implementation of an MaaS proposal in different directions. They could act as strategic enablers by fostering academy–company collaborations, thus bypassing the potential mismatch between the public and private spheres [48]. They could address specific knowledge gaps by analysing shared micro-mobility usage, investigating longitudinal behavioural responses, or exploring user intentions for sustainable transport adoption [49].

Methodological innovation could be addressed as well by academic communities in terms of advanced analytical methods application [43].

On the other hand, several challenges and limitations in adopting universities as use cases may be traced.

The obtained results from university pilots could have less generalisability and transferability to the wider urban community, thus hampering the testbed potential [39]. The specific nature of a university community may translate into poorly representative results [36].

Economic viability and profitability remain critical concerns, due to the limited scale of a university-based pilot [50]; so, business models require further deepening from the research and operational point of view.

The significant role of the university should also insist on safety and privacy concerns, which risks remaining under-investigated [51], as similar pilots are institutionally led and publicly controlled [35]. Upscaling of the initiative could involve more (private) stakeholders that could be seen as a barrier to personal mobility data-sharing.

The digital literacy of a university community on MaaS may differ from the one characterising the relevant urban and territorial community, thus reflecting environmental awareness concerning sustainable mobility, as well as innovation propensity [52].

### *2.3. Universities' Engagement Within Regional and Local MaaS Initiatives*

Beyond university-focused initiatives, several European countries have developed national or large-scale regional MaaS programs that involve diverse stakeholder configurations, including varying degrees of academic engagement. Understanding these frameworks provides an essential context for positioning the Italian approach within the broader European MaaS landscape (Table 1).

Finland represents the most advanced case of national MaaS framework implementation. The Finnish Transport Services Act of 2018 established mandatory requirements

for all mobility operators to provide open data and interoperable ticketing systems, creating favourable conditions for private MaaS operators to emerge [53]. This legislative approach positioned the government as an MaaS enabler rather than operator, facilitating the development of MaaS Global's Whim application, which launched in Helsinki in 2016 and subsequently expanded internationally [54].

The Finnish model involves a multi-layered stakeholder ecosystem comprising the Ministry of Transport, public transport authorities such as HSL (Helsinki Region Transport), private MaaS operators, and the innovation funding agency Tekes [54]. The Rural MaaS project further demonstrated Finland's comprehensive approach by extending the concept to sparsely populated areas [20]. In this configuration, universities primarily contribute through research activities and policy advice but are not positioned as primary testbeds or ecosystem coordinators. Academic institutions engage in studying MaaS impacts and user behaviour but maintain a more peripheral role compared to government agencies and private operators [55].

Sweden has pursued a distinctly research-intensive path to MaaS development through programs like KOMPIS (Combined Mobility Services) and DriveSweden, both funded by VINNOVA, the Swedish innovation agency [9]. The UbiGo pilot in Gothenburg (2012–2014) represented one of Europe's earliest comprehensive MaaS experiments, involving approximately 70 households and demonstrating the viability of integrated mobility packages [56].

Swedish universities, particularly Chalmers University of Technology and the KTH Royal Institute of Technology, assume prominent roles as research leaders, evaluation coordinators, and knowledge brokers within the MaaS ecosystem [9]. The SEAMLESS project (Systematic Evaluations and Assessments of MaaS) exemplifies this academic leadership, establishing evaluation frameworks and national databases to assess environmental, economic and social impacts of MaaS pilots at multiple scales [53]. Stakeholders include the Swedish Energy Agency, regional public transport authorities, mobility service providers, and an extensive network of academic institutions collaborating through structured research programs [13].

Unlike the Italian model, Swedish universities act not merely as scientific partners but as strategic coordinators and methodological leaders, shaping the national research agenda and directly influencing policy development [57].

Belgium's approach reflects its federal structure, with an inter-regional MaaS vision coordinated across Flanders, Wallonia, and the Brussels-Capital Region. The Flemish MaaS Agreement Framework, developed through extensive stakeholder consultation, exemplifies "soft" or "collaborative regulation", where public and private actors jointly develop dynamic and scalable frameworks [19].

The Belgian model explicitly identifies five stakeholder groups: users, MaaS providers, transport operators, local authorities, and data brokers [58]. This participatory structure emphasises co-creation processes, with the regional government acting as a facilitator rather than a directive authority. Universities, such as the University of Antwerp's involvement in the city's MaaS initiative, participate primarily in technical advisory capacities and stakeholder coordination activities, though their role remains secondary to transport operators and public authorities [19].

The Netherlands implemented a structured pilot program where the Ministry of Infrastructure and Water Management established framework agreements for seven regional MaaS initiatives. This approach attracted 41 consortia, with 24 awarded contracts encompassing diverse actors including IT platforms, financial institutions, start-ups, and traditional transport operators [19].

Dutch universities and universities of applied sciences participate as consortium members, contributing technical expertise, user research, and business model analysis [59].

The development of technical standards like TOMP-API and contractual frameworks demonstrates the program's emphasis on interoperability and scalability. However, academic institutions function primarily as technical partners within broader consortia rather than as independent testbeds or ecosystem managers [19].

Austria's Vienna Upstream platform represents a distinctive publicly led model, where the city and transport authority jointly created a public startup to develop MaaS infrastructure [19]. This disaggregated approach maintains the backend in public control while allowing multiple front-end applications. In Graz, academic institutions participate in MaaS steering groups and action plan development, though not as primary operators [60].

German initiatives in Hamburg (Switchh platform) and Hannover (USTR mobility management transformation) exemplify city-level rather than national approaches. Universities contribute through pilot evaluation and adoption studies, but stakeholder configurations remain dominated by public transport operators and municipal authorities [61].

The UK's voluntary MaaS Code of Practice in 2023 emphasises accessibility and consumer protection, supporting regional pilots like Solent MaaS. Universities such as Portsmouth contribute primarily through evaluation frameworks focusing on social equity and inclusion [62]. Similarly, Australia's Queensland ODIN PASS trial positions the University of Queensland and University of Sydney as core research partners investigating business model viability and governance structures, demonstrating strong academic–government partnerships [19].

**Table 1.** National approaches to university engagement in MaaS initiatives. Source: Authors' own.

Country	National Program	Governance Model	University Role(s)	Primary Functions	Level of Integration	In-Key Institutions	Stakeholder Coordination
<b>Finland</b>	Act on Transport Services (2018); Whim MaaS; Rural MaaS	Market-driven; legislative enabler	Peripheral research contributor	Research on MaaS impacts; user behaviour studies; policy advice	Low–Medium	Various Finnish universities; limited specific mentions	Ministry of Transport; HSL; MaaS Global; Tekes
<b>Sweden</b>	KOMPIS; DriveSweden; UbiGo pilot (2012–2014); National MaaS Roadmap (2017–2027)	Research-intensive; public funding through VINNOVA	Strategic research leader; ecosystem coordinator	National evaluation frameworks (SEAMLESS); pilot design; methodology development; steering groups	Very High	Chalmers University; KTH; Uppsala; Lund	VINNOVA; Regional transport operators; Samtrafiken; Energy Agency
<b>Belgium</b>	Flemish MaaS Agreement Framework; Inter-federal vision	Collaborative governance; co-creation approach	Advisory technical partner; stakeholder participant	Stakeholder consultation; technical recommendations; accessibility assessment	Medium	University of Antwerp	Flemish/Federal governments; MaaS providers; Transport operators; Local authorities; Data brokers
<b>Netherlands</b>	Seven nationwide pilot projects	Consortium-based;	Technical support in consortia	Business model analysis; user research;	Medium–High	Universities of applied	Ministry of Infrastructure; IT platforms; Banks;

	(2020–present)	ministry framework		technical standards development (TOMP-API); evaluation support		sciences; technical universities	Start-ups; Mobility companies; Public transport
<b>Austria</b>	Vienna Upstream platform; Graz MaaS action plan	Public-led; disaggregated platform model	Steering group participant; action plan contributor	Pilot testing; governance assessments; implementation planning	Medium	Graz universities (unspecified); ITS Austria	Wiener Linien; Upstream; City government; Regional authorities
<b>Germany</b>	Hamburg Switchh; Hannover USTRA transformation	City-level initiatives; public operator	Pilot evaluation support; adoption research	User behaviour studies; pilot assessment; adoption barriers analysis	Low–Medium	Hamburg/Hannover universities (unspecified)	Municipal governments; Transport operators; Private mobility providers
<b>United Kingdom</b>	MaaS Code of Practice (2023); Solent MaaS; Regional pilots	Voluntary guidance; regional implementation	Accessibility/inclusion specialist; evaluation partner	Accessibility evaluation; social equity assessment; inclusive MaaS design	Medium	University of Portsmouth; other regional universities	Department for Transport; Local authorities; Transport operators; MaaS providers
<b>Australia</b>	Queensland ODIN PASS trial (Brisbane)	State government partnership	Core research partner; trial co-leader	Trial design; business model research; governance model studies; participant recruitment	Very High	University of Queensland; University of Sydney	Department of Transport; Corporate research centres; Industry partners
<b>Italy (MaaS4Italy)</b>	MaaS4Italy NRRP program (11 city/regional pilots)	Public-led; NRRP funded	Scientific partner; stakeholder manager; CMaaS tester (limited)	Survey design; data analysis; KPI development; public-private mediation; user testing (2 pilots)	High	Multiple: Politecnico di Milano, Politecnico di Torino, UNINA, UniPI, Universität Bozen, others	Ministry of Transport; Municipal authorities; Transport operators; Private MaaS providers

Across these national initiatives, several patterns emerge regarding stakeholder roles and academic engagement:

1. Government positioning varies from legislative enabler (Finland) to direct operator (Vienna) to research funder (Sweden), fundamentally shaping the ecosystem structure [53].
2. University roles span a spectrum from peripheral research contributors (Finland, Germany) to strategic research leaders (Sweden) to evaluation specialists (UK, Australia), but rarely as primary testbeds despite the literature emphasising this potential [9,62].
3. Private sector engagement predominates in market-driven models (Finland, Netherlands), while public control characterises other approaches (Belgium, Austria), affecting innovation dynamics and sustainability pathways [57].

4. Multi-level governance challenges emerge consistently, particularly regarding data sharing, interoperability standards, and coordination across administrative boundaries, regardless of national model [19,58].

These diverse national experiences provide an essential comparative context for understanding the Italian MaaS4Italy framework and the specific roles assigned to academic institutions within it.

### 3. Materials and Methods

#### 3.1. MaaS4Italy and University Engagement

Once the potential advantages linked to MaaS university pilots' implementation have been discussed, in order to frame the role and relevance of Italian academic communities within the MaaS4Italy framework, it is required to recall some contextual and peculiar information.

MaaS4Italy is a centrally funded program that was launched in 2021, stemming from Italian National Recovery and Resilience Plan resources (on their turn descending from Next Generation EU financing). In this direction, it was the only NextGeneration EU-funded Member State-level MaaS.

As previously recalled, it can be considered as a post-COVID-19 generation MaaS since it aims both at the design and implementation of a national database and repository supporting shared data standards on a national level, the so-called Data and Service Repository for MaaS (DSRM) [63], as well as at implementing several pilots nationwide.

In this direction, two selection rounds were performed, the former in 2021 targeting capital cities (the so-called *Città Metropolitane*) and the latter in 2022 addressing regions on a wider scale. All selected areas, both capital cities and regions (see Table 2) host public universities that could deploy the testbed role [31], as well as provide scientific and operational support [47].

Thirdly, the MaaS4Italy initiative addressed the pilots' implementation, as well as the need to implement living labs investigating MaaS uptake and development and to provide the testers with a qualitative survey to investigate their preferences [64] and willingness to adopt in order to ensure tailored and demand-driven solutions [65]. In this direction, universities may play a key role in the data collection and analysis process.

Moreover, the need to design, in most cases, an MaaS proposal without any prior experience in this field, required the strong commitment in terms of stakeholder engagement [66] and the construction of local MaaS ecosystems [67]. Universities may act as enabler of this delicate process.

**Table 2.** MaaS4Italy pilot areas.

MaaS4Italy – Capital Cities	MaaS4Italy – Regions
Turin	Autonomous Province of Bolzen
Milan	Piedmont
Naples	Veneto
	Emilia–Romagna
	Tuscany
	Abruzzo
	Campania
	Puglia

#### 3.2. Research Assumptions

According to the different roles of academic institutions within current scientific debate, three main alternatives were identified:

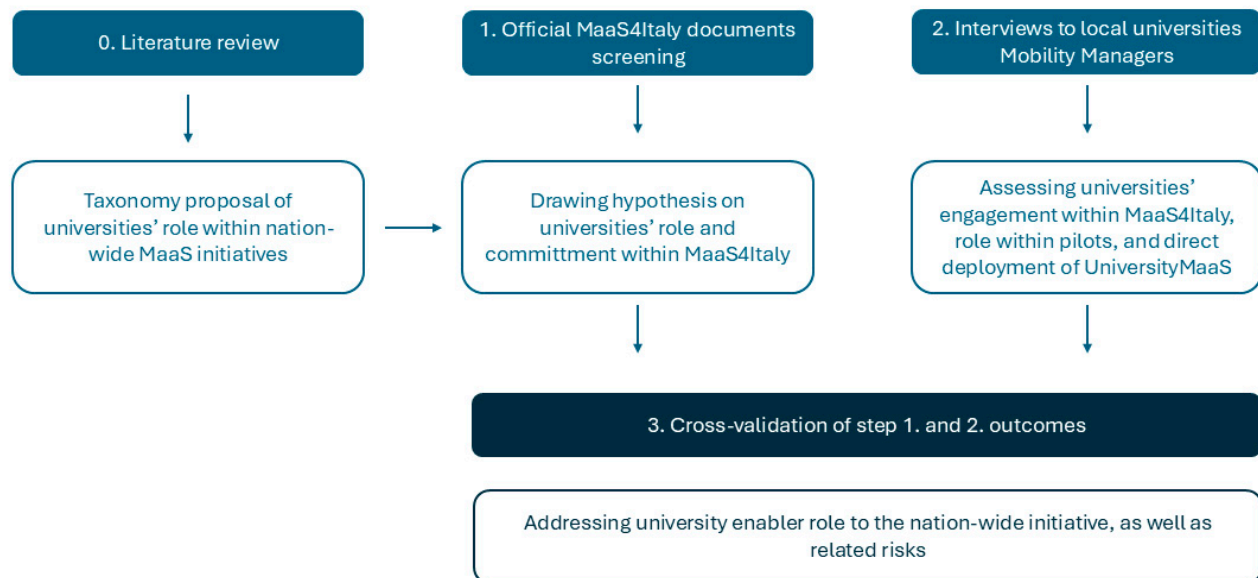
- **Universities as Corporate MaaS (CMaaS) testers:** Considering such institutions as particularly fitting controlled communities to test the CMaaS proposal [68], due to their structure and composition. The large number of potentially involved users, general innovation and environmental awareness could present universities as peculiar companies acting as ideal frontrunners;
- **Universities as Scientific partners,** thus supporting application, living labs and a survey design process to the third mission scope, insisting on inherent knowledge and innovation potential [69]. Academic institutions may in this direction be an MaaS promoter and integrator with detailed and updated scientific and technical knowledge. At the same time, they could support them in the evaluation and monitoring steps to ensure an impartial perspective on the initiative targeting general feasibility, users' satisfaction and service performances;
- **Universities as Stakeholders' manager:** Stakeholders' engagement and coordination represent in this direction core activities of academic institutions fostering a shared and participatory way to MaaS [70]. The third party involvement of universities may indeed enable easier interactions between Mobility Providers, the MaaS Integrator and the Operator, thus overcoming potential mistrust and reluctance to join the MaaS ecosystem. The public and impartial role of academic institutions may contribute to bypassing traditional barriers to company data-sharing.

### 3.3. Methodological Workflow

Once these three main roles of academic institutions within MaaS initiatives have been identified, the subsequent step was to evaluate the role of the universities involved in the mentioned pilots, validating the official MaaS4Italy data with in-field interviews with local representatives of the involved universities. A similar mixed approach enabled the authors to compare the institutional documentation with the direct investigation of project magnitudes and outcomes.

From a methodological point of view, a similar process may be described as follows (Figure 1):

- i. A systematic analysis of official reports, deliverable and presentations published online on the official websites of the initiative until July 2025 was performed. Official data were collected and comprehensively assessed in order to classify universities' roles within the pilots according to the research assumptions. Data were retrieved from the ministerial open repository of the MaaS4Italy initiative, as well as from the involved municipalities and regions' websites dedicated to the project. The subsequent classification process was performed according to keywords and descriptive sections of the documents characterising universities' involvement in any stage of the process.
- ii. A subsequent round of interviews was conducted involving universities' Mobility Managers of the territories involved in the initiative, to investigate a. whether the local university was involved within MaaS4Italy pilot; b. which role the local university has been playing within the MaaS ecosystem; c. whether a university MaaS has been deployed within the experimentation.
- iii. Operational data from the forms filed by the universities' Mobility Managers were later compared to the official report and documents to be recorded in step i. to form an initial evaluation of the universities' commitment within the initiative.



**Figure 1.** Methodological workflow. Source: Authors' own.

## 4. Results and Discussion

### 4.1. Main Findings

According to the chosen approach, ten involved universities were addressed through official documents' screening, as well as through direct interviews with the referring Mobility Managers.

The main aim of this first round was to match the universities' role within the pilot with the proposed taxonomy.











Although the official project documents rarely mentioned the direct commitment of local universities, the cross investigation of their role through dedicated surveys allowed the authors to locate 10 valid responses (Bolzen university did not reply) within the previously mentioned classification.

In detail, the selected universities were clustered into the following three subsamples (Figure 2).

In this direction, some general considerations can be drawn:

- None of the considered universities act simultaneously as a CMaaS tester, scientific partner and stakeholders' manager. The full involvement of academic institutions fails indeed to be deployed within MaaS4Italy framework.
- Among the eleven MaaS4Italy pilots, universities are always involved as scientific partners, independently from the chosen model and approach.
- Only three out of eleven engage academic communities as CMaaS testers (namely Turin, Piedmont and Tuscany), and two of them overlap (with Turin as the capital city of the Piemonte region, they share partners and referring roles). Only the former one acted as a real university testbed, since the Tuscany initiative targeted students only.
- A similar share of pilots targets universities as stakeholder managers (in Milan, in Campania and Naples). The role of the academic institutions was in this direction required both in the implementation step to progressively build the MaaS ecosystem structure, as well as to support continuous exchange and interactions between local administrations and mobility providers.

- The Autonomous Province of Bolzen did not share public data on university engagement into the local initiative; so, it is excluded from further discussion.

MaaS4Italy pilot	University	Role	
Turin	Politecnico di Torino		 CMaaS tester
Milan	Politecnico di Milano		 Scientific partner
Naples	Università Federico II di Napoli		 Stakeholder manager
Autonomous Province of Bolzen	-	-	
Piedmont	Politecnico di Torino		
Veneto	Università di Padova		
Emilia-Romagna	Università di Bologna		
Tuscany	Università di Firenze		
Abruzzo	Università degli Studi dell'Aquila		
Campania	Università di Salerno		
Puglia	Politecnico di Bari		

**Figure 2.** Role of Italian universities within MaaS4Italy Initiative. Source: Authors' own.

The wide engagement of universities within the MaaS4Italy initiative is therefore consolidated; nevertheless, they appear to be involved for their institutional role and neutral mission of education, scientific research and territorial engagement (the so-called third mission).

Their pilot potential is indeed under-exploited, although they have been traditionally targeted as ideal early adopters.

The CMaaS component seems to be transferred to other territorial stakeholders—mainly private companies—thus widening the horizon of local MaaS ecosystems.

Within this wider framework that has been built to address MaaS within a nation-wide top-down perspective, bypassing the traditional fragmentation of bottom-up experiences, universities are indeed asked to act institutionally, being involved as enabling facilitators more than deploying university-centred pilots.

#### 4.2. Shifting from Local Testbeds to National Governance Buffers

A further deepening of the preliminary results may lead to interesting and quite unexpected outcomes concerning the state-led way to MaaS and the role academic communities have been given within this framework.

The role of CMaaS tester, which has been largely addressed by academic research [71], proves to be quite marginal within MaaS4Italy initiative. In fact, only two pilots are deploying similar experiments—namely Piedmont/Turin and Florence—and the latter is targeting university students only, thus limiting the potential mobility management implications [72], since Italian legislation requires University Mobility Management planning for employees only [73]. The university community is targeted as an operational pilot to be up-scaled only in Turin, where it could contribute with an overall community of approximately 40,000 members.

The comparative analysis reveals indeed a fundamental shift in how universities are positioned within MaaS ecosystems. Traditionally, regional and local initiatives—particularly the Scandinavian and Dutch models—treat universities as testbeds primarily focused on user-centric experimentation and the collection of behavioural data [56]. In

these contexts, the university's role is largely operational, serving as a controlled environment to test app functionalities and incentives on a specific demographic.

Conversely, the MaaS4Italy framework redefines the university as a governance buffer within a state-led industrial policy. Under the NextGeneration EU funding structure, Italian universities have been institutionalised as neutral mediators. Instead of being mere passive testing grounds, they serve as a critical bridge between the central Ministry and fragmented local administrations, ensuring that the Smart and Sustainable Choices pillar of the EU Green Deal is operationalised consistently across different metropolitan areas [3,4].

Universities act as active innovation boosters [74], both on the technical, as well as on the managerial and engagement side, more than passive testbeds. Their added value seems to be perceived more in terms of scientific and managerial support than on the CMaaS side [75].

#### *4.3. Paradox of Neutrality vs. CMaaS Implementation*

A significant finding of this study is the paradox of neutrality emerging from the Italian scale-up. The academic literature emphasises the potential of Corporate MaaS (CMaaS) to reduce system-level impacts and promote sustainable commuting patterns [72]. However, while regional pilots often allow for deep localised service design, they frequently struggle with the difficulty of scaling innovation beyond the pilot phase [56].

In MaaS4Italy, the emphasis on stakeholder management and KPI definition has, in some cases, crowded out the actual testing of university-based mobility bundles [46] and Padua [76]. Moreover, few of the considered university samples were involved in stakeholder engagement through the organisation of thematic tables gathering different interests and purposes within the potential MaaS ecosystem [77]. The Florence, Naples and Milan academic communities have supported their respective municipalities during the whole process. In this direction, the potential role of similar institutions to enable and facilitate public and private subjects' interactions to address shared goals has been only partially deployed [57]. In this direction, it is interesting to note that, in Milan, a market-driven scenario has been pursued, so that multiple companies are competing to provide MaaS, and the university has supported stakeholders' relations both in the selection and evaluation steps. On the other hand, Naples and Florence have chosen a more publicly controlled way, so that the main managerial role played by academic institutions concerns private operators' engagement in the process.

While universities have indeed successfully filled the governance gap by facilitating data-sharing and trust between private aggregators and public authorities—two elements often cited as primary barriers to systemic MaaS innovations [26]—their potential as massive operational testbeds remains partially untapped. Only specific cases, such as the Turin/Piedmont pilot, align with the University-as-a-Service model, where the institution acts simultaneously as a manager and a primary user group [37]. Several pilots, such as the ones in Puglia and Abruzzo actually addressed young users as potential early adopters. Nevertheless, the representativeness potential of academic communities in terms of diverse socio-demographic features and mobility needs [35], as well as in terms of controlled conditions of the environment [37], seem not to be pivotal.

#### *4.4. Policy Implications: Universities as De-Risking Agents*

The Italian experience suggests that in the context of large-scale post-COVID-19 recovery funds, universities act as technical insurance for public investments. By standardising monitoring protocols and providing scientific validation, they mitigate the political and financial risks associated with hard-to-abate sectors like transport.

This acts in line with previous European pilots experiences. In Sweden, universities such as Chalmers and KTH assume strategic leadership roles, designing national evaluation frameworks (SEAMLESS project), coordinating multi-stakeholder research programs, and directly influencing policy development through initiatives like KOMPIS [9,53]. Swedish academic institutions function not merely as service providers conducting surveys and analysis but as architects of the national MaaS knowledge infrastructure. Italian academic institutions' engagement in survey design, data collection, and KPI definition [46,69,76] resembles also the technical support model observed in Germany and Finland, where academic involvement focuses on specific evaluation tasks rather than ecosystem-wide strategic coordination [54,55].

The UK model offers alternative configurations where universities specialise in particular evaluation dimensions. Portsmouth's focus on accessibility and inclusion [78] demonstrates how academic institutions can develop distinctive expertise areas that inform both local implementation and international knowledge transfer.

Nevertheless, to avoid the pilot-trap common in regional deployments, policymakers should further institutionalise this role. As suggested by [74], universities should be viewed as permanent innovation drivers rather than occasional consultants. For future policy iterations, such as those inspired by the UK Government's Code of Practice [22], the Italian model offers a blueprint for a Triple Helix governance (Government–University–Industry) that prioritises systemic stability and data interoperability over isolated technological experiments.

In Belgium's collaborative governance model, stakeholder coordination occurs through formalised multi-party frameworks involving government facilitators, transport operators, MaaS providers, local authorities, and data brokers [19]. Universities participate within these structures but do not typically assume convening or mediating roles. The Swedish experience offers partial parallels, where academic institutions facilitate knowledge exchange through platforms like Samtrafiken and participate in steering groups, though the primary coordination responsibility remains with public agencies and industry associations [13].

Similar evidence shows how market-driven approaches (Finland, parts of Netherlands) position universities peripherally, as market actors and government enablers drive development [54]. Public-led initiatives (Belgium, Austria, Italy) create more space for academic engagement, as public authorities value universities' research capacity, convening power, and alignment with public interest objectives [19,54].

Sweden's research-intensive model, funded through innovation agencies rather than transport ministries, exemplifies a third pathway where academic institutions gain strategic positioning through research funding mechanisms [9]. Italy's post-COVID-19 recovery funding structure, channelled primarily through the transport ministry and focused on pilot implementation rather than research programs, may partially explain why Italian universities assume support roles rather than strategic leadership positions, despite their substantial expertise.

## 5. Conclusions

This paper examines the evolving role of universities in scaling up Mobility-as-a-Service (MaaS) initiatives within state-level actions for transport decarbonisation, focusing on Italy's MaaS4Italy program as a case study.

Through the analysis of how universities contribute to national MaaS governance, we performed via a qualitative review of 11 MaaS4Italy pilots (January–July 2025), document screening and dedicated survey, which showed a shift in academic entities' role from traditional testbeds to institutional anchors that facilitate stakeholder trust and data sharing.

From a theoretical perspective, this research contributes to the literature on sustainability transitions by identifying the university's role as a governance buffer, thus highlighting an inherent paradox, as well: universities de-risk public investments but underutilise their potential as Corporate MaaS (CMaaS) testers, favouring other territorial stakeholders to assume similar roles within national MaaS ecosystem.

In an era of fragmented policy-making and rapid digitalisation, universities provide the necessary neutral ground to foster trust between public authorities and private operators. This finding suggests that the success of large-scale environmental policies, such as the EU Green Deal, depends not only on technological readiness but on the presence of intermediary institutions capable of certifying data and mediating stakeholder conflicts.

Universities involved in MaaS4Italy pilots serve as scientific partners for survey design, KPI development, data analysis, and impartial evaluation, while only three pilots use universities as CMaaS testers. Three other pilots position universities as stakeholder managers, mediating public–private interactions and ecosystem building. No university fulfils all three roles simultaneously, emphasising institutional neutrality over operational testing.

In this direction, the present deepening of Italian pilots offers three main lessons for policymakers:

1. Formalising the role of universities as scientific and managerial coordinators could contribute to de-risk public investments in green technologies;
2. While universities have excelled as managers, their potential as high-density community testers remains underutilised. Policymakers should encourage the implementation of dedicated university mobility bundles (e.g., the Turin model) to act as a catalyst for wider urban adoption;
3. The use of university-led KPIs, as seen in MaaS4Italy, provides a blueprint for a standardised European approach to monitoring the carbon-reduction impacts of MaaS, preventing the “pilot-trap” of isolated and non-comparable local data.

Despite the robustness of the MaaS4Italy framework, the long-term sustainability of this governance model remains a question once extraordinary funding concludes. Future research should investigate whether this “University-as-a-Service” model can be sustained through market-driven mechanisms or if it requires permanent public institutionalisation to continue driving the decarbonisation of urban transport.

This study constitutes a preliminary investigation derived exclusively from publicly available documentation and official project reports through July 2025. Several limitations merit acknowledgment.

First, the qualitative nature of documentary analysis, while providing valid institutional perspectives, should be complemented by detailed surveys administered to university research coordinators and implementation teams to assess the actual operational activities beyond documented roles.

Second, MaaS4Italy continues through its final operational semester, with several pilots in active implementation phases and ex-post evaluation still pending. Comprehensive assessment must await completion of final data collection and impact evaluation phases, particularly regarding uptake rates, user satisfaction, and long-term behavioural changes.

Third, institutional data availability limitations, particularly regarding the Autonomous Province of Bolzen's university engagement, preclude complete national coverage and comparative analysis.

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## References

1. European Commission. *Mobility Strategy*; European Commission: Brussels, Belgium, 2021.
2. European Commission. *European Climate Law*; European Commission: Brussels, Belgium, 2021.
3. European Commission. *Sustainable and Smart Mobility Strategy—Putting European Transport on Track for the Future*; European Commission: Brussels, Belgium, 2020.
4. Pritchard, J. MaaS to pull us out of a car-centric orbit: Principles for sustainable Mobility-as-a-Service in the context of unsustainable car dependency. *Case Stud. Transp. Policy* **2022**, *10*, 1483–1493.
5. Farahmand, Z.H.; Gkiotsalitis, K.; Geurs, K.T. Mobility-as-a-Service as a transport demand management tool: A case study among employees in the Netherlands. *Case Stud. Transp. Policy* **2021**, *9*, 1615–1629.
6. Orozco-Fontalvo, M.; Moura, F. Refocusing MaaS approach: A brief. *Transp. Policy* **2023**, *141*, 340–342.
7. Butler, L.; Yigitcanlar, T.; Paz, A. How can smart mobility innovations alleviate transportation disadvantage? Assembling a conceptual framework through a systematic review. *Appl. Sci.* **2020**, *10*, 6306.
8. Ho, C.Q. Can MaaS change users' travel behaviour to deliver commercial and societal outcomes? *Transp. Res. A Policy Pract.* **2022**, *165*, 76–97.
9. Sochor, J.; Arby, H.; Karlsson, I.M.; Sarasini, S. A topological approach to Mobility as a Service: A proposed tool for understanding requirements and effects, and for aiding the integration of societal goals. *Res. Transp. Bus. Manag.* **2018**, *27*, 3–14.
10. Hensher, D.A.; Hietanen, S. Mobility as a feature (MaaS): Rethinking the focus of the second generation of mobility as a service (MaaS). *Transp. Rev.* **2023**, *43*, 325–329.
11. Hasselwander, M. Mobility-as-a-feature (MaaS): Why and how ride-sharing platforms have evolved into super apps. *Transp. Res. Procedia* **2024**, *78*, 297–303.
12. Becker, H.; Balac, M.; Ciari, F.; Axhausen, K.W. Assessing the welfare impacts of Shared Mobility and Mobility as a Service (MaaS). *Transp. Res. A Policy Pract.* **2020**, *131*, 228–243.
13. Fenton, P.; Gustafsson, S. Mobility as a Service (MaaS): Exploring the views of MaaS stakeholders in Stockholm. *Case Stud. Transp. Policy* **2020**, *8*, 1410–1423.
14. Mukhtar-Landgren, D.; Smith, G. Perceived action spaces for public actors in the development of Mobility as a Service. *Eur. Transp. Res. Rev.* **2019**, *11*, 32.
15. Kriswardhana, W.; Sárvári, B.; Esztergár-Kiss, D. Differences in MaaS adoption among university students. *Transp. Lett.* **2025**, *18*, 356–369.
16. de Souza, T.A. Responsible Innovation in Mobility Systems: A Support for Governance of Smart and Sustainable University Campuses. Doctoral Dissertation, Université Paris-Saclay and University of Lavras, UFLA, 2022.
17. Griffiths, S.; Del Rio, D.F.; Sovacool, B. Policy mixes to achieve sustainable mobility after the COVID-19 crisis. *Renew. Sustain. Energy Rev.* **2021**, *143*, 110919.
18. European Commission. *Recovery and Resilience Scoreboard. Thematic Analysis, Sustainable Mobility*; European Commission: Brussels, Belgium, 2024.
19. MaaS Alliance. *Mobility as a Service ('MaaS') Regulatory Models White Paper*; MaaS Alliance: Brussels, Belgium, 2024.
20. Eckhardt, J., Aapaoja, A., Nykänen, L., Sochor, J., Karlsson, M., & König, D. (2018). The European roadmap 2025 for mobility as a service. Proceedings of the 7th Transport Research Arena TRA.

21. Horth, P.A.; Menerault, P.; Richer, C. L'importation du MaaS (mobility as a service) en France: Un nouvel instrument pour les politiques de transport? *Netcom. Réseaux Commun. Territ.* **2021**, *35*, 3–4.
22. UK Government. Mobility-as-a-Service: Code of Practice. Department for Transport. 2023. Available online: <https://www.gov.uk/government/publications/mobility-as-a-service-maas-code-of-practice/mobility-as-a-service-code-of-practice> (accessed on 9 February 2026).
23. Polis. Governing MaaS: The Flemish MaaS Agreement Framework. Polis. 2022. Available online: <https://www.polisnetwork.eu/news/governing-maas-the-flemish-maas-agreement-framework/> (accessed on 9 February 2026).
24. Mink, E. MaaS of the Month: Supporting MaaS with Pilots. National MaaS Programme in The Netherlands. 2019. Available online: <https://share.google/f9lksvq5LNayA9gEL> (accessed on 9 February 2026).
25. Strikkers, S.A.I. The Dutch Mobility Transition: An Assessment of Governance Factors Contributing to Successful Implementation of MaaS in The Netherlands “A Qualitative Research Analyzing Governance Factors Regarding the Seven MaaS Pilots, Gaining Insights for National Implementation”. Master’s Thesis, Utrecht University, Utrecht, The Netherlands, 2021.
26. Surakka, T.; Härrä, F.; Haahtela, T.; Horila, A.; Michl, T. Regulation and governance supporting systemic MaaS innovations. *Res. Transp. Bus. Manag.* **2018**, *27*, 56–66.
27. Aba, A.; Esztergár-Kiss, D. Creation of the MaaS readiness index with a modified AHP-ISM method. *Commun. Transp. Res.* **2024**, *4*, 100122.
28. Lopes, A.S.; Orozco-Fontalvo, M.; Moura, F.; Vale, D. Mobility as a service and socio-territorial inequalities. *J. Transp. Land Use* **2023**, *16*, 215–240.
29. Caballini, C.; Olivari, E.; Gasparini, C.; Dalla Chiara, B. The spread of MaaS initiatives in Europe: The leading role of public governance emerging from an Italian regional application. *Sustainability* **2023**, *15*, 13413.
30. Audouin, M.; Finger, M. Empower or Thwart? Insights from Vienna and Helsinki regarding the role of public authorities in the development of MaaS schemes. *Transp. Res. Procedia* **2019**, *41*, 6–16.
31. Coppola, P.; Silvestri, F.; Pastorelli, L. Mobility as a Service (MaaS) for university communities: Modeling preferences for integrated public transport bundles. *Travel Behav. Soc.* **2025**, *38*, 100890.
32. Kriswardhana, W.; Esztergár-Kiss, D. University students’ adoption of mobility as a service with respect to user preferences and group differences. *J. Public Transp.* **2024**, *26*, 100079.
33. Silvestri, F.; Costa, V.; Pastorelli, L. Mobility as a Service (MaaS) adoption: Assessing heterogeneity across university communities. *Transp. Eng.* **2025**, *14*, 100366.
34. Merlin, L.A.; Freeman, K.; Renne, J.; Hoermann, S. Clustered randomized controlled trial protocol of a Mobility-as-a-Service app for College campuses. *Transp. Res. Interdiscip. Perspect.* **2022**, *14*, 100572.
35. Jin, Z.R.; Qiu, A.Z. Mobility-as-a-Service (MaaS) testbed as an integrated approach for new mobility—A living lab case study in Singapore. In *Proceedings of the International Conference on Intelligent Human Computer Interaction*; Springer International Publishing: Cham, Switzerland, 2019; pp. 441–458.
36. Kriswardhana, W.; Esztergár-Kiss, D. Examining university students’ preferences toward MaaS aspects. *Transp. Res. Interdiscip. Perspect.* **2025**, *30*, 101348.
37. Le Pira, M.; Fazio, M.; Giuffrida, N.; Calabrò, G.; Inturri, G.; Ignaccolo, M. UaaS app—University as a service app: Exploring the acceptability of a MaaS-like concept for a University community. *Eur. Transp.* **2023**, *90*, 1–10.
38. Schuurman, D.; De Marez, L.; Ballon, P. Living labs—A structured approach for implementing open and user innovation. In *Proceedings of the 13th Open and User Innovation Society Meeting*, Lisboa, Portugal, 13–15 July 2015.
39. Chen, X.; Lu, Y.; Whitehead, J.; Hickman, M. Understanding bundle choices and subscription patterns of mobility as a service (MaaS) trial participants: Evidence from an Australian university community. *Travel Behav. Soc.* **2026**, *42*, 101123.
40. Hesselgren, M.; Sjöman, M.; Pernestål, A. Understanding user practices in mobility service systems: Results from studying large scale corporate MaaS in practice. *Travel Behav. Soc.* **2020**, *21*, 318–327.
41. Amaral, A.; Barreto, L.; Pereira, T.; Baltazar, S. Towards the adoption of corporate mobility as a service (cmaas): A case study. In *Proceedings of the Conference on Sustainable Urban Mobility*; Springer International Publishing: Cham, Switzerland, 2020; pp. 316–325.
42. Cassar, E. Evaluating Mobility as a Service for sustainable travel among young adults. *Transp. Res. Procedia* **2023**, *72*, 4159–4166.
43. Kriswardhana, W.; Esztergár-Kiss, D. Identifying latent mobility as a service preference segments among college students. *Eur. Transp. Res. Rev.* **2025**, *17*, 24.

44. Leontev, M. Reasons of university students' susceptibility to intelligent mobility and the use of mobility-as-a-service schemes. *E3S Web Conf.* **2023**, *376*, 04017.
45. Inturri, G.; Giuffrida, N.; Le Pira, M.; Fazio, M.; Ignaccolo, M. Linking public transport user satisfaction with service accessibility for sustainable mobility planning. *ISPRS Int. J. Geo-Inf.* **2021**, *10*, 235.
46. Silvestri, F.; Silvestri, F.; Coppola, P. Mobility as a Service (MaaS) bundle uptake: A case study in Milan, Italy. *Eur. Transp. Res. Rev.* **2025**, *17*, 3.
47. Rodríguez-Rad, C.J.; Revilla-Camacho, M.Á.; Sánchez-del-Río-Vázquez, M.E. Exploring the intention to adopt sustainable mobility modes of transport among young university students. *Int. J. Environ. Res. Public Health* **2023**, *20*, 3196.
48. Lu, Y.; Chen, X.; Hickman, M. Comparing the spatial temporal dynamics of public transport ridership before and after the launch of MaaS trial: A case study of University of Queensland, Brisbane, Australia. *Transp.* **2025**, *1*, 1–27.
49. Kawamura, Y.; Makino, K.; Yamashita, N. Advanced Mathematical Science for Mobility Society. In *Advanced Mathematical Science for Mobility Society*; Springer Nature: Singapore, 2024; pp. 3–7.
50. Gandia, R.; Antonialli, F.; Nicolai, I.; Sugano, J.; Oliveira, J.; Oliveira, I. Casual carpooling: A strategy to support implementation of Mobility-as-a-Service in a developing country. *Sustainability* **2021**, *13*, 2774.
51. Barreto, L.; Amaral, A.; Pereira, T.; Baltazar, S. Academic Mobility as a Service (AMaaS) Cybersecurity Challenges. In *Proceedings of the Conference on Sustainable Urban Mobility*; Springer Nature: Cham, Switzerland, 2024; pp. 713–722.
52. Costa, V.; Campanini, F.; Delponte, I. Shared practices and experiences of University Mobility Management. Exploring scalability at the municipal level. *Transp. Res. Procedia* **2025**, *90*, 320–327.
53. Karlsson, I.C.M.; Mukhtar-Landgren, D.; Smith, G.; Koglin, T.; Kronsell, A.; Lund, E.; Sochor, J. Development and implementation of Mobility-as-a-Service—A qualitative study of barriers and enabling factors. *Transp. Res. A Policy Pract.* **2020**, *131*, 283–295.
54. Smith, G.; Sochor, J.; Karlsson, I.M. Mobility as a Service: Development scenarios and implications for public transport. *Res. Transp. Econ.* **2018**, *69*, 592–599.
55. Jittrapirom, P.; Caiati, V.; Feneri, A.M.; Ebrahimigharehbaghi, S.; Alonso-González, M.J.; Narayan, J. Mobility as a service: A critical review of definitions, assessments of schemes, and key challenges. *Urban Plan.* **2017**, *2*, 13–25.
56. Strömberg, H.; Rexfelt, O.; Karlsson, I.C.M.; Sochor, J. Trying on change—Triability as a change and design methodology. *Des. Stud.* **2016**, *43*, 122–143.
57. Smith, G.; Sørensen, C.H. Public-private MaaS: Unchallenged assumptions and issues of conflict in Sweden. *Res. Transp. Econ.* **2023**, *99*, 101297.
58. Polydoropoulou, A.; Pagoni, I.; Tsirimpa, A.; Roumboutsos, A.; Kamargianni, M.; Tsouros, I. Prototype business models for Mobility-as-a-Service. *Transp. Res. A Policy Pract.* **2020**, *131*, 149–162.
59. van 't Veer, R.; Annema, J.A.; Araghi, Y. The potential of Mobility as a Service bundles as a mobility management tool: A case study in The Netherlands. *Case Stud. Transp. Policy* **2023**, *11*, 100953.
60. Dynaxibility4CE. *MaaS Topic Guide: Planning and Implementing MaaS in Central Europe*; Interreg Central Europe Programme: Vienna, Austria, 2021.
61. APTA. *Being Mobility-as-a-Service (MaaS) Ready: Final Report of the APTA International Study Mission*; American Public Transportation Association: Washington, DC, USA, 2019.
62. Dadashzadeh, N.; Sagmanli, S.S.; Ouelhadj, D. Inclusive Mobility as a Service (MaaS): Key performance indicators and a conceptual framework for evaluation. In *Proceedings of the 3rd International Conference on Mobility as a Service (ICoMaaS)*; Tampere University: Tampere, Finland, 2022.
63. Dipartimento per la Trasformazione Digitale. *Investimento PNRR 1.4.6 "Mobility as a Service for Italy" Discussion Paper "Data Sharing and Service Repository Facilities" (DS&SRF)*; Italian Government: Rome, Italy, 2022.
64. Ho, C.Q.; Mulley, C.; Hensher, D.A. Public preferences for mobility as a service: Insights from stated preference surveys. *Transp. Res. A Policy Pract.* **2020**, *131*, 70–90.
65. Covelli Garrido, C.I.; Giovannini, A.; Mangone, A.; Silvestri, F. Managing urban mobility during big events through living lab approach. *Sustainability* **2023**, *15*, 14566.
66. Gace, I.; Babic, J. Mobility as a service: Stakeholders and challenges. In *Proceedings of the SoftCOM 2020 PhD Forum*, Split, Croatia, 18 September 2020; Volume 10.
67. Schulz, T.; Gewald, H.; Krcmar, H.; Wagner, H.T. My way, your way, or no way? How Mobility-as-a-Service ecosystems emerge. *Inf. Syst. E-Bus. Manag.* **2024**, *23*, 423–466.

68. Frank, L.; Klopfer, A.; Walther, G. Designing corporate mobility as a service—Decision support and perspectives. *Transp. Res. A Policy Pract.* **2024**, *182*, 104011.
69. Giuffrida, N.; Mascia, M.; Binetti, M.; Ottomanelli, M. Mobility patterns and the potential of innovative mobility services for a university community. *Transp. Res. Procedia* **2025**, *86*, 128–135.
70. Guyader, H.; Nansubuga, B.; Skill, K. Institutional logics at play in a mobility-as-a-service ecosystem. *Sustainability* **2021**, *13*, 8285.
71. Pashmchi, M. Mobility as a Service for University Communities, Case Study. Master's Thesis, Politecnico di Milano, Milan, Italy, 2022.
72. Vaddadi, B.; Zhao, X.; Susilo, Y.; Pernestål, A. Measuring system-level impacts of corporate mobility as a service (CMaaS) based on empirical evidence. *Sustainability* **2020**, *12*, 7051.
73. Ministero della Transizione Ecologica. *Decreto Interministeriale n. 179 del 12 Maggio 2021*; Ministry of Ecological Transition, Italian Government: Roma, Italy, 2021.
74. Valavanidis, A. Universities as innovation drivers for major disruptive technological transformations and economic development. *Sci. Rev.* **2020**, *2*, 1–48.
75. Lindblad, S.; Nygås, S. Corporate Mobility as a Valuable Service? An Exploratory Study from a Business Model Perspective. *Transp. Res. Procedia* **2018**, *37*, 345–352.
76. Baldassa, A.; Ceccato, R.; Orsini, F.; Rossi, R.; Gastaldi, M. MaaS bundling and acceptance in the pandemic era: Evidence from Padua, Italy. *J. Adv. Transp.* **2022**, *2022*, 9833689.
77. Chinvanichai, S. Exploring the enablers and barriers of stakeholder's collaboration of MaaS platform: A case study of Bangkok. *Transp. Res. Procedia* **2024**, *78*, 899–906.
78. Dadashzadeh, N.; Ermagun, A.; Nicholls, R.; Shamsunnahar, Y. Socially Sustainable Mobility as a Service (MaaS): A multi-criteria decision making approach for inclusivity and accessibility evaluation. *Cities* **2024**, *154*, 105360.

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