Interreg CENTRAL EUROPE

Co-funded by the European Union

GreenPATH

D1.1.3

IT Approaches to support Mobility Management: EU project synergies for Sustainable Mobility in Functional Urban Areas

Version
04 2025

DISCLAIMER

The views and opinions expressed in this document are solely those of the author(s) and do not necessarily reflect the views of the European Union or Interreg Central Europe. The European Union and the Managing Authority shall not be held liable for any errors or omissions in the content of this document.

While every effort has been made to ensure the accuracy of the information contained in this document, the authors and any other participant in the GreenPATH consortium make no warranty of any kind, express or implied, including but not limited to the warranties of merchantability and fitness for a particular purpose.

The GreenPATH consortium and its members, including their officers, employees, and agents, shall not be held responsible or liable in negligence or otherwise for any inaccuracies or omissions in this document. Furthermore, the GreenPATH consortium and its members shall not be liable for any direct, indirect, or consequential loss or damage arising from the use of or reliance on any information or advice contained in this document.

Table of Contents

1. Introduction and Objectives

Mobility management is a critical component of modern urban and regional planning, aiming to enhance the efficiency, sustainability, and accessibility of transportation systems. As cities grow and mobility patterns become increasingly complex, traditional approaches to managing transport infrastructure and services face significant challenges. Issues such as congestion, air pollution, carbon emissions, and the need for seamless multimodal transportation require innovative solutions that go beyond conventional transport planning. In this context, Information Technology (IT) has emerged as a key enabler in transforming mobility management by providing advanced tools for data collection, analysis, and service integration.

Across Europe, diverse IT-driven solutions for improving mobility experiences and stimulating more sustainable mobility behaviors have been implemented to address the challenges posed by urbanization, environmental concerns, and the changing expectations of commuters and businesses. By leveraging technological developments ranging from the reliable provision of real-time data and digital connectivity to simulation models and app-based campaigns and challenges, these IT approaches facilitate public transport efficiency and promote sustainable travel behaviors through integrated mobility services.

This report presents a **comprehensive cross-European analysis** of IT approaches supporting mobility management. By examining a wide range of existing IT approaches and tools from multiple countries and urban contexts, it identifies **practical tools and strategies** associated with implementing IT solutions for the facilitation of sustainable mobility behaviours with a special focus on facilitating sustainable commuting practices. The study explores how different European regions are leveraging digital innovations to improve mobility efficiency while balancing environmental, economic, and social priorities. Moreover, it assesses the scalability and transferability of these IT-based solutions to other cities and regions facing similar mobility challenges.

The main objective of this report is twofold:

1. **Providing an overview of existing IT approaches** that support mobility management across different European contexts. This includes identifying state-of-the-art tools, platforms, and digital solutions that enable data-driven decision-making, real-time monitoring, and integrated mobility services. By analyzing various existing IT solutions, the report highlights best practices and innovative approaches that have proven effective in optimizing sustainable commuting habits.

2. **Presenting a selection of the most suitable IT tools and approaches** that will be beneficial for the planned pilot activities within the **GreenPATH project** as the initiative focuses on enhancing sustainable mobility solutions by **testing and implementing climate-friendly mobility solutions for workers and students** in industrial and university areas. By assessing the applicability of different IT solutions, this report provides a foundation for selecting and implementing the most effective strategies in upcoming pilot projects. These recommendations will help ensure that GreenPATH benefits from **scalable, adaptable, and future-proof** digital mobility solutions that align with environmental and societal goals.

By synthesizing lessons from diverse European experiences, this report aims to provide **valuable insights for policymakers, transport authorities, urban planners, municipalities, companies and technology providers** who seek to harness IT innovations for improved mobility management. Ultimately, the report supports the development of **smarter, more sustainable, and more user-centric** mobility ecosystems across Europe, with a specific focus on practical applications within the GreenPATH project.

2. EU Projects on Sustainable Commuting and Synergies with GreenPATH

EU funded projects have presented a vast knowledge, outcomes and progress in sustainability and green mobilty. Partnerships among different stakeholders such as public and private sector have been very important for expanding our horizon, strengthening cross-border cooperation and improve transferability of the knowledge for better future. By having access to valuable research, innovative solutions and tested approaches, it paves the way for even better integration in every aspect, where we can learn what works and where we can learn more.

Therefore, synergies between projects are very beneficial for all future projects and collaborations between different partners, to achieve a greater goal for more sustainable communities.

Below we have identified several EU funded projects that in one way or another, present synergies and IT approaches to the GreenPATH project.

2.1 Introduction of EU-Projects relevant to GreenPATH

CISMOB - Cooperative Information Platform for Low Carbon and Sustainable Mobility) (2014 – 2020), Interreg Europe

CISMOB promotes sustainable mobility through mobility solutions and different planning tools. Main goal is to find different innovative solutions and ways on how to reduce carbon footprint and increase sustainable mobility in their urban areas through ICT services. Objective is to improve mobility planning and public participation in decision making process. Project was focused on pedestrian and cycling infrastructure, improving and expanding bicycle sharing model and EV fleet. Project output were creation of single platform for all transport modes, self-driving shuttle buses and first 5G bike that monitors air quality.

IT approach

CISMOB is using different digital tools to improve mobility services such as real time data on public transport, real-time transport emissions monitoring and mobile apps to integrate multiple transport modes. Functionalities and features consist of integrated mobility solutions, multimodal transport networks, and real-time travel data systems.

Synergies with GreenPATH

CISMOB and GreenPATH promote sustainable transport. CISMOB focuses on data and integration while GreenPATH addresses policy development.

Project Website: https://projects2014-2020.interregeurope.eu/cismob/

DANOVA - Innovative transportation services for blind and partially sighted passengers in Danube region (2020-2022), Interreg Danube Transnational Programme

DANOVA project involves 14 partners from 9 different countries. It aims to develop innovative solutions in transport infrastructure and improve transport accessibility for all disabilities through innovative services, adopting them in airports, ports, train and bus stations. Main objective is to improve accessibility for blind and partially sighted commuters at airports, seaports, train and bus stations. Goal

was to provide all passengers equal access to public transport, specifically making it possible for passengers with any disability, to have an opportunity to travel independently.

IT Approach

Digital tools such as AI powered guidance systems, mobile apps with guided assistance for visually impaired.

Synergies with GreenPATH

GreenPATH project aims to develop innovative approaches for sustainable commuting in functional urban areas with smart and green mobility solutions. DANOVA project aims for practical solutions for specific user groups to improve accessibility for passengers with any disability. Findings of DANOVA could be beneficial to GreenPATH's planning strategies for different transport modes, for example how to improve bus or train commuting for people with disabilities.

Project Website: https://dtp.interreg-danube.eu/approved-projects/danova

DIGNITY - DIGital traNsport In and for socieTY (2020 – 2022), Horizon Europe

DIGNITY project involves partners from Belgium, Germany, Italy, Netherlands, Spain and United Kingdom. Project focuses on digital gaps on may levels such as macro on institutional, meso level on provision of digital mobility, and micro level on needs of end users. Project's goal was to identify digital abilities and gaps in mobility, provision of digital urban transport and policies.

IT approach

The project's output named Dignity Toolkit was developed to support in creating inclusive, sustainable digital mobility services. It serves as a central hub for resources and guidance. It provides easy access to different tools, best practices. The interactive decision support tool guides users through a series of questions in order to identify most relevant resources based on specific needs and context.

Synergies with GreenPATH

The Dignity Toolkit could be useful for GreenPATH project to assist in identifying and developing more inclusive digital products, services and also help us understand gaps, needs and issues faced by vulnerable target groups and lastly forming strategies and policies that would promote sustainable mobility for all users.

Project Website: https://www.dignity-project.eu/

Transformer (2022 – 2024), Horizon Europe

Transformer project involves project partners from Germany, Italy, Poland and Greece. Aim of the project is to present a possibility for long-term transformation of frameworks and to fasten the shift towards climate neutrality, through development of Transition Super-Labs (TSLs) that serve as a real-life laboratories for testing innovative solutions. The project has developed blueprints for implementing and toolkit to support TSL. Knowledge hub was established to share knowledge and capacity building.

Synergies with GreenPATH:

Transition Super Labs aligns with GreenpATH's objectives of promoting sustainable mobility and putput produced within Transformer project, called Knowledge hub could be useful for GreenPATH's deliverable of online training courses, where we could see the impact of how well maintained the platform is, even after the project.

Project Website: https://www.transformer-project.eu/about

SUSTANCE (2024 – 2026), Interreg Central Europe

SUSTANCE project involves project partners from Italy, Hungary, Slovenia and Croatia. The goal of the project is to provide all citizens an equal public transportation service and access to it. Project target group are citizens living in peripheral areas, which face poorly connected infrastructure and the project tackles this issues with developing new cross-border sustainable services and options, to improve sustainable mobility. Project introduces cross-border train services, development of DRT, creation of interactive mobility apps and shared mobility solutions (bike and scooter sharing).

Synergies with GreenPATH:

SUSTANCE have been collaborating with different stakeholders from different countries which shows a potential as best practice on stakeholder engagement and directly complements GreenPATH project. Projects efforts in enhancing cross-border solutions aligns with GreenPATH's objectives and developing ICT tools to improve connectivity for target regions could be used as a model for scaling up for GreenPATH's FUAs which are different for each GreenPATH partner.

Project Website: https://www.interreg-central.eu/projects/sustance/

DREAM_PACE (2023 – 2026), Interreg Central Europe

DREAM_PACE project involves partners from Italy, Hungary, Austria, Germany and Croatia. Goal of the project is to improve accessibility and connectivity in peripheral and rural areas through DRT solutions. Project focuses on integrating DRT services into Sustainable Urban Mobility Plans (SUMPs)

Synergies with GreenPATH:

Project focuses on integrating DRT solutions into SUMPs. Their approach towards this integration could be very useful, if the blueprints could be adopted by each GreenPATH partner, depending on their region and needs, to implement and adopt.

Project Website: https://www.interreg-central.eu/projects/dream-pace/

MaaSolutions – Digital Solutions for Sustainable Urban Mobility (2024 – 2028), Interreg Europe

MaaSolutions project involves partners from Italy, Romania, Belgium, Latvia, Hungary, Germany, Greece, Netherlands and Serbia. Project is still ongoing, but the intention is to improve urban mobility through integration of different transport modes into single platform of MaaS digital solution which will provide a user friendly mobility solution for the end user. Project aims to encourage political authorities and decision makers into transformation of urban mobility by promoting MaaS implementation and on other hand encouraging commuters to change their transportation mode into more sustainable option. Expected results and outcomes are to create a functional MaaS platform with multimodal planning solutions.

IT Approach

The project focuses on data analytics for optimizing mobility and integrating different transport modes into a MaaS digital solution. The IT approach involves developing a MaaS platform and mobile applications.

Synergies with GreenPATH

GreenPATH and MaaSolutions aim to promote sustainable urban mobility. GreenPATH is focusing on improving urban mobility governance across FUAs, recognizing gaps and needs, addressing policy and governance, while MaaSolutions focuses on digital solutions and governances. Outcomes of the project could be very useful for the project as how to offer commuters user friendly single platform and encourage them to make a shift from the car. Data on adoption and user behaviour could be beneficial for GreenPATHs urban mobility governance improvements. GreenPATH could implement commuting recommendations features into a MaaS platform and encourage commuters to choose more sustainable option.

Project Website: https://www.interregeurope.eu/maasolutions

OPTI-UP - Optimized Urban Transport Systems (2024 – 2026), Interreg Central Europe

OPTI-UP project involves partners from Italy, Hungary, Slovenia, Czech Republic and Croatia. OPTI-UP intends to make public transport more approachable and accessible through urban planning and data analytics. Goal is to improve efficiency and accessibility through different smart mobility solutions. Partners in six pilot areas will test solutions on DRT, route planning and fleet optimization. Project's goal is to optimize transport networks, to improve traffic flow and improve urban accessibility.

IT Approach

OPTI-UP is focusing real time data such as DRT for improving efficiency and sustainability. With real time data for DRT, fleet management and optimization of the routes will be tested.

Synergies with GreenPATH

Both projects share the same goal of promoting eco-friendly mobility. GreenPATH focuses on integrating technologies and sustainable practices into transportation networks, while OPTI-UP on optimizing transport systems through data and integration urban planning. OPTI-UP combines a smart planning and data-driven approach.

Project Website: https://www.interreg-central.eu/projects/opti-up/

SMART COMMUTING (2017 – 2021), Interreg Central Europe

SMART COMMUTING focuses on commuting strategies, innovative mobility policies and technological solutions on FUA level. Objectives are to reduce car usage and encourage passenger to use more sustainable commuting options with a goal to improve urban mobility. The pilot actions included:

- **Rimini, Italy**: Promoted cycling and carpooling through a bike-to-school challenge and a new mobile app for carpooling communities.
- **Koper, Slovenia**: Focused on shifting from private cars to public transport and active modes, preparing a feasibility study for sustainable intermodal solutions with a focus on improving the cycling infrastructure.
- **Velenje, Slovenia**: Aimed to increase cycling by upgrading the bike rental system with electric bikes, establishing new rental terminals, and encouraging cycling for commuting and overcoming steep slopes.
- **Hranice, Czech Republic**: Conducted a feasibility study on integrating railway and cycling, focusing on access routes and bike-and-ride facilities, and ran an information campaign to promote environmentally friendly transport choices.

- **Zadar, Croatia**: Conducted a feasibility study on ticket integration for buses and boats to improve public transport accessibility and affordability for commuters, residents, and tourists.
- **Weiz, Austria**: Investigated maximizing the use of a newly opened railway extension and improving train accessibility, focusing on increasing service usage.
- **Szolnok, Hungary**: Aims for a 10% increase in the modal share of environmentally friendly transport by 2030, through data-driven transport management and innovation in the bus fleet.

IT Approach

Digital tools for planning, coordination, multimodal trip planning platforms and digital mobility tracking tools.

Synergies with GreenPATH

SMART COMMUTING's strategies for sustainable commuting are focused on energy-efficient transportation planning but could directly contribute on GreenPATH's policy and governance aspects.

Project Website: https://programme2014-20.interreg-central.eu/Content.Node/SMART-COMMUTING.html

SUMBA – Sustainable Urban Mobility and Commuting in Baltic Cities (2017-2021) and SUMBA+ (Apr 2021-Dec 2021), Interreg Baltic Sea Region

SUMBA focuses on developing master plans on commuting in nine municipalities in five Baltic Sea region countries. SUMBA+ builds on the SUMBA project and aims to advance the implementation of the measures proposed in the commuter concept. The focus is on multimodal mobility planning in urban areas through promoting more sustainable, efficient and accessible commuting modes. Project objectives are to reduce car usage through integrating multimodal transport modes such as bike and car sharing, usage of public transport. Their target groups are general commuters, urban planners and public transport users. The project studied and tested measures facilitating intermodal and sustainable commuting, including mobility hubs, circulation plans, bicycle libraries, and digital communication tools for transport strategies. Project partners provided a toolbox that guides users for transport modelling and data collection. The toolbox gathers available transport models as well as planning support tools. It also contains Intermodalyzer index which measures how well intermodal city transport is. Partners improved their ability to work with transport models, including integrated emissions analysis, to evaluate measures prior to implementation. A dissemination toolkit was created to provide project partners with resources to communicate activities and outputs, including films, documents, communication templates, and conference abstracts.

IT Approach

SUMBA+ uses multimodal trip planning apps, digital transport monitoring systems, journey planners and real-time transit information, emission calculation tools and stakeholder collaboration platforms. The project includes sustainable mobility solutions to reduce GHG emissions and promote eco-friendly commuting, supporting mobility managers and organizations with tools for optimizing commuting systems, integrating sustainable transportation options into city designs, raising awareness with promoting a shift from private cars to more sustainable transport options, use of IT tools to evaluate current mobility patterns and identify areas for improvement.

Synergies with GreenPATH

Both projects emphasize sustainable mobility. SUMBA+ supports GreenPATH by providing data-driven approaches for mobility planning in FUAs. Use of Intermodalyzer would improve identifying needs, gaps, stakeholders and how to form and implement strategies into policies.

Project Website: https://interreg-baltic.eu/project/sumba/

SMACKER – Soft Measures & Actions for behavioural Change and Knowledge to Embrace peripheral and Rural areas (2019 – 2022), Interreg Central Europe

SMACKER involves partners from Austria, Croatia, Czech Republic, Germany, Hungary, Italy, Poland, Slovakia and Slovenia. Project provides solutions to public transport and commuting services that connect local and regional areas, by recognizing their gaps and needs. Goal is to promote more sustainable commuting solutions for rural and peripheral areas through promotional campaigns and pilot actions for more efficient integration. Partners have developed six action plans to support policy makers towards better integration of peripheral areas. Pilots include DRT service with last mile connection, ICT platform, improvement in last mile from fixed to flexible and different measures to improve user experience.

IT approach

SMACKER project has provided different IT approaches mainly focusing on DRT services such as last mile connection in peripheral areas, improvements in last mile from fixed to flexible services and a real time information system. The IT approaches are centered on the development of applications and platforms for data analysis and gamification.

Synergies with GreenPATH

SMACKER's pilot results could improve planning and accessibility in FUAs. Pilot outcomes such as DRT services on last mile, on real time information systems and single application for DRT could provide us information to better understand what worked and what didn't along the pilot actions. Implementing SMACKER's experience in behaviour change techniques in GreenPATH's strategies could encourage changing commuting habits.

Project Website: https://programme2014-20.interreg-central.eu/Content.Node/SHAREPLACE.html

SHAREPLACE - Shared mobility and Regional transport integrated Planning for a better connected Central Europe (2017 – 2020), Interreg Central Europe

SHAREPLACE involves partners from Germany, Italy, Hungary and Croatia with five pilot regions. SHAREPLACE identifies need for integration of different transport modes. Goal was to improve connection and accessibility between local, regional and transnational areas through development of mobility solutions and integration of public, private, digital solutions into multimodal solution. The implementation of multimodal solution was a focus from the beginning and pilot regions have implemented different services like carpooling, bike sharing and DRT.

IT Approach

SHAREPLACE has focused on integration of different transport modes, from public transport, carpooling, bike sharing and DRT. They have developed a multimodal trip planner which includes national railway transport and urban public transport. DRT solution was developed for better integration of local and bus services. Commuters have the ability to view connections between local buses and train for their departure and arrival times.

Synergies with GreenPATH

Pilot results such as DRT bus service and multimodal trip planning service along with carpooling, improving accessibility of the local university campuses and bicycle sharing to a DRT service call-a-bus service could significantly improve GreenPATH's pilot actions.

Project Website: https://programme2014-20.interreg-central.eu/Content.Node/SHAREPLACE.html

MOVECIT - Engaging employers from public bodies in establishing sustainable mobility and mobility planning (2016-2019), Interreg Central Europe

MOVECIT involves partners from Austria, Czech Republic, Hungary, Slovakia, Slovenia, parts of Germany and parts of Italy. MOVECIT focuses on implementing different measures to encourage emloyees of public institutions into more sustainable transportation mode. Different pilot actions have been developed such as, personalized travel planning and installation of bike sheds, purchase of e-bikes and e-bike charging stations. For improving multimodal commuting, bike point were installed at the train and bus stations and traffic flow measures to identify congestion points. To raise awareness among commuters they have promoted a "Walking Award" to promote walking among employees.

IT Approach

Interesting IT functionality was developed by a project partner, allowing employees to reserve an e-bike, which is a very transparent way for employees to reserve the bike on a specific day or hour based on their need.

Synergies with GreenPATH

MOVECIT and GreenPATH share the same goal of encouraging commuters to choose a more sustainable commuting option. MOVECIT focuses only on municipal employees, where GreenPATH targets various commuters within urban areas. MOVECIT focuses on targeted measures and GreenPATH on broader strategies. GreenPATH could gain from techniques and different pilot solutions that were implemented in MOVECIT.

Project Website: https://programme2014-20.interreg-central.eu/Content.Node/MOVECIT.html

SCALE-UP – User-Centric & Data Driven Solutions for Connected Urban Poles (2021-2025), Horizon Europe

SCALE-UP project involves partners from Belgium, Spain and Finland. SCALE-UP focuses on developing user specific and data driven approaches and mobility solutions for advanced multimodal solutions. Project pilot actions consist multimodal route planner in Antwerp, park and ride facilities in Madrid and mobility map in Turku. These solutions offer integrated different transport modes, real-time information on available transport services.

IT Approach

The project involves several IT approaches such as multimodal route planner and mobility map with real-time data information.

Synergies with GreenPATH

SCALE-UP project uses data and analyses behaviour of users in order to create effective mobility solutions. Both projects are encouraging the use of sustainable transport modes. GreenPATH could learn from data-driven approach and use it as a model for future integration.

Project Website: https://www.scale-up-project.eu/

EMPOWER - The European Platform to Promote Wellbeing and Health in the workplace (2015 – 2018), Horizon Europe

EMPOWER focuses on reducing usage of CFV (conventionally fuelled vehicles), developing set of measures that are cost-effective and based on data. Goal is to encourage users for more sustainable commuting modes. The project developed an **EMPOWER Toolkit** which includes new mobility services with innovative policy measures, data on positive incentives and organisational models for implementation of policy measures.

IT Approaches

Within the project three ICT tools were developed: Zwitch, CommuteGreener, Smart. The focus is to promote campaigns or services to motivate commuters to choose more sustainable transport option and tracking and rewarding their sustainable mobility behaviour. More information about the Apps.

Synergies with GreenPATH

EMPOWER also promotes sustainable mobility such as cycling, public transport and reducing car usage. They are working on data-driven solutions for the implementation of policies and optimizing mobility services. The project also uses a user-centric approach where they focus on user behaviour to develop effective mobility solutions.

Mobility Management Aspect

EMPOWER contains many mobility management aspects such as exploring governance models and public-private partnerships to improve cooperation among stakeholders and create long-lasting policies for implementation, using data frameworks to analyse data and supporting MaaS providers, implementing measures to influence commuting behaviour and promoting adoption of more sustainable transport modes.

Project Website: https://empower-project.eu/

MUV - Mobility Urban Values (2017-2020), Horizon Europe

The project involves main cities such as Amsterdam, Barcelona, Fundao, Ghent, Helsinki and Palermo. MUV project have approached behavioural change in different way, through gamification. Different stakeholders were engaged with a purpose of changing behaviour, through a game that mixes digital and physical experiences,

IT Approaches

Within the project a gamified mobile application MUV-App was developed where different stakeholders would engage in exchanging responsible and healthy habits. The MUV App gamifies sustainable commuting by rewarding users for eco-friendly travel choices while providing mobility planners with real-time data to optimize urban transport systems. The platform itself is open data which enables policymakers to adopt and improve planning processes.

Synergies with GreenPATH

MUV focuses on sustainable commuting but rather with a different approach of promoting a sustainable shift by collecting mobility and environmental data and leveraging mobility behaviour change through gamification and trip comparison.

Mobility Management Aspect

The project takes a different approach involving public such as local communities and policy makers to collaborate and jointly create mobility solutions.

Project Website: https://civitas.eu/projects/muv

UPPER - Unleashing the Potential of Public Transport in Europe (2023 – 2026), Horizon Europe

UPPER is focusing on reducing car dependency and encouraging to make a shift in mobility patterns. UPPER has more than 80 push and pull measures with innovation models such as urban mobility planning, mobility services ecosystem, road network management, democratic governance, mindset and culture which makes a difference since every country has different cultures. This approach opens a door for collaboration between authorities and operators which could lead for better mobility planning. UPPER is helping cities to update their SUMPs to keep public transport affordable and efficient.

Synergies with GreenPATH

UPPER is aiming for improving sustainable commuting and helping partners to update their SUMPs. Their approach and knowledge could be beneficial for GreenPATH since it is focusing on FUA level and SUMPs with the aim of improvement of sustainable mobility.

Project Website: https://www.upperprojecteu.eu/

SUITS - Supporting Urban Integrated Transport Systems: Transferable tools for S-M local authorities (2016-2020)

SUITS project involves partners from seven European countries. SUITS aim was to improve and update SUMPs in nine European cities through a set of planning tools and implementing various of measures.

The project developed a set of learning materials that (Capacity Building Program) which addresses gaps and needs related to urban planning. Materials were developed and provided through webinars and events. Capacity Building Program was developed to help local policy makers implement better transport solutions and provide end users better travel experience.

Synergies with GreenPATH

The Capacity Building Program could be very useful for GreenPATH project since it connects different stakeholders on many different levels and it could serve as good practice for online training courses or webinars.

Mobility Management Approach

The SUITS project has several mobility management approaches because a set of innovative measures to improve SUMPs in European countries that forms a collaboration among different stakeholders such as policy makers and planners were developed.

Project Website: https://www.suits-project.eu/

2.2 Further interesting ongoing EU-Projects

MAPS - Models, Assessment, and Policies for Sustainability (2024 – 2028), Horizon Europe

MAPS involves 6 participants and 3 partners. The project is focusing on developing advanced policies, models and assessments to help increase human well-being. This project is aiming at broadening policies and integrating post-growth scenarios to guide policymakers towards more sustainable future. Its objective is to develop tools for effective sustainable transport policies and promote the adoption of sustainable practices in urban transport planning.

Project Website: https://mapsresearch.eu/

GIANTS - Green Intelligent Affordable New Transport Solutions (2024 – 2027), Horizon Europe

GIANTS focuses on transforming electric mobility. The focus is on developing cost-effective sustainable transport solutions and to reduce costs of ownership for electric vehicles. Within the project a platform will be developed that it is built on a set of technology solutions that will enable production of light electric vehicles suited for urban traffic solutions. It will offer modularity, innovative charging and energy optimization solutions.

Project Website: https://giants-project.eu/

AMIGOS - Active Mobility Innovations for Green and safe city sOlutionS (2023 – 2027), Horizon Europe

The AMIGOS project involves 28 partners from 16 European and associated countries. The project focuses on using digital tools to recognize urban mobility challenges and promoting the use of public transport and active mobility through co-creation (art- and game-based methods and digital twin city models) of solutions that are inclusive, affordable and safe.

Project Website: https://amigos-project.eu/

SPINE - Smart Public Transport Initiatives for climate-neutral cities in Europe (2023 – 2026), Horizon Europe

SPINE involves 16 counties with the aim to change the public transport industry. The project is focusing on a rapid progress on climate neutrality by integrating public transport system through new mobility services, sharing schemes, active transport modes and micromobility.

Project Website: https://www.spine-project.eu/

EMBRACER - intErconnecting MoBility acRoss europeAn CitiEs and subuRbs (2023 – 2027), Interreg Europe

EMBRACER is a project where seven underserved regions have connected with a purpose to integrate public transport with different transport modes such as cycling, ride-hailing, car/bike/scooter sharing, on-demand transport and autonomous shuttles and improve interconnections with urban areas.

Project Website: https://www.interregeurope.eu/embracer

3. Strategies in Functional Urban Areas

Sustainable mobility strategies are crucial in Functional Urban Areas (FUAs) for many reasons, all contributing to a healthier, more efficient, and equitable urban environment. The key benefits of adopting a sustainable mobility strategy are environmental, social and economic. Sustainable mobility strategies, like promoting public transport, cycling, and walking, help reduce reliance on private vehicles, thus lowering greenhouse gas emissions. At the same time, transportation is a major contributor to air pollution and climate change. As a result, air quality improves, and noise pollution is reduced. Social benefits include encouraging active modes of transport like walking and cycling, which promotes physical health, increased accessibility and equity, and providing the opportunity to get around even for those who cannot afford a car or cannot drive. This ensures that everyone can access jobs, education, and essential services. Furthermore, this could also lead to economic benefits since sustainable mobility options can be more affordable than owning and maintaining a private vehicle, benefiting individuals and households.

This paragraph has been realised through the cross-reading of Territorial Needs and Gaps Analyses from D 1.1.2. In the Territorial Needs and Gaps analysis, one chapter was dedicated to “Strategies and Plans”. In the analysis, there has been requested information about:

- existing SUMPs in the selected FUA, including other plans related to mobility and commuting at the local level
- if there is also RMP (Regional mobility plan)
- the level of government or body where SUMP/RMP was adopted (local, regional, national)
- if they are in preparation or effect (when were they released or updated?)
- a summary of the primary strategy and action to support sustainable commuting (insert a link to the plan if available), reporting eventual planned interventions.

The information has been requested both at the FUA and pilot level. Based on the information received, the following matrix was created.

	SUMP (or UMP) and the level of government or body where it was adopted	**RMP and level of government or body where it was adopted**
Berlin	No SUMP, but Urban Development Plan for Mobility and Transport 2030 incl. catalogue of actions/measures (Stadtentwicklungsplan Mobilität und Verkehr 2030 inkl. Maßnahmenkatalog)	Berliner Mobilitätsgesetz (applicable for the state of Berlin, it considers the movements between Berlin and Brandenburg and the more significant metropolitan area of Berlin)

	Adopted by the Senate of Berlin in 2021	Adopted by the Senate of Berlin in 2018
Kecskemét	Sustainable Urban Mobility Plan of Kecskemét (since 2016) will be updated	n.a.
Maribor	The SUMP for the city of Maribor (in effect from 2015) is expected to be updated in 2025. Adopted by city council in 2015	The SRMP is currently under preparation (by the Regional development agency, not a political body) and is expected to be adopted in 2025. It will cover approximately the Maribor FUA (there are no regional governments in Slovenia). Act on Integrated Transportation Planning (2022)
Monza	• Sustainable Urban Mobility Plan of the Municipality of Monza • Sustainable Urban Mobility Plan of Monza-Brianza SUMPs approved at the municipal and provincial level	Cycling Regional Mobility Plan
Osijek	No	Transport Master Plan for the Functional Region of Eastern Croatia (until 2030) Adopted at the regional level
Ravenna	Sustainable Urban Mobility Plan of the Municipality of Ravenna (SUMP 2032) Adopted at the municipality level	Regional Integrated Transport Plan (PRIT 2025) Adopted at the regional level
Vienna	Urban Mobility Plan Vienna 2014 has targets for 2025, and updates are planned shortly. Adopted by the City Council as part of the Urban Development Plan STEP 2025 in 2014	Mobilitätsmaster-plan 2030

This matrix shows that almost all GreenPATH areas have adopted, or are adopting, strategies for mobility planning at the local, regional or FUA level. In those strategies, some measures are related to IT solutions or towards an approach more focused on adopting them. The importance of integrating IT-based measures

in Sustainable Urban Mobility Plans (SUMPs) stems from their ability to support effective and adaptable urban transportation systems. IT facilitates the acquisition and analysis of real-time data, which is essential for understanding and responding to the dynamic nature of urban mobility. This data-driven approach enables planners to make informed decisions, optimise traffic flow, and enhance the efficiency of public transportation. Furthermore, IT plays a vital role in promoting sustainable transport modes by enabling the development of platforms like Mobility as a Service (MaaS), which integrate various transportation options. Additionally, IT tools empower cities to engage with citizens through digital communication and open data initiatives, fostering transparency and collaboration in planning. Finally, IT provides the means to monitor and evaluate the performance of SUMP measures, ensuring that they remain effective and aligned with evolving urban needs. Therefore, the integration of IT is indispensable for creating sustainable, efficient, and citizen-centric urban mobility systems. Integrating new IT solutions into the mobility strategies of the FUAs means broadening the approach towards new technologies, which can effectively become part of urban and regional mobility development strategies in cities and regions.

Analysis of IT approaches in FUAs

The paragraph below analysed some of the leading examples of IT approaches and measures included in the strategies adopted in FUAs.

Vienna

Strategy: Vienna Urban Mobility Plan

The Vienna Urban Mobility Plan strongly emphasises leveraging research and innovation within information technology to achieve its ambitious mobility objectives. This commitment is evident in the city's proactive approach to funding and developing advanced transport information systems, such as the existing user portals "qando" and "AnachB I VOR," which provide real-time transportation data to citizens. This includes real-time travel information, route planning, and possibly integration of multiple modes of transport. Furthermore, Vienna is actively pursuing the creation of integrated mobility platforms, exemplified by the "SMILE" prototype, a comprehensive digital platform that combines route planning, provides information on public transport availability and ticket prices, and enables direct booking and payment for various transport modes.

Also, a "graph integration platform," a digital representation of the city's transport network, will be developed as a basis for applications, including traffic information, route planning, and traffic modelling. It underscores the city's dedication to utilising sophisticated traffic management and planning tools. Vienna actively funds research and development projects to drive innovation while fostering close collaboration with academic institutions. This multi-faceted approach signifies Vienna's strategic integration of IT to enhance its urban mobility infrastructure.

Ravenna

Strategy: Sustainable Urban Mobility Plan of Ravenna

Ravenna's Sustainable Urban Mobility Plan (SUMP) identifies "Technology" as one of its primary macro-themes, demonstrating the significant emphasis placed on this aspect of mobility.

Regarding the technology theme, the central policies and measures to be adopted will be:

- Development of apps for information on mobility services (parking, bike paths, loading/unloading bays, etc.)

- Extension of the video surveillance system for regulated areas (historical centre, urban areas, public transport priority lanes) (Confirmation of the existing SUMP action)
- Dematerialization of permits and passes for parking and access
- Development of the possibilities for using Mobility as a Service (starting from the ROGER project) (Action already underway and to be developed more decisively)

Furthermore, concerning the urban logistics macro-theme, a logistics platform for the exchange between motor vehicles and sustainable vehicles (goods distribution via cargo bikes or electric cars) (Confirmation of the existing SUMP action) and the experimentation of a computerised system for booking, protecting, and accessing loading/unloading bays.

Monza

Strategy: Sustainable Urban Mobility Plan of Monza and Brianza (provincial SUMP)

The prominence that the PUMS of Monza and Brianza gives to the technological aspects already stems from one of its main objectives: the development, strengthening, extension and requalification of the public transport network, about both infrastructural and technological factors, to be implemented on lines, stations stops and nodes of the network, with particular attention to satisfying the demand for mobility expressed by territorial areas still not adequately served by the existing LPT network. In particular, other aspects involving IT in the PUMS Monza Brianza are:

- Innovative technologies for mobility management: a commitment to develop further initiatives to promote sustainable mobility. Initiatives include boosting mobility management, promoting innovative technologies and activating incentives and reward mechanisms.
- Car-sharing: Car-sharing was implemented not only for mobility management but also to offer a complementary service to local public transport to solve the last-mile problem. It can guarantee an active service in time slots where traditional methods of travel cannot operate and meet the demand for transport in the case of events (concerts, sporting events, etc.), offering an alternative service to the private car, capable of significantly reducing the number of vehicles on the road. Potential operators were mapped to Enjoy, E-Vai, Share Now, and Ubeeqo to implement it.
- Demand Responsive Transit (DRT): DRT (on-demand/on-call transport services) is another aspect. The PUMS promotes the deployment of DRT - Demand Responsive Transit, i.e. flexible collective transport, with vehicles that dynamically adapt the basic route, stops and passing frequencies according to requests entered by users through a digital platform. Such services (supplementary or entirely replacing LPT in specific areas or time slots) can help reduce travel by private vehicles, intercept occasional needs and/or weak and disadvantaged users, and reduce polluting components, thanks to low-emission vehicles.

Strategy: Sustainable Urban Mobility Plan of Monza (municipal SUMP)

One of the main objectives of the Monza Municipality's SUMP strategy is to digitalise services. Digital technologies enable significant improvements in the mobility system with relatively low investments and short implementation times. They find widespread applications in the mobility sector for the monitoring, control, and management of shared mobility services and private vehicle mobility.

To make the digitisation process truly effective, the primary step is to have a more and more accessible data collection and sharing platform. To this end, it has been launched by the Lombardy Region, the SMART MOBiGi project. The main aim of this project is to build integrated and interoperable digital ecosystems for

Bergamo and Monza with a central system that will collect and manage all the data needed to meet people's daily demands for mobility. This data will be collected through sensors and video cameras positioned along the city's main roads and nodes, developing an innovative road network. The sensors will serve both the users on the road to be able to choose the most efficient route in real-time and the authorities in charge of planning mobility developments in the medium/long term and improving the quality of services provided.

Another aspect of digitalisation is the territorial distribution of MaaS. It will allow mobility to be managed at 360 degrees, from ZTL permits to bike sharing to parking reservations for significant events. To make this app more effective, it will therefore be necessary to integrate it with the most considerable number of mobility operators operating in the territory, from LPT to rail transport to sharing services. Integration will also have to be done to allow users to pay for all the services they decide to use through a single portal. The widespread use of such an application also has essential advantages for the authorities planning and optimising urban transport. These data, if integrated with those collected by external instrumentation, such as the smart roads mentioned above, will be able to provide fundamental insights to calibrate services to meet the needs of users as much as possible.

Berlin

Strategy: Berlin Mobility Act

The Berlin Mobility Act demonstrates a comprehensive strategy for modernising urban transportation through the pervasive integration of innovations, data, technologies, and digital platforms. Across all six sections, a consistent emphasis is placed on establishing digital infrastructure, promoting open data initiatives, and fostering data-driven decision-making. The Act mandates the creation of public platforms for disseminating traffic-related data, enabling multimodal integration through digital ticketing and navigation systems, and encouraging the development of intelligent traffic management solutions. It prioritises transparency by requiring the online publication of planning documents, survey results, and infrastructure condition reports while pushing for adopting emerging technologies in public transport, cycling, and commercial logistics. Crucially, the Act establishes frameworks for data collection, analysis, and sharing, ensuring that technological advancements are aligned with the overarching goals of sustainability, accessibility, and efficiency and, in this way, transforming Berlin's transportation landscape into a digitally interconnected and responsive ecosystem.

To underline the importance of the digital theme, here is one of the measures that the act has adopted:

- **Open Data for innovations**: a "*public platform for transport-related data*." This is a key focus on open data and digital infrastructure. The platform aims to create a comprehensive database for traffic control, management, planning, and service development. Traffic-relevant data will be pooled in an interoperable data and information system for exchange between entities. The platform is intended to enable the responsible public authorities to make data available and access it, which can be used to manage traffic in the interests of urban mobility. This platform supports the state of Berlin's open data strategy.

Conclusions

To conclude this paragraph, the technological approaches adopted in the Sustainable Urban Mobility Plans (SUMPs) or equivalent mobility policies of Vienna, Ravenna, Monza (both provincial and municipal levels), and Berlin are compared.

The comparison highlights recurring patterns, innovative digital practices, and shared challenges across the various approaches. The focus is on integrating ICT tools, data-driven systems, and Mobility-as-a-Service

(MaaS) platforms as key enablers of sustainable and efficient urban mobility. The following sections identify the **standard features** and **potential weaknesses** affecting these technological approaches' scalability, effectiveness, and inclusiveness.

Common Elements

1. **Integration of digital platforms and MaaS (Mobility as a Service):**
    - Cities such as **Vienna** (SMILE), **Monza** (SMART MOBiGi), **Ravenna** (ROGER), and **Berlin** (public platforms) are investing in comprehensive digital ecosystems to integrate multiple transport modes under unified platforms.
    - The shared goal is to achieve **functional and fare integration** across public transport, shared mobility, urban logistics, and last-mile solutions.
2. **Advanced use of data and sensors for Mobility Management:**
    - All cities promote the use of **real-time data** collected through sensors, cameras, and digital tools to support dynamic traffic monitoring and long-term strategic planning.
    - **Berlin** and **Monza** stand out for establishing **interoperable ecosystems and open data strategies**.
3. **Digitalization as a low-cost, high-impact lever:**
    - Particularly in **Monza** and **Ravenna**, digitalisation is seen as improving **services with limited investment and fast deployment**, aiming for agile and scalable interventions.
4. **User-centered digital services:**
    - Mobile applications for **information access, reservations, integrated payments**, and permit management are commonly implemented.
    - These tools are designed to **simplify user access** and improve the overall travel experience.
5. **Innovation in flexible transport models:**
    - **Demand Responsive Transit (DRT)**, promoted by **Monza**, reflects the broader commitment to customised services, especially for low-demand areas or off-peak times—aligning with **Vienna's** efforts to personalise services through digital platforms.

Common Weaknesses and Challenges

1. **Dependence on interoperability and data standardization:**
    - The effectiveness of digital platforms heavily relies on **data accessibility, standardisation, and interoperability** between public and private operators—a potential bottleneck in less digitally mature contexts (e.g., **Ravenna**, municipal-level **Monza**).
2. **Risk of fragmentation between pilot projects and system-level integration:**
    - Some initiatives (**e.g., SMILE in Vienna**, **ROGER in Ravenna**) remain experimental, with **limited operational continuity** and scalability challenges across the territory.
3. **Weak integration between technology and governance:**
    - Technology adoption is not always accompanied by **reinforced governance models** or agile decision-making processes (e.g., lack of coordinating authorities, unclear policies on real-time data usage).
4. **Digital divide and accessibility barriers:**

- Digital solutions may **exclude digitally vulnerable populations**, mainly where user support systems or digital infrastructure are insufficient.

5. **Unclear economic sustainability of digital services:**
    - The **long-term maintenance and updating of platforms** require consistent funding and transparent business models, which are not always defined (e.g., **Ravenna**, **Monza**).
6. **Institutional and regulatory delays:**
    - The pace of technological innovation often exceeds the **speed of regulatory adaptation or administrative flexibility**, hampering large-scale implementation (e.g., data governance, public-private integration).

This analysis underlines how some FUA investigated (Vienna, Ravenna, Monza, and Berlin) reveal a growing convergence around the use of digital technologies as a strategic enabler for sustainable urban mobility. Despite varying degrees of implementation maturity and institutional capacity, all cities recognise the transformative potential of integrated platforms, real-time data, and user-centric digital tools.

However, this digital transition also exposes systemic vulnerabilities. The success of these technological approaches depends not only on infrastructure and innovation but also on effective governance, cross-sector coordination, interoperability frameworks, and inclusive access policies. Without addressing these foundational elements, the risk is that digital mobility solutions remain fragmented, underutilised, or inaccessible to key user groups.

Moving forward, urban mobility strategies must aim for cohesive digital ecosystems that are resilient, scalable, and socially inclusive. These ecosystems must be capable of adapting to rapid technological evolution while ensuring long-term operational sustainability and equitable service provision.

4. IT Approaches for Sustainable Commuting

This chapter presents a comprehensive comparative analysis of 48 IT-based approaches aimed at improving and fostering sustainable mobility and commuting. As cities and regions face increasing challenges related to congestion, emissions, and inefficient transport systems, digital solutions have emerged as key enablers of more sustainable and user-friendly mobility.

Therefore, chapter 4.1 first provides a descriptive and comparative analysis of the identified IT approaches via the following categories: i) main goals, ii) mainly addressed mode of transport, iii) technical features, iv) addressed target groups, v) core functionalities, and vi) associated costs. By categorizing and comparing these IT approaches, we provide valuable insights into how IT tools, such as real-time data analytics, smart mobility platforms, ride-sharing applications, and IT-based gamification campaigns, contribute to enhancing efficiency, accessibility, and environmental sustainability of commuting practices. Additionally, the chapter examines how these approaches cater to different user needs, from individual commuters and businesses to public transport operators and policymakers, ensuring a broad understanding of their potential impact. Conclusively, this comparative analysis serves as a resource for decision-makers, researchers, and practitioners seeking to implement effective IT-driven strategies for greener and more efficient commuting practices.

The subsequent chapter 4.2 provides a preselection of six IT approaches that are considered most relevant and transferable to the needs of GreenPATH's pilot activities. Each approach will be presented in detail, including a consideration of potential benefits, limitations, and the provision of contact data.

4.1 Comparison of IT Approaches

4.1.1 Main goals

Among the 48 identified IT approaches, the most common goal is to change commuting behaviours (35%), highlighting a strong focus on encouraging more sustainable commuting habits. Many IT solutions aim to influence user choices by promoting public transport, active mobility (walking and cycling), and shared mobility options over private car usage. These behaviour-changing approaches often rely on digital nudging strategies, such as gamification, incentive-based reward systems, and personalized mobility recommendations. By leveraging real-time travel data and user engagement techniques, these IT solutions play a crucial role in shifting individuals toward greener and more efficient transport options.

The second most prevalent goal, emission reduction (27%), underscores the importance of minimizing environmental impact through mobility strategies. Many IT solutions in this category focus on reducing CO_2 emissions by encouraging the use of low-emission transport modes and integrating electric and shared mobility options. Some few approaches leverage AI-powered algorithms to suggest eco-friendly routes, while others provide carbon footprint tracking tools that enable users and organizations to monitor and reduce their travel-related emissions. The alignment of these approaches with global sustainability goals highlights the critical role of digital solutions in mitigating climate change through smarter mobility choices.

Mobility planning and coordination each account for 25%, reflecting a strong emphasis on optimizing transport networks and ensuring seamless collaboration between stakeholders. IT solutions in this category often provide decision-making tools for city planners, transport authorities, and mobility service providers. These solutions facilitate data-driven urban planning by analysing commuting patterns, predicting demand, and optimizing public transport schedules. Additionally, coordination-focused approaches support real-time communication and integration between different transport services, enabling smoother multimodal travel experiences. By enhancing planning and operational efficiency, these IT tools contribute to the development of smarter, more adaptive transportation ecosystems.

Interestingly, the improvement of the trip experience is the least prioritized aim at 15%, suggesting that while user comfort and convenience matter, broader strategic goals like sustainability, behaviour change, and planning take precedence. IT solutions in this category typically focus on enhancing user satisfaction through features such as real-time travel updates, multimodal journey assistance, and seamless ticketing solutions. While improving the travel experience is often a secondary objective, it remains an important factor in encouraging long-term adoption of sustainable mobility solutions.

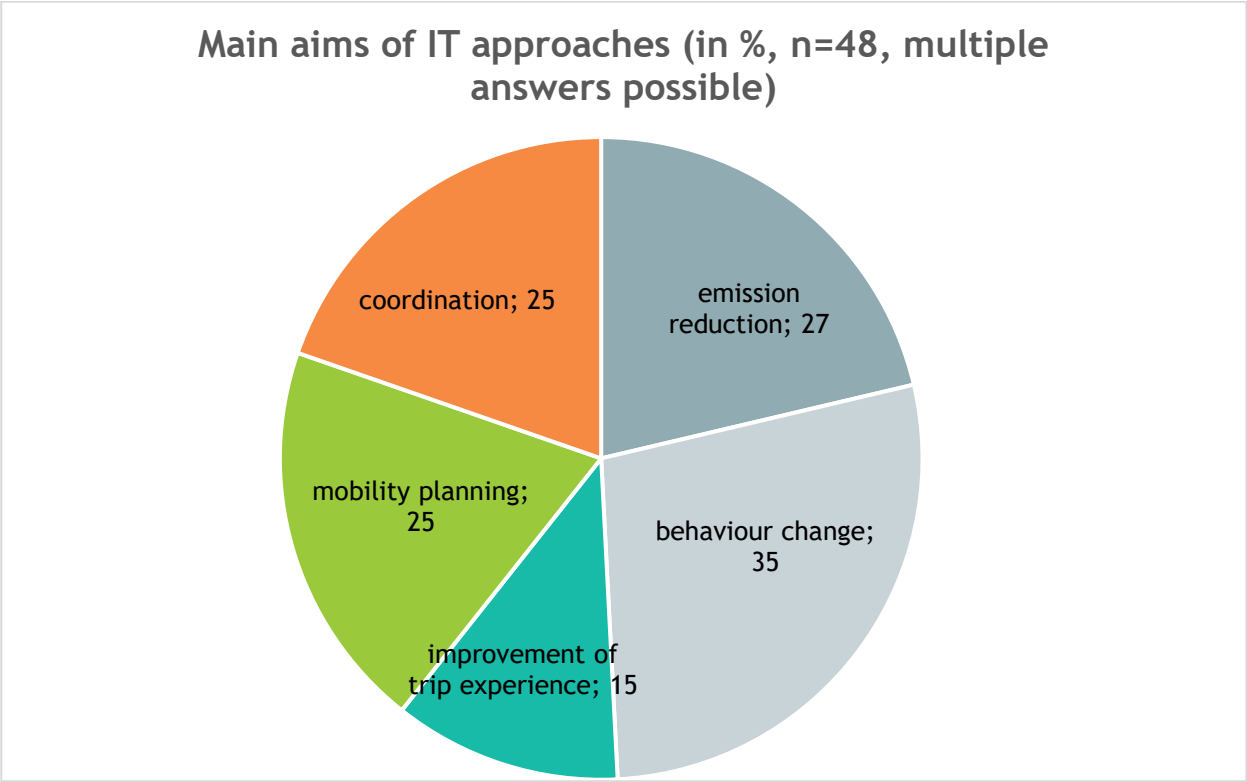

Figure 1 – Main aims of IT approaches

4.1.2 Mode of Transport

Regarding the respective main mode of transport focused among the 48 approaches, almost half of them primarily target Public Transport (24) and Active Mobility (18). The preference for these modes is hardly surprising, as they are widely recognized as the most relevant for achieving sustainable commuting habits with minimal reliance on motorized individual transport. Public Transport solutions often include real-time journey planning, mobile ticketing, and multimodal integration, while Active Mobility approaches support walking and cycling through navigation tools, safety enhancements, and infrastructure planning.

Illustrated by Fig. 2, IT approaches that focus on Multimodal Transport (15), Shared Mobility (12), or Ride Sharing/Pooling (7) form a smaller but significant group. Multimodal Transport approaches aim to integrate various transport modes seamlessly, often leveraging Mobility-as-a-Service (MaaS) platforms to facilitate smooth transitions between different options. Shared Mobility solutions, including car-sharing and bike-sharing schemes, emphasize reducing private car ownership and encouraging shared-use models. Ride Sharing and Pooling approaches further contribute by optimizing vehicle occupancy, reducing empty seats, and promoting cost-effective and eco-friendly travel alternatives.

Beyond these categories, 11 approaches do not follow a specific modal focus but instead refer to the use of all transport modes. These solutions often provide overarching mobility platforms, data-driven insights, or policy-support tools that can be adapted to various transport needs. By categorizing and comparing these approaches, this chapter provides valuable insights into how IT solutions contribute to enhancing efficiency, accessibility, and environmental sustainability. Additionally, the analysis examines how these digital tools

cater to different user needs, from individual commuters and businesses to public transport operators and policymakers, ensuring a broad understanding of their potential impact.

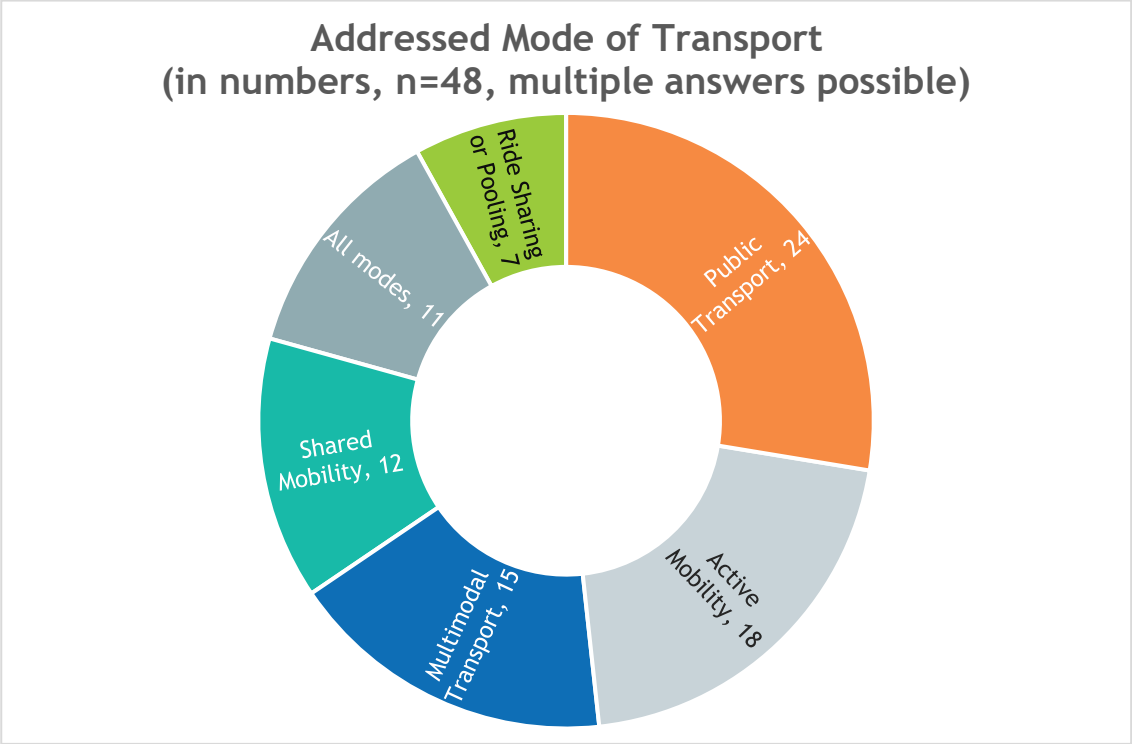

Figure 2 – Addressed mode of transport

4.1.3 Addressed target groups

Figure 3 illustrates the distribution of target users for IT-based mobility approaches, emphasizing that the vast majority of these solutions are designed for commuters. With 42 out of 48 IT approaches catering to this group, the primary focus appears to be on enhancing the commuting experience through improved accessibility, efficiency, and sustainability. A significant portion, 17 solutions, serves both mobility managers and commuters, suggesting that many IT tools are designed to facilitate both individual travel decisions and strategic mobility management. Only a small subset of approaches is dedicated exclusively to mobility managers, indicating a more specialized role for IT solutions in transportation planning and decision-making. The chart also reveals a limited focus on employees and students, with just two approaches targeting employees and one explicitly designed for students. This suggests that while workplace and student mobility solutions exist, they represent a niche within the broader landscape of commuter-focused IT tools. Overall, the data highlights a strong emphasis on supporting daily travel needs, with a secondary focus on providing strategic tools for mobility managers, while specific workforce or student mobility considerations remain less prioritized.

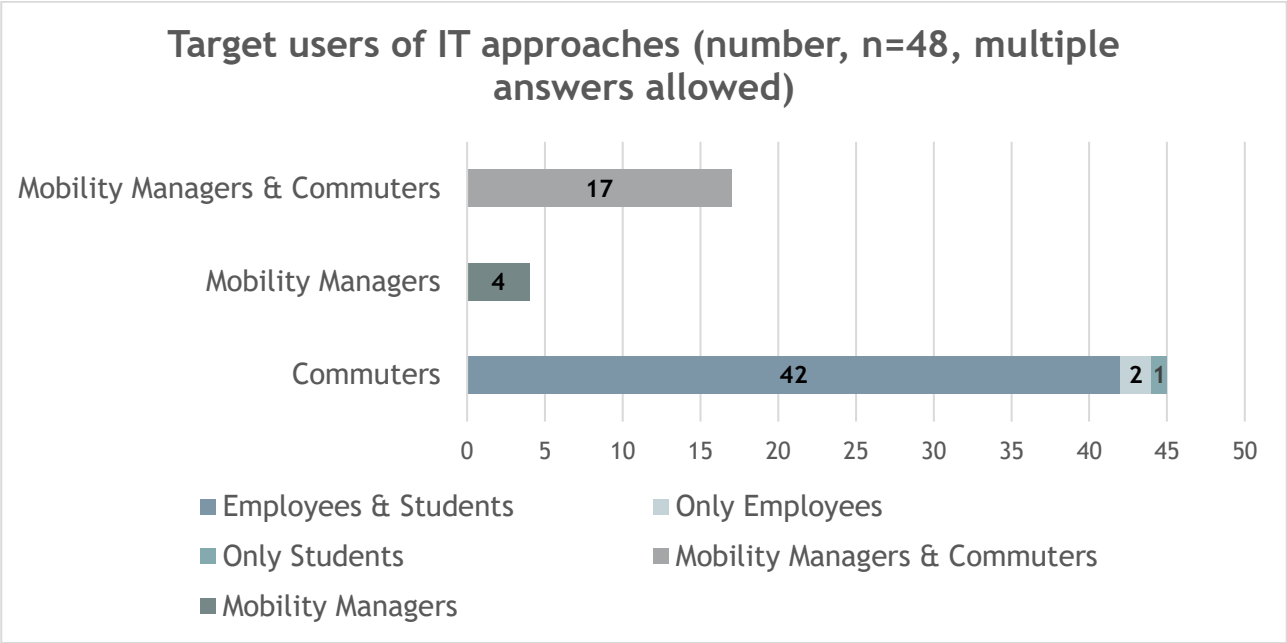

Figure 3 – Target users of IT approaches

4.1.4 Technical Features

Regarding technical operationalization, most IT approaches are offered as Mobile and Web Applications, making them widely accessible to users across different devices and platforms. Mobile applications, often available on both Android and iOS, allow users to access real-time mobility services, such as trip planning, ticket purchasing, and vehicle tracking, directly from their smartphones. Web-based platforms complement these mobile solutions by providing broader access via desktop interfaces, enabling users to analyse mobility options, plan routes, and manage accounts with greater flexibility.

The widespread use of mobile and web applications ensures that most of these IT approaches can be easily deployed and adapted to different urban and regional contexts. Their cloud-based infrastructure allows for real-time data processing, seamless updates, and integration with other digital services, such as payment gateways, mapping systems, and user authentication frameworks. Additionally, these solutions are typically designed to be compatible with existing public transport and mobility management systems, facilitating smooth implementation without the need for extensive modifications to physical infrastructure.

However, as shown in Figure 4, only a few of the approaches already integrate advanced smart technologies, such as Virtual Reality (VR), Augmented Reality (AR), or Artificial Intelligence (AI). While these emerging technologies offer significant potential for enhancing user experiences and improving mobility efficiency, their adoption remains relatively limited due to factors such as high development costs, technical complexity, and the need for specialized hardware. AI-driven solutions, for example, can optimize traffic flow through predictive analytics, enhance demand-responsive transport services, and improve travel recommendations based on user behaviour. AR applications have the potential to provide interactive navigation guidance, assisting pedestrians and cyclists in complex urban environments, while VR can be leveraged for mobility training and simulations. Despite these advantages, the majority of IT approaches in this study rely on more conventional digital technologies that prioritize accessibility and ease of use.

As a result of the wide accessibility provided by mobile and web platforms, most of the approaches presented here can be easily adapted to specific mobility management needs. This flexibility is particularly beneficial for municipalities, transportation agencies, and private mobility service providers looking to implement scalable and cost-effective digital solutions. Many of these platforms offer customizable features, allowing for integration with local mobility policies, real-time traffic management systems, and multimodal transport services. Furthermore, their adaptability ensures that they can be tailored to meet the specific requirements of different user groups, including daily commuters, tourists, businesses, and policy planners.

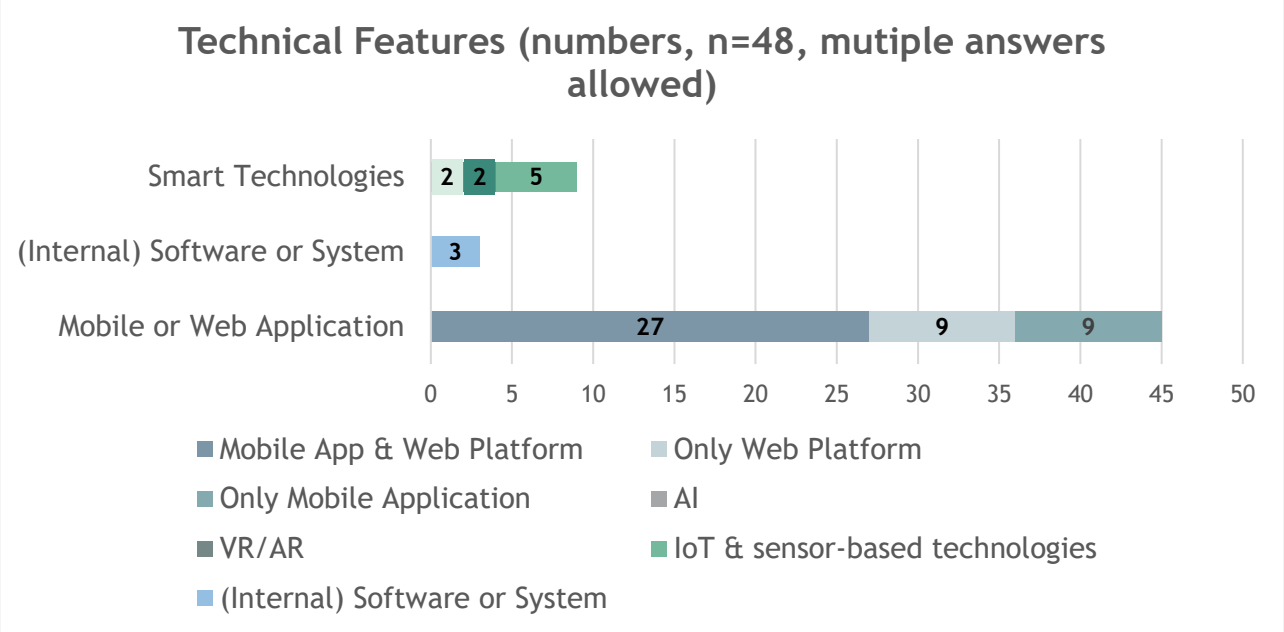

Figure 4 – Technical Features

4.1.5 Functionality

The pie chart in Figure 5 illustrates the functionalities and features of 48 IT-based mobility approaches, highlighting the prevalence of different strategic focuses. Trip planning emerges as the most common functionality, accounting for 36 approaches (75%). This reflects the widespread use of digital tools that assist users in optimizing their routes, integrating multiple transport modes, and accessing real-time travel updates, making commuting more efficient and seamless. Nearly as prevalent is data collection and reporting, featured in 33 approaches (69%), emphasizing the importance of gathering mobility-related insights. These functionalities support transport authorities, urban planners, and mobility service providers in analyzing travel behavior, optimizing infrastructure, and improving overall transport systems.

Individual behavior change and awareness are also prominent, with 32 approaches (67%) incorporating features designed to encourage sustainable commuting habits. Many of these platforms leverage gamification, incentive programs, and real-time feedback mechanisms to promote the adoption of environmentally friendly travel choices. The emphasis on behavior change aligns with the broader goal of

shifting users away from private car dependency toward more sustainable alternatives such as public transport, active mobility, and shared transport.

Corporate mobility management is featured in 13 approaches (27%), demonstrating its relevance in optimizing employee commuting patterns, managing company-owned fleets, and integrating sustainable travel policies into workplace operations. While not as widespread as trip planning or behavioral change, corporate-focused solutions play an essential role in reducing congestion and emissions within business districts and large organizations.

The least common functionality, appearing in 8 approaches (17%), involves the exchange of experiences or knowledge. These platforms foster information sharing, collaborative problem-solving, and best-practice dissemination among mobility stakeholders. Although this category is less emphasized, it contributes to community-driven learning and the collective advancement of sustainable mobility strategies.

Overall, the distribution of functionalities suggests that IT-based mobility solutions primarily focus on improving trip planning, enhancing data-driven decision-making, and influencing user behavior. While corporate mobility management and knowledge exchange are less frequently addressed, they still serve niche but valuable roles within the broader mobility ecosystem. The data underscores the strong alignment of IT solutions with sustainability goals, emphasizing efficiency, informed decision-making, and behavioral shifts to create more sustainable commuting patterns.

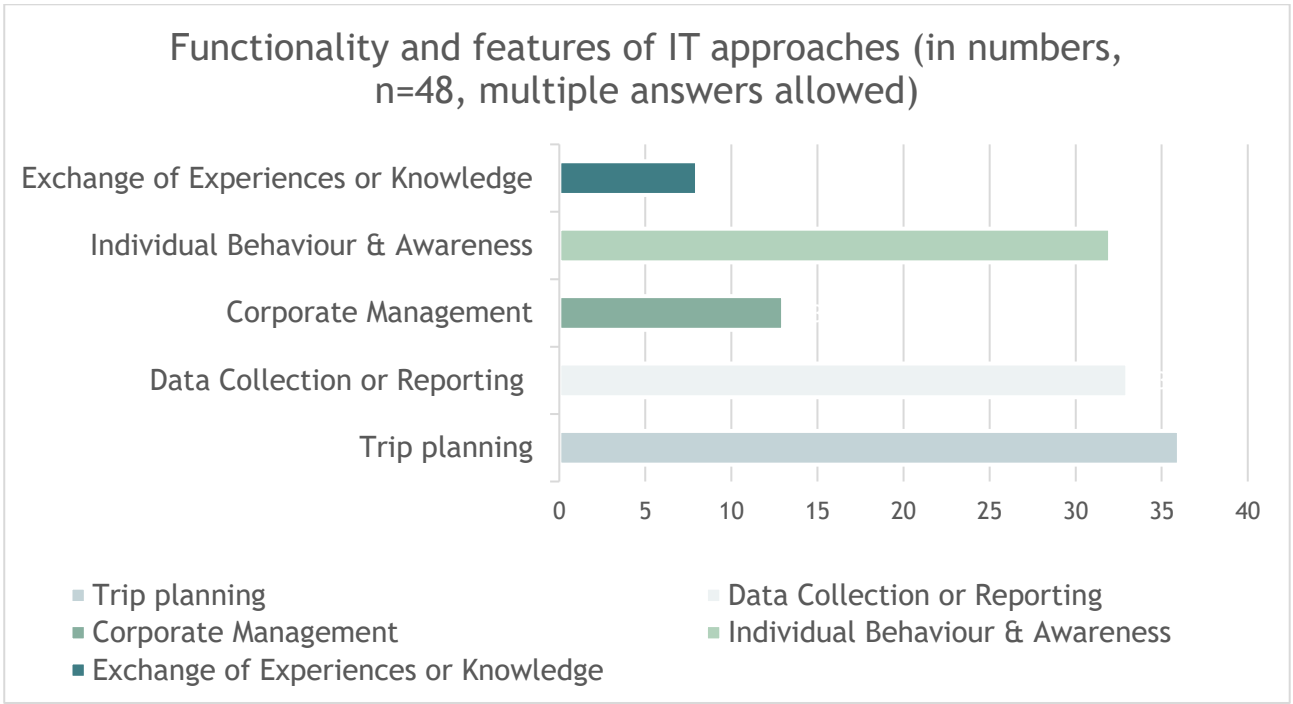

Figure 5 – Functionalities and features of IT approaches (multiple answers possible)

As the GreenPATH pilot activities will strongly focus on changing individual commuting habits, the following section shall provide a few more details on this particular functionality. Illustrated by Figure 6, the majority of features address awareness raising for sustainable commuting (25), followed by the crucial feature of

tracking personal commuting practices (13). Representing a fewer but also relevant share of functionalities and features addressing individual behavioural changes, Gamification and Reward ing systems (11) and Carbon footprint calculation account for additional sophisticated ways of attracting more sustainable commuting habits.

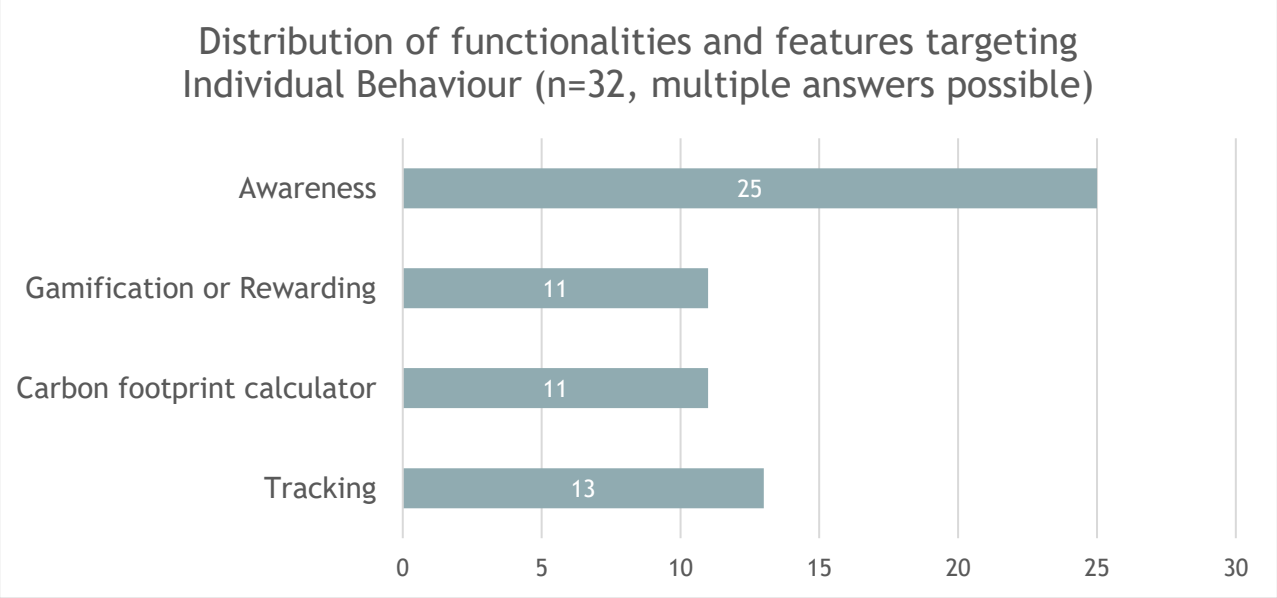

Figure 6 - Distribution of functionalities and features targeting Individual Behaviour

4.1.6 Costs

Almost half of the IT approaches are offered for free, making them widely accessible to users without financial barriers. The cost of paid solutions varies depending on several factors, including the complexity of features, the target audience, and the business model of the provider. Subscription-based pricing models are common, particularly for services offering advanced functionalities such as real-time analytics, AI-driven mobility recommendations, or corporate fleet management. Some IT solutions apply a freemium approach, where basic services are available at no cost while premium features require payment.

More than three-quarters of the IT approaches are commercial, indicating a strong presence of private sector innovation in sustainable mobility solutions. Many of these platforms are developed by startups, tech companies, or mobility service providers, often integrating revenue models based on licensing, subscriptions, or partnerships with transport operators. The commercial nature of these solutions suggests a market-driven approach to mobility management, where technological advancements are continuously refined to meet consumer and industry demands.

In contrast, only 16% of the IT approaches are governmental, highlighting a relatively limited direct involvement of public authorities in developing mobility-specific digital tools. However, governments often play a crucial role in supporting, funding, or integrating these solutions into public transport networks and urban mobility strategies. Some publicly funded approaches focus on data-sharing platforms, multimodal trip planning, or policy-driven mobility management, aiming to enhance accessibility and sustainability in transportation systems.

Open-source solutions account for just 10% of the IT approaches, representing a small but important segment. These platforms encourage collaboration, transparency, and adaptability, allowing communities, researchers, and organizations to customize and improve mobility-related software. Open-source tools are particularly relevant for academic research, civic technology initiatives, and non-profit projects that prioritize accessibility and innovation over commercial viability.

4.2 Introduction of selected IT approaches

Out of a total of 48 identified IT approaches, a selection of six was made based on their relevance to key strategic objectives in mobility management within the GreenPATH project activities. More precisely, the selection process was guided by three core criteria, ensuring that the chosen IT solutions effectively contribute to behaviour change, commuter experience enhancement, and data-driven decision-making.

1. **IT Solutions for Behaviour Change & Engagement**
    - **Goal:** Encourage sustainable commuting choices by influencing user behaviour and fostering engagement.
    - **Rationale:** Promoting more sustainable mobility patterns requires IT tools that effectively engage commuters, provide incentives, and support the adoption of eco-friendly transport modes. The selected approaches have demonstrated the ability to shift commuting behaviours through gamification, reward systems, and personalized mobility recommendations.
2. **IT Solutions for Improving the Commuting Experience**
    - **Goal:** Enhance the convenience, efficiency, and multimodality of daily commutes.
    - **Rationale:** A seamless and user-friendly commuting experience is crucial for increasing the attractiveness of sustainable transport options. The selected IT solutions address real-time travel information, multimodal trip planning, and digital ticketing, making commuting more efficient, reliable, and accessible.
3. **IT Solutions for Planning & Monitoring**
    - **Goal:** Support decision-makers in optimizing mobility strategies through data-driven insights.
    - **Rationale:** Effective mobility management relies on robust data collection, monitoring, and analysis. The chosen IT solutions enable stakeholders to assess travel demand, monitor traffic patterns, and evaluate the impact of mobility measures, thereby facilitating informed decision-making and continuous optimization.

The final selection of the following six IT approaches represents the most impactful and scalable solutions across these three categories. This targeted approach ensures that the selected tools are not only technologically advanced but also practical for real-world application in mobility management.

The selected IT approaches comprise of:

- **SCRAT**
- **EMMA**
- **Prevozi**
- **MUV**
- **Wiseair workplace mobility**
- **EcoCommute**

Aiming to provide a comprehensive comparison of these six IT tools and approaches, Figure 7 illustrates the similarities and differences of each approach along four key categories on a 5-stage scaling system.:

- Target Groups: Target Groups quantified stakeholder types of inclusivity, with a 5 awarded to approaches serving eight or more diverse cohorts (e.g., commuters, students, mobility managers) and a 2 to those addressing only one or two (e.g., employees alone), emphasizing broad applicability across commuting populations.
- Mode of Transport: Modes of Transport were appraised for their contribution to ecological sustainability and modal integration, with a score of 5 denoting comprehensive support for multimodal or low-impact options (e.g., public transport, active mobility) and a 2 indicating limited focus on a single, moderately sustainable mode (e.g., ride-sharing alone), prioritizing solutions that reduce motorized individual transport reliance.
- Cost: Costs gauged economic feasibility, assigning a 5 to cost-free or negligibly priced tools (e.g., open-source platforms), a 2 to those with significant annual fees (e.g., hundreds of euros), and a 1 to exorbitantly priced systems, reflecting the need for accessible implementation.
- Scale: Scale assessed geographic congruence, granting a 5 to Functional Urban Area (FUA)-level tools, a 2 to those either excessively global or narrowly institutional, and a 1 to hyper-local or worldwide scopes, ensuring transferability within Central European contexts

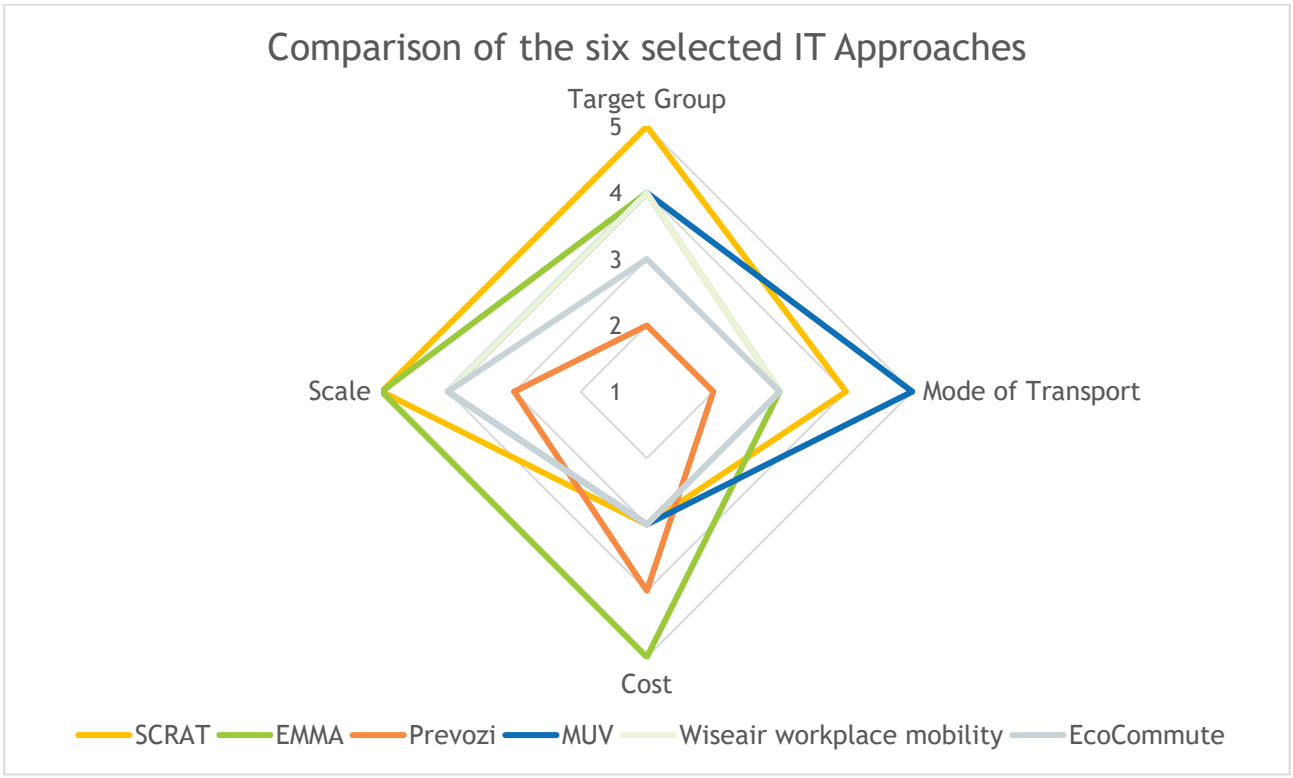

Figure 7 - comprehensive comparison of selected six IT approaches

In the following, the six selected IT approaches will be presented in more detail, by highlighting the respective goals, key features, addressed modes of transport, target groups, costs, limitations, and further contact data to the developers.

SCRAT

The comprehensive toolkit for mobility managers

Goal

Influencing and optimising the daily mobility choices of employees, promoting environmentally and economically sustainable behaviours.

Reducing reliance on private vehicles, decrease traffic congestion, lower emissions, and promote a culture of sustainable mobility within workplaces.

Key features

The Mobility Platform is a web-based AI tool for Mobility Management, helping companies develop Home-Work Travel Plans (PSCLs) and promote sustainable commuting. It facilitates coordination between area and company mobility managers in line with Ministerial Decree No. 179/2021.

Key features include GIS-based mapping, company info sheets, and a customizable survey module. The platform automatically analyses data, generates graphs and reports, and provides AI-driven mobility recommendations. It also includes an environmental benefits calculator, dynamic data export, and a news section for employee communication.

Modes of Transport

All modes

Target group or area

Mobility managers

Cost

Survey and tool function: 600,00€/year

Limitations

You can have access to open data but only on Italian data.

The app has to be implemented by most of the companies in order to be effective.

More Information

Website: https://www.scrat-srl.it/scrat-mobility-management

Mail: info@scrat-srl.it

EMMA

Home-to-Work Travel Plans made easy

Goal

Developing, implementing and monitoring Work-Home Mobility Plans (PSCL)

Key features

EMMA is an open-source platform supporting companies and schools in preparing and monitoring Home-Work Commute Plans (PSCL).

- Survey & Data Analysis – Enables sharing surveys with employees and automatically processes results into graphs.
- Area Mobility Management – Provides a dashboard with key indicators, company databases, and survey filtering.
- Action Monitoring – Tracks the implementation and impact of mobility measures.
- Flexible Data Export – Supports multiple formats (e.g., XLS, CSV) for further analysis.
- Full Ownership & Adaptability – Public entities retain control and can customize instances as needed.

Modes of Transport

All modes

Target group or area

Commuting employees, commuting students, mobility managers, transport providers, companies, universities

Cost

Open-source: Free to download, install, and configure for public administrations.

Limitations

Limited possibilities of tailoring, but it's possible to modify the source code.

More Information

Website: https://www.muoversinpiemonte.it/piattaforma-digitale-regionale-emma
Mail: info.morsinpiemonte.it

Prevozi

Carpooling made simple

Goal

The goal of the platform is to reduce single-car occupancy, offering low fee for a long trips and promote shared mobility. The service is commonly used among commuting students and employees between regions and cities.

Key features

Prevozi application connects drivers and passenger to arrange carpooling, saving costs with the low fee per trips and reducing emissions. It is most commonly used by commuting students and employees across Slovenia, mainly for long distance commuting (between the regions and cities).

Modes of Transport

Ridesharing or Pooling

Target group or area

Commuting employees and students

Cost

tbd

Application is already running but application updates would be needed along with awareness campaigns.

Limitations

Application doesn't support online paying for the trips, instead it is paid by cash at the location/trip. Integrating online payment would be beneficial for drivers and passenger, improving safe trip experience.

More Information

Website: https://prevoz.org/

Mail: info@prevoz.org

MUV

Holistic toolkit for corporate mobility managers

Goal

Promoting sustainable mobility among communities.

Key features

Corporate mobility managers:

- Sharing customizable surveys with workers, distributing them via the app & sending notifications.
- Launching & promoting challenges and defining rewards (consultation services included).
- Integrating survey analysis with real-time mobility data & producing tailored reports (e.g., heatmaps).

Area mobility managers:

Analysing mobility patterns in an aggregated form (with the ability to distinguish between home-to-work trips and others; users can indicate systematic trips) through a web dashboard that presents real-time data.

Employees:

Fostering a sense of belonging and motivation (not limited to environmental indicators but also including metrics such as calories burned).

MUV Game: MUV Game is an innovative game designed to promote sustainable urban mobility by transforming it into a competitive sport. The primary goal of MUV is to encourage users to adopt eco-friendly transportation habits while tracking and scoring their daily movements through a mobile app.

Modes of Transport

All modes

Target group or area

Commuting employees, commuting students

Cost

Solution based on configured apps & dashboard; possibility to customise (price to be quoted; fully covered by MUV); main support requested from the company is the involvement of the HR and communication department to create, disseminate & promote mobility challenges.

Limitations

None reported.

More Information

Website: https://www.muvbcorp.com/muv-case-studies/mims.html

https://www.muvgame.com/

Wiseair workplace mobility

Full-fledged corporate mobility management

Goal

Assisting companies in managing and optimizing sustainable corporate mobility.

Enabling companies to calculate the emissions produced by employees during their home-to-work commutes, recognizing that peak-hour employee travel, especially in large cities, significantly contributes to pollution.

Analysing commuting habits through tailored questionnaires, the service provides actionable insights to reduce environmental impact.

Key features

Compliance: Providing automatized data collection and analysis to fulfil the Italian National requirements in terms of mobility management:

- replacing traditional questionnaires with continuously updated mobility profiles,
- providing a strategic dashboard for the company mobility manager,
- generating automatically strategic reports
- calculating dedicated KPIs,
- elaborating trend analysis based on historical data, and
- measuring environmental impact

Enablement: transforming data in strategic actions, through advanced territorial analysis, impact assessment, strategic segmentation (based on user data and preferences), smart pooling, mapping opportunities and predictive strategies.

Engagement: Through a centralized platform and a personalised dashboard, targeted initiative and intelligent updating to keep the profiles continuously up to date.

Modes of Transport

All modes

Target group or area

commuting students, commuting employees, mobility mangers, universities, companies

Cost

300 Euro per year

Limitations

The focus is on companies, a coordination dashboard at FUA level is missing.

More Information

Website: https://wiseair.vision/en/

Mail: contact@wiseair.vision

EcoCommute

Challenge your team mobility

Goal

Promoting sustainable commuting and providing actionable data for mobility management

Key features

- Focus on team-based challenges,
- Data-driven insights for companies
- Potential CO_2 reduction impact measurable through analytics

Modes of Transport

Active mobility, Rideshaaring or Pooling, Public Transport

Target group or area

Commuting employees, companies

Cost

1.20-3.00 € per employee per month. Premium plan on request.

Limitations

Requires company registration, not available to individual users.

Effectiveness strongly depends on company participation.

More Information

Website: https://ecocommute.de/

Mail: info@inserteffect.com

Attachment: Comprehensive List of IT Approaches

Name of IT Approach	Potential Users				Functionality and Features												Mode of Transport						Goal					Scale					Provider			Cost	Key Characteristics	Usefullness for GreenPATH	Limitations
	Commuters	Mobility Managers	Transportation Providers	Policy Makers	Trip Planning, Routing, Navigation	Data Collection, Analysis, Visualization, Reporting	Habit Tracking	Integration (e.g. MaaS, with public transport, ticketing)	Gamification, Challenge, Reward System	Infrastructure or Vehicles	Awareness	Carbon Footprint Calculator	Comparison Tools	Carpool or Ridesharing	Corporate or Institutional Management	Accessibility, Inclusivity, Safety	Exchange of Experiemces or Knowledge	All Modes	Active Mobility	Shared Mobility	Ride Sharing or Pooling	Public Transport	Multimodal Transport	Reduce Emission	Behaviour Change	Improve Trip Experience	Planning of Mobility	Coordination	Company/University	Local (City Wide)	Regional (e.g. FUA Level)	National (Country Wide)	Global	Commercial	Governmental	Open-Source				
ATM Milano	x	x	x	x	x	x		x		x	x		x		x	x						x	x		x				x				x			free	Route planning, integrated QR code tickets, real-time updates, issue alerts, and ticket office bookings; redesigned app with bike sharing now separate (bikemi.com).	App partially integrated due to shared ticketing with ATM/NET in the metro area, enabling bus/train ticket purchases; aims to add bike/other transport info and live LPT timetables.	App owned by ATM Milano, a private company, restricts use to its LPT services in select cities.
AVANT2GO – Car-Sharing Service	x				x						x			x						x			x	x						x			x				It is an electric car-sharing platform in Slovenia, offering rentals for short or long trips. It reduces car ownership and is ideal for tourists exploring the country.	It aligns with GreenPATH's focus on reducing private car usage and promoting eco-friendly shared transport options.	The app's limitation is the availability of electric charging infrastructure.
BePooler	x	x												x				x						x	x			x					x					It offers a dashboard for Mobility Managers and an app for employees to manage carpooling. Standard features include trip management, reporting, and business support. Premium features include a white-label solution, shuttle services, fleet management, MaaS, and home-to-work mobility management.	It aims to benchmark various commercial platforms, focusing on functionalities and services for developing Mobility Management packages for commuting students and employees.	The focus is on companies, as there is no coordination dashboard at the FUA level.
Bologna Mobility Management System	x					x	x								x		x	x						x						x			x				The MM System platform for Bologna aids mobility managers in preparing the PSCL by sharing surveys, processing results, and tracking completion. It offers detailed reports, data exports, and database management, including survey analysis by district.	The platform is fully operational and valued by Bologna's company mobility managers, supporting PSCL development.	The Mobility Management System, developed by NTT Data for Bologna, has specific software requirements (Talend, Tableau) that should be considered for reuse.
Bolt App (feature for e-scooters)	x				x				x	x	x								x	x				x		x				x						Search available e-scooters via map, book, unlock, check battery status, and lock when done.	The usage of free-float e-scooter sharing system for multimodal travels to and from work.	App focused on e-scooter sharing scheme only; no integrations with other transport modes
Bosh eBike Connect	x													x					x						x	x	x		x				x				An e-scooter-sharing service offering short trips in urban areas with integrated app-based rental and payment	Potentially useful for last-mile connectivity within GreenPATH areas	Availability limited to certain cities
BudapestGO	x				x	x		x	x	x									x	x		x	x	x	x				x	x	x		x			free	Centralized trip planner for the capital, suburban regions, and national rail and bus systems (with some limitations), based on RealCity, the same platform used by the national bus company.	For trip planning, routing, navigation, data analysis, visualization, and reporting, plus integration (e.g., MaaS), public transport, ticketing, marketing, and optional fleet management.	Requires internet access, is sensitive to interference, and undergoes regular maintenance. Some slow functions and minor, persistent map issues.
CityMapper	x	x	x	x	x	x		x	x	x	x	x	x	x		x		x						x	x	x				x	x	x	x		x	free	**Overview:** Global app/platform expanding to more cities (8 in Italy: Rome, Milan, Naples, Turin, Genoa, Florence, Bologna, Venice); free, playful, and interactive for multimodal, sustainable trip planning per "Mobility as a Service." **Affiliation:** Part of VIA (ridewithvia.com), experts in urban and on-demand mobility plus consulting. **Features:** Accurate, real-time info; some cities offer AR guidance and train coach tips for optimal transfers.	Aligns with multimodal, sustainable transport goals; global, all-in-one mobility app with a fun, user-friendly interface that boosts LPT use and eco-friendly habits.	Pricing unclear; not in all cities (quick implementation TBD); company needs from providers unknown; no direct ticket purchases (links to provider apps).
CityMapper	x				x	x		x											x			x							x	x			x				User-friendly interface, comprehensive coverage of various transport modes	Encourages the use of public and active transport modes	Limited coverage in some cities and less populated areas; relies on third-party data accuracy.
DB Navigator	x				x			x													x		x	x		x				x			x			free	Providing route planning, ticketing, and real-time updates for all DB services and partners	Supports public transport reliance and seamless commuting	Requires established transport partnerships, may exclude smaller operators
DB Rad+ App	x						x				x								x					x	x		x				x			x			free	A cycling rewards app that motivates users to bike more by offering discounts at local businesses	GreenPATH could use a similar rewards-based strategy for cycling promotion	Availability limited to certain regions
EcoCommute	x								x					x	x		x		x		x	x								x			x				Focus on team-based challenges, data-driven insights for companies	Aligns with GreenPATH's objectives by promoting sustainable commuting and providing actionable data for mobility management	Aims to reduce CO_2 emissions from commuting; effectiveness depends on company participation
EcoPassenger	x					x					x	x	x									x	x								x		x			free	Allows users to compare the environmental impact of various transport modes	Valuable for promoting sustainable mobility awareness, aligning with GreenPATH's goals of reducing emissions and encouraging eco-friendly travel.	Limited to comparative analysis
EMMA		x	x	x		x		x		x		x	x		x	x	x		x			x	x		x					x							Uniform data format, home-to-work/school travel plans, sustainable mobility tools, anonymized data sharing for managers, streamlined transport planning and coordination.	Aids Company Mobility Manager with Home-To-Work Travel Plans, offers top mobility solutions for employees, and shares data with Area Mobility Manager.	Limited details due to no implementation, but a presentation left a positive impression.
goodride	x				x	x		x											x							x	x				x			x			free	A digital platform that allows users to plan and book multimodal journeys, integrating various transport services into one app.	Could serve as a model for GreenPATH's integrated mobility approach	Regional limitations in coverage
Google Maps	x	x	x	x	x	x	x	x			x		x			x	x		x	x		x	x			x	x		x	x	x	x	x			free	Google Maps provides satellite imagery, street maps, real-time traffic, and route planning for walking, driving, cycling, and transit.	Users reach the stops of the pilot project with trips planned on Google Maps.	This global platform supports timetables and routes but focuses on individual navigation over public transport.

Name of IT Approach	Potential Users				Functionality and Features												Mode of Transport						Goal					Scale					Provider			Cost	Key Characteristics	Usefullness for GreenPATH	Limitations
	Commuters	Mobility Managers	Transportation Providers	Policy Makers	Trip Planning, Routing, Navigation	Data Collection, Analysis, Visualization, Reporting	Habit Tracking	Integration (e.g. MaaS, with public transport, ticketing)	Gamification, Challenge, Reward System	Infrastructure or Vehicles	Awareness	Carbon Footprint Calculator	Comparison Tools	Carpool or Ridesharing	Corporate or Institutional Management	Accessibility, Inclusivity, Safety	Exchange of Experiemces or Knowledge	All Modes	Active Mobility	Shared Mobility	Ride Sharing or Pooling	Public Transport	Multimodal Transport	Reduce Emission	Behaviour Change	Improve Trip Experience	Planning of Mobility	Coordination	Company/University	Local (City Wide)	Regional (e.g. FUA Level)	National (Country Wide)	Global	Commercial	Governmental	Open-Source				
GPP portal departures and Moj lega tramvaj app	x				x						x		x									x				x			x	x			x		free	Route and trip planning with public transport timetables based on selected start and end points	General view on bus and tram lines availability	No live vehicle tracking or coverage for shared transport modes (bikes, e-bikes, e-scooters)
Greenshare	x	x			x	x	x	x	x			x	x	x							x		x					x					x				It tracks mobility for strategy development, offering rewards and AI-based insights. Clacsoon monitors carpooling and integrates with existing apps. Custom solutions are available.	Area mobility managers analyze user mobility patterns for strategy development. Corporate managers track employee mobility and carpooling effectiveness. Workers can offer/request free rides, with cost calculation and remuneration options.	User monitoring may limit adoption.
Gyerebusz	x				x	x		x		x					x							x			x	x	x					x			free	On-demand solutions for Nyíregyháza's public transport during low frequency periods.	For trip planning, booking, data analysis, visualization, and integration (e.g., MaaS, public transport, ticketing). Optional features include fleet, infrastructure, corporate management, and on-demand transport (DRT).	Website only, no app, with user-side educational gaps. No offline version or integration with the local system.
Jojob	x				x	x								x							x			x				x	x				x				It provides Mobility Managers with pre-processed data for easy inclusion in plans. Area managers can monitor real-time data on CO2 reduction, savings, and carpooling. Employees can offer/request paid rides and certify their carpooling activity.	At the territorial level, it offers carpooling services to all members of the local community, enabling carpooling between employees of different companies.	Colsulting service
Kecskemét local public bus transport timetable	x	x	x	x	x	x		x		x	x					x						x				x	x					x			free	Trip planning by line/stop with map display; for active routes, shows vehicle position, current segment, and schedule deviation in minutes.	Will explore adding demand-driven bus data at the pilot site.	Free trip planning between stops or public areas is unavailable. The program lacks flexibility for intermodal routes and transfers.
MARPROM – Public Transport App	x																				x	x	x	x	x	x		x					x		free	A public transport app for the Maribor region, available on web and mobile, mainly used by daily commuters, students, employees, and seniors.	To raise awareness, promoting sustainable commuting and simplifying access to public transport.	Integrating multi-modal shared mobility services like bike-sharing and car-sharing would enhance real-time tracking and expand transportation options.
MÁV	x				x	x		x	x	x											x				x					x			x		free	Centralized trip planner and ticketing app for the national railway system, including major cities (e.g., Budapest), with a forum for service updates and disruptions.	For trip planning, navigation, delay management, public transport integration (Volán-HÉV-BKK), data analysis, visualization, and reporting. Optional features include fleet management and marketing (gamification, rewards).	Requires internet access and has hidden, popular features (e.g., live GPS railway map nationwide)
Mbajk – Bike-Sharing Platform	x				x			x											x	x				x	x			x					x	x		free	A bike-sharing scheme in Maribor offering affordable, sustainable short-distance commuting. The app locates bike stations and tracks bike and parking availability via an integrated map.	This app supports GreenPATH goals and our e-bike pilot program, promoting cycling and potential e-bike sharing integration in Maribor.	App is currently limited to city Maribor, expanding it to other FUAs would increase impact on car dependency and promoting sustainable mobility.
Menetrend	x	x	x	x	x	x	x	x		x	x					x						x	x			x	x			x		x				free	Initially designed for local public transport, the platform now supports intercity bus and rail planning, including stops and junctions. It is available online and offline, with free and subscription options.	The app provides all Kecskemét timetables (KEKO, Volánbusz, MÁV) for easy trip planning.	Trip planning between public areas is unavailable; searches are stop-based. The program supports intermodal routes, transfers, and walking directions.
Menetrendek	x	x	x	x	x	x	x	x		x			x			x						x	x			x	x		x	x		x				free	Local services were integrated for better transfer planning. The travel planner uses colors to distinguish providers and vehicles.	Supports Keko's bus services, but its handling of demand-driven transportation is uncertain.	It is designed for long-distance transport, limiting local use to transfer hubs. Its handling of demand-driven transport is also questionable, making it less suitable for the project.
MOBICAT - digital mobility certificates for buildings		x				x				x	x		x				x									x	x					x					Streamlines building permits, reduces disputes with traffic authorities, mitigates unforeseen requirements, defines measures to boost active mobility and public transport, determines actual parking needs, lowers construction and operation costs (e.g., underground parking), and optimizes traffic assessments.	External consultation, provision of documents and certificates	Focusing on new constructions or extension of companies/universities
Mobility48	x	x				x					x				x			x						x	x			x					x					This platform helps manage Home-to-Work Mobility Plans with tools for questionnaires, geolocation, and plan generation. Employees interact via an app, providing feedback, updating data, and participating in challenges.	The interest for the project relies in the opportunity of performing a benchmarking analysis across different commercial platforms, functional to the development of the Co-designed Mobility Management coordination dashboard.	The focus is on companies, as there is no coordination dashboard at the FUA level.

Name of IT Approach	Potential Users				Functionality and Features												Mode of Transport						Goal					Scale					Provider			Cost	Key Characteristics	Usefullness for GreenPATH	Limitations
	Commuters	Mobility Managers	Transportation Providers	Policy Makers	Trip Planning, Routing, Navigation	Data Collection, Analysis, Visualization, Reporting	Habit Tracking	Integration (e.g. MaaS, with public transport, ticketing)	Gamification, Challenge, Reward System	Infrastructure or Vehicles	Awareness	Carbon Footprint Calculator	Comparison Tools	Carpool or Ridesharing	Corporate or Institutional Management	Accessibility, Inclusivity, Safety	Exchange of Experiences or Knowledge	All Modes	Active Mobility	Shared Mobility	Ride Sharing or Pooling	Public Transport	Multimodal Transport	Reduce Emission	Behaviour Change	Improve Trip Experience	Planning of Mobility	Coordination	Company/University	Local (City Wide)	Regional (e.g. FUA Level)	National (Country Wide)	Global	Commercial	Governmental	Open-Source				
MobiSwitch	x				x	x	x				x	x	x		x		x	x							x	x	x	x					x				The process begins with an initial discussion to clarify the framework, sign an NDA, and establish a data protection agreement. A checklist is then provided, including company details, infrastructure, vehicle fleet, and a .csv template for employee residence data. The kick-off meeting defines goals, priorities, and improvement needs, reviews the checklist, and pre-selects measures. A mobility analysis follows to assess inventory, potential, and key traffic and environmental data. Up to five measure packages are selected and customized, followed by forecasting and evaluating their impact. The results and recommendations are then presented.	External consultation, if internal process for mobility management is powerless or get stuck. Provision of documents for analysis, development of goals, development, implementation and evaluation of measures.	If company is not willing to change something and implement (effective) measures.
Moovit	x	x	x		x	x		x			x		x		x	x	x		x	x		x		x		x	x		x	x	x		x				Multi-modal journey planning, real-time arrival info, favorite lines/stations, service alerts, live navigation, payment options, crowd reporting, station photo/data updates, accessibility support, and Moovit MaaS solutions with urban mobility analytics.	Commercial platform for public transport and multimodal sharing providers in order to ensure end-to-end planning, booking and the use of multimodal trips.	Readiness of transport providers to adopt and pay for Moovit MaaS solutions, urban mobility analytics, and branded multimodal apps
Movesion		x		x		x	x				x	x	x		x		x		x				x		x		x		x	x			x				Advanced mobility surveys, real-time data monitoring, and emission calculations per European standards.	Supports data-driven mobility strategies, aligning with GreenPATH's goals of reducing emissions and promoting greener commuting.	Depends on user participation and data quality for effectiveness.
Muoversi in Piemonte (Moving in Piemonte)	x	x	x	x	x	x		x		x			x			x			x			x	x		x	x				x					x		From route planning to receiving real time data on the service, receiving warnings in case of problems on the lines.	Web platform integrating mobility systems, aiding GreenPATH to promote sustainable, multimodal solutions.	Excludes private sharing services; ticketing limited to select transport types.
MUV	x				x	x	x		x		x	x						x										x				x				Corporate mobility managers can share customizable surveys, launch challenges, define rewards, and integrate survey results with real-time mobility data for tailored reports. Area mobility managers analyze aggregated mobility patterns via a dashboard, distinguishing between home-to-work and other trips. Employees are motivated with metrics like calories burned, fostering a sense of belonging.	The approach engages large organizations (e.g., INAIL, MIT, Avellino) with success stories and synergies with Bike to Work incentives. It tracks all transport modes, prioritizing sustainable ones. The "Port of Ravenna" community includes sub-communities for segmented impact analysis and gamified challenges between companies.	Colsulting service
MUV Game	x	x			x	x	x		x		x	x						x	x	x	x		x	x						x		x					It is a game that promotes sustainable urban mobility by turning it into a competitive sport. Users earn points for eco-friendly transport choices like walking, cycling, public transit, or car-sharing. Points are based on route length, transport type, and bonuses. The app encourages community engagement through challenges and tournaments.	It presents additional features (gamification) that could be integrated in the project outputs.	Integration with other mobility management tools to be verified.
NextBike App	x				x				x	x	x								x	x				x		x			x	x			x				Search bikes at stations via map, select, book, unlock rides (bikes/e-bikes), check battery status, and lock when done.	The usage of station-based bike sharing system for multimodal travels to and from work.	App focused on bike sharing scheme only; no integrations with other transport modes
Österreich radelt zur Arbeit (Austria is cycling to work)	x					x	x		x		x	x	x						x					x	x						x			x		free	To participate in the "Austria Cycles to Work" campaign as a company or university, simply register in the Austria Cycles app or on radelt.at. Select your company, then log the days you cycle to work.	Supporting activities for active mobility (cycling), prices are awarded by the providers of the platform.	Using Smartphones for participating is preferred
Oszkár	x				x									x						x	x				x							x				free	Users can offer carpool seats, which regular travelers can book via the app's itinerary planner. This option is often cheaper than public transport on long routes and helps the driver cover costs.	For trip planning, routing, navigation, and carpooling/ridesharing in Kecskemét's pilot area (e.g., dedicated corporate app for local companies).	Not integrated, countrywide only, requires high digital skills, and is better suited for long-distance travel than short commutes.
Prevozi	x										x			x							x			x							x			x	free	The app connects drivers and passengers for carpooling, reducing costs and emissions. It's mainly used by commuting students and employees for long-distance travel across Slovenia.	This could be transferable to university-level for organizing carpooling among university employees and students.	The app doesn't support online payments; trips are paid in cash. Adding online payment would improve safety and convenience for both drivers and passengers.
SCRAT	x	x	x	x		x			x			x			x			x								x	x		x			x					**Purpose:** Creates PSCLs to promote sustainable mobility (environmental, social, economic). **Compliance:** Meets Ministerial Decree no. 179/2021 requirements. **Features:** GIS employee mapping, company info sheets, adaptable questionnaire, auto-graphs, data export, recommendation algorithm, eco-benefits calculator, exportable output, news page.	Assists Company Mobility Manager with Home-Work Travel Plans, recommends optimal employee mobility solutions, and shares data with Area Mobility Manager.	Access limited to Italian open data; app effectiveness requires widespread company adoption; yearly subscription costly, especially for non-GreenPATH companies.
TatabanyaGO	x				x	x		x		x												x		x	x				x				x			free	Centralized trip planner for the capital, suburbs, and national rail and bus systems (with some limitations), based on RealCity, used by the national bus company.	For trip planning, routing, navigation, data analysis, visualization, and reporting, plus MaaS integration, ticketing, marketing, and optional fleet management.	Requires internet access, is sensitive to interference, and undergoes regular maintenance. Has slow functions and persistent map issues.

Name of IT Approach	Potential Users				Functionality and Features												Mode of Transport						Goal					Scale					Provider			Cost	Key Characteristics	Usefullness for GreenPATH	Limitations
	Commuters	Mobility Managers	Transportation Providers	Policy Makers	Trip Planning, Routing, Navigation	Data Collection, Analysis, Visualization, Reporting	Habit Tracking	Integration (e.g. MaaS, with public transport, ticketing)	Gamification, Challenge, Reward System	Infrastructure or Vehicles	Awareness	Carbon Footprint Calculator	Comparison Tools	Carpool or Ridesharing	Corporate or Institutional Management	Accessibility, Inclusivity, Safety	Exchange of Experiences or Knowledge	All Modes	Active Mobility	Shared Mobility	Ride Sharing or Pooling	Public Transport	Multimodal Transport	Reduce Emission	Behaviour Change	Improve Trip Experience	Planning of Mobility	Coordination	Company/University	Local (City Wide)	Regional (e.g. FUA Level)	National (Country Wide)	Global	Commercial	Governmental	Open-Source				
Točen.si	x				x															x	x	x			x	x	x	x				x			x	free	Application is simple, real-time platform for tracking different forms of transportation, from public transport to car or bike sharing.	The app supports public transport, car-sharing, and bike-sharing, providing information on sustainable commuting. It could integrate e-bike schemes if expanded nationally.	Real-time tracking is limited by data from transport operators. The app covers few providers and lacks coverage in less developed regions, requiring infrastructure expansion and updates.
TPL FVG – My Cicero	x				x	x		x																x	x	x				x			x			free	Comprehensive trip planning tool for public transport	Useful for promoting sustainable travel options, encouraging behavior change	It focuses only on bus transport and lacks multimodal options, such as train integration.
Up2go	x	x									x							x						x	x			x				x					This platform offers comprehensive Mobility Management services, including planning, monitoring, and reporting trips. It integrates various mobility options (Carpooling, Bike2Work, etc.) and supports gamification. The company also assists with shared fleet management (bikes, e-cars, shuttle buses).	It aims to benchmark commercial platforms, focusing on functionalities and services to develop tailored Mobility Management packages for commuting students and employees.	The focus is on companies, as there is no coordination dashboard at the FUA level.
Utas	x	x	x	x	x	x	x	x		x	x					x					x	x			x	x	x		x			x				free	"utas.hu" enables real-time route planning, stop schedules, and vehicle tracking. It offers easy timetable selection and a user-friendly map display.	Since Keko's network (except Volánbusz routes) is missing from "utas.hu", it offers little value to the GreenPATH project.	Relying on Volánbusz data, the app lacks coverage for other local transport providers, limiting its usefulness.
Verkehrsauskunft Österreich (Austrian traffic information service)	x	x	x	x	x	x				x					x		x		x		x	x				x				x			x				The Austrian traffic information service VAO provides comprehensive, intermodal traffic data for all of Austria, covering all transport modes and events. Accessible via website, app, or interface, VAO offers routing, traffic updates, and reports. It serves all road users through its partners. The GIP graph integration platform supports VAO's digital traffic network. Route planners from services like AnachB, VOR, VVT, ÖAMTC, ASFINAG, and more rely on VAO and the GIP platform.	To raise awareness and do comparisons between different modes	Road infrastructure is managed through the GIP platform, with data accuracy (e.g., construction sites, road changes) varying by state. Micro-mobility and sharing services are sometimes excluded, depending on the initiative and cooperation of providers.
Wien Mobil Webpage and App	x				x	x		x			x		x	x					x	x		x	x			x		x	x	x		x	x			Route planning for all transport modes (public, bike, car-sharing) with real-time data and ticketing. Includes options like Sharetoo, Nextbike, Sixt, Europcar, and MO.Point.	To raise awareness and do comparisons between different modes	No flexibility in the features or branding for individual mobility management.
Wiseair workplace mobility	x	x				x					x				x		x						x	x			x			x		x				**Compliance:** Automates data collection, replacing surveys with updated profiles and generating reports, KPIs, and environmental impact assessments. **Enablement:** Transforms data into actions with analysis, impact assessment, and smart pooling. **Engagement:** Centralized platform with personalized dashboards and updates to keep profiles current.	The project focuses on benchmarking different commercial platforms to develop the Co-designed Mobility Management coordination dashboard.	The focus is on companies, as there is no coordination dashboard at the FUA level.
ZGreenMove	x					x	x				x	x	x		x			x									x					x					It simplifies creating Home-Work Commute Plans by collecting and analyzing data, integrating HR systems, calculating commute distances, and estimating emissions savings. It helps define sustainable mobility strategies aligned with national guidelines.	Provides essential tools for analyzing mobility patterns and developing sustainable commuting strategies, aligning with GreenPATH's goals of reducing emissions and promoting green travel habits.	Primarily focused on workplace/university commuting; effectiveness relies on employee/student survey participation.