

TeMA

Journal of
Land Use, Mobility and Environment

print ISSN 1970-9889 e-ISSN 1970-9870
FedOA press - University of Naples Federico II

DOAJ

anvur Rivista scientifica
di classe A - 08/F1

Scopus WEB OF SCIENCE

Special Issue 1.2026

Living and Walking in Cities Mobility, Public Space and Spatial Justice

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TeMA

Journal of
Land Use, Mobility and Environment

Special Issue 1.2026

Living and walking in cities: Mobility, Public Space and Spatial Justice

Published by

Laboratory of Land Use Mobility and Environment
DICEA - Department of Civil, Architectural and Environmental Engineering
University of Naples "Federico II"

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Editor-in-chief: Rocco Papa
print ISSN 1970-9889 | online ISSN 1970-9870
Licence: Cancelleria del Tribunale di Napoli, n° 6 of 29/01/2008

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The cover image was created using an AI tool, taking into account the thematic content of the articles included in this issue.

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Living and Walking in Cities: Mobility, Public Space and Spatial Justice

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TeMA Special Issue 1 (2026) 133-148
print ISSN 1970-9889, e-ISSN 1970-9870
DOI: 10.6093/1970-9870/13322

Double-blind review under the responsibility of the "Living and Walking in Cities 2025" Conference Committee.

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Innovative policies and practices for sustainable rural mobility across Europe

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Abstract

European rural regions are of immense significance to agricultural production, tourism, as well as the preservation of nature, but are highly inadequately served with regard to transport infrastructure, thereby contributing to their socio-economic exclusion. The current study, designed in accordance with the Romanian PON "Research and Innovation 2014-2020," takes a comprehensive approach to case study research on innovative mobility practices in rural regions across Europe, incorporating both scientific literature and grey literature. The results indicate an assortment of rural transport practices of an inclusive nature, giving prime consideration to flexibility, social interaction, and mobility. In addition, the study points to an increasing epistemic relevance of grey literature in defining mobility innovation, with a pivotal focus on spatial planning in sustainable transport policy development for rural regions.

Keywords

Rural areas; Sustainable mobility; Mobility innovation

How to cite item in APA format

Junaid, M., Ferretti, M. & Marinelli, G. (2026). Innovative policies and practices for sustainable rural mobility across Europe. *TeMA - Journal of Land Use, Mobility and Environment*, (1), 133-148.
<https://dx.doi.org/10.6093/1970-9870/13322>

1. Introduction

Rural regions account for about 83% of the area covered by the entire European Union and also comprise 30% of its population; however, they are not well covered by publicly provided transport services and function as nodes with a lower priority when it comes to urban centers (European Commission, 2021). To address this issue, our research defines “rural regions” with help from the Degree of Urbanization (DEGURBA) adopted by the European Commission (European Commission, 2014), which is also embedded within the broader EU rural vision up to 2040 (see Fig.1).

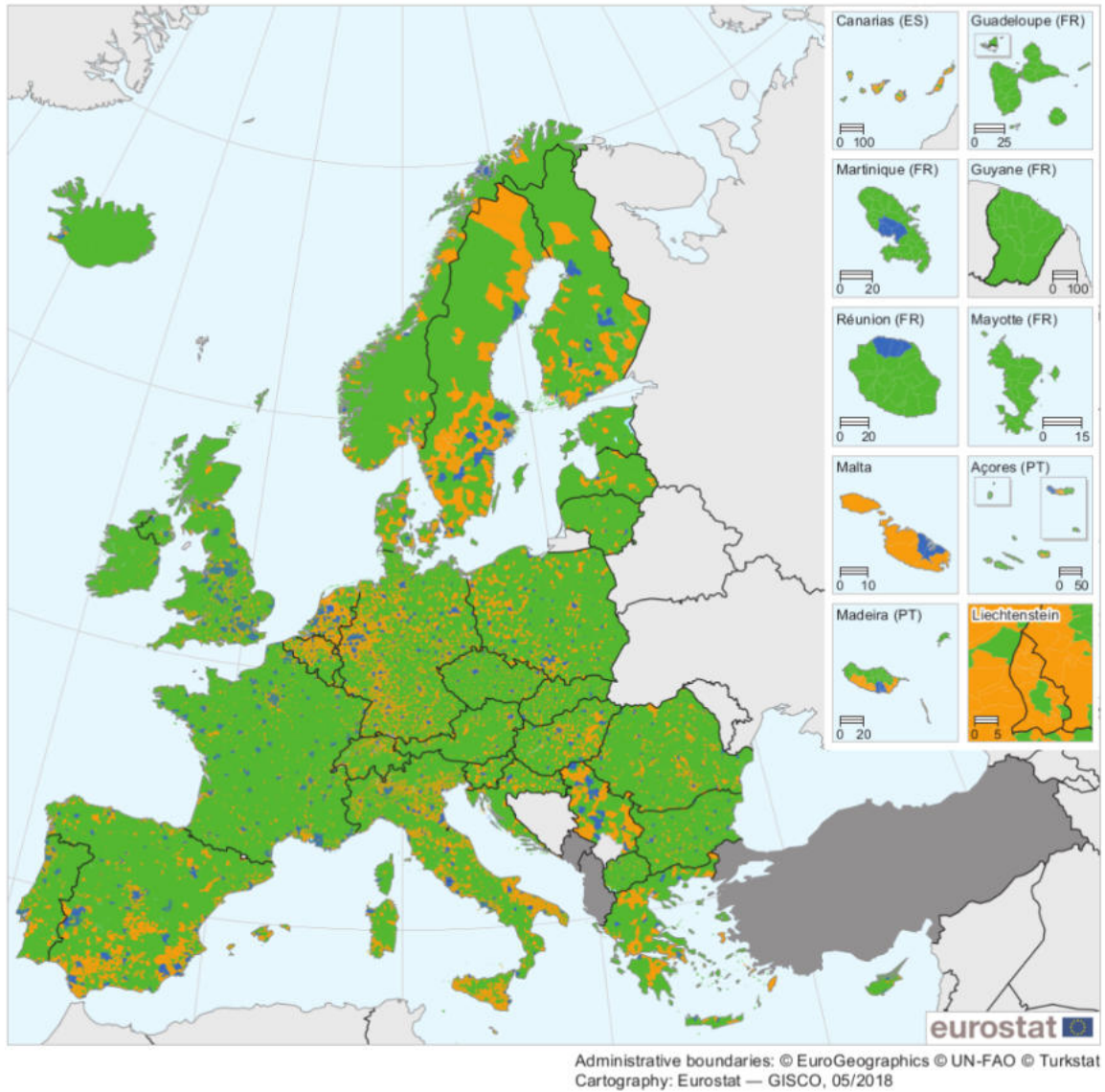


Fig.1 EU Rural vision up to 2040 (Data source: JRC and European Commission Directorate-general for Regional Policy)

This measures NUTS3 regions to determine “cities,” “towns and suburbs,” or “rural regions” depending upon the population density and whether settlements are contiguous or not (Özlüperi et al., 2024). In this research,

our focus remains "rural regions" with a population of less than 150 people per km² and where there is not any agglomeration of more than 5,000 people. Historically speaking, personal or privately owned transport has emerged as an important mode of transport for people living or temporarily staying in rural regions (Næss et al., 2019; Cottrill et al., 2020). Such structural barriers have resulted in it being difficult to develop economically viable and sustainable public transport alternatives that further promote car dependency and related environmental problems.

The transportation sector corresponds to approximately 25% of total GHG emissions in Europe and represented the only sector where GHG had increased prior to the COVID-19 pandemic (European Environment Agency, 2020). The fact that car use remains biased towards private transportation makes a substantial contribution to GHG emissions as well as other negative externality effects such as land use, pollution, and social exclusion (European Commission, 2019). Even though there is an increasing recognition of the challenge of sustainable mobility, most of these policy- and investment frameworks continue to base themselves on economic efficiency principles, to the detriment of these kinds of environmental, health, and social implications of accessibility (Marsden et al., 2010; Karjalainen & Juhola, 2021). Even though there have been improvements in this respect in most urban areas (Holden et al., 2019), there seems to be insufficient targeting and strategic coherence in rural transportation policies for most European countries (Mounce et al., 2020).

Traditional public transportation in rural areas is often insufficient in terms of financial viability and adaptability to catering to different changing mobility requirements. Although new innovative approaches such as shared mobility and demand-responsive transportation have recently begun to appear in rural areas (Mounce et al., 2020; Alonso-González et al., 2018; Bauchinger et al., 2021; Wright, 2013), still most of the literature remains interested in how these approaches might apply to urban areas, such as in new frameworks of Smart Cities and Mobility-as-a-Service (MaaS) (Bauchinger et al., 2021; Wright, 2013; Cohen & Kietzmann, 2014; Ferrero et al., 2018; Jochem et al., 2020) There is clearly an acute lack of knowledge in these matters about sufficient, inclusive, and scalable mobility solutions in sparsely populated areas.

This paper seeks to fill this research gap in relation to a number of examples of mobility innovations in rural areas that have been gathered from grey literature sources in Europe. These examples seek to show how flexible, community-oriented, and digitally-enabled approaches may have an important role to play in disseminating and making more effective territorial cohesion policies with respect to issues of accessibility in rural areas. An important point that is being argued in this paper is that there is an important role for spatial planning in developing sustainable mobilities in rural areas.

2. Methodological framework

The study adopts a holistic approach in using a case study method in examining mobility systems in European rural areas. The essence of this particular study rests with its comprehensive grey literature review, in which our study derives good practices from successful mobility projects undertaken in European rural spaces, offering an effective evidence base in designing strategies. The criteria in selecting these good practices for this study follow an informed, strict framework of criteria in which all good practices must, in essence, satisfy all criteria. Our study adopts a two-tier approach in contributing exemplary rural mobility practices in European rural spaces. Firstly, all potential studies must have their origin in European rural spaces, have to be genuinely sustainable, used within a peripheral or marginalized location, and all projects have to be in an area with clearly identified populations. Second, in order to represent a comprehensive set of rural transport problems, we have been selective in developing transport solutions that vary in geography (coastal/rural, northern or southern), economic conditions (rich/poor), geography (mountainous, plain, warm, dry), density (sparse settlements/large market towns), or rural transport problems (last mile, digitally excluded, variable in different seasons). Our selection strategy ensures that not only are we rigorous in developing transport solutions, irrespective of geography, but also adaptable in selecting innovative transport solutions based on different

geographies. By using the above selection strategy, thirteen European countries were shortlisted, as illustrated in Fig.2, in order to assess rural transport innovations in these thirteen countries. These countries feature different rural geography, climate, economic conditions, and urbanization patterns.

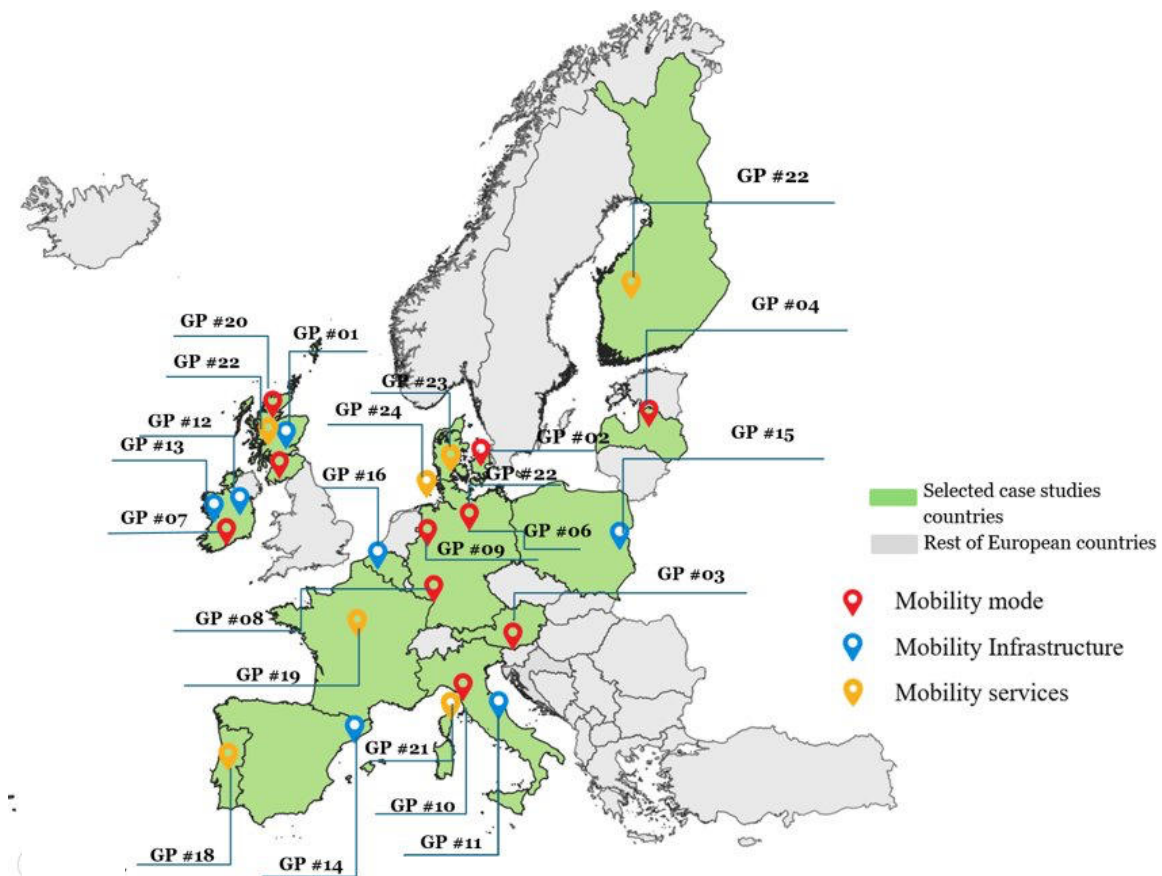


Fig.2 Countries of the selected good practices

This study was based on an in-depth literature research, such as implemented pilot projects, policy papers and literature, the most relevant sources of information for the analysis. The first step was to find the best practices, for what a close examination of a few processes was performed. These measures were selected according to specific criteria, in order to ensure suitability and usability. Two sets of criteria that were used in this process are: the main criteria-paying attention to how applicable they practice is, and another set (that ensured that good practices from a variety of European regions would be taken into consideration).

The first set of criteria is presented below and graphically in Fig.3.

- First, the practices had to be placed within the context of Europe based on the list of countries within the European Union because the study seeks to find solutions to the specific issues presented in rural Europe.
- Second, the regions where the practices were to be applied had to demonstrate features related to peripherality and marginality in order to capture the uniqueness associated with the regions.
- Third, the sustainability of the practices became an important aspect as they ought to be environmentally, economically, as well as socially sustainable in order to fit into the rural development vision.
- Fourth, the population of the case study areas was taken into account to make sure that the practices had a bearing on the needs of sparsely populated rural areas or intermediate areas with respect to mobilities. The mentioned criteria ensured that the practices that were picked were innovative and also depicted the needs of rural Europe, which face distinctive challenges.

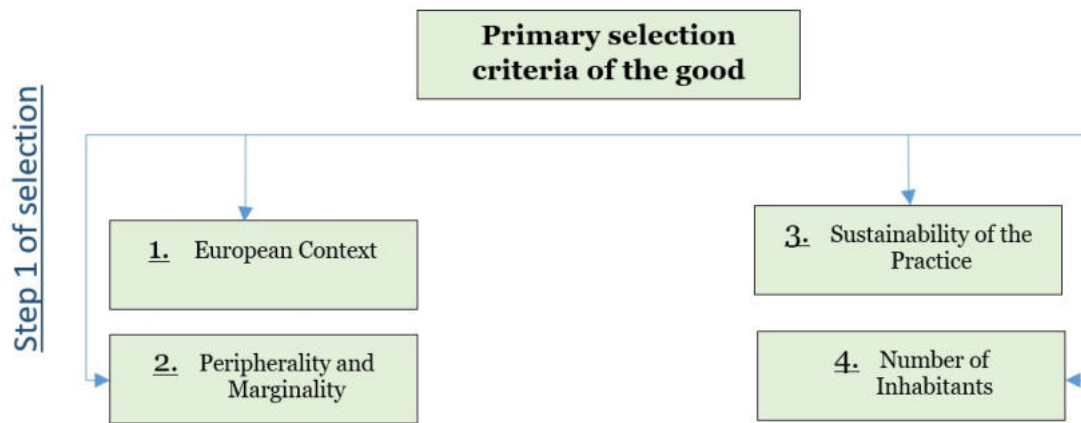


Fig.3 First set of selection criteria for good practices

Having established the 24 best practices, these were then plotted within 13 European countries to ensure that the final cases met further criteria, such as regional and economic variety, population density and level of urbanization, and territorial and climatic variety, as well as specific challenges in rural mobilities as presented in Figure 4a. Indeed, as the European countryside is recognized by substantial territorial variety, as there are areas in the countryside that are inaccessible mountainous regions, and as there are also areas in the countryside that are agricultural plains, which in turn impose economic and social patterns within these areas, such as those related to sustainable development, traffic, and economic development, respectively (Copus & Dax, 2010). For example, areas like the alpine regions in central Europe and the Scandinavian forests with challenging climatic and connectivity conditions, respectively. (Dax & Fischer, 2018) whereas the fertile lowlands in southern and Eastern Europe are important for farming and the export of food products (Dax et al., 2011).

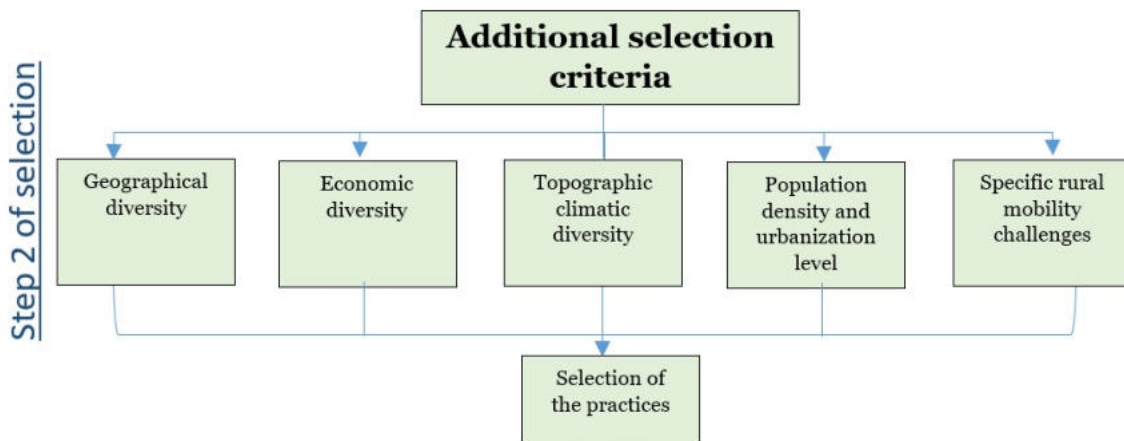


Fig.4a Additional Criteria for selecting good practices

An important factor in the selection process is the economic diversity, since it can characterize the resources, landscapes, and infrastructure of different regions in different ways. In some regions, the economies remain founded largely on agriculture and logging, while in other regions, a strong focus has been put on the development of the following areas of economic activity: In the proximity of the cities, the economic options are favored in some regions, whereas in some regions, because of the distance, the connectivity and infrastructure represent some disadvantage (European Commission, 2021; OECD, 2020) Topographic and climatic diversity is the third important criterion, since the regions in the mountains may not have the same connectivity and the weather in some regions is adverse (European Commission, 2023a; European

Commission, 2023b; OECD, 2002). Furthermore, population density, urbanization factors, as well as difficulties associated with mobility within rural regions were taken into account while selecting the countries. This is because a significant part of rural Europe is characterized by reduced population size, an older population, as well as low density; hence making the development processes even more complicated. For instance, older people who live far away from each other within a place like Scotland Highlands or rural Portugal are likely to suffer from isolation owing to a lack of accessibility through proper transport networks; on the other hand, a place like rural France that has a high volume of rural tourism is likely to address the needs of its residents as well as its tourists (Banister et al., 2008; Gillis et al., 2016).

The selected practices, along with the countries, are presented in Tab.1.

There are other figures that explain to some extent how the practices met other criteria. This first figure (Fig.4b), discussed below, concentrates on geographical diversity. This shows that the selection was made to represent different parts of Europe; practices have indeed been chosen from Northern, Western, Southern, Eastern, and Central Europe. In addition to this is the second feature of geographical diversity that identifies the differences in settlement types in the different countries represented in the selection. Practices have been sought in countries like Germany and Denmark that have clustered and scattered settlements, while others are from countries like Italy, Spain, Finland, and Scotland that have compact, linear, and isolated settlements.

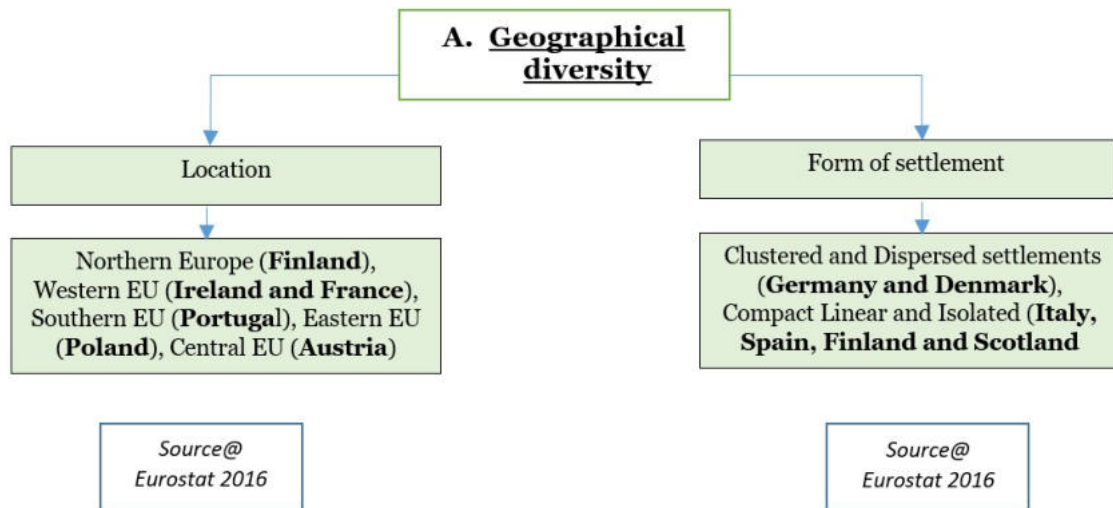


Fig.4b Specification of the geographical diversity criterion

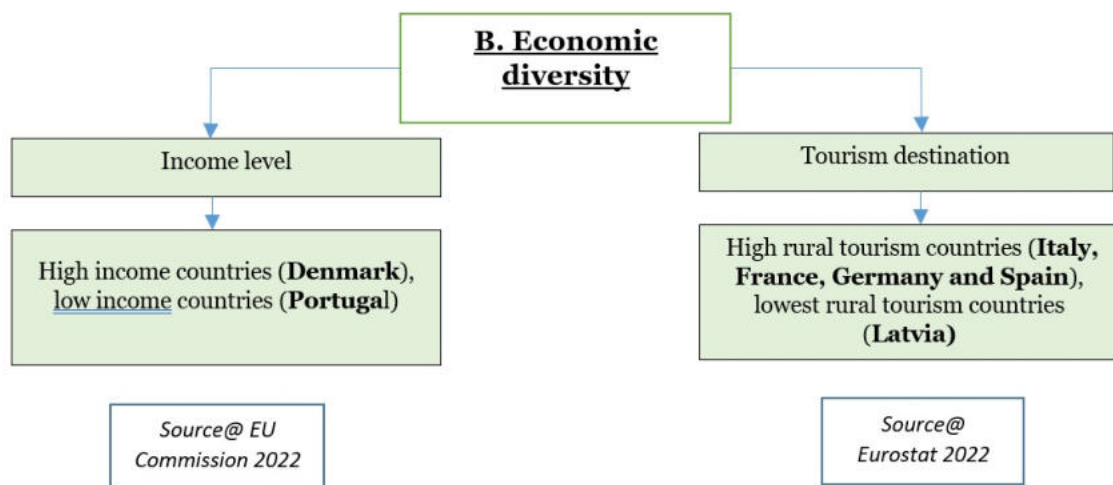


Fig.4c Specification of the economic diversity criterion

Fig.4c shows the data regarding economic diversity. In selecting the countries from which practices were adopted, there has been consideration based on the level of income rates and the tourism potential within

such countries. For instance, some countries with high income rates, such as Denmark, are part of the selection alongside those with low incomes like Portugal. In addition to that, the adopted practices also involve countries with high tourism rates as well as low tourism rates. Such countries with high tourism rates include Italy, France, Germany, and Spain; on the other hand, countries with low tourism rates are Latvia among others. The following figure focuses on population density and the level of urbanization. It illustrates how the chosen case studies were gathered from various countries that meet the requirement of population density. The case studies include countries that are of low population density and of high population density. Countries that are of high population density include Belgium and Germany, whereas countries that are of low population density include Finland and Latvia. Similarly, countries that are of high urbanization include Belgium, whereas countries that are of a predominantly rural area include Finland and Latvia.

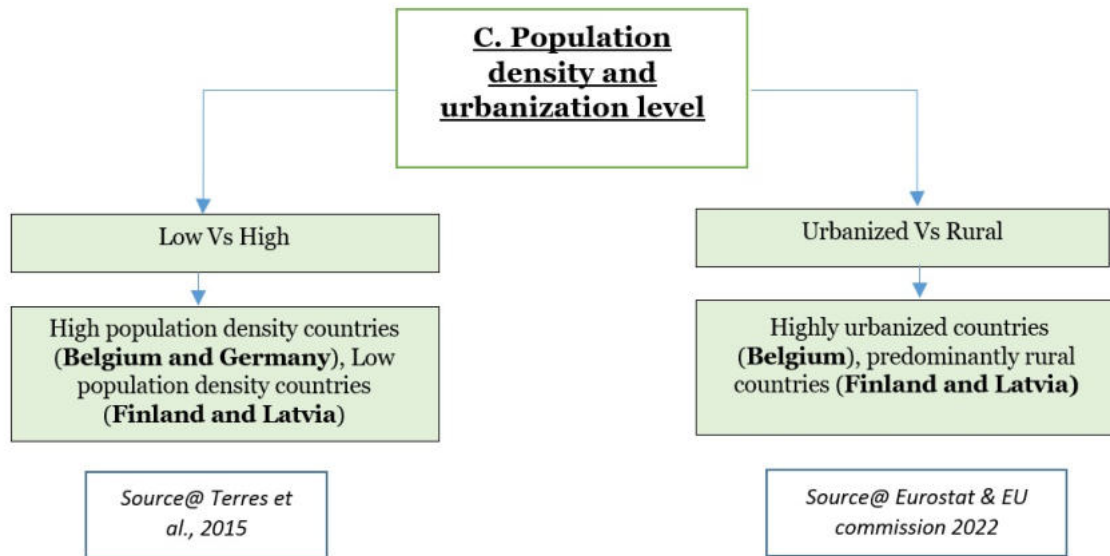


Fig.4d Specification of the population density and urbanization level criterion

Moving on to the next figure after 4c, which is 4d, and as per Fig.4c, this figure emphasizes the topographic and climatic differences and is shown below. This requirement is met by ensuring the practices come from countries with different topographic and climatic factors. For instance, the practices range from mountainous areas like Italy and Austria (Marinelli 2022) to mostly flat areas like Spain and Finland. Another part of this requirement is the differences in whether countries are coastal or landlocked. Coastal countries like Italy, Spain, and France, as well as Denmark, are compared to landlocked countries like Austria, Latvia, and Poland.

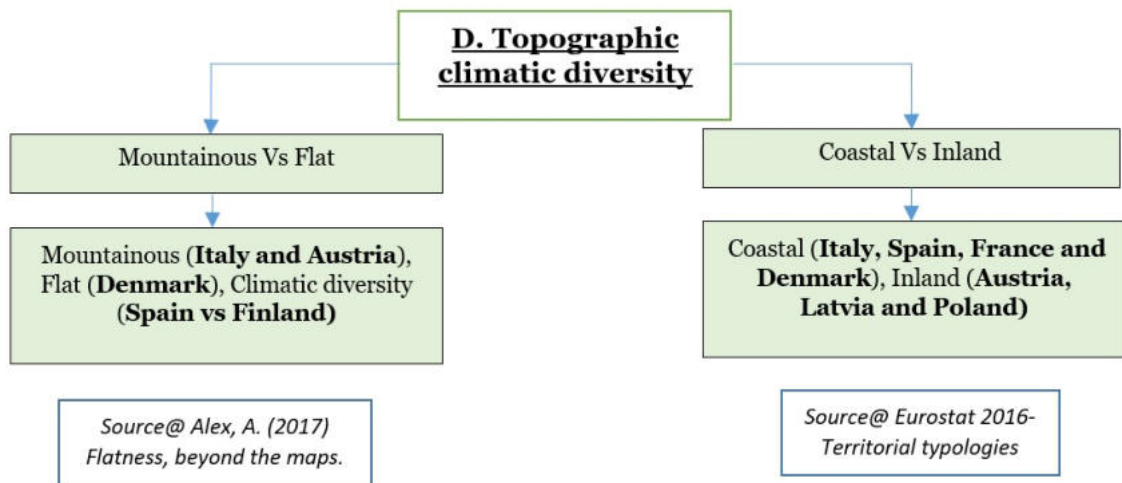


Fig.4e Specification of the topographic climatic diversity criterion

In addition, the final criterion of step 2 within the selection framework is illustrated in Figure 4f, which emphasizes nations facing distinct challenges in their rural mobilities. For example, our selections feature Italy, which represents the challenge of aging populations resulting from related factors such as mobilities and accessibility. Another dimension includes nations with distant locations in their rural areas, as in the case of Scotland, as well as those with high potential in their tourist areas, as in the case of France, Italy, Spain, Germany, Austria, and Denmark.

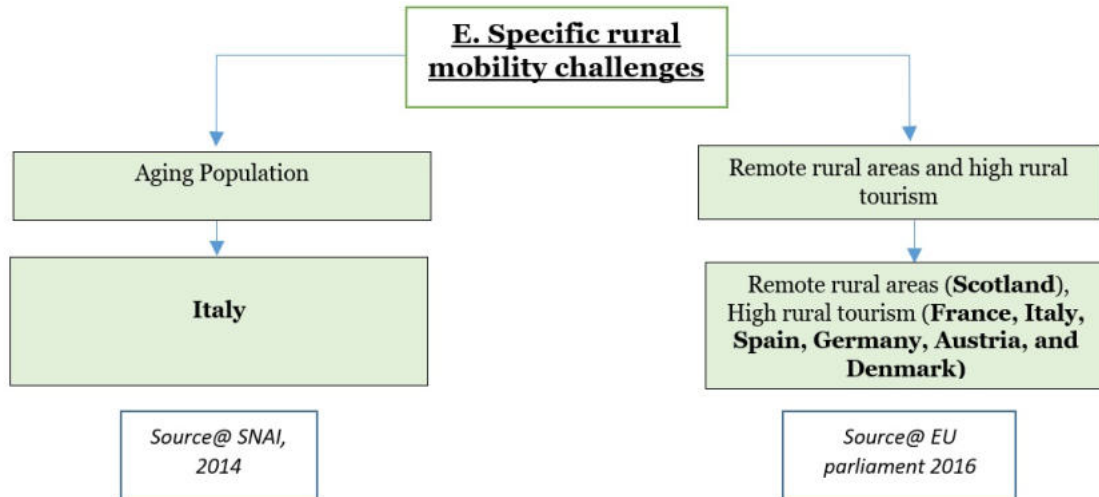


Fig.4f Specification of the specific rural mobility challenges criterion

3. Results

We identified twenty-four completely implemented initiatives from these countries that satisfied our sustainability and peripheral deployment standards. Then the good practices were divided these instances into three groups: mobility modes (the actual transportation services), infrastructure (the built assets that facilitate travel), and platforms (the organizational or digital systems that coordinate mobility). We then conducted a thorough innovation audit for each area. Through this process, we were able to map the specific tools used by each practice and identify five key areas of advancement, five innovation lines, namely: technological tools, stakeholder engagement and partnerships, governance and management models, transit corridor design and connectivity solutions, and approaches to social inclusion. With an emphasis on rural areas, this article explores the design and implementation of these transportation options, including the rationale behind their selection, the planning of the mobility systems, and the actions taken to implement them.

Based on the innovation lines identified, an extensive comparative table was prepared, which encompassed the various different innovative elements. To begin with, an integrated table was prepared, which encompassed all the practices cumulatively. This led to the development of two more tables, which classified the practices based on top-down innovation methods and bottom-up innovation methods. Top-down innovation methods encompass those practices that have been generated from above, such as the implementation of strategic directives by various levels. On the other hand, the bottom-up innovation methods encompass grassroots innovation, which involves the participation of the local community members. Finally, an extensive critical discussion was performed, which focused on each innovation domain, exploring the various trends, gaps, criticalities, and opportunities. This analysis sought to uncover patterns, point out regions of concern, as well as the potential for development in each sector. Based on the lessons learned from best practices, further subcategorization of each line of innovation was done, as presented in Tab.2, to ensure a better understanding of the differences existing in each of the sectors. Based on the further subcategorization, another crucial analysis was performed in each of the sectors utilizing the tables of the further subcategorization. This analysis sought to examine a number of factors, such as the technologies that are most prevalent, the technologies that are still needed, the reasons for such demands, as well as the

opportunities for development in the future. A similar analysis would have been performed in the case of other factors, such as the manner of the partnerships, or forms of involvement that are necessary, their significance in achieving development, as well as the justifications.

Categories	Good practice Name	EU Country	Activation
Mobility Modes	1. Cairngorm National Park Micromobility System	Scotland	2017-20
	2. Cycling without age in Denmark	Denmark	2012
	3. Go-Mobil (Demand based Rural Transportation Service)	Austria	2017-20
	4. On-demand services in Vidzeme region	Latvia	2017-20
	5. Transport on Demand & Shared Mobility "Badenoch and Strathspey"	Scotland	2018
	6. Transport on demand system "ALFA" in Plon	Germany	2018
	7. Ring A Link Kilkenny Community Mobility Services In Rural Area, (On-demand and Fixed Scheduled)	Ireland	2001
	8. Mobilfalt (Werra-Meißner district, Hesse)	Germany	2013
	9. Community Shared car System Cuxhaven	Germany	2019
	10. BIRÒ Shared Mobility, Peccioli, Pisa	Italy	2022
Mobility Infrastructure	11. Spoleto-Norcia cycle path, Umbria	Italy	2014
	12. Conversion of old rail trails to greenways	Ireland	2019
	13. Royal canal greenway	Ireland	2021
	14. On-demand bus service in Catalonia	Spain	2017-18
	15. Hajnowka E-bike Scheme	Poland	2019-21
	16. MobiHUB in East Flanders	Belgium	2016
	17. Calderwood Mobility Hub	Scotland	2021
Mobility Platforms	18. Demand responsive transport service in Middle Tejo	Portugal	2013
	19. RezoPouce (Modern hitch hiking)	France	2009
	20. Mobility as a Service in Rural Scotland	Scotland	2018
	21. Shared Use Mobility Agency - Suma In Elba Island, Italy	Italy	2019
	22. Regional Steering Group for Mobility Services in South Ostrobothnia, Finland	Finland	2019
	23. Ridesharing Application in Vejle	Denmark	2019
	24. Service-to-people Accessibility Solution in Hallig Hooge	Germany	2018

Tab.1 List of selected good practices from thirteen European countries

For example, the study focused on the types of partnerships that were analyzed in order to identify the mandatory role they play in propelling innovation, and guidelines were developed to improve collaborations. The exhaustive process of analysis was extended to the remaining three lines as well. The lines were analyzed with the same intensity, making sure that all areas were analyzed comprehensively. Rather than studying each line individually, the interaction between trends, gaps, and opportunities related to all lines enabled the development of a holistic understanding related to the study. The results and subcategories obtained from the lines related to innovations have acted as the basis for the development of guidelines and strategic actions

intended to improve mobility and accessibility systems within rural areas. Rather, by drawing on the results obtained from the study, tailored approaches can be developed for overcoming challenges related to rural areas, making sure that the whole community benefits from efficient and effective mobility related to all.

<p>Technological Innovation Sub Categories</p> <ol style="list-style-type: none"> 1. Real-Time App and GPS Integration 2. Machine learning and AI technologies 3. Electric vehicles and sustainable energy 4. ICT platform and integration technologies 5. Remote access and communication technologies 	<p>Innovation in Engagement and Partnerships Sub Categories</p> <ol style="list-style-type: none"> 1. Public private partnership (PPP) and collaboration with local businesses 2. Community driven engagement 3. Strategy for stakeholder engagement 4. Promotion and marketing partnerships
<p>Innovation Governance and Management Sub Categories</p> <ol style="list-style-type: none"> 1. Centralized coordination and support 2. Decentralized and community driven governance 3. Volunteer led governance 	<p>Innovation Transit pathways and connectivity Sub Categories</p> <ol style="list-style-type: none"> 1. Flexible solutions and design for specific needs 2. Feeder transport and public transport enhancements 3. Infrastructure repurposing and interconnectivity 4. Technological infrastructure innovations and multi-modal integration
<p>Innovation in Social Inclusivity Sub Categories</p> <ol style="list-style-type: none"> 1. Inclusivity for vulnerable groups (elderly and disabled) 2. Support for low income and vulnerable groups 3. Enhancement of community and public spaces 4. Inclusivity through special services and support 	

Tab.2 Sub categorization of the five innovation lines

4. Discussion

Rural areas in the European region have unique mobility challenges that can be attributed to a number of factors. The population ageing, together with fertility decline, is one of the greatest challenges for many European nations. The effect is that there will be a lower working population, meaning that there will be a high level of dependence on the service provided by the retirees. The problem is more pronounced in rural areas, as there is a migration of young people to urban areas for better educational and job prospects. The consequence is that rural areas will have a senior population that will have to fend for themselves and cope alone. This demographic shift not only contributes to a shrinking workforce but also brings about additional pressures on their social and healthcare provisions, which may already be limited within these regions.” The rural exodus of youth further aggravates rural depopulation. The migration of youth to urban areas makes these regions even less populated with fewer youth who often encounter greater challenges when seeking fundamental services such as “healthcare and education.” In rural regions, “the poor accessibility of public transportation systems further inhibits access to these crucial services,” which are often necessary for rural seniors who may “have restricted mobility” to access rural healthcare services due to lack of accessibility of these services compared to “the urban population” within Sweden’s rural areas. The demographic shift further worsens accessibility to healthcare due to “urbanization. Many of these rural areas, especially those which are farther away from cities, lack efficient public transportation services. As a consequence of this lack of public transport services, a considerable percentage of people, especially older people, are forced to travel by private cars. Using private cars is not only leading to increased social isolation but also affecting the environment. The increased use of private cars by people in these regions is a leading reason for air pollution. In actuality, much of the Western world has a transport sector which is heavily reliant on fossil fuels. Much of the transport sector’s contribution to climate change is accounted for by the transport sector of the European Union. For example, the transport sector in the European Union accounted for 37% of the CO₂ emissions of the European Union in 2021 (International Energy Agency, 2022). In addition to these facts related to climate change, public transport services in many of these regions are either inadequate or non-existent. The lack of effective and

affordable public transport networks in these regions exacerbates social exclusion in these regions, especially for those who do not have a vehicle or are unable to drive due to their age or physical condition. Social exclusion is also perpetuated by the lack of connectivity for these regions, which have limited access to the economic sector. The social exclusion of these regions shows the extreme importance of sustainable transport services for the efficient bridging of social exclusion in these regions for the benefit of every resident in these regions (Mattioli, 2021; Choi et al., 2019).

Furthermore, social justice issues significantly exacerbate the challenges of rural mobility, particularly affecting marginalized groups such as lower-income households, women, the elderly, and individuals with disabilities. These groups are disproportionately impacted by transport gaps in rural areas, where public transport systems are either underdeveloped or non-existent. Without reliable transportation options, vulnerable groups face difficulties accessing essential services and participating in social, educational, and economic activities. This lack of mobility often leads to social exclusion, resulting in a decline in overall well-being, reduced opportunities for personal growth, and limited social interactions. As a result, their ability to engage with the community, find employment, and access healthcare services becomes restricted, perpetuating inequality and limiting their participation in society (Reneland-Forsman, 2018; Carvalho et al., 2020). Transport poverty seriously affects older people residing in rural regions. Research has identified the cumulative vulnerability of older people owing to a lack of public transport access, especially in regions where public services are lacking or not available. A review by Simcock (Simcock et al., 2021) revealed that older people are considered one of the most vulnerable groups with respect to energy poverty as well as transport poverty. In particular, the percentage of overlapping vulnerability for transport poverty is the highest in rural regions. Owing to a lack of public transport in these regions, older people are solely reliant on personalized vehicles or people carriers. However, personal transport is a luxury that many older people cannot afford, further exacerbating social exclusion (Simcock et al., 2021; Martiskainen et al., 2021).

Thus, with the movement of the younger generations to the urban areas in pursuit of improved prospects, the remaining older generations in the rural areas face even more challenges in accessing necessary services such as health care, education, and social welfare, most of which remain far from their living areas. Infrastructure in the rural areas notwithstanding the ageing demographic, such as the absence of appropriate transport infrastructure, health facilities, and social infrastructure, make the rural areas susceptible to marginalization in the social and economic senses (Simcock et al., 2021). Social Justice in the mobility of the rural social group relates to equal access of everyone, including persons in rural areas, to transportation, irrespective of their social standing in society. A change in transport policy toward an inclusive one will promote a fair and inclusive society for all individuals to equally take part in society and access the essential services they require (Pérez-Peña et al., 2021; Herzog, 2023). A holistic approach needs to be adopted to address transport in rural areas. This will include upgrading transport systems and ensuring that digital and inclusive transport systems are easily accessible in rural areas. Digital Service Solutions (DiSS) have become thriving alternatives to transport systems and have helped in increasing accessibility without long distance travel. Digital locks at supermarkets in rural areas can be such an example in helping in increasing accessibility without having to travel long distances through digital innovation and advancement (Banister, 2008; Narayanan & Antoniou, 2023). However, the application of these technologies requires meticulous consideration to prevent the widening of the digital divide, where the older population and those residing in rural areas may not have adequate access to digital solutions. The Sustainable and Smart Mobility Strategy by the European Union acknowledges the issue of exclusion of rural dwellers from these solutions because of poor connectivity to digital solutions in these areas (Fyhri et al., 2011). The digital transition requires all-inclusive measures to prevent the exclusion of the vulnerable in society (European Union, 2020b). The rural mobility problem can thus be addressed by adopting an all-inclusive strategy by incorporating digital solutions in the mobility solutions provided in the rural areas in addition to developing transport solutions for the rural dwellers. These solutions should not only

improve conventional transport means such as bus transport and trains but should also include modern solutions like on-demand ride sharing and telemedicine. Such solutions will help cut down on long distances journeys, which will ensure a sustainable transport system. It is possible to ensure social inclusion, economic sustainability, and environmental sustainability by providing tailored solutions according to rural communities (Averill, 2012; Hantson et al., 2023).

The European Union has identified challenges concerning the rural mobility complex, especially in its Territorial Agenda 2030, which emphasizes the determination of equal access to basic services and much more 'friendly' public transport networks. It also states that a reduction in gaps between urban and rural will be needed through the development of digital and transport infrastructure. This is essential in making rural communities more sustainable, resilient, and much better connected, having the opportunity to equally exploit all the opportunities and services available for urban areas. Such infrastructure gaps need to be addressed if there is to be any hope of easing mobility challenges brought about by changed demographics and geographical spread that devises inclusivity and enhances the quality of living within rural areas (European Union, 2020a; European Union, 2020b). In that respect, the EU promotes digital technologies, such as Digital Service Solutions-DiSS, as a complementary solution to traditional systems of mobility. These solutions might lower the demand for long-distance transportation by enabling locally based services. An example of such a solution would be digital locks for grocery stores located in remote rural regions. They might increase access to resources without necessitating long-distance transportation for rural residents. Innovations of this sort might mitigate the weaknesses of traditional transport systems by providing alternative solutions that are more environmentally as well as technically sound. Through the application of digital innovation solutions, rural regions might promote greater autonomy for their residents by improving their transportation systems and lowering their carbon impact (Banister, 2008; Narayanan & Antoniou, 2023; Habibipour et al., 2021). In this regard, the integration of digital innovation solutions for rural region transportation might require consideration of the digital divide between rural and urban regions. As illustrated in the EU's Sustainable and Smart Mobility Strategy, there is concern about the risk of exclusion of older people as well as those in rural areas who may lack adequate access to digital solutions in the form of digital tools/services. The digital divide could potentially create additional barriers to mobility for people who are already at risk because of the lack of traditional transport systems being in place. The worry is that if the transition to digital mobility solutions is not done in a balanced way, it may lead to worse disparities in mobility in the future than before because it would potentially leave some people behind. The digital divide especially in rural areas can be seen in the poor connectivity being experienced in rural areas and the limited digital literacy being observed in these areas. This could lead to the ripple effect of further deteriorating the already marginalized social groups, such as the elderly, the disabled, and low-income families, who may not have the capacity to adapt to the new technology systems in the mobility technology era. Thus, it becomes important that these technologies remain inclusive to the benefit of the overarching mobility technology system that can conveniently meet the needs of everyone, particularly in the rural areas, where transportation remains a big problem in those communities. This calls for not only the development of smart mobility technology but also the technology utilized in the digital world to fit the needs of the rural community, including initiatives such as digital inclusion of marginalized groups, development, and improvement of digital infrastructure, as well as the assistance of people who may not understand the technology systems in the digital world (Carvalho et al., 2020; European Union, 2020a; European Union, 2020b).

5. Conclusion

The problem of rural mobility can be resolved with a comprehensive multi-factor approach, including but not limited to a focus on tech alone for a solution. Real-world evidence from rural mobility case studies supports that a lack of accessible transport in rural regions is a problem to be overcome not just by working with

transport infrastructure, but by developing a so-called adaptive transport system. These special transport services, such as Go-Mobil in Austria or Transport on Demand ALFA in Plön (Germany), are realized in a low-density area to increase mobility on a low basis especially for senior individuals in rural regions without their own automobile.

Additionally, the convergence of digital solutions, as in the RezoPouce project (France) or the Mobility as a Service pilot in rural Scotland, shows how ICT solutions can also be of assistance in matters related to transport in sparsely populated zones. But this depends on the availability of proper digital infrastructure and digital literacy on the part of the residents. The existence of a digital divide concerning older people and people with lower socioeconomic status can constitute a structural problem for the implementation of these innovations. Starting with a territorial planning point of view, initiatives such as Spoleto-Norcia Cycle Path or the transformation of former railways into green routes (Ireland) provide best practices of reuse of existing infrastructural assets that could pursue a plurality of goals such as promoting active mobility modes, renovating the natural habitat, while promoting tourism. In this sense, infrastructural development should necessarily harmonize with territorial features.

Notably, the study points out that ICT and service innovation concepts, including on-demand transport sharing, telemedicine, and platform coordination systems, may decrease independent long-distance travel, making room for localized and optimized solutions (Herzog, 2023; Banister, 2008). However, their successful implementation requires a comprehensive understanding of local demographic structures, transport demands, and institutional capabilities. Thus, syncing service hours to fit the day-to-day cycles of farmers, school-goers, and elderly communities is a prerequisite to ensure their adoption and effective sustainability.

In conclusion, the evidence points to the need for a place-specific approach to rural mobility, with a multilevel governance structure that addresses stakeholder engagement and capacity building, especially for those that are aging and vulnerable territorially. Mobility planning that takes note of the local configurations of the geographical sites of governance is critical for ensuring that the governance of the infrastructure works for social equity, geographic cohesion, and environmental sustainability (Fyhri et al., 2011; Averill, 2012, Aderibigbe 2024).

References

- Aderibigbe, O.-O. B., & Gumbo, T. (2024). Exploring the use of active mobility in selected rural areas of Nigeria. *TeMA - Journal of Land Use, Mobility and Environment*, *17*(3), 439–452. <https://doi.org/10.6093/1970-9870/10928>
- Alonso-González, M. J., Liu, T., Cats, O., van Oort, N. & Hoogendoorn, S. (2018). The potential of demand-responsive transport as a complement to public transport: An assessment framework and an empirical evaluation. *Transportation Research Record*, *2672*, 879-889. <https://doi.org/10.1177/0361198118790842>
- Averill, J. B. (2012). Priorities for action in a rural older adults study. *Family & Community Health*, *35* (4), 358-372. <https://doi.org/10.1097/fch.0b013e318266686e>
- Banister, D. (2008). The sustainable mobility paradigm. *Transport Policy*, *15*, 73-80. <https://doi.org/10.1016/j.tranpol.2007.10.005>
- Banister, D., Lucas, K. & Schwanen, T. (2008). Developing sustainable mobility in rural areas. *Transport Policy*, *15*(4), 199-204. <https://doi.org/10.1016/j.tranpol.2008.02.006>
- Bauchinger, L., Reichenberger, A., Goodwin-Hawkins, B., Kobal, J., Hrabar, M. & Oedl-Wieser, T. (2021). Developing sustainable and flexible rural–urban connectivity through complementary mobility services. *Sustainability*, *13*, 1280. <https://doi.org/10.3390/su13031280>
- Carvalho, D., Rodrigues, A., Rodrigues, M., Teoh, T., Tanis, J., Matthews, B., Gomes, R. & Costa, C. (2020). *Mapping accessible transport for persons with reduced mobility*. European Union. Retrieved from: <https://op.europa.eu/en/publication-detail/-/publication/48900136-3b63-11eb-b27b-01aa75ed71a1>
- Choi, Y., Nam, K. & Kim, C. Y. (2019). Association between convenience of transportation and unmet healthcare needs of rural elderly in Korea. *Journal of Preventive Medicine and Public Health*, *52*, 355-365. <https://doi.org/10.3961/jpmph.19.172>
- Cohen, B. & Kietzmann, J. (2014). Ride on! Mobility business models for the sharing economy. *Organization & Environment*, *27*(3), 279-296. <https://doi.org/10.1177/1086026614546199>

- Copus, A. & Dax, T. (2010). *Conceptual background and priorities of European rural development policy* (Deliverable 1.2). FP7 RuDI Project.
- Cottrill, C. D., Brooke, S., Mulley, C., Nelson, J. D. & Wright, S. (2020). Can multi-modal integration provide enhanced public transport service provision to address the needs of vulnerable populations? *Research in Transport Economics*, 83, 100954. <https://doi.org/10.1016/j.retrec.2020.100954>
- Dax, T. & Fischer, M. (2018). An alternative policy approach to rural development in regions facing population decline. *European Planning Studies*, 26(2), 297-315. <https://doi.org/10.1080/09654313.2017.1361596>
- Dax, T., Copus, A., Shucksmith, M. & Meredith, D. (2011). Cohesion policy for rural areas after 2013. *Studies in Agricultural Economics*, 113, 1-16. <https://doi.org/10.7896/j.1113>
- European Commission (2014). *Regional and urban policy regional working paper 2014 a Harmonised*. Available at: https://ec.europa.eu/regional_policy/sources/work/2014_01_new_urban.pdf (Accessed: 28 January 2026).
- European Commission (2019). *Handbook on the external costs of transport*. Retrieved from: <https://op.europa.eu/en/publication-detail/-/publication/9781f65f-8448-11ea-bf12-01aa75ed71a1> (Accessed: May 28, 2021)
- European Commission (2021). *Rural development. Agriculture and rural development*. Retrieved from: https://agriculture.ec.europa.eu/common-agricultural-policy/rural-development_en (Accessed: November 7, 2024)
- European Commission (2023a). *Bridging urban-rural transport divides. Urban Mobility Observatory*. Retrieved from: https://urban-mobility-observatory.transport.ec.europa.eu/news-events/news/bridging-urban-rural-transport-divides-2023-03-29_en (Accessed: March 29, 2023)
- European Commission (2023b). *Smart villages and rural mobility. European Network for Rural Development*. Retrieved from: https://ec.europa.eu/enrd/news-events/news/smart-villages-and-rural-mobility_en.html (Accessed: March 29, 2023)
- European Environment Agency (2020). *Transport: Increasing oil consumption and greenhouse gas emissions hamper EU progress*. Retrieved from: <https://www.eea.europa.eu/en/analysis/publications/transport-increasing-oil-consumption-and> (Accessed: October 21, 2020)
- European Union (2014). *A harmonised definition of cities and rural areas*. Retrieved from: https://ec.europa.eu/regional_policy/sources/work/2014_01_new_urban.pdf (Accessed: July 27, 2025)
- European Union (2020a). *Territorial Agenda 2030 – A future for all places*.
- European Union (2020b). *Sustainable and smart mobility strategy*.
- Ferrero, F., Perboli, G., Rosano, M. & Vesco, A. (2018). Car-sharing services: An annotated review. *Sustainable Cities and Society*, 37, 501-518. <https://doi.org/10.1016/j.scs.2017.09.020>
- Fyhri, A., Hjorthol, R., Mackett, R. L., Fotel, T. N. & Kyttä, M. (2011). Children's active travel and independent mobility in four countries: Development, social contributing trends and measures. *Transport Policy*, 18 (5), 703-710. <https://doi.org/10.1016/j.tranpol.2011.01.005>
- Gillis, M., Hernandez, M. & Walton, L. (2016). Tourism and transport in rural regions: Balancing the needs of locals and visitors. *Journal of Rural Studies*, 47, 106-115. <https://doi.org/10.1016/j.jrurstud.2016.06.004>
- Habibipour, A., Lindberg, J., Runardotter, M., Elmistikawy, Y., Ståhlbrost, A. & Chronéer, D. (2021). Rural living labs: inclusive digital transformation in the countryside. *Technology Innovation Management Review*, 11, 59-72. <https://doi.org/10.22215/timreview/1465>
- Hantson, M., Caset, F., Boussauw, K., Keblowski, W. (2023). Understanding the role of on-demand public transport in low-density regions: Insights from Flanders. In Tampere, C., Cools, M. & Proost, S. (Eds.). *Proceedings of the BIVEC-GIBET Transport Research Days 2023*, 414-430. Leuven: BIVEC-GIBET
- Herzog, I. (2023). Urban-rural justice. *Journal of Political Philosophy*, 31, 233-253. <https://doi.org/10.1111/jopp.12297>
- Holden, E., Gilpin, G. & Banister, D. (2019). Sustainable mobility at thirty. *Sustainability*, 11 (7), 1965. <https://doi.org/10.3390/su11071965>
- Jochem, P., Frankenhausen, D., Ewald, L., Ensslen, A. & Fromm, H. (2020). Does free-floating carsharing reduce private vehicle ownership? The case of SHARE NOW in European cities. *Transportation Research Part A*, 141, 373-395. <https://doi.org/10.1016/j.tra.2020.09.016>
- International Energy Agency (2022). *Transport: Improving sustainability of passenger and freight transport*.
- Karjalainen, L. E. & Juhola, S. (2021). Urban transportation sustainability assessments: A systematic review of literature. *Transport Reviews*, 41(5), 659-684. <https://doi.org/10.1080/01441647.2021.1879309>
- Marinelli, G., Domenella, L., Galasso, M. & Rotondo, F. (2022). Planning seismic inner areas in Central Italy: Applications for the infrastructural project, lifeline and resilient public space in the shrinking territory. *TeMA - Journal of Land Use, Mobility and Environment*, 195-211. <https://doi.org/10.6093/1970-9870/8659>

- Marsden, G., Kimble, M., Nellthorp, J. & Kelly, K. (2010). Sustainability assessment: The definition deficit. *International Journal of Sustainable Transportation*, 4(4), 189-211. <https://doi.org/10.1080/15568310902825699>
- Martiskainen, M., Sovacool, B.K., Lacey-Barnacle, M., Hopkins, D., Jenkins, K.E.H., Simcock, N., Mattioli, G. & Bouzarovski, S. (2021). New dimensions of vulnerability to energy and transport poverty. *Joule* 5 (1), 3-7. <https://doi.org/10.1016/j.joule.2020.11.016>
- Mattioli, G. (2021). Transport poverty and car dependence. In R.H.M. Pereira & G. Boisjoly (Eds.), *Advances in Transport Policy and Planning*. Academic Press.
- Mounce, R., Beecroft, M. & Nelson, J. D. (2020). Frameworks and smart mobility for rural areas. *Research in Transport Economics*, 83, 100956. <https://doi.org/10.1016/j.retrec.2020.100956>
- Narayanan, S. & Antoniou, C. (2023). Shared mobility services towards MaaS. *Transportation Research Part A*, 168, 103581. <https://doi.org/10.1016/j.tra.2023.103581>
- Næss, P., Xue, J., Stefansdottir, H., Steffansen, R. & Richardson, T. (2019). Second-home mobility and climate impacts. *Journal of Transport Geography*, 79, 102468. <https://doi.org/10.1016/j.jtrangeo.2019.102468>
- OECD (2020). *Rural well-being: Geography of opportunities*. OECD Publishing. Retrieved from: https://www.oecd.org/content/dam/oecd/en/publications/reports/2020/10/rural-well-being_8d2d0140/d25cef80-en.pdf
- OECD (2002). The impact of transport infrastructure investment on regional development. Retrieved from: https://www.oecd.org/content/dam/oecd/en/publications/reports/2002/05/impact-of-transport-infrastructure-investment-on-regional-development_g1gh2082/9789264193529-en.pdf
- Özlü, S., Dedeoğlu Özkan, S. & Beyazlı, D. (2024). The identification of rurality at Nuts-3 level in Turkey. *TeMA - Journal of Land Use, Mobility and Environment*, 17(2), 339–356. <https://doi.org/10.6093/1970-9870/10632>
- Pérez-Peña, M. D., Jiménez-García, M., Ruiz-Chico, J. & Peña-Sánchez, A. R. (2021). Transport poverty and sustainability. *Sustainability*, 13(3), 1451. <https://doi.org/10.3390/su13031451>
- Reneland-Forsman, I. (2018). Borrowed access and digital participation. *International Journal of Lifelong Education*, 37(3), 333-344. <https://doi.org/10.1080/02601370.2018.1473516>
- Simcock, N., Jenkins, K., Lacey-Barnacle, M., Martiskainen, M., Mattioli, G. & Hopkins, D. (2021). Identifying double energy vulnerability: A systematic and narrative review of groups at-risk of energy and transport poverty in the global north. *Energy Research & Social Science*, 82, 102351. <https://doi.org/10.1016/j.erss.2021.102351>
- Wright, S. (2013). Designing flexible transport services: guidelines for choosing the vehicle type. *Transportation Planning and Technology*, 36(1), 76-92. <https://doi.org/10.1080/03081060.2012.745757>

Image sources

Fig. 1: Data from Joint Research Centre (JRC) and European Commission, Directorate-General for Regional Policy;

Fig.2: Author's own elaboration;

Fig.3: Author's own elaboration;

Fig.4a: Author's own elaboration;

Fig.4b: Author's own elaboration;

Fig.4c: Author's own elaboration;

Fig.4d: Author's own elaboration;

Fig.4e: Author's own elaboration;

Fig.4f: Author's own elaboration.

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