Gender mobility and transport poverty

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The paper investigates the issue of gender mobility, both in isolation and in relation to transport poverty. Both issues have been the subject of studies and research, as well as innovative attempts to address them, in recent years. This paper aims to emphasise the importance of a gendered approach in analysing and developing policies to reduce transport poverty.

In recent years, both **transport poverty and gender mobility** have been the focus of studies, research and innovative solutions. Having access to transport options is vital for reaching essential opportunities such as jobs, education, shops and socialising, all of which affect people's quality of life. Mobility is essential for full participation in society and meaningful living. **The lack of mobility options is inextricably linked to social disadvantages and exclusion.** So are the inadequate transport facilities. The unaffordable costs too. And the excessive travel times. And the unsafe conditions. All of these things mean that people are unable to access opportunities, services, employment and social interactions. Attention has shifted towards the relationship between social disadvantage and mobility-related disadvantage, generating the term **'transport poverty'.**

Research demonstrates that gender is one of the key factors in accounting for differences in mobility and travel behaviour, with studies showing how gender influences not only how people move around but also how they travel. Women's ability to move freely is crucial for their empowerment, access to opportunities, and independence. However, they often face limitations in their mobility patterns due to entrenched cultural and social norms, as well as challenges in accessing transport (both private and public), infrastructure, and services. As women tend to be more engaged in childcare, domestic work, and caring for the elderly, they generally have more complex travel patterns that traditional commuter services do not properly address. Additionally, women face disadvantages related to safety issues when travelling on or to/from the transport system.

A growing body of literature on various topics related to transport poverty has been contributed to by several researchers, professionals and policymakers[1]. These topics include social and economic conceptualisations, the relationship between transport poverty and social exclusion, equity in public transport, transport and well-being, the psychological impacts of transport poverty and designing public policies for social fairness and justice. Vulnerable groups are particularly affected by transport poverty, which can have a significant negative impact on them. When contemplating the role of women in transportation, it is imperative to perceive them not merely as a distinct cohort of vulnerable users. We are referring to a significant proportion of the population, constituting approximately 50% of the total, whose mobility requirements are not adequately addressed within the framework of transport planning. Gender issues are made worse and more apparent by transport poverty, especially in terms of accessibility, affordability, availability, quality, safety and security for vulnerable users.

Therefore, it is essential to adopt a gender-sensitive approach when considering the specific mobility requirements of vulnerable user groups, including those with low incomes, the elderly, migrants, and people living in rural areas. In fact, half of these people are women, which will further affect their ability to access,

[1] See for example the critical and comprehensive review carried out by Christopher Lowans et al. (2021) https://www.sciencedirect.com/science/article/pii/S0140988321002668, the review from Kamruzzaman et al. (2016) https://www.mdpi.com/2071-1050/8/7/696, and the JRC study "Transport Poverty: A systematic literature review in Europe" https://publications.jrc.ec.europa.eu/repository/handle/JRC129559.

use and benefit from transport services. An example of how vulnerabilities are given rise to by the intertwining of the two dimensions of gender and transport poverty is represented by women living in rural or semi-peripheral areas.

The paper starts by providing a conceptualization of transport poverty and discussing its interlinkage with the gender dimension. In the second part, it presents the results of an in-depth analysis of women's mobility needs in the Salento peninsula, the easternmost and most remote part of the Apulia region in Italy, as carried out within the Horizon 2020 HiReach[2] research project and presents interesting insights into key issues and possible innovative solutions.

[2] HiReach (2017 – 2020) is a Horizon 2020 research project coordinated by TRT Trasporti e Territorio focusing on the development of new tools and business models to improve accessibility for special areas and communities. https://www.trt.it/en/PROGETTI/progetto-hireach/

Definition of transport poverty

Having access to transport options is vital for reaching essential opportunities such as jobs, education, shops and socialising, all of which affect people's quality of life. Mobility is essential for full participation in society and meaningful living. **The lack of mobility options is inextricably linked to social disadvantages and exclusion.**

The European Pillar of Social Rights, jointly proclaimed by the European Parliament, the Council and the Commission on 17 November 2017, places transport among the essential services to which everyone has the right to access (Principle 20). It also stresses that such services should be of good quality and that support for access shall be available for those in need.

In recent years, new research streams focused on the relationship between social disadvantage and mobility-related disadvantage, generating the term **'transport poverty'.**

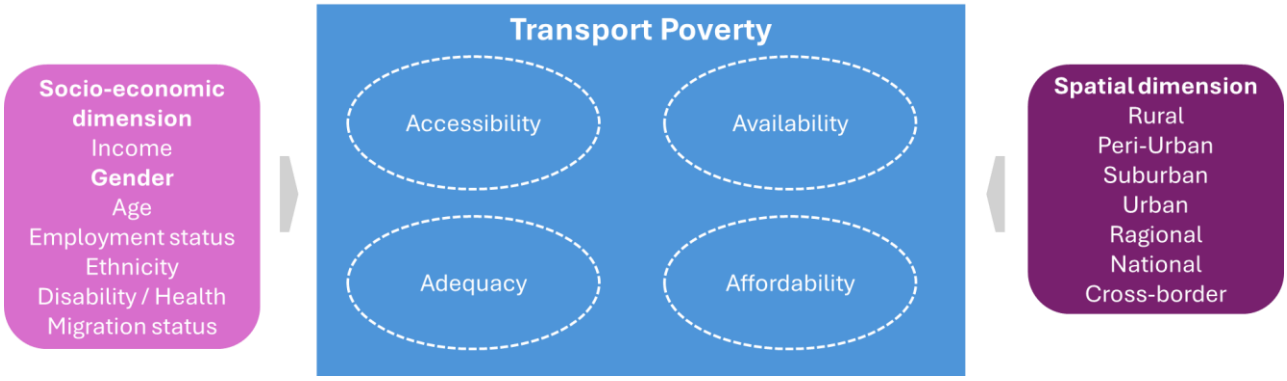
In 2023 the European Commission introduced the first and only Union-wide definition of transport poverty under Article 2(2) of the Regulation (EU) 2023/955 establishing a Social Climate Fund. According to this definition: *'transport poverty' means individuals' and households' inability or difficulty to meet the costs of private or public transport, or their lack of or limited access to transport needed for their access to essential socio-economic services and activities, taking into account the national and spatial context.*

In the light of this definition, *four dimensions* for transport poverty can be identified*:*

- ***Accessibility:*** It considers whether people can reach key services at a reasonable cost, in a reasonable time, and with reasonable ease. Accessibility poverty also involves a situation that severely restricts a person's ability to participate in the activities deemed normal in a particular society. Accessibility to transportation infrastructure can be limited due to geographical isolation, inadequate transport connections etc. Moreover, even when the transport system offers accessibility to essential goods and services, transport users can still face transport-related "**time poverty**" if it takes an excessive amount of time to reach these destinations.
- ***Availability:*** The presence and readiness of transportation options to meet user demand It essentially indicates the presence of transportation modes or services in a given spatial and temporal context. A household or individual faces availability issues when they do not have transport (options), public and/or private, available to them. Challenges in ensuring the availability of diverse transportation options generally include limited routes, infrequent schedules, and restricted modes of transport.
- ***Affordability:*** It refers to the "financial burden individuals bear in purchasing transportation services, particularly those required to access basic goods and activities such as healthcare, shopping, school, work, and social activities". Also, "transport poverty occurs when a person is forced to consume more travel costs than it can reasonably afford, especially costs relating to car ownership and usage". Transportation costs tend to be higher in certain geographic locations due to factors such as limited competition, higher fuel prices, and the need for longer routes, making transportation less affordable for residents.
- ***Adequacy:*** The degree to which transport systems and services meet established standards and criteria for reliability, efficiency, comfort, and convenience, while also ensuring the protection of passengers, goods, and infrastructure from harm, accidents, and malicious activities. This concept encompasses various aspects, including the reliability of transport networks, the comfort and convenience of travel experiences, adherence to safety regulations and protocols, and the implementation of measures to prevent and mitigate security threats and risks.

Besides the above-mentioned four dimensions, a correct conceptualization of transport poverty, should also account for the **socio-economic and the spatial dimensions** (European Commission, 2024) since the causes of transport poverty stem from low income and other systemic barriers, such as lack of access to affordable housing in the proximity of the workplace, educational facilities and essential services, geographic isolation, absence or limited availability of public or private transport or specific socio-economic, demographic and physical characteristics that limit individuals' ability to benefit from adequate transport services (European Commission, 2025).

Figure 1 - Conceptualization of transport poverty



Source: Authors' adaptation of Oeko-Institut and University of Manchester.

By taking socio-economic and spatial characteristics into consideration, the conceptualisation of transport poverty acknowledges that the phenomenon is experienced differently by different groups, who may have different mobility needs which need to be incorporated in policy design and implementation (European Commission, 2024).

Vulnerable groups (i.e. people with temporarily or permanent reduced mobility, children, young and elderly people, women, migrants and ethnic minorities, low income and unemployed) are particularly affected by transport poverty, which can have a disproportionate negative impact on them.

The gender dimension of transport poverty

Of importance is also the cumulative effect of several degrees of vulnerability to transport poverty. Indeed, individuals may fall into more than one single group. Typical examples include elderly people living in rural or deprived areas, or low income or unemployed women. These people are particularly vulnerable and exposed.

Lower employment rates, part-time roles and low-wage positions are the main factors which determine a sensible difference between women and men participation in the labour market. INPS's analysis of gender gaps in the Italian labour market shows an annual nominal wage differential of €5,200 (15.5%) between men and women in the public sector. In the private sector, the gender differential is even higher (approximately €6,000). This gap in the average annual income originates from different factors, including the different form of employment (part-time vs full-time). Data shows that in 2022 47.7% of Italian women were employed part-time compared to 17.4% of men, with Southern regions showing the highest share of part-time contracts for women.

It is also worth noting that the gender pay gap persists beyond the working life cycle, as part-time employment and lower wages impact on women post-working-age incomes with lower pensions compared to their male colleagues.

Women disproportionately shoulder unpaid care responsibilities, have in general less access to private vehicles than men and, also as a consequence of it, are more reliant on public transport or walking. Therefore, access to public transport is of paramount importance not only for fulfilling their mobility needs, but also for their empowerment and independence. They have also less free time than men being more engaged in family care and domestic work and are more likely to combine trips/make trip chains than to make separate trips. Women are also less likely than men to engage in 'extreme commuting', defined as a one-way commute of 90 minutes or more.

Poor mobility and access to transport, but also absence of properly designed public transport services fitting women needs (links and timetables) and unsafe transport conditions, can prevent women from fulfilling their mobility needs and entering the labour market or lead women to choose less profitable jobs because they are closer to home or easier to travel to.

Consequently, transport poverty has a relevant gender dimension, with women often experiencing higher rates of poverty than men.

Indeed, the abovementioned *four dimensions* of transport poverty are also often used to describe key aspects of women's mobility. In this context, *availability* (including reliability) and *affordability* are crucial for women with low income and no access to cars. Limited access to reliable and affordable transportation can restrict women's access to employment opportunities, education, and training, perpetuating economic inequality. *Availability* and *accessibility* of destinations are major barriers for those living in rural and deprived areas. In terms of *adequacy*, women often face safety and security risks when using public transport, including harassment, assault, and fear of crime, leading them to rely on more expensive, but potentially safer, private transport options or avoid traveling at certain times.

When contemplating the role of women in transportation, it is however imperative to perceive them not merely as a distinct cohort of vulnerable users. Women represent a significant proportion of the population, approximately 50% of the total, whose mobility requirements are not adequately addressed within the framework of transport planning. Gender issues are made worse and more apparent by transport poverty, especially in terms of accessibility, affordability, availability, adequacy of transport services for vulnerable users.

The case of Southern Salento

Women's vulnerability to transport poverty in peripheric regions and islands is even amplified due to the lower access to essential socio-economic services. This is the case of the southernmost part of the Salento peninsula, in the extreme south-east of the Apulia Region (Italy), which was investigated in the context of the European research project HiReach.

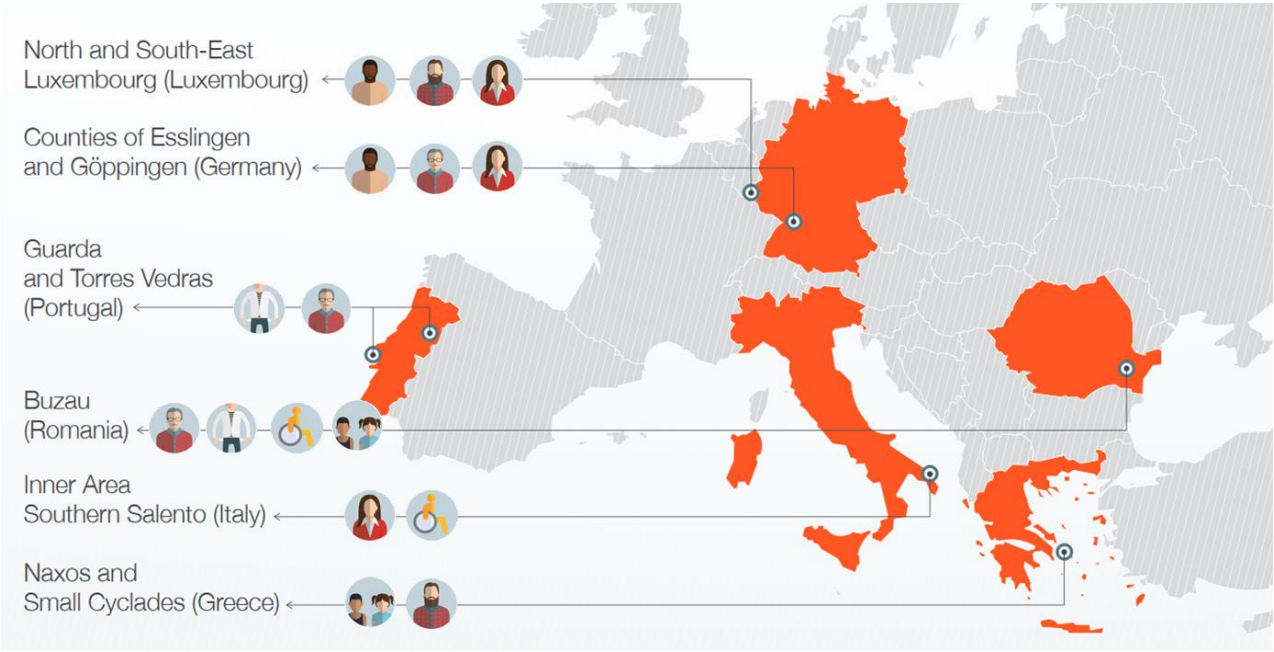
Funded under Horizon 2020, the HiReach project analysed and developed new tools and business models to improve accessibility and public transport in specific territorial contexts such as rural and peri-urban areas, city outskirts and disadvantaged areas. The objective was to aggregate and optimize individual, diversified and geographically dispersed travel requests to promote more inclusive and community-participated forms of mobility. To do so, HiReach relied on the understanding and analysis of different mobility needs with the direct involvement of the most vulnerable social groups such as:

- People with reduced mobility (temporary or permanent)
- Children and young people

- Elderly
- Women
- Ethnic minorities and migrants
- Low-income or unemployed people
- People living in rural or deprived areas.

The project involved local communities and institutions from seven European study areas: the municipalities of Guarda and Torres Vedras (Portugal), the city of Buzau (Romania), the district of Naxos (Greece), the region of Baden-Württemberg (Germany), some areas of Luxembourg and the Internal Area South Salento – Cape of Leuca in Italy.

Figure 2 - Communities involved in the Horizon 2020 HiReach project



The study area

"Southern Salento – Cape of Leuca" is an association of 18 municipalities, representing one of the many finisterrae of the European continent. It is a **polycentric scattered area** characterized by the presence of numerous compact historical towns but not villages nor isolated settlements. It can be classified as **remote peri-urban area** with the presence of coastal settlements and rural farms in the countryside. The main service node is the provincial capital Lecce that is 80 km far away from the most remote town.

The total number of inhabitants is about 70,000 in the inner area[3], and is almost double in the overall strategy area. The total area size is 469 km^2 with a population density of near 260 inhabitants per km2 and an average altitude of 120 m above sea level.

[3] The municipalities that are part of the official Inner Area of Southern Salento are Acquarica del Capo, Alessano, Castrignano del Capo, Corsano, Gagliano del Capo, Miggiano, Montesano Salentino, Morciano di Leuca, Patù, Presicce, Taurisano, Salve, Specchia and Tiggiano. Four additional municipalities, Tricase, Ruffano, Casarano and Ugento, are included in the wider strategy area being the main nearest "service centres" of the Leuca Cape.

No large infrastructure connects Salento territory with the rest of the world. The closest motorways start from Taranto and Bari and the national railway network ends in Lecce with no high-speed trains in service. However, recent investments and expansion of flights operating from the airport in Brindisi have partly reduced the gap.

The inner area is served by the local railway network of Ferrovie del Sud Est (FSE), taken over in 2016 by the national railway operator FS Group (Ferrovie dello Stato) due to financial problems at the local company. Created in the second half of the 19th century mostly to transport agricultural products, this non-electrified rail network is made up of different lines that cover almost entirely the provincial territory with its 55 stations (one every 5.3 km). The **rail infrastructure's potential for passenger transport was never fully exploited and the overall performance of the service is very low** (the load factor is below 15%) due to old rolling stock and lack of upgrade and proper maintenance of the infrastructure, including station buildings. The maximum speed is set by the national safety authority for railways ANSF to only 50 km/h[4] so that travel times are very long on almost every connection: the fastest train takes 2 hours to cover 66 km between the southernmost station of Gagliano del Capo and Lecce along the Adriatic line.

In addition, the competition from private transport, but also by inter-urban bus transport designed more as substitution than integrated with rail services, are the opposing elements that have prevented up to today a more intense use of the railway, the latter not always being able to provide a competitive service due to origins and destinations of trips.

Public transport by road in the area is managed by the regional consortium of PT operators COTRAP and by FSE buses (as substitutive railway services). **The bus network is not organized on a hierarchical basis and the service is often provided only to serve students with many overlapping bus lines**.

The Local Health Service (ASL Lecce) manages **special transport services for reduced mobility users.**

School transport for primary schools is organized and funded directly by the municipalities whereas secondary school students with reduced mobility can use special school transport services organized by the Province of Lecce.

The University of Salento provides a daily transport service to students with reduced mobility with only one minibus in the city of Lecce (from home or railway station/bus stop to the university and vice versa). Only one trip per week can be organized from outside the cities (provinces of Lecce, Brindisi and Taranto) depending on availability and capacity of the vehicle.

The wider theme of transport, particularly collective public transport, **was not part of the political agenda of local administrations for many years**. Now the level of attention is higher but there is a **lack of knowledge about its functioning and potentia**l, and thus in identifying proper solutions to be transposed in policies and actions. Still for many local politicians, public transport is seen as a component of tourism-related strategies or limited to school transport needs and not as a basic service for the society (i.e. for commuting purposes or for addressing transport poverty issues).

The Inner Area of Southern Salento was recognized with Resolution of the Puglia Regional Council n. 2186/2016 as an area that meets the requirements identified by the National Strategy for Internal Areas (SNAI), the national cohesion program that aims to intervene in some areas of the country characterized by conditions of demographic decline, population aging, great social and economic hardship through a dual type of intervention: strengthening local development processes by enhancing the potential connected to the rural economy, the environment, culture and tourism; rebalancing the offer of basic services with particular reference to education, health and mobility.

[4] The 50 km/h speed limit will remain in place until the line's modernization works will be completed as envisioned in the National Recovery and Resilience Plan and the Regional Transport Plan adopted with Regional Government Resolution No. 754 of May 23, 2022.

Mobility as crucial issue

All the participants at focus groups organised the context of the HiReach project identified mobility as crucial issue intercepting different dimensions such as access to work, education, family care and independency as well as affecting work-life balance. **Although the term and meaning of transport poverty were not known, awareness of transport poverty effects and conditions was very high.**

Focus group participants immediately identified the absence of proper public transport options as one of the main barriers affecting women's mobility. The overall perception among interviewees was that the collective mobility system is almost inexistent, inefficient and of very poor quality. This also inhibits the possibility of accessing social services for some vulnerable groups like elderly people living alone or immigrants without a car.

The following clusters of problems were identified during the focus group sessions.

- **Inaccessible places, in space and time.** Focus groups participants considered Southern Salento quite difficult to be reached (both by car and by public transport) and - also within the area - relatively close destinations can be reached with long travel times . In this respect, they were aware of the **remoteness of the area** and recognized it as a barrier to the development of local economy and tourism.
- **Imbalance in managing work-family life and leisure time.** Participants reported of a lot of time needed and invested in car mobility and of the difficulty to reach the right balance between work, family care and leisure time. Men's contribution to family care is generally limited, and children are not autonomous in their daily mobility needs, e.g. to go to school or to meet friends in the evening. Thus, parents need to carefully coordinate their work and family life especially in relation to their mobility needs. Also, both women and men tend to give up social and leisure activities as it means additional car trips. One participant stated: "***if you drive a lot for working purposes and for family reasons, you tend to avoid additional car trips for leisure and social activities (e.g. meet friends)***".
- **Limitation of opportunities (for women and for their family).** Another aspect highlighted during the focus groups was that people living in Southern Salento have **limited choices in terms of job and education opportunities**. Most of the times they must commute long distances (e.g. to reach the provincial capital Lecce). Unemployed women often give up their training opportunities or first employment because they are not used to driving or there are limited public transport options. Young women have no incentives for attending distant trainings or schools thus compromising their future job/education opportunities and personal growth.
- **Difficulties in reaching healthcare and counselling services.** Elderly women have many **difficulties in accessing healthcare and social services** because of transport poverty. A participant working in the local healthcare service in Gagliano del Capo also reported of pregnant women from ethnic minorities facing many problems in reaching hospitals and other local healthcare services because they have no access to a car and there is no public transport either.
  Women at risk of violence have difficulties accessing anti-violence supporting and advising services. They do not have the possibility to move autonomously due to the absence of mobility options. Some of them live in rural areas, others do not have a driving license or cannot use the car because it belongs to their husbands.
- **Unsafe places and anxiety when driving.** Moving from a small town to a main "service centre" like Tricase or Casarano, for example for accompanying children to sports or cultural activities, means passing through other towns. Changes in traffic rules (e.g. one way directions) with poor or absent signage were indicated as an element creating **difficulties in driving across towns**, especially with kids on-board. Also, absence of proper lighting on secondary roads or police controls creates a sense of unsafety. Several times the discussion referred not only to the participants' own needs, but also to those of their relatives. The absence of public transport options **forces young people to use private**

cars (as drivers or passengers of driving friends) and this creates anxiety, stress and concerns among parents. Also, women who travel alone on public transport do not feel safe and secure.

The activity with the focus group clearly showed that the lack of *available, accessible, affordable and adequate* public transport options in the study area is one of the main barriers affecting women's ability to travel, preventing them from being independent and making them more prone to social isolation. Without a car, many places in the entire province are inaccessible. This especially holds for immigrant women who need to reach local health services or for the users of the anti-violence centres.

However, even women who can use their own car expressed dissatisfaction: cars can be a convenient means of transportation, but participants reported being "forced" to use them and using them excessively.

Potential solutions to women's transport poverty in the area

When discussing about potential solutions, participants to the focus groups not only called for improved public transport options (e.g., more frequent and faster trains or express buses to reach more destinations), but also immediately identified more **flexible, on-demand minibus services as the most appropriate solution for traveling within the inner area**. Considering that this type of service is not available in the region, this was somehow surprising to the facilitators of the focus groups **demonstrating the population's knowledge and awareness of alternatives beyond those offered by traditional scheduled public services**.

The facilitators then conducted an exercise presenting **four innovative models of flexible services** in place in other European context - including as well solutions closer to the needs of the southern Salento region - asking participants to select the most interesting one. The presented options were:

- **Local Link**, a rural transport program active in Ireland since 2002. With nearly 900 drivers serving almost 2 million passengers, the scheme was providing a year-round transport service in 17 sparsely populated areas, where public transport stopped operating due to low levels of demand.
- **PickMeApp**, an on-demand transport service offering a mobility solution specifically tailored to children, elderly, and disabled people. It offered a door-to-door service, with online booking and payments, and GPS traceability through a special bracelet also in the Italian cities of Potenza and Salerno.
- **Boleia**, a ridesharing/car-pooling platform developed by a small Portuguese company and distinguishing itself by not receiving any commission payment from the final users. Its business model relied on big employers, cities and events to whom Boleia was collaborating to offer tailored platforms.

  Dörpsmobil, an e-car sharing solution launched by the Mayor of the small municipality of Klixbüll in Germany. All members of the founding carrier organization (a registered local association) were using the service: residents, employees of local companies and of the municipality, thus guaranteeing a minimum usage of the vehicle to financially sustain the scheme.

An interactive session encompassing a questionnaire and a follow up discussion on each option allowed to collect the following reactions.

Local Link

In terms of usefulness, the answers to the questionnaire ranged from being neutral for its potential to reduce travel times to more disperse - but still positive - answers in relation to other elements like improvement of the public transport offer and its quality. During the discussion, the element of being **a service adapted and built around the effective needs/demand was particularly appreciated**. None of the participants had experience in using such kind of service, particularly for flexible/demand-responsive services but also more in general of public transport. Reasons were identified in the total absence of a proper public transport offer

but also in the absence of information related to existing services that make participants unable to describe the current public transport system.

For Local Link the characteristics of having **one single inclusive mobility solution instead of diversified services for vulnerable groups** (e.g. kids, disabled) was perceived as very positive, especially in consideration that for such categories the service was totally free.

Respondents indicated **a substantial trust in the Local Link scheme,** and this was confirmed also during the discussion when several positive elements of the service were highlighted, particularly in relation to the visual identity, clarity of the timetables and communication campaigns. In the discussion several opinions converged towards the service as typical public transpirt offer (to be established and secured in its quality and standards by local authorities) allowing interconnection with other modes and particularly with local trains.

During the final discussion, a key point was raised on the **overall governance behind the Local Link scheme, i.e. the local offices managed by the communities (volunteers-run)**: this aspect was seen as positive but **not properly replicable in the local context** because of a perceived scarce capacity of self-organization from the local communities (*"it's a very good approach and idea but we are not ready to cover these tasks and responsibilities"*). Participants suggested that a Local Link Office could be more easily managed by some "intermediary bodies" like the Local Action Groups (GAL in Italian), public-private partnerships already existing in the region. This element was also linked to the consideration that for a number of local services the local authorities already make large use of volunteers, often not properly recognizing the importance of their work. They argued local authorities should guarantee proper funding and balance among professional and volunteer contribution to public services in general.

Dörpsmobil

The solution of Dörpsmobil was evaluated very positively with reference to certain elements like the service being operated with an **electric car (environmental concerns)** and **the sharing principles behind the scheme (more community-based and not a commercial service)**. They considered this type of initiative as very positive to increase the sharing culture in the area, also because it transmits a positive image of local community (sharing items and collaborate to support each other). This can be confirmed also from the answers related to perceived usefulness, usability, and trust even though nobody used such kind of service in the past.

In relation to the impact of use, the answers revealed a more neutral attitude. This can be explained by the **fact that all respondents were already car owners/users thus less prone to imagine themselves selling one of their cars to shift to car sharing**. The service was more evaluated as "additional" and not "substitutive".

Another barrier in relation to Dörpsmobil applicability to the area was seen in the **scarce availability of charging points in small villages**. Additionally, the managing scheme (i.e. the car club self-managed by the members) was seen as a barrier in the area.

The possibility of using the car sharing scheme also as "ridesharing" with someone available to drive and chauffeuring was seen as positive particularly for elderly people. A direct reference to those persons not owning a car (or not having its availability) was made as **positive element to reduce social exclusion**.

PickMeApp

In relation to PickMeApp, the main element to highlight is the attitude of women to evaluate and consider its key characteristics and advantages not directly to fulfil their primary needs, but more considering **the needs of their kids and elderly members of the family**.

They really appreciated the **tracking bracelet as a tool for allowing autonomy for their kids.** Additionally, the participants highlighted their concerns about safety of young children and daughters, especially if they own

and/or use mopeds, including those of friends: *"I am particularly worried for them using the mopeds especially during the summer season… from Tricase to the sea the provincial road is very dangerous so that I prefer to chauffeur them everywhere".*

Definitely, the **flexibility of the service** was identified as its main advantage as well as the different functioning characteristics. It is also worth noting that **elderly women confirmed their preference for the call centre instead of the App**. On the contrary, no difficulties nor barriers were declared by the rest of the group.

Also, women being employed or self-employed stated their **willingness to use the service also for commuting trip,** thus confirming the attitude of being dissatisfied in their current excessive car usage (that is more "forced").

Elderly women confirmed their willingness to pay is very high: the cost of their autonomy is considered to be fair according to the price list of PickMeApp. They stated they could definitely be frequent users of the service.

When discussing about the service, several participants made reference to already existing ride hailing transport services (offered by private local operators) to pick up elderly and people with particular health conditions from their homes to the very close thermal bath centre of Santa Cesarea Terme.

The service is sometimes managed in a very informal way (with people calling the operator by phone) also for certain trips to health centres and hospitals even if the Local Health Service can provide the transport option for free.

When looking at the questionnaires, answers confirmed a **positive evaluation of the perceived usefulness, the flexibility of the use, and especially trust in how the service** is organized and presented (they made reference to the drug test and constant checks of the affiliated operators from the startup). There was also a convergence in the final answers towards the effect of an increased mobility because of the introduction of PickMeApp in the area and definitely the prices offered on the market were not evaluated as a barrier or an increase in their monthly budget for transport.

PickMeApp was seen especially by elderly participants as a way for being more autonomous and independent although this particular segment expressed no interest at all towards the digital components of the solution.

Boleia

The suitability of Boleia revealed **different views** from the participants. They knew BlaBlaCar and some of them declared they have also used the platform for long distance trips. One participant with a French husband highlighted that he used carpooling in France also for short distance trips and that in general she thought this is linked to "the more pronounced sharing culture" in that country (***"they have got used to sharing cars, bikes, etc. it's matter of mentality and this is not the case here in Salento".***

Several participants agreed on the fact that in Southern Salento there is still a kind of **prejudice towards the idea of sharing things and this includes rides and the costs associated to car trips and not only the costs associated with the car itself.** In this regard, participants argued that also a more structured carpooling platform might encounter difficulties in attracting new users while on the contrary the scheme is well known and used within more informal and "close" communities (friends, family).

Also, one participant raised the issue of "**security**" in case of a service like Boleia or BlaBlaCar available in a wide area: she argued she will definitely use carpooling on shorter distances but only in urban areas and not in Southern Salento or similar territories. **The perception of the risk of being harassed in a rural road was very high and almost all the participants converged towards this main barrier.**

The Nemi pilot

On the basis of the feedback collected in Italy and in the other European case studies, in March 2019 HiReach launched a Startup Lab involving 25 European startups to select five finalists for evaluating their mobility solutions in real conditions. The inland area of South Salento, with the support of the Puglia Region, collaborated with **Nemi, a Catalan startup** that provides digital solutions for flexible public transport services capable of improving mobility in low-density areas.

Nemi is a full stack app to enable the operation of Demand Responsive Transport (DRT) services both to improve existing lines with low demand and to reach areas where public transport cannot provide a valid solution. The platform consists of a routing algorithm and different interfaces (user, driver, and back-office) that allow citizens to book seats on DRT vehicles, indicating the origin, destination and time of the desired trip. The available options are determined by virtual stops and timetables previously defined with the competent public authority.

Thanks to HiReach - and after the full involvement of local authorities and communities - **the first on-demand transport service in South Salento was launched and tested with Nemi**, also thanks to the collaboration of the local Ferrovie del Sud Est.

The test took place during the summer of 2020 and involved a series of preliminary activities, including the translation of the platform into Italian and obtaining authorization to carry out the experimental activity through the local public transport regulatory authorities (Puglia Region and Province of Lecce).

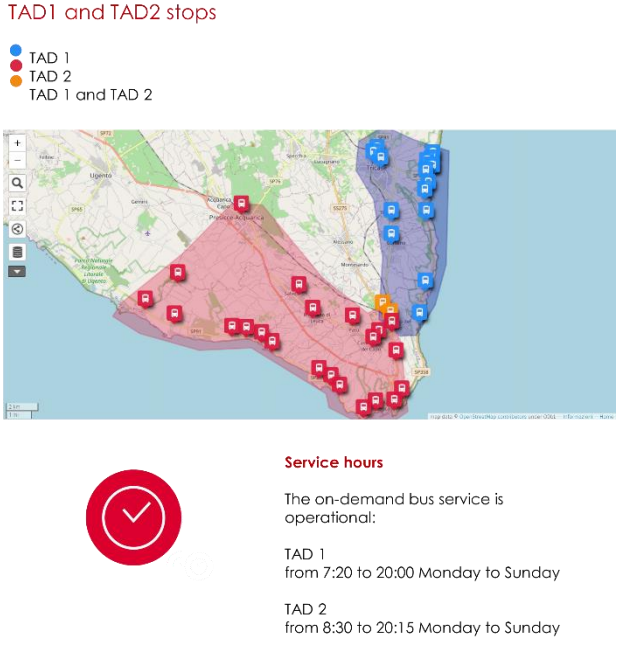
The main objective of the test was to verify the feasibility and operational management of an on-demand transport service in a rather large inter-municipal area. The focus was therefore on the **planning and design activities of the service** while the operational phase took place for only 30 days from mid-September to mid-October, about a month later than planned.

Two lines were designed (TAD 1 and TAD2) with different ranges of action/operation: more limited in the Adriatic area from Tricase to Gagliano del Capo and wider from Santa Maria di Leuca to Presicce-Acquarica on the Ionian area. Both lines converged on two interchange stops in Gagliano, one of which was at the railway station.

The identification of the stops was partly made through the use of existing stops of local public transport bus lines, partly through virtual stops.

The next activity involved the construction of the operating program of the lines: some fixed theoretical departures from the termini were set (with trips activated only in case of requests) and all the possible combinations between the stops were elaborated by calibrating the travel times within a maximum interval of modification of the timetable initially communicated through the App equal to 15 minutes in advance or late.

Figure 3 - TAD service piloted in HiReach



The Flexi TAD service

In continuity with the activities already carried out within HiReach, in 2022 the local authorities of the Southern Salento Inner Area decided to put forward a more structured “demand-aligned collective transport system” (TAD) project for the area with the aim of promoting internal mobility, social inclusion and accessibility of the municipalities of Capo di Leuca with respect to the main service centres and the provincial capital.

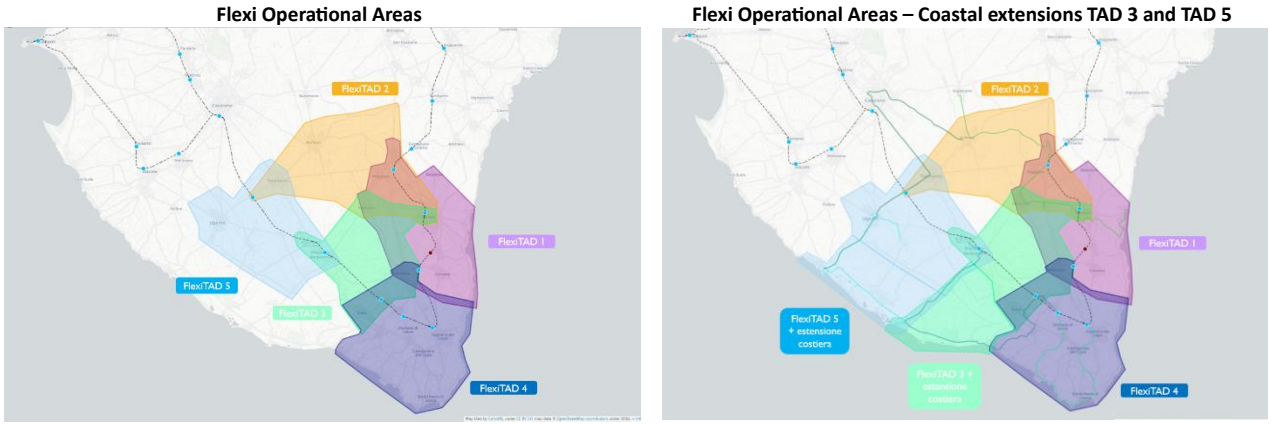
The project[5] consisted in the optimization of existing public transport services, in their enhancement and in the activation of new flexible collective transport services (on request or on call) capable of serving several neighbouring municipalities and gravitating around one or more interchange nodes and/or access to some key services: service centres of the strategy area, school and health centres, railway stations and medium and long-distance bus stops. Three macro-actions aimed at defining: (i) interventions to speed up and improve the level of service in the connections between the strategic area, the provincial capital and the main service centres outside it (first level network); (ii) additional “second level” services based on fixed lines to strengthen internal connections to the strategic area to and from interchange nodes, school and training centres, health and social care centres and coastal locations; (iii) additional “third level” services based on entirely flexible lines (FlexiTAD service).

The “third level” services FlexiTAD are designed as completely flexible on-demand transport service with routes and timetables variable and adapted to real demand, supported by advanced booking via Nemi app or call center. Five optimal operating areas served by minibuses (8 seats) have been identified:

- FlexiTAD 1 Tricase
- FlexiTAD 2 Ruffano
- FlexiTAD 3 Presicce-Acquarica
- FlexiTAD 4 Castrignano-Patù
- FlexiTAD 5 Ugento

The FlexiTAD 3 and 5 areas also include some coastal extensions operational during summer in the evening time slots.

Figure 4 – Flexi TAD operational areas



[5] The project was developed in synergy with the drafting activities of the Sustainable Urban Mobility Plan of the Internal Area of South Salento and in integration with the infrastructural project called "Planning and design of enhancements of connections of the secondary and tertiary nodes of the internal area of South Salento-Capo di Leuca - Improvement of accessibility in urban centres crossed by transport on demand (TAD) and elimination of bottlenecks in the main network infrastructures", financed within the scope of action 7.2 of the POR Puglia 2014-2020.

The first trial in Patù

Following the project design, in summer 2024 the first TAD service connecting Patù with S.Gregorio, Felloniche and the railway stations of Barbarano and Gagliano was launched for an initial test[6].

Figure 5 – 2024 Flexi TAD service promotional leaflet

To book the FLEXI service, the user must download the Nemi app from the App Store or Play Store and create a personal account. Rides must be booked in advance (from 7 days to one hour before the desired departure) through the app or by sending a message to a free Whatsapp number.

Once logged in, the user can easily choose the departure and destination stop from a dropdown menu or select the stops directly on the map, using the zoom to view them all. Then the user must indicate the number of seats (maximum eight people), day and desired time, specifying the number of seats requiring assistance for disabled people. It is also possible to track the movement of the minibus in real time via the app, which also warns of the arrival at the stop or of any changes to the timetable.

[6] Project funded by the National Recovery and Resilience Plan (PNRR) "Patù inclusive village - Inclusion, hospitality and proximity welfare".

Figure 6 – Flexi TAD App interface

The service was free for some rides and paid for on other less requested or on uncovered time slots. Tickets could be purchased through the app or on board the minibus. Suggestions and complaints could also be sent via the Nemi app.

The Flexi Patù users grown steadily to reach about 120 active users until the end of the testing period, the vast majority booking the service via the Nemi app. The service operated on average 13 runs per day, with runs mainly during three time periods: 7:00-10:30; 12:00-13:30; 16:00-19:00, peaking up to 77 passengers transported in a day.

The good response to the flexible service at the local level has led to its extension to 2025, albeit limited to the summer period only, due to limitations related to funding resources.

Figure 7 – 2025 Flexi TAD service promotional leaflet

Conclusions

The HiReach Project highlighted the need to better investigate mobility needs of social groups most exposed to transport poverty in the South Salento area. This led not only to a pilot testing during the duration of the project, but also to extending the piloting phase to subsequent years, even in the absence of European project funding. Although representing still limited and partial attempts to improve mobility, these pilots gave visibility to promising alternatives to traditional public service models and contributed breaking established patterns in the operation of collective transport services.

The need to address mobility needs through an integrated transport service model has been identified. Traditional (scheduled) services alone are inadequate to meet the demand of individuals with specific mobility needs. Flexible services, integrated within a hierarchically relevant public transport service, can be one of the responses to the mobility demand of the most vulnerable groups and therefore capable of resolving the economic and territorial imbalances that determine the structural conditions of transport poverty.

Experiments with on-demand services require more careful monitoring of their effectiveness, both in terms of served demand and its stratification. The technological systems associated with the operation of the TAD booking systems are largely capable of bridging this gap and providing more comprehensive information regarding user profiles and their travel needs (purposes, itineraries, etc.).

The issue of data collection disaggregated by service users and, more generally, of information on mobility demand by user groups is a general issue that goes beyond monitoring public transport demand. Overcoming the information deficit related to gender-specific mobility demand is a prerequisite deserving greatest attention.

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