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Ligurian transfer: when territorial constraints may hamper mobility policies replicability

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Abstract
Within EU, policy transferability is pivotal. Nevertheless, best-practices' approach has proved ineffective for fragile and peculiar regions. In terms of mobility policies, Sustainable Urban Mobility Plans constitute one of the main EU-led tools larger cities were provided to define context-based actions, later spreading to wider regions, according to the reading of EU system as a polycentric intertwined network, where main hubs connect higher and lower layers. Nevertheless, not all EU regions show this territorial model. Liguria, North-Western Italy, does not: its geo-morphological asset has deeply influenced urban and infrastructural development. The definition of a user-centred perspective, turning from a case-study to a use case approach, contributes shaping inductively tailored solutions. Present perspective may contribute to identify similarities in needs and requirements, thus supporting policies up-scaling.

Key-words: mobility policies, user-centred, use case methodology, place-based

1. Introduction
As the official motto states – *United in diversity* (European Union, 2000) – European Union strategic mission as policy maker is to build shared background, structures and policies able to both respect Member States peculiar cultures and identities as well as define a common approach towards challenges they all need to face.
Best-practices transfer appeared to be, in this direction, the most suitable initiative to meet similar double-layered goal. Descending from private business' world where in the 1960's companies aimed at enhancing performances and consolidating competitive advantage (Jarrar Y. and Zairi M., 2000), similar approach was later extended to support replicability of solutions, policies, actions or procedures within different territorial contexts facing comparable issues, especially whenever planning and mobility initiatives are concerned (Macmillen and Stead, 2014).
Similar choice did not aim only at supporting policy transferability, but played also a significant role in the implementation of evidence-based actions, thus legitimating public decision-making and governance (Ettelt, Mays and Nolte, 2012). Best-practices replication appears indeed to be extremely suitable also in terms of public expenditure rationalisation, thus reducing variability and uncertainties related to experimental steps (Marsden, 2011). This territorial "legacy" supports therefore regions and cities in policy-making processes to capitalize on foreign successes and avoid mistakes repetition (Stead, De Jong and Reinholde, 2008). Exchange network and formats therefore boosted within EU borders, later defined as a "massive transfer platform" (Radaelli, 2000). Increased efficiency and evidence-based approach guided indeed deeply different contexts and regions to reproduce winning experiences implemented elsewhere (Blake *et al.*, 2021), thus providing best-practices a unprecedented pivotal role among policy-making tools (Vettoretto L., 2009).
Nevertheless, their de-contextualizing effect has been also harshly criticized (Vettoretto L., 2009), since actions' effectiveness has been more and more related to context-specific features (Stead D., 2012).

In this direction, progressive EU extension East-ward increased inter-regional differences and variety, so that policy-transfer approach needed to be updated (Hospers, 2005). Regional peculiarities progressively gained relevance in this mechanism, so that innovation and competitiveness started to be promoted and boosted through local features valorisation, following the concept of the so-called *learning regions* (Morgan, 1997). Regional identities gradually acquired indeed larger spots both referring to policies and politics spaces (Salone, 2010), thus increasing structural resources to locate themselves on the map.
After policy transfer and replication showed their weaknesses, networking among cities and regions seemed consequently the most proper way to foster local innovation and development (Stuck, Broekel and Revilla Diez, 2016), thus contrasting isolation risk. Main hubs and secondary nodes were therefore identified to support territorial complementarity in driving regional competitiveness.
As far as transport and mobility policies, similar reasoning may be found at the basis of both infrastructural (TEN-T network) and governance (SUMPs) initiatives.
Large cities are therefore required to drive smart and green transition of their reference region, thus relying on smaller centres supporting progressive spreading of the actions.
Nevertheless, not all regions show similar territorial and urban structure, where both vertical and horizontal complementarities contribute in achieve effectiveness performance thresholds.
Ligurian regional asset and structure for instance show not to match present model.
Is it therefore possible to conceptualize different approach towards mobility and transport policies for those contexts where unusual spatial patterns hamper policy up-scaling?
Present contribution aims indeed at highlighting how user-centred approach may help fragile and peculiar regions towards sustainable mobility goals. In details, conceptual shift from a case-study to a use-case methodology will be addressed.
To this aim, mobility policies and EU-led initiatives will be investigated in terms of territorial governance and implementation mechanisms (Section 2), in order to evaluate potential mismatches with Liguria and Genoese asset (Section 3), thus framing potential benefits coming from the shift from a case-study to a use-case approach. In this direction, potential system requirements would be pointed-out (Section 4) to finally evaluate how similar user-centred approach could contribute to overcome existing barriers in terms of mobility policies up-scaling (Section 5).

2. Mobility policies and territorial complementarities

Since the very beginning of common transport and mobility policies, large urban areas have been targeted as key-actors to face EU strategic challenges. Similar responsibilities were mainly due to their weight in terms of socio-economic phenomena, related traffic flows attraction and generation, as well as of energy consumption and emissions production (Harris *et al.*, 2020).
Increasing commitment of EU to mitigate transport-related externalities, supporting sustainable transition of territorial systems, met a significant change in 2013 when both *Guidelines for the development of the Trans-European Transport Network* (European Union, 2013) and *Urban Mobility Packages* (European Commission, 2013) -and consequently *Sustainable Urban Mobility Plans* (SUMPs)-were introduced.
It is therefore evident that on the infrastructural as well as on the governance and planning side, urban hubs were targeted as main drivers of EU-scaled transport and mobility initiatives. Their strategic intertwining was therefore remarked in 2021 when

TEN-T network was revised, and 400 cities constituting the nodal structure of the network were required to design and approve SUMPs in order to ensure transport infrastructures full and effective implementation (European Union, 2021).
As far as sustainable mobility planning is concerned, EU initiative -initially launched in 2009 (European Commission, 2009), supporting progressive consolidation of SUMPs- aimed at collecting experiences descending from voluntary commitment of European cities to foster subsequent best-practices transfer.
Nevertheless, EU monitoring of the databases showed that smaller municipalities (counting less than 100,000 inhabitants) had weakly participated in SUMP programme, due to limited human and material resources to be dedicated (EU Urban Mobility Observatory, 2021). In this direction, White Paper in 2011 (European Commission, 2011) suggested that municipalities over that threshold should be required to draft SUMPs on a mandatory basis, thus conditioning the allocation of regional and cohesion funds (Torrisi *et al.*, 2020).
Specific guidelines for small municipalities were later published, to support widespread transfer of best practices, at the same time topic guide for metropolitan implementation of SUMPs (Chinellato and Morfoulaki, 2019) was introduced, thus stating that similar up-scaling is not feasible through standardized, *one-size-fits-all* solutions. It is therefore evident that present transfer strategy relies on the potential of larger cities to design innovative actions to be later extended to wider metropolitan and regional contexts. Nevertheless, past SUMPs history has shown that not all territorial *milieu* prove to be equally successful (Klausen and Szmigiel-Rawska, 2017).
In this direction, potential explanation could be derived from different territorial networks model. While Christallerian and interconnected networks (Dematteis G., 1994) benefit from both vertical and horizontal complementarities among smaller and larger centres (Figure 1), thus feeding regional hub and spoke system, territorial contexts where strong polarisation is present may face significant challenges (Lang *et al.*, 2022).

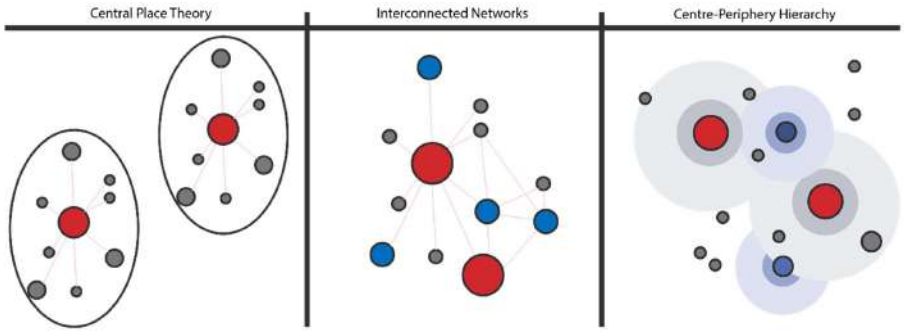

Figure 1. Territorial networks model

In parallel, it is necessary to point-out that SUMPs programme identify several mobility enablers, in order to support multi-modal integration, green and digital transition. Among these several bottom-up mechanisms (such as Mobility Management and Mobility-as-a-Service) are targeted to support bottom-up mechanisms whenever top-down approach fails in the up-scaling of policies (Timms, 2011). User-centred perspective is indeed gaining relevance to overcome planning barriers related to

administrative boundaries, layered and complex urban flows management, conflicting interests and prevision.

3. Genoa: using case-studies or studying use cases?

In this section we introduce the case study: the city of Genoa, Italy, and its role in determining travel in Ligurian Region. Through the experiences gained from the pilot projects and policies implemented in the metropolitan city area, strengths and weaknesses in the scalability on a regional scale will be identified.
To that purpose, through the models of networks and territorial nodes, limitations in the regional development of mobility policies in Liguria are traced.
Finally, a use-case methodology is introduced through which to structure the proposal in the next section.

3.1 Case Study And Regional Mobility

The case study that is the subject of this paper is the municipality of Genoa and by extension of mobility policies the region of Liguria, located in the north-west of Italy. Genoa is the main city of Liguria and with more than 500,000 inhabitants it accounts for more than 35 percent of the regional population.
Liguria is an Italian region consisting of four provinces: Imperia, Savona, the Metropolitan City of Genoa and La Spezia (Figure 2). To the north and south, it is delimited by two physical boundaries: the Ligurian Sea and the Alpine-Apennine arc. This territorial conformation also determines the compressed shape that Liguria possesses and explains its infrastructural systems, with a coastline and three pass lines to the north.
The region's main urban centres are located along the coastline and, in line with the classification provided by the National Strategy for Inner Areas (Agenzia di Coesione Territoriale, 2013), 43% of Ligurian municipalities are unable to reach an urban pole capable of providing the necessary services in less than 20 minutes (Istat, 2021). Moreover, in terms of employment rate they achieve significantly lower percentage values than urban centres - poles, inter-municipal poles and belt poles (Istat, 2021).

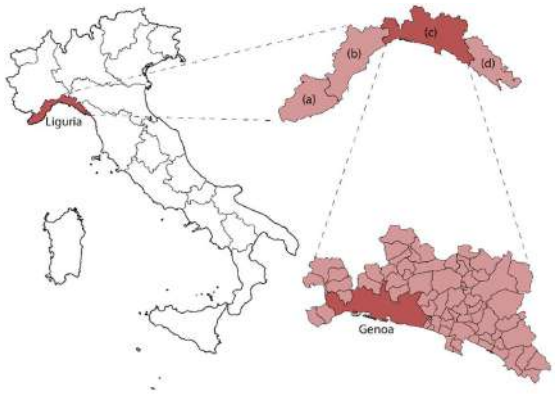

Figure 2. Case study location in relation to Italy. Imperia province (a), Savona province (b), Genoa Metropolitan Area (c) and La Spezia province (d).

Administratively, Liguria borders France to the west, Piedmont and Emilia Romagna to the north and Tuscany to the east. The infrastructure network - motorway and railway - converges on the Genoa node where the presence of the port - freight and cruise - is a determining factor in the Genoese and regional economy (Autorità Portuale di Genova, 2017). In fact, the induced industries activated by the port sector generate over 10 percent of added value and 8 percent of regional employment (Autorità Portuale di Genova, 2017).
All these factors turn out to be decisive in the definitions of the mobility habits of Ligurian citizens, strongly dependent on the need to reach Genoa, a city that plays a barycentric role in the determination of daily travel motives. The Liguria Region itself has published a report analysing regional mobility through data processed by the Vodafone Analytics service(Regione Liguria, 2020). Although the report describes a pre-pandemic situation, it can be considered representative of the current situation, not in numerical terms but in the definition of descriptive trends.
As emerges from the histograms shown in Figure 3, Genoa assumes a centralising role in mobility because it generates and attracts travel numbers hardly comparable to those of other Ligurian destinations, both in the off-season - November - and in the peak-season - August. It is interesting to point out that the city of Genoa exceeds one million trip-days; therefore, relating this number to the number of inhabitants makes the central role more evident than the whole Ligurian population.

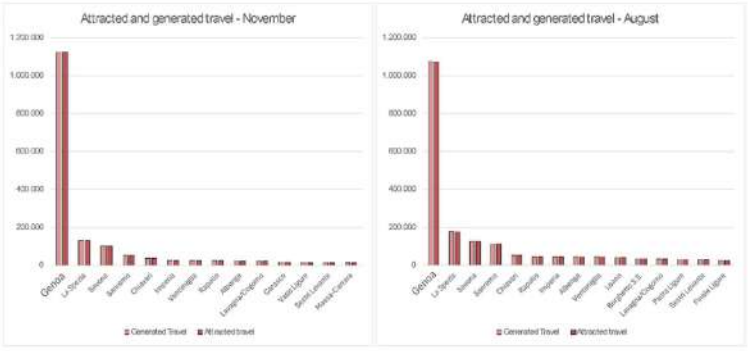

Figure 3. Number of travels generated and attracted in one day by Ligurian municipalities in November and August. Source Regione Liguria (2020), graphic reworking by the authors.

This is most evident when reading the desire lines, the tracks that indicate the movements according to the origin-destination pattern and assess their extent. In Figure 4, the month of November 2019 is taken as a reference and some singularities are highlighted: two areas of disconnection, one between the provinces of Imperia and Savona and one between the Metropolitan City of Genoa and La Spezia; furthermore, the city of Genoa centralises the displacements.
The Metropolitan City of Genoa adopted a SUMP in 2019 (Città Metropolitana di Genova, 2019), through which it determines the strategies and actions to be pursued and monitored in the following years. One part of the proposed actions focuses on the mobility of goods and people within Genoa's urban boundaries. A second part concerns strategic actions to optimise commuting to Genoa. In the latest version of the PUMS the line of strengthening and adapting the urban transport network for people and goods continues, with a strongly focused vision on local public transport (Città Metropolitana di Genova, 2023). In addition, MaaS - Mobility as a Service -

experiments are mentioned for the entire Metropolitan City of Genoa in order to stimulate the development of technologically advanced solutions for travel management and the various mobility services in the area (Città Metropolitana di Genova, 2023).

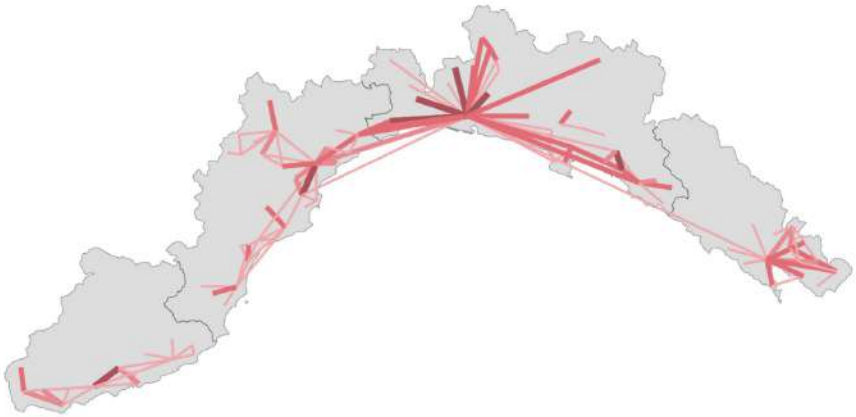

Figure 4. Map of Liguria's desire lines in November, line size and colour are proportional to the number of travel-days. Source Regione Liguria, (2020), graphic reworking by the authors.

Finally, it is recorded that the city of Savona is beginning the process to adopt its own SUMP (Comune di Savona, no date) and the city of La Spezia has adopted a municipal SUMP (Comune di La Spezia, 2018). In both cases it is emphasised how, despite the non-compulsoriness imposed at national level for the adoption of PUMS, the two municipalities represent two virtuous attempts to adapt to the new sustainable mobility standards. However, it must be emphasised that they are limited to the municipal territory and do not include the entire province in the planning of strategies.
Hence, it can be stated that the mobility policies at stake mainly concern the Metropolitan City of Genoa and describe localised actions on the main urban system and promote its accessibility. Therefore, the successful attempts found at the urban level have not been activated at a larger scale, so the areas surrounding the large urban centres are excluded from the provincial and regional scaling up of mobility actions.

3.2 Regional Limitations

In the previous subsection, actual shortcomings in the transition of mobility policies and winning actions from the urban - Genoese - to the larger - provincial and regional - scale were highlighted.
In line with what has been described by Dematteis (1994), it is demonstrable that Liguria can be ascribed to a polarised model in which Genoa is the centre around which the other municipalities gravitate, for different reasons. Therefore, service levels decline with distance from the centre and actions produced and designed for the centre are hardly redistributed.
Through Figure 5 we describe the territorial limitations in the direct application of the theoretical model of territorial development just specified. In fact, in Liguria, in the first

instance morphological limitations invalidate the regular extensibility of policies; to these are added the borders and administrative subdivisions. The presence of the Ligurian Sea to the south and the mountain arc to the north limit the distribution and incidence of policies and services from a circular model to a west-east linear model.
This theoretical simplification has a representation in reality if the infrastructure structure endowed to the region and described above is visualised.

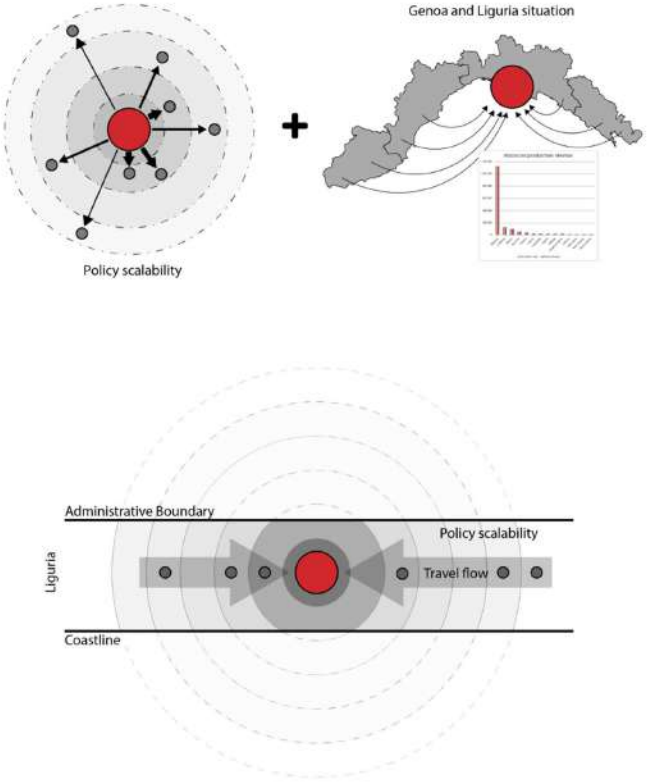

Figure 5. Theoretical application of the polarised model to the Ligurian case. The result is a limited linear distribution against the mobility towards Genoa.

According to the literature, the increased responsibility attributed to metropolitan cities in the exportability on a territorial scale of their policies faces resistance from other levels of governance that attempt to maintain their decision-making autonomy (Chinellato and Morfoulaki, 2019). This is evident from the administrative composition of Liguria, a border region composed of four provinces each dependent on its capital, as a point of convergence of the shifts that emerged from the desire lines (Figure 4). Therefore, it can be said that the greater the distance from Genoa, the more difficulties there will be in the exportability of mobility policies adopted at the local Genoese level. This is more apparent if one adds to the territorial description also the travel trends described in the previous section. In fact, Genoa plays the pivotal role in daily travel motivations from all over Liguria.

Consequently, it emerges how the trend of mobility in Liguria takes place in the opposite direction to the ideal scalability of mobility policies produced by the central pole (Figure 5).

3.3 Use-case Methodology

To motivate the proposed approach for mobility management on a regional scale in the following section, in this section we introduce the Use-case Methodology (UcM).
UcM was developed in 1992 by computer scientist Ivan Jacobson as a language useful for modelling and preliminary design of software and digital tools (Jacobson, 1993).
Use cases are understood to be the description of the individual of a set of interactions between a user and a system that enable the user to achieve a goal or perform a task.
In addition, it can be said that through the analysis of the interaction pattern of use cases, the external characteristics of a software system are defined from the user's point of view (Schneider and Winters, 2001).
Hence, UcM can be represented as a whole within which individual use cases are positioned which, if completed, allow the achievement of the objective for which UcM was used.
Although this methodology was born for IT, in this paper we attempt to re-propose it to support regional mobility planning in a territory with particular boundary conditions such as Liguria. So, in our case the object described by UcM is 'Ligurian Transfer', that is the possibility of reaching any destination from any origin in Liguria.
While individual interactions are represented by users who need to make a journey. In conclusion, it will be the individual user who will be the solution to the need to move and the interaction he or she generates with the mobility service will be addressed, in this sense the idea behind UsM in which the user is an element external to the project will be overturned (Figure 6).

4. Proposed approach

As shown by the authors in the previous section, Ligurian urban and infrastructural asset, as well as territorial inequalities and unbalances hamper mobility policies up-scaling. Administrative boundaries, as well as polarised accessibility, act as barriers to best-practices transfer.
At the same time, recent MaaS experiences suggest that both bottom-up and user-centered perspective may contribute to overcome existing limits.
Use-case approach requires the preliminary setting of the operational question. In details, moving across Ligurian Region through sustainable alternatives is therefore main aim of proposed approach. In this direction, origin and destination of the journey deeply affect individual mobility potential. General framing of travel demand implies indeed to further investigate users' mobility patterns, choices and needs to support sectorial policies design independently from territorial boundaries and constraints (Figure 6).
Operational question needs to be detailed then according to travel purposes, being them study/work commuting, personal non-systematic reasons, free time/holiday (Manfredini and Dilda, 2012).
Once travel sub-systems are defined, thus setting travel frequency, purposes and respective elasticity on a general basis, users' individual features require to be identified.

In this direction, it is particularly relevant to define which variable may affect more significantly users' behaviors and attitudes (Lenormand *et al.*, 2015). Similar user-centered perspective is the one leading MaaS offer where transport services combination (and consequent fares) target specifical users' segment.
Starting from demographic and socio-economic profile of regional population, is therefore possible to identify tailored measures to be implemented.
Proposed approach is to profile several "personas" able to orient policy design, not only on a territorial basis, but including also individual features and behaviors.
According to recent studies linked to MaaS experiences (Ye, Zheng and Yi, 2020; Smith, Sochor and Karlsson, 2022), main individual features influencing mobility choices are related to i.age; ii.gender; iii.work conditions; iv.driving licence; v.vehicles ownership.

4.1 Potential Impacts Assessment

4.1.1 Accessibility Improvement

Combinations of similar sets of features may guide policy makers to identify relevant gaps in terms of transport supply as well as in terms of territorial accessibility.
Turning from a strictly sectorial mobility approach to the wider look of activity-based accessibility (Ferreira and Papa, 2020) could represent a turning point for a more integrated and inclusive planning. Defining mobility policies inductively may contribute to meeting widespread needs, more than territorial-scaled top-down initiatives. Similar approach indeed may constitute a win-win solution both for users –provided with tailored services- and policy makers – developing effective and efficient policies supporting sustainable and digital transition.

4.1.2 Planning Prioritization

At the same time, shaping planning and policies following a UcM, may support indeed the analysis of potential synergies among different clusters of users: de-contextualizing mobility needs and data from a standardized territorial-driven basis, may help policymakers to identify different users' segment converging into similar preferences and necessities. In this direction, transport measures replicability and transferability could be further boosted beyond traditional administrative and services boundaries.
In this direction, similar recognition and assessment could prove particularly relevant for public administrations and planners in order to point out priorities among mobility interventions and actions, thus tracing potential economy of scales within a wider context. Instead of consolidated approach where urban-led actions are supported in the name of local competitiveness and efficiency, while non-urban initiatives belong to territorial cohesion field, the potential intersection among the two contexts on a users' needs basis contributes to the clear and effective individuation of mobility patterns, thus making it easier to cluster them and respond them in a targeted way.

4.1.3 Stronger Regional Coordination

Finally, the shift to a user-centered approach –due to the massive requirements in terms of data collection- may lead to an up-scaling of strategic mobility planning, thus providing within the wider framework of regional coordination, significant support to

smaller municipalities, historically unable to cope with EU-initiatives requirements and prescriptions (as SUMPs experience has recently shown).

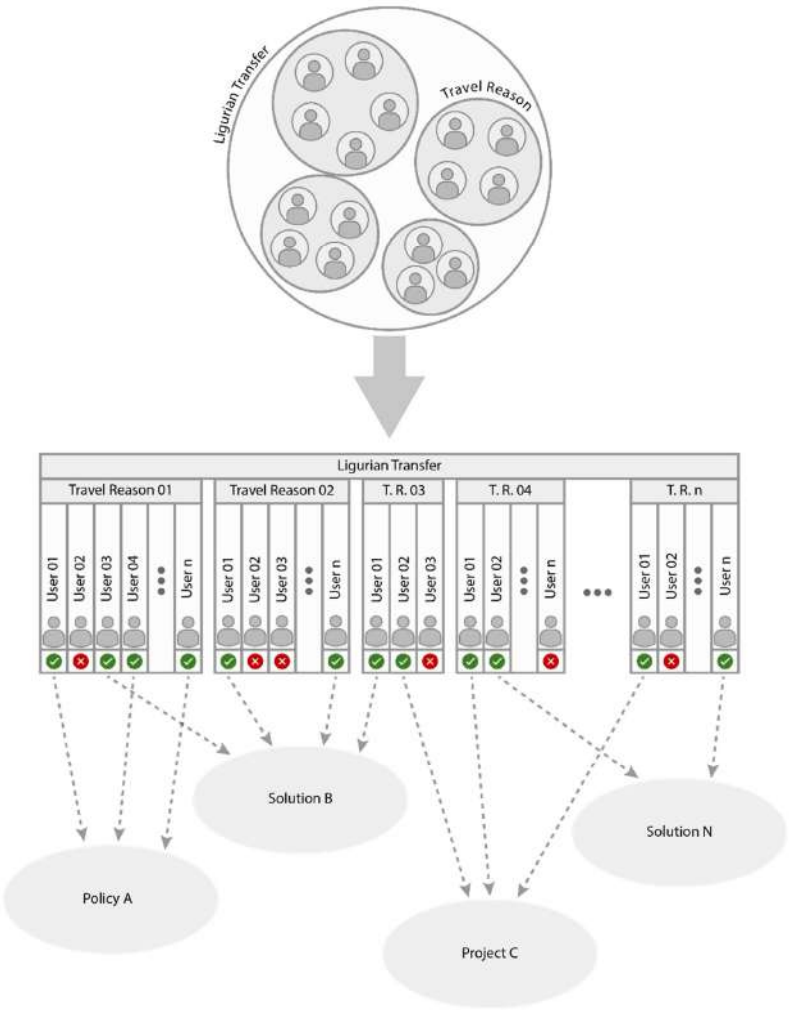

Figure 6. Representative and simplified diagram of the proposed solution based on the UcM and the possible identification of mobility solutions in Liguria.

4.2 Limitations

Nevertheless, some criticalities on the planning level require to be highlighted.

4.2.1 Massive Data Collection

As previously stated –also capitalizing MaaS-related recent experiences- user-centered mobility planning requires massive data-collection, thus constituting relevant

barrier both in terms of users' privacy protection and ICT structures for public administrations. Significant legislative issues are currently under EU investigation to balance tailored mobility experiences and individual privacy guarantee.

4.2.2 Planning Competencies Allocation

Transport and mobility competencies are allocated to different administrative levels. Despite Regional role in strategic transport and mobility planning, mobility basins, as well as public transport networks, are scaled on a provincial/metropolitan basis, transport-related initiatives may be finally defined within municipal borders. In this direction, greater coordination among them is necessary to feed user-centered system, both in terms of data collection and intervention prioritization. Mobility Agencies may for instance constitute key-actors of similar processes, especially in guiding transitional steps.

4.2.3 Strategic Planning Relevance

Policies' fragmentation on a user-centered basis may hamper holistic and integrated mobility planning. Particular attention should be paid to strategic planning in order to orient user-centered initiatives within a wider sustainable mobility framework. Tackling the risk of a vertical planning, thus ignoring interactions among different users' segments and dedicated strategies, general coordination of the entire process should be provided to assure that the sum of individual interests effectively equals the pursue of collective sustainability goals.

5. Conclusions

Best-practices approach towards mobility policies transfer has been for long the prevailing approach within EU boundaries. Increasing variability and complexity of urban flows and dynamics have later required to fine-tune initial approach. After SUMPs were firstly introduced, it was therefore evident that smaller municipalities faced strong criticalities in reproducing mobility initiatives implemented elsewhere. In this direction, plans up-scaling proved particularly difficult whenever territorial assets and network do not develop vertical and horizontal complementarities. Polarised configurations (such as the Ligurian one) are not able to support effective spreading of sustainable mobility planning and experiences.

The definition of a Use-case Methodology may contribute indeed to shift mobility planning inductively, thus tailoring policies through a user-centered approach.

Similar de-contextualized planning and policymaking could represent potential solution to the need of policies mobility and replicability within EU context becoming more and more variegated and changing.

It needs to be pointed out that user-centered perspective, thus potentially driving a more conscious and effective approach towards transport planning, somewhat overlaps best-practices premises in terms of practices replicability and de-contextualization. Nevertheless, decades of EU policies have shown that despite not all regions may develop similar networks, structures and sensibilities, all communities and citizens show comparable needs to join socio-economic opportunities and share similar basic needs.

The shift from a mobility-driven approach towards a more accessibility-centered way to look at passengers-dedicated transport policies and planning could constitute the

turning point to a widespread and effective upscaling of EU initiatives towards a more sustainable mobility.

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