



**ESPON**



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# **ESPON Territorial Studies**

Quality of Life in the Alpine area

Final Report / February 2024

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## **Disclaimer**

This document is a final report.

The information contained herein is subject to change and does not commit the ESPON EGTC and the countries participating in the ESPON 2030 Cooperation Programme.

The final version of the report will be published as soon as approved.

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# Abbreviations

AAL	Active and Assisted Living
AI	Artificial Intelligence
AHA	Active & Healthy Ageing
CSR	Corporate Social Responsibility
EC	European Commission
ENoLL	European Network of Living Labs
EQI	The European Quality of Government Index
ESPON QoL	ESPON Quality of Life
ESPON TQoL	ESPON Territorial Quality of Life
GDP	Gross Domestic Product
GHG emission	Greenhouse Gas Emission
NUTS <sub>2</sub>	Nomenclature of Territorial Units for Statistics - <i>regional territorial units for the application of regional policies</i>
NUTS <sub>3</sub>	Nomenclature of Territorial Units for Statistics - <i>sub-regional territorial units specific diagnoses</i>
LAU <sub>2</sub>	Local Administrative Units consisted of municipalities or equivalent units in the 27 EU Member States.
OST	<i>Osservatorio dello Sviluppo Territoriale</i>
PROLIDA	Professional Living, Innovation and Development Lab for an Ageing Society
QoL	Quality of Life
SUPSI	Italian Swiss University of Applied Sciences
TQoL	Territorial Quality of Life
USI	Università della Svizzera Italiana
USTAT	Canton Ticino Statistical Office

# 1 Executive summary

The aim of the ESPON Quality of Life (QoL) in the Alpine Convention Space study was to produce new territorial evidence for the Alpine area by implementing and enhancing the Territorial Quality of Life (TQoL) Accounting methodology, initially developed by the ESPON QoL project, including a system of indicators to measure the quality of life in a territory, tested in different types of regions – urban, rural, cross-border – in Europe. The overall ambition was to produce new evidence of the present quality of life situation in the Alpine area not only for benchmarking purposes, but also for looking forward to the future evolution of quality of life within the Alpine regions, suggesting indicators apt to monitor emerging trends and the impact of global changes scenarios on local quality of life patterns.

Therefore, as part of the study, **living labs** have been tested in four case studies – Canton Ticino (Switzerland), Trento (Italy), Koroška region (Slovenia) and Unterkärnten (Austria) – where stakeholders and citizens' focus groups were engaged to **identify quality of life priorities and recommend strategic indicators** to measure the present situation, as well as to devise likely evolutions and scenarios of **climate, digital, demographic, lifestyle, governance change** and evaluate their impact on the quality of life in the Alpine area. This approach was useful to identify indicators related to spatial planning instruments and policy goals to be implemented in practice, motivating the public participation and involvement of communities and citizens in decision making processes at local level (suggested indicators are presented in Annex B to this report).

The TQoL analysis employs a composite index approach which aggregates proxy indicators selected for 22 quality of life sub-domains in nine domains and the three dimensions of good life enablers, life maintenance and life flourishing. Although useful for an overall view and for comparing the position of any region with that of other regions in the Alpine area (NUTS3-level maps are presented in Annex A to this report) this is not sufficient to measure the real state and evolution of the quality of life in different places within the region and therefore be of support for the preparation of local policies. To address this issue, we followed in our study a three-fold strategy of research and development of the TQoL measurement methodology:

1. **Creating territorial indicators and maps using data scraping methods**, to map the density of facilities essential for living – retail shops, primary and secondary schools, pharmacies and banks, doctors and hospitals – down to the finest territorial scale – and computing the indicators of accessibility to these essential facilities for areas of settlements of different density ('heatmaps') within the local administrative unit scale (LAU2) and at the more aggregate scale of NUTS3 regions, for the whole Alpine area.
2. **Designing a potential local scale application of the TQoL methodology**, by developing a pilot TQoL index limited to measuring two key enablers of QoL, i.e., the accessibility to the above-mentioned essential services and the access to train and bus stations, but in a granular way, anchored to the precise distribution of the population within the region. Indeed, the hectometric grid data available for the whole Europe allow to visualize a granular picture, 'geo-localising'<sup>1</sup> the information about where people precisely live within the region – detecting resident population and housing in each hectare – and the availability within walking distances of facilities (essential services and public transport stops) which are key for people's everyday quality of living.
3. **Analysing the quality of life needs of urban and rural residents** The granular analysis of tangible and intangible QoL aspects that are localised in the vicinity of the place of residence would help to measure with the needed level of territorial resolution the quality of life of people living in high or medium density settlements (urban and peri-urban areas) but would be much less useful to measure the quality of life of people living in low density settlements (rural and mountainous areas). The guarantee of a right of access for all to tangible infrastructures and services necessary for a good quality of life (good life enablers), to the intangible conditions necessary to maintain good health (life maintenance) and to opportunities that enrich the experience of life (life flourishing) does not mean guaranteeing the same level of

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<sup>1</sup> Geo-localisation allows to identify the exact geographical location of permanent attributes – buildings, resident population, transport infrastructures, typology of land use etc. Nowadays, dynamic localisation of individuals is also possible thanks to the diffusion of mobile devices and new urban analytics techniques, based on the collection of mobile traffic data complemented by those supplied by remote sensor data, can be applied to observe dynamic patterns of population behaviour (e.g., daily mobility) and would be useful to measure quality of life indicators related to those patterns (e.g., the daily time spent on congested routes). To analyse the potentiality of urban analytics for TQoL measurement is beyond the scope of this territorial study, but it could be the scope of future applied research.

services and conditions uniformly throughout the territory regardless of the density of settlements: it is neither possible nor desirable to do so. The different QoL conditions, related to living in high density urban and low density rural areas, are analysed in a qualitative fashion, based on a macro-analysis of expected differences for aspects of quality of life grouped in 65 sub-categories, called “TQoL conditions”. The latter have been identified considering the list of 452 indicators suggested by the stakeholders engaged in the four living labs (presented in Annex B to this report), grouping proxy indicators measuring similar aspects of quality of life<sup>2</sup>, while the expected differences for urban and rural areas have been investigated by means of machine learning exploration, using a systematic ChatGPT prompt: “Is the [TQoL condition] different in urban and rural areas?”. The results of this analysis have inspired the pyramid of basic and higher needs presented at the end of the report, which shows different basic challenges and potential QoL priorities for residents living in urban and rural areas. In addition, a micro-analysis of urban and rural residents’ quality of life perceptions has been performed by engaging a focus group of residents living in urban, peri-urban and rural places in Canton Ticino the only case study with an heterogeneous distribution of population in urban centres (Lugano, Bellinzona, Locarno), peri-urban and rural zones.<sup>3</sup>

Besides suggesting indicators suitable for measuring quality of life needs and expectations, the discussions with the stakeholders and citizens engaged in the living labs have been helpful to collect new insights, allowing our study to answer to policy questions and eventually deliver the following key messages and recommendations:

- To answer the first policy question *How can we use the ESPON (place-based and citizen-centred) approach to measure QoL in the Alpine area?* the TQoL framework and dashboard tool should be further developed in three directions:
  - To reduce the gaps of harmonised data at European level, by increasing the availability of geo-referenced information for demographic, housing, infrastructures and services, land use and environmental variables from EU databases, and harmonizing them (or at least establish equipollence) with geo-data available for non-EU Alpine countries (Switzerland, Lichtenstein, Monaco), to get a wider range of granular TQoL indicators and maps, especially related to good life enablers and life maintenance indicators, valid for the whole Alpine area.
  - To co-design and coordinate national quality of life surveys with annual frequency and a sample sufficiently consistent and robust to support the computation of reliable indicators within the countries, at NUTS3 regions’ level and for the sub-NUTS3 distinction of urban/peri-urban/rural areas, especially to measure life flourishing aspects. Coordinated surveys should allow to compute for the TQoL sub-domains the same or at least equipollent proxy indicators across all Alpine countries.
  - At local level (e.g., NUTS3 or city level) promote and establish connections between the TQoL framework applications engaging public statistical offices and business associations’ Corporate Social Responsibility reporting mechanisms (as suggested for the Canton Ticino and Trento cases).
- The following are the key messages answering the second policy question *How QoL is perceived in the different types of territories of the Alps? And which territorial profiles can be identified at sub-national level? What similarities and differences can be identified within Alpine regions/territories?*
  - *Climate change* certainly is perceived as having important impacts on the quality of life in the Alpine regions, because of various threats caused by the rise in temperature and the frequency and intensity of extreme weather events. These include health impacts, unfavourable water cycle changes, air quality impacts, with ozone becoming the most relevant pollutant to monitor because of increasing temperature and nitrogen oxides becoming instead less relevant with the reduction of fossil fuels and transport emissions.
  - *Globalisation impacts* on local labour markets are perceived as highly problematic, especially by the younger generations due to the unfavourable evolution of job opportunities, quality of work and wages that strongly influence their career and locational choices, combined with the increasing cost of living (and especially the difficulty to find affordable houses).

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<sup>2</sup> for instance, in the sub-domain ‘housing and basic utilities’ we were able to recognise four groups of indicators for measuring house availability, house overcrowding, house cost, house services and so on for the other sub-domains.

<sup>3</sup> In the other case study territories population density is more homogenous: the Trento case was focused on the city, while the other two cases in Slovenia and Austria are rural regions without high density urban centers.

- Besides the impacts on labour markets, the *digital transformation* will produce its most significant effects in the way in which the different actors of society interface and are connected to each other. This will give rise to new lifestyles, behaviour and business models. The result of this change will presumably be defined by the capacity of all the actors involved (companies, public actors and users) to gain the most complete understanding possible of the digital transformation and become aware not only of the technological aspects but also of the social and cultural ones.
- *Population ageing* – and in some Alpine regions also decline – presents several QoL implications and challenges especially for the healthcare and welfare service systems increasingly challenged by constantly evolving social, organisational, and economic factors.
- In the most innovative Alpine regions (Trento, Carinthia, Canton Ticino and other Swiss regions hosting important innovation clusters), *Artificial Intelligence* is perceived not only as a risk factor, but as a much-needed aid, particularly the use of AI in healthcare. It is not about replacing healthcare and welfare staffs but rather to assist them with support tools and technologies both in care facilities and at patients' homes. Similarly, AI could be used to mitigate potential difficulties due to climate change. A good quality of life should be also measured by the ability to embrace emerging technologies to free up space and time for citizens, increasing the efficiency of their activities. In this context, it is worth mentioning the strategy for the digital transformation of Canton Ticino launched by the cantonal government (Consiglio di Stato) on 24 August 2023, as an example of digital government agenda that promises to profoundly change the nature of relationships and interactions between the State, the population and the economy, introducing ways of being more in line with the needs and habits of people and the operations of companies. As highlighted in the inception of the Strategy: “the digital public service must be designed to respond to user needs in a simple, direct way and with services accessible 24 hours a day, seven days a week, without time or place constraints”<sup>4</sup>. However, digital services will complete the public service offering without replacing the other forms of services, according to the principle of non-exclusion of people not wishing to access online. This means that there is a strong complementarity, at least potentially, between the aim of the digital transformation strategy to improve people's online experience (their digital life or 'on-life') and that of the TQoL approach, of measuring and improving policies to enhance the quality of life in the territory, ensuring a good mix of 'off-line' and 'on-line' life opportunities and experiences for all. Coupling digital transformation and territorial quality of life agendas is therefore an approach recommended for all regions in the Alpine area (and in Europe).
- *Territorial QoL profiles* can be best identified at sub-national level by using geo-referenced data available from official sources (Eurostat, European Environmental Agency, national geo-data from Switzerland, Lichtenstein, Monaco), complemented with data scraping methods exploiting geo-localised open source information (Open Street Maps – OSM), to map the accessibility to consumption opportunities, education and health-care services, public transport infrastructure (rail and bus stations) at granular level – down to an hectometric grid of territorial cells covering the whole European space. The available granular accessibility data allow to map the presence of essential facilities and services in the vicinity of population homes (e.g., within 400 metres or the equivalent of 15 minutes walking), which is one prerequisite for a good quality of life. But the same approach can be extended to include environmental variables, e.g., to measure the presence of green areas, the exposure to air pollution sources, the quality of waters and soil.
- Several lessons learned and key messages about how to organise effectively TQoL living lab tests emerged from the case studies, answering the third policy question *How Territorial Quality of Life living labs in the Alpine Convention area should be tested and further developed? How can citizens, community initiatives, associations, and public actors be involved?* Two recommendations have been eventually delivered:
  - To promote the use of the opportunities offered by the TQoL method for measuring quality of life in the regions, more regional workshops should be offered (e.g., by the programme committee introducing the programme and the project) to increase the level of information and knowledge. It would also be helpful if the regions and living labs involved in the project (in Austria, Italy, Slovenia, Switzerland) could continue to exchange ideas and learn from each other mutually in a joint, transnational workshop. In order to increase the usability and application of the ESPON TQoL indicator set in the regions, it would be favourable if the regions hear experiences and practical stories from other regions that already have more experiences in the application and use of this indicator set and

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<sup>4</sup> Cfr. Strategia per la trasformazione digitale del Canton Ticino, page 3.

measurement system (e.g., usage of indicators, which information and planning needs and for which purpose, challenges of application, benefits).

- Upscale the visibility of the TQoL living lab approach by promoting its implementation as an instance of ‘framework for participation’, following the recent European Commission Recommendation<sup>5</sup> in the Alpine regions of the EU Member States, and promote covenants as well with Switzerland and the micro-states of Lichtenstein and Monaco for the same purpose. The aim of strengthening citizens’ empowering in the definition of quality of life indicators and deliberation of QoL policies better aligned with their needs and expectations in the whole Alpine area, will achieve a better balance between citizens, civil society and other government and business stakeholders contributions to the TQoL living lab processes.
- For answering the fourth policy question of our study: *How can TQoL be integrated into spatial planning instruments/processes and sectorial policies in the Alpine Convention space?*, we have designed a **new conceptual tool**, the ‘pyramid’ of territorial quality of life priorities related to basic and higher needs of residents living respectively in low-density (rural or peri-urban) and high density (urban) areas. The pyramid – evoking Maslow’s distinction between basic and higher human needs – has been elaborated analysing the expected value differences in low density (rural and peri-urban) and high density (urban) areas for the QoL indicators identified in the living labs with the stakeholders of Canton Ticino, Trento, Koroška and Unterkärnten (shown in Annex B to this report) and, in addition, investigating quality of life perceptions and needs with a focus group of citizens living in rural, peri-urban and urban areas of Canton Ticino. This tool could be used as a guiding frame to help any region in Europe either to integrate specific quality of life priorities into sectorial plans (e.g., by setting goals related to house affordability in urban housing policies) or more broadly to shape rural and urban quality of life goals in spatial plans aiming to balance the distribution of services (of general interest) in urban and rural areas within the region.

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<sup>5</sup> Commission Recommendation (EU) 2023/2836 of 12 December 2023 on promoting the engagement and effective participation of citizens and civil society organisations in public policy-making processes (<https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32023H2836>)

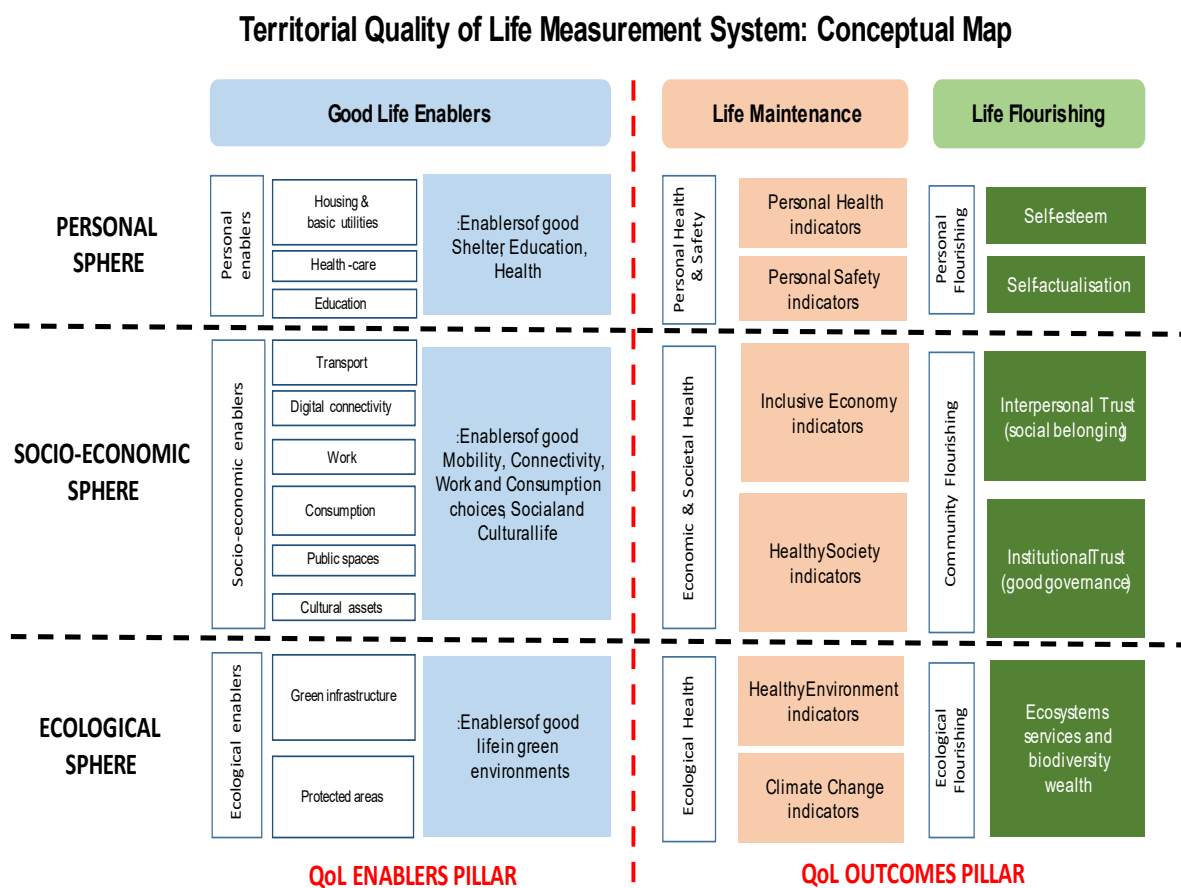
## 2 Introduction: is and will life be good enough in the Alpine area?

The aim of the ESPON Quality of Life (QoL) in the Alpine Convention Space study is to implement and enhance the Territorial Quality of Life (TQoL) Accounting methodology, initially developed by the ESPON QoL project. This methodology includes a system of indicators to measure the quality of life in a territory, tested in different types of regions – urban, rural, cross-border – in Europe<sup>6</sup>.

The TQoL system of indicators was developed starting from the definition of **territorial quality of life** as “*the capability of living beings to survive and flourish in a place, thanks to the economic, social and ecological conditions that support life in that place*”<sup>7</sup>, designing a conceptual framework including three dimensions – the territorial factors of ‘good life (good life enablers), health conditions (life maintenance) and progress (life flourishing) – and an operational dashboard of indicators, filled with data for selected indicators available for all NUTS3 regions in Europe.

Good life enablers, life maintenance and life flourishing conditions are identified in the personal, socio-economic and ecological spheres, eventually designing a nomenclature including in total 22 domains, illustrated in the figure below:

**Figure 1 – Territorial Quality of Life Measurement System: Conceptual Map**



<sup>6</sup> A summary of the methodology and its application on a European scale is provided the ESPON Working Paper “Is our life good enough?” available at: <https://www.espon.eu/is-our-life-good-enough>.

<sup>7</sup> ESPON QoL Working Paper “Is our life good enough?”, page 4.

This Territorial Quality of Life framework and the dashboard is applied in this study to analyse and illustrate the present 'status-quo' of territorial quality of life in the Alpine area.

However, the aim of the study was to produce new and better evidence of the present quality of life situation not only for benchmarking purposes, but also for looking forward to the future evolution of quality of life within the Alpine regions, suggesting indicators apt to monitor emerging trends and the impact of global changes scenarios on local quality of life patterns. Therefore, as part of the study, **living labs** have been organised in four case studies – Canton Ticino (Switzerland), Trento (Italy), Koroška region (Slovenia) and Unterkärnten (Austria) – where stakeholders and citizens' focus groups were engaged to **identify quality of life priorities and recommend strategic indicators** to measure the present situation, as well as to devise likely evolutions and scenarios of **climate, digital, demographic, lifestyle, governance change** and evaluate their impact on the quality of life in the Alpine area. This approach was useful to identify indicators related to spatial planning instruments and policy goals to be implemented in practice, motivating the public participation and involvement of communities and citizens in decision making processes at local level.

The results of the study are presented in the following sections, answering to policy questions raised in the Terms of Reference of the study:

- **Territorial Quality of Life measurement:** Answering the first policy question “*how can we use the ESPON (place-based and citizen-centered) approach to measure QoL in the region?*”, section 2 illustrates the results and recommendations stemming from the analysis of TqoL data available at NUTS3 level and from the elaboration of data and maps at LAU2 and grid levels for selected quality of life conditions (namely accessibility variables). This section includes also recommendations concerning the application of the TqoL measurement approach in the four case studies.
- **Impact of global changes on QoL conditions and management:** Answering the second policy questions “*How QoL is perceived (currently and considering global change scenarios) in your region? What similarities and differences can be identified within your region compared to other Alpine regions?*”, section 3 illustrates the results and recommendations stemming from the analysis of trends and global scenarios and from the qualitative findings of the four living labs related to the impacts climate change, digital transformation, demographic and lifestyle changes are expected to have on future QoL conditions, and associated new priorities for measurement of emerging trends and challenges.
- **How to deliver effective TqoL living lab processes:** Answering the third policy questions “*How TqoL living labs should be further developed in your region? How can citizens, community initiatives, associations, and public actors be involved?*”, section 4 illustrates transversal lessons drawn from the implementation of pilot TqoL living labs in the four case studies, highlighting similarities and differences in the type of obstacles encountered, and suggesting tips to further develop and expand the approach, enhancing the engagement of citizens, community initiatives, associations, and public actors, within each specific case study contexts and across the Alpine area.
- **How can the TqoL approach help to integrate a systemic and citizens needs oriented perspective in spatial planning instruments, processes and sectoral policies:** Answering the fourth policy question “*How can TqoL be integrated into spatial planning instruments/processes and sectoral policies in your region?*”, section 5 illustrates the TqoL living labs findings related to the integration of TqoL measurement and policies in spatial planning instruments and processes, as well as in sectoral policies and suggests a systemic approach to formulate territorial QoL policy agendas, that could be deployed at European, national and regional scale to address basic and higher quality of life needs of the population living in rural (low density) and urban (high density) contexts.

### 3 Territorial Quality of Life measurement

#### 3.1 Analysis of Territorial Quality of Life indices in the Alpine area (NUTS3 level)

The TqoL analysis employs a composite index approach which aggregate proxy indicators selected for 22 quality of life sub-domains in nine domains and the three dimensions good life enablers, life maintenance and life flourishing. The indicators are listed in the table below:

**Table 1** Territorial Quality of Life List of Indicators<sup>8</sup>.

Dim.	Dom.	Sub-domain	Indicator name
Good Life Enablers	Personal Enablers	Housing & basic utilities (b11)	Sanitation conditions (% uncollected sewerage and % sewerage treatment)
			Households lacking of adequate heating
			Household overcrowding
			Burdensome cost of housing
		Healthcare (b12)	Availability of Hospital beds
		Accessibility to health (pharmacies, doctors and hospitals)	
	Education (b13)	Accessibility to education (primary and secondary schools)	
	Socioeconomic Enablers	Transport (b21)	Access to high-level transport infrastructure
		Digital connectivity (b22)	Efficiency of digital networks
			Internet at home
			Online interaction with public authorities
		Work opportunities (b23)	Labour market accessibility (accessibility to jobs)
		Consumption opportunities (b24)	Accessibility to commercial services (shops and banks)
		Public spaces (b25)	Not applicable at NUTS3 level
Cultural assets (b26)	Availability of cultural landmarks (Unesco World Heritage)		
	Accessibility to cultural services (cinemas)		
Ecological	Green infrastructure (b31)	Availability of Natural Areas	
	Farmland abandonment (% of abandoned land)		
	Protected areas (b32)	Existence of Protected Areas	
Life Maintenance	Personal Health	Personal Health (m11)	Life expectancy at birth
		Personal Safety (m12)	Standardised traffic accident death rate
		Standardised homicide death rate	
	Economic and Societal Health	Inclusive Economy (m21)	Household disposable income per capita
			Gender employment gap
		Healthy Society (m22)	Unemployment rate
			People at risk of poverty rate
	Ecological Health	Healthy Environment (m31)	Early Leavers from education (18-24)
			NEET 15-24
		Climate Change (m32)	Tertiary Educational Attainment (25-64)
Air Quality			
Life Flourishing	Personal Flourishing	Self-esteem(f11)	Aggregate expected impact of climate change by 2070
		Standardised suicide death rate	
	Co-Flourishing	Self-actualisation(f12)	Population covered by Sustainable Energy (and Climate) Action Plans
		Voluntary work perception	

<sup>8</sup> ESPON TQoL Metadata:

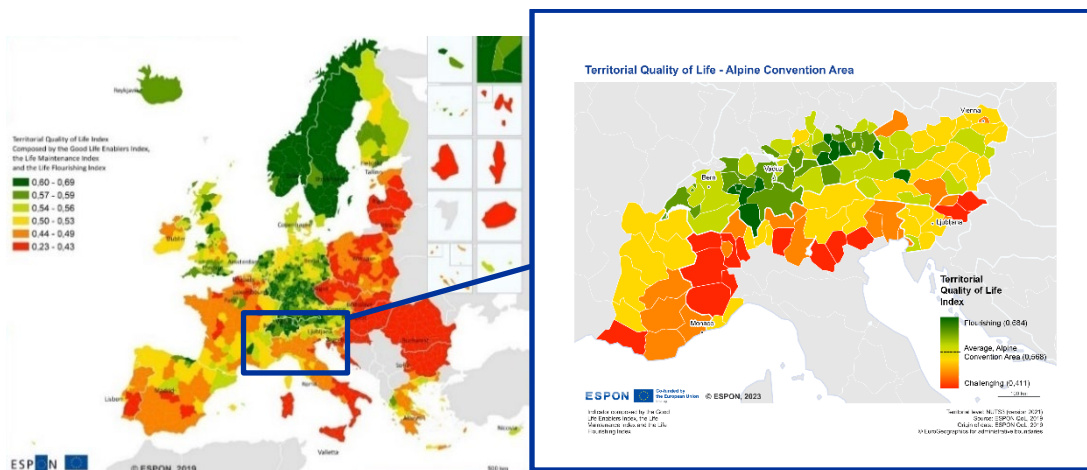
[https://www.dropbox.com/scl/fi/pe3tnworkd6xyqotmmzd9/ESPON\\_TQoL\\_Alpine\\_Area\\_Metadata.xlsx?rlkey=kfh2gu3hakffp8v8uvs7ifz&dl=0](https://www.dropbox.com/scl/fi/pe3tnworkd6xyqotmmzd9/ESPON_TQoL_Alpine_Area_Metadata.xlsx?rlkey=kfh2gu3hakffp8v8uvs7ifz&dl=0)

<b>Ecolo gical</b>	<b>Interpersonal Trust (societal belonging) (f21)</b>	Participation in Community work
		European Quality of Government Index
	<b>Institutional Trust (good governance) (f22)</b>	Trust in the Administration
		Quality and accountability of government services
		Corruption Index
	<b>Ecosystems services and Biodiversity wealth(f31)</b>	Invasive Alien Species
Ecosystem services net value (Supply-Demand)		

The aggregation process entailed first a standardisation – to neutralise the different units of measurement, each indicator is reduced to a standardised score between 0 and 1, using the formula  $[\text{Value} - \text{Min} / \text{Max} - \text{Min}]$  – followed by the computation of the simple average of the scores of all the indicators included in the same sub-domain. The position of the regions in each sub-domain is then evaluated by ranking them according to the average scores achieved. The same process was replicated for computing the indices and the positions of the regions at the aggregate levels of nine domains and three dimensions.

While the database of TqoL indicators is available for the entire European Union (EU), further work was necessary to zoom in and focus on the study area for computing the position of the regions within the Alpine area and delivering specific Alpine area maps<sup>9</sup>.

**Figure 2 - Territorial Quality of Life in the Alpine area in comparison to the European Context**



Source: ESPON QoL: 2019

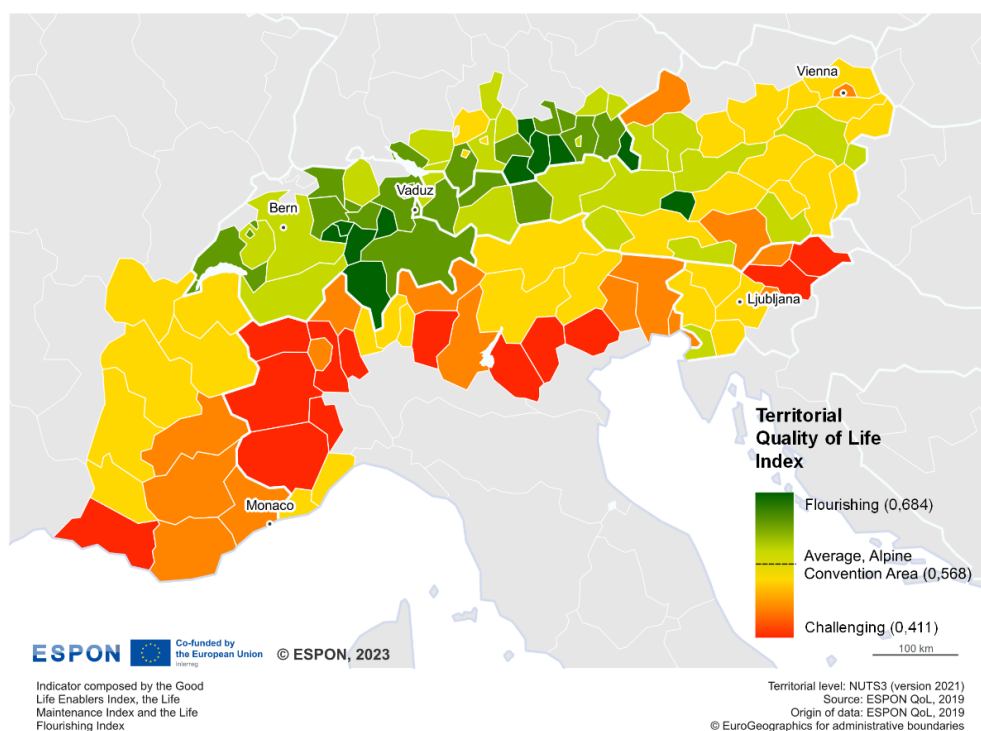
The **composite TQoL index** computed for the NUTS3 regions in the Alpine area combines the proxy indicators measured for all the 22 Good Life Enablers, Life Maintenance and Life Flourishing sub-domains. As mentioned above, each indicator is standardised and a simple average score computed within each sub-domain. Simple average scores are then computed at the aggregate dimensions' level – delivering Good Life Enablers, Life Maintenance and Life Flourishing indices and finally the composite index is produced by averaging the values of the three dimensions.

The map of the composite TQoL index is presented on the following page and it aids in discerning whether the Quality of Life in these regions is characterised by flourishing, average or challenging conditions.

The specific TQoL indices and maps elaborated for the three dimensions – good life enablers, life maintenance and life flourishing – and separately for the 22 sub-domains of QoL are presented in Annex A to this report.

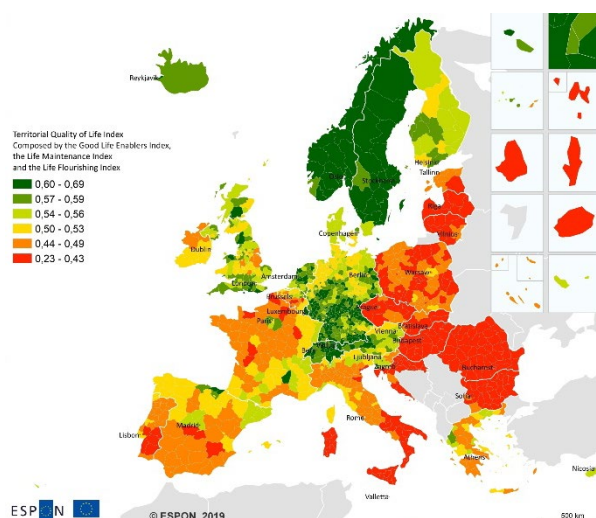
<sup>9</sup> The Alpine Convention area, utilising the NUTS 2021 framework, defines the geographic scope of this assessment. It encompasses all NUTS3 regions within the confines of the Alpine Convention Space. Notably, the ESPON EGTC furnished the ESPON map template used in this report, and the NUTS geometries align with the 2021 version.

**Map 1 Territorial Quality of Life Index – Alpine area**



### *Main territorial patterns in the Alpine area*

The Alpine area presents a mosaic of diverse territories, encompassing both rural and urban areas situated amidst mountainous landscapes. This diversity manifests in varying Quality of Life Indices across regions, illustrating distinct territorial profiles. Broadly, the northern central part of the Alpine space stands out for its flourishing quality of life. As shown later, this mostly depends on strong performance in Life Maintenance, a dimension which includes personal, societal and ecological health aspects. Conversely, challenging regions are predominantly located in the south, including Piemonte, the northern area of the Pianura Padana, Les Alpes Maritimes and the eastern portions of Slovenia and Austria. These results are mostly due to lower rates of the Good Life Enablers dimension, and especially housing and healthcare deficits in Slovenia and lower scores on protected areas in Austria.



**Map 2 Territorial Quality of Life Index in Europe**

## **3.2 Analysis of Territorial Quality of Life at local scale**

Although useful for an overall view and for comparing the position of any region with that of other regions in the Alpine area, the development and analysis of TQoL indicators for an entire NUTS3 region is **not sufficient to measure the real state and evolution of the quality of life in different places within the region**, and therefore be of support for the preparation of local policies. We need to go down to a local scale and in the stakeholders' workshop held in Lugano on 17 October 2023 some guiding ideas and methodological and data resources available at the finest territorial scale, the hectometric grids (squares of one hectare each) have been suggested for this purpose. Grid-based information on resident population, housing,

land use and some accessibility indicators are available for the whole European space, and in the next section 2.2.1 we will present indicators created by using granular information to map the service availability and accessibility at local scale in the whole Alpine area. In section 2.2.2 we will discuss a partial Territorial Quality of Life index which measures only two specific aspects of QoL – the availability in the vicinity of the place of residence of train or bus stops and of essential services (retail shops, primary and secondary schools, banks and pharmacies, doctors and hospitals) – with the finest level of territorial detail within one Alpine region (Canton Ticino) taken as example.

However, before presenting the TQoL granular measurement technicalities, it is necessary to discuss the guiding idea for ‘territorializing’ indicators and policies for the quality of life in a mountain region, as those in the Alpine area. The idea is to establish a ‘basic access right’ for anyone permanently settled in the region to reach, within a reasonable time from the place of settlement (home), *tangible* infrastructures and services necessary for a good quality of life (thereby measuring the supply and quality of ‘good-life enablers’ within fifteen minutes of walking from one’s home – which include proximity services for daily life, local health services, nursery and primary schools), as well as a ‘basic right’ to enjoy some *intangible* conditions necessary to maintain good health (life maintenance) such as air quality, quality of water supply, noise, risks of road accidents, personal safety, measurable with objective indicators. Added to these elements necessary to live well in one’s neighbourhood are the opportunities that enrich the life experience (life flourishing) including opportunities for higher education, work, consumption and leisure, specialised care services, etc., which, if not already present in the neighbourhood, should be reached in a reasonable time by public transport, thus offering everyone the possibility of using public transport as an alternative to the forced use of their own private vehicle.

- ✓ *How to implement this guiding idea – which follows the principle of the ‘15 minutes city’<sup>10</sup> – in a vast mountain area, characterised by more densely populated valley bottoms with a mix of urban, peri-urban and rural areas, and by sparsely populated mountain areas, often in the process of further depopulation?*

An initial instinctive response may lead to consider the contribution of digital connectivity technologies, the spread of virtual working methods (smart working), telemedicine, distance learning, online commerce, digital public services, etc., which make the use of services, in principle, accessible in real time wherever you are based, in cities or in countryside areas, as long as they are covered by the Internet service and by logistics services (e.g., Amazon distribution). But this does not solve the problem of guaranteeing not only individual accessibility to services, but also that minimum level of aggregation and social interaction that the maintenance of some basic services<sup>11</sup> can offer to people settled in rural or mountain villages, reversing depopulation. Another useful factor for reversing the depopulation of mountain areas would be to create new opportunities of work on site, for example for the maintenance, care and sustainable use of mountain ecosystems, including for instance environmental services (e.g., forest management, biodiversity monitoring, etc.) regenerative agriculture practices, eco-tourism activities, etc.

To suggest a way for answering the question formulated above, we followed in our study a three-fold strategy of research and development of the TQoL measurement methodology:

- **Creating territorial indicators and maps using data scraping methods<sup>12</sup>**, to map the density of facilities essential for living – retail shops, primary and secondary schools, pharmacies and banks, doctors, and hospitals – at the finest territorial scale, and computing the indicators of accessibility to these essential facilities at spatial grid-level, as well as for local administrative unit scale (LAU2) and the more aggregate scale of NUTS3 regions, for the whole Alpine area. As mentioned, the results are discussed in section 2.2.1 below.
- **Testing a potential local scale application of the TQoL methodology**, by developing a partial TQoL index limited to measuring two key enablers of QoL, i.e., the accessibility to essential services and the access to train and bus stations, but in a granular way, anchored to the precise distribution of the population within the region. The granular TQoL index is discussed in section 2.2.2, it has been applied to the Canton Ticino example, but as mentioned it is based on data available at grid-level for the whole European scale, which means it is potentially replicable for any region in the Alpine

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<sup>10</sup> Moreno, C., et al. (2021)

<sup>11</sup> For example, post office, nursery/primary school, small retail shops, restaurants, pharmacy, and a public transport service with a minimum but convenient schedule which allows to travel over the day (including late evening) to/from nearby urban poles in the region (or elsewhere, by ensuring the access to long distance transport infrastructure and services).

<sup>12</sup> Illustrated in the intermediate report of this study.

area (and in Europe). The same section 2.2.2 discusses a potential extension to include in the granular analysis other intangible conditions necessary to maintain good health (exposure to air pollutants, noise, accident risks etc.) based on a methodology we found applied in the Canton Ticino case study, using a wider set of geo-referenced data available for Switzerland.

- **Analysing the quality of life needs in high- and low-density areas.** The granular analysis of tangible and intangible QoL aspects that are localised in the vicinity of the place of residence would help to measure with the necessary level of territorial resolution the quality of life of people living in high or medium density settlements (urban and peri-urban areas) but would be less useful to measure the quality of life of people living in low density settlements (rural and mountain areas). It seems like a banal observation, but it is not: the quality of life in an area depends on the place where you live and whether it is densely populated (urban area) or sparsely populated (rural area). The guarantee of a right of access for all to tangible infrastructures and services necessary for a good quality of life (good life enablers) to the intangible conditions necessary to maintain good health (life maintenance) and to opportunities that enrich the experience of life (life flourishing) does not mean guaranteeing the same level of services and conditions uniformly throughout the territory regardless of the density of settlements: it is neither possible nor desirable to do so. In section 2.2.3 the different QoL conditions for people living in high- or low-density areas are analysed in a qualitative fashion, based on a macro-analysis of 'TQoL conditions', which have been identified by grouping the indicators – suggested for the 22 TQoL sub-domains by the stakeholders engaged in the four living labs – which measured similar QoL aspects in sub-categories, and a micro-analysis of the different perceptions of quality of life needs, discussed with a focus group of citizens living in urban, peri-urban and rural places in Canton Ticino.

### 3.2.1 Production of territorial indicators and maps at local scale for the Alpine area

In the field of territorial analysis, statistical institutes play a crucial role as the primary source of data for historical and regional categorisation. Employing rigorous methodologies, they ensure the accuracy of indicators and work with unified territorial units for inter-territorial comparisons within the European Union, following the Nomenclature of Territorial Units for Statistics (NUTS) and the Local Administrative Units (LAU). In previous studies on Territorial Quality of Life (TQoL), the selected territorial unit was the sub-regional level (NUTS3). However, to gain a more detailed understanding of the territorial dynamics in a complex region like the Alps, in this ESPON QoL territorial study a **data scraping methodology** has been proposed to elaborate granular information available from open data sources and related to the localisation of territorial assets (infrastructures, proximity services and points of interest) within the NUTS3 regions, delivering detailed maps of the distribution of these assets at spatial grid-level.

The main assumption behind this approach is that territorial assets play a crucial role in enabling populations to achieve a certain quality standard in each region. These assets, which are localised, exert influence in the surrounding areas. The presence or absence of a service or infrastructure directly impacts the population living in the vicinity and their ability to meet their needs. Accordingly, assets can be classified and categorised based on the functionalities they provide to the corresponding population. To achieve this goal, in addition to the categorisation of citizens' needs that are addressed by territorial assets, comprehensive and complementary information is necessary.

The territorial scope of the data needs to be broad, covering the whole of Europe or at least the entire Alpine region, to ensure the scalability of the methodology and its compatibility with other territorial units. In this regard, the selection of data depends on its territorial granularity, the absence of data gaps in individual regions and adherence to a meaningful categorisation of citizens' needs. Based on these constraints, the categorisation of QoL needs proposed for the granular analysis is presented in the table below:

**Table 2** Categorisation of gathered information

Category	Description	Elements	Project	Font
<b>Population</b>	Density (100m)			JRC
<b>Mobility</b>	Train, Bus stations and platforms		Transport Assets	OSM
<b>Services</b>	Culture	Places of worship Theatres, museums and cinemas Archeology Schools	Points of interest	OSM
	Essential Needs	Pharmaceutical and Financial assets Healthcare Tourism	Profecy	ESPON
	Leisure	Commercial and Services Accommodation and Restauration Sports and Nature	Points of Interest	OSM

The data sources for statistical information include ESPON, Copernicus, and JRC reports – trusted institutions dedicated to making data accessible at the European scale. Additionally, data scraping methods are recommended for exploiting open data and functions as a complementary source of information otherwise unavailable. In this case, Open Street Maps (OSM) offers a consolidated database on points of interest as well as buildings information.

Therefore, in the ESPON QoL Alpine Convention Space study we downscaled the analysis of quality of life from regional and subregional scales to the micro scale of sub-localities and spatial grid of one-hectare cells (hectometric grid). This means that instead of collecting indicators generated by statistical offices for formal statistical units (e.g., municipalities, city neighbourhoods or boroughs or NUTS nomenclatures) we use georeferenced crowd-sourced punctual data that enable analyses at micro levels, based on raster cartographies or small-scale grids. In this study we first approached the issue by scraping web data layers from OSM and other similar internet providers, generating a layer of points corresponding to economic activities and public services, representing urban assets for the population: education, health, culture, retail commerce and hospitality and leisure assets. Further on in the project, layers of OSM scrapped web data have been integrated with similar data services availability sourced from the already normalised ESPON Profecy database created in 2021.

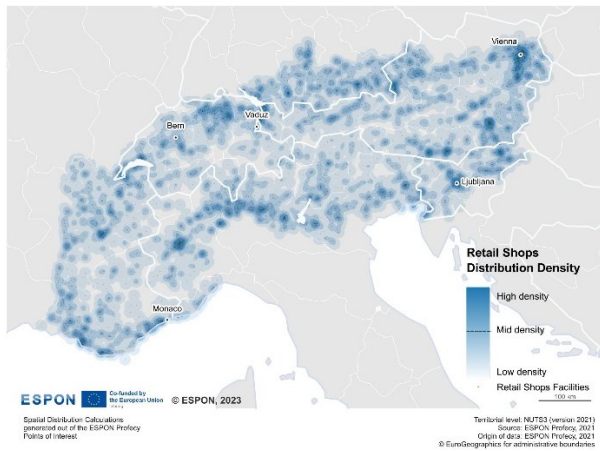
Indeed, thanks to the existence of ESPON Profecy reports and the 2021 database, the analysis of micro-data at spatial grid-level can rely on an official source of data which provide localised information on essential services<sup>13</sup> in the EU, complemented by OSM data in other categories. Two possible approaches for processing available data involve the use of territorial raw data: on one hand, it is possible to relate selected information to existing territorial units, facilitating comparison with existing NUTS3 or LAU2 indicators, which are useful for specific purposes; on the other hand, application using grid-level data allow to elaborate and compare a plurality of detailed heat maps<sup>14</sup>.

Eventually, services accessibility was analysed for the whole Alpine area by producing heat maps based the ESPON Profecy data. The ESPON Profecy classification begins with Level 0, representing regions with fundamental commercial activities such as retail (map 3). As a region ascends through the levels, the spectrum broadens, encompassing education at Level 1 (map 4), specific services like banking and pharmacies at Level 2 (map 5) and culminating in Level 3, where essential healthcare facilities, including hospitals and doctors, become integral components of the regional service landscape (map 6). In addition to the heat maps, map 7 visualises the same data at municipal level (LAU2) and map 8 at regional level (NUTS3).

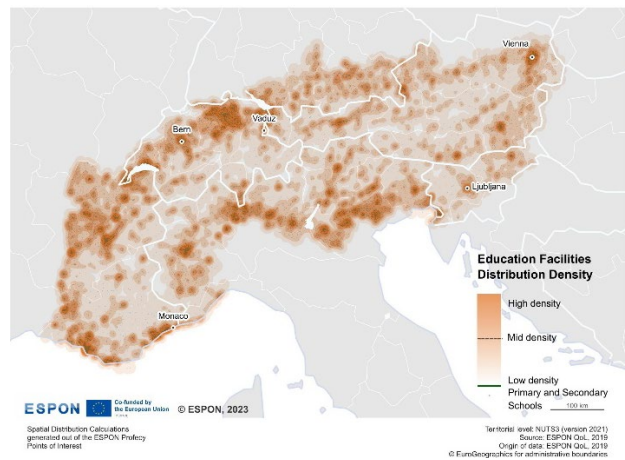
<sup>13</sup> including primary and secondary schools, banks, pharmacies, doctors and hospitals

<sup>14</sup> The heatmap methodology involves collecting geo-localised activities (e.g. schools, etc.) in point format and applying a kernel density function to visualise their area of influence by showing isoline contours measuring varying level of intensity of influence on the map. The GIS processes employed in grid-data level applications gather both raster and vector information. Raster data represent spatial information as a grid of cells or pixels, where each cell has a specific value. It is a matrix of rows and columns and each cell contains a value that represents a certain attribute (e.g., population) of a specific zone. Vector information represents spatial data using points, lines, and polygons to precisely define geographic features – e.g., zone contours – on a map.

**Map 3** Accessibility to retail shops in the Alpine area



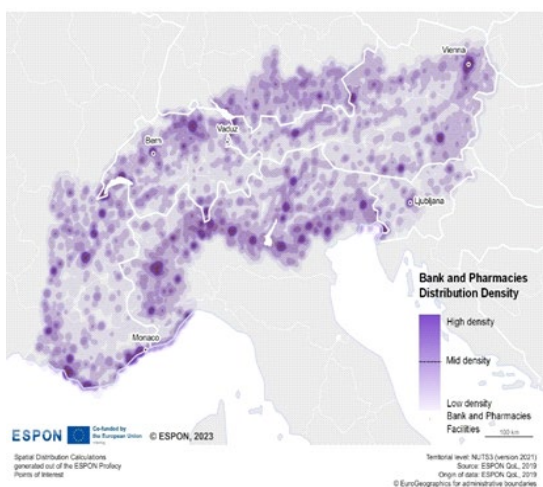
**Map 4** Accessibility to primary and secondary schools in the Alpine area



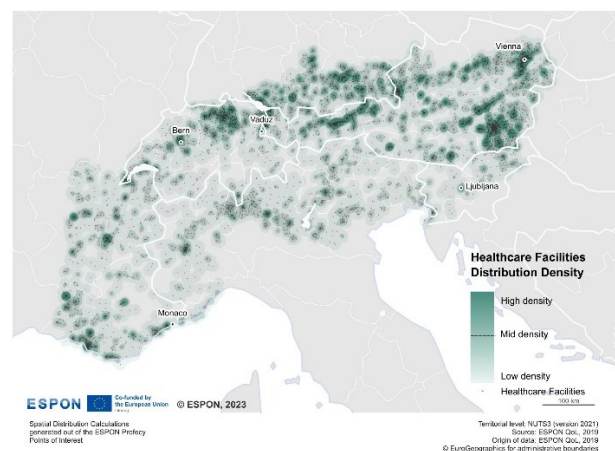
When analysing the distribution of retail shops in the Alpine Area, a notable pattern emerges, highlighting a stark contrast between the innermost mountainous regions and the surrounding areas. Along the French/Italian border and extending through southern Switzerland and Austria, there is a conspicuous absence of retail shops, signifying a dearth in the provision of even the most fundamental services. This absence depicts a line of discontinuity and low commercial density within this territory. As one ventures away from these mountainous regions, a discernible shift occurs, revealing an increase in the density of retail activities. Moreover, these retail establishments tend to aggregate into hubs, exhibiting variations in size. The transition from sparsely populated and discontinuous retail landscapes in the mountainous core to more densely populated and hub-centric patterns in the peripheral areas suggests a nuanced interplay of geographical, economic, and social factors shaping the retail distribution in the Alpine region.

A comparable trend is observed when examining the distribution of education facilities (Level 1) in the Alpine Area. Significant education hubs emerge in proximity to major cities. This phenomenon may be attributed to the concept of service centrality, possibly influencing the inclination of young individuals towards student mobility, seeking educational opportunities concentrated around these hubs. Conversely, a continuous belt of moderate density areas is evident in the more central zones of the Alpine region, encompassing regions such as Central North Italy and parts of Austria. This distribution pattern suggests a more evenly spread availability of educational facilities in these central areas, fostering a balanced access to educational resources across the region.

**Map 5** Accessibility to pharmacies and banks in the Alpine area



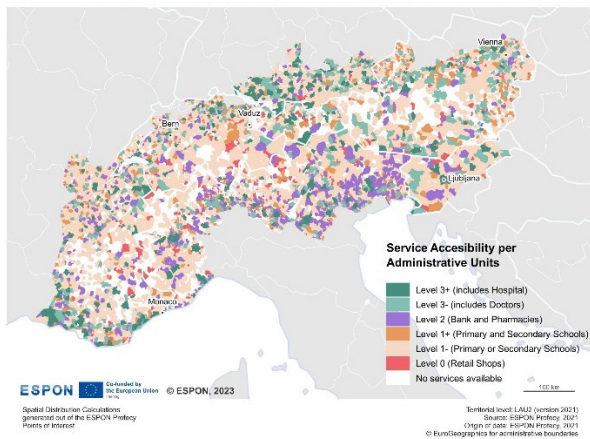
**Map 6** Accessibility to doctors and hospitals in the Alpine area



The distribution of banking and pharmacies in the Alpine Area exhibits distinct characteristics, revealing two primary trends. In certain regions, such as the south of Germany and the east of Austria, mid-density areas prevail, demonstrating a continuous presence without the formation of significant hubs. Conversely, the Swiss, French and Italian cases present a different situation where substantial hubs exhibit higher density and greater territorial fragmentation. One trend involves mid-density and scattered distribution, while the other showcases a densely populated and dispersed arrangement. This dichotomy implies a diverse strategy in these countries, with one opting for a more evenly spread and moderately dense distribution and the others showing a concentrated, high-density and spatially fragmented pattern. An interesting observation is the presence of an empty area in the south of France, suggesting a notable absence or scarcity of banking and pharmacy services in that region. This void could be influenced by various factors, including demographic patterns, economic activities, or regional policies affecting the provision of these essential services.

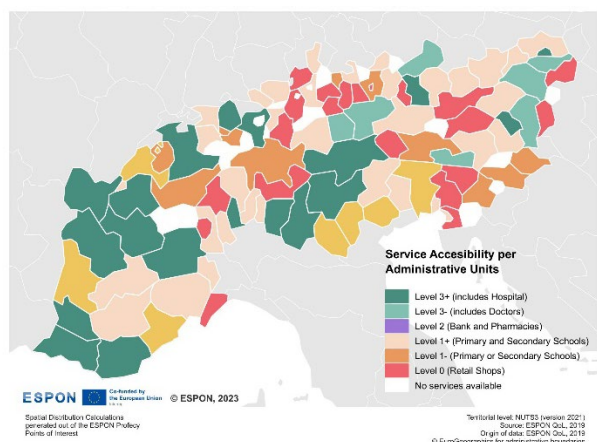
The distribution of doctors and hospitals in the Alpine Area displays significant disparities, echoing some previously identified patterns but with pronounced contrasts in healthcare accessibility between regions. In the southern regions of Italy, Austria and France, there is a notable low concentration of these healthcare facilities. In contrast, the northern regions exhibit an intense and continuous presence, emphasising a more robust and consistent availability of healthcare services. This disparity in healthcare accessibility between the southern and northern regions could stem from various factors, including population density, economic development, healthcare infrastructure and regional health policies. The observed trends highlight potential areas for improvement or targeted interventions in the southern regions.

**Map 7** Accessibility to Services of General Interest (SGIs) in the Alpine area (LAU2)



The analysis of territorial administrative units, particularly municipalities (LAU2), reveals irregular accessibility to the previously classified services levels (level 0: retail, level 1: schools, level 2: banks and pharmacies and level 3: hospitals and doctors) under study. A predominant observation is that most territories have access to education services, encompassing both primary and secondary levels within the same locality. This suggests a relatively uniform distribution of educational facilities across these regions. However, a heterogeneous distribution is evident when examining other services, with key areas (highlighted in green) exhibiting comprehensive access to a diverse range of services. These areas might serve as central hubs with a robust infrastructure providing various services. Furthermore, there are territories (highlighted in purple) where banking and pharmaceutical support are available, potentially serving as complementary resources to adjacent regions.

## Map 8 Accessibility to Services of General Interest (SGIs) in the Alpine (NUTS3)



The analysis of NUTS3 units<sup>15</sup> reveals some differences compared to the previous findings. It becomes apparent that when evaluating the availability of basic services in a region, the size of the region plays a significant role in influencing the assessment. One notable observation is in the North-East NUTS3 of Austria and Slovenia, where there appears to be a lower service level, indicating potential challenges in accessibility or service provision in those areas. Conversely, in certain regions, there is a visible concentration of services, which makes these regions functioning as hubs for nearby regions. Some examples of these ‘hub’ regions are: Bouches du Rhone and Var, in Southern France; Torino, Savoie, Haute Savoie, Isère and Ain in the east central region of the Alps; Bern, Zürich and St Gallen in Switzerland; Salzburg und Umgebung, Graz and Vienna in Austria; Varese, Bergamo, Sondrio, Bolzano, Trento, Belluno in Northern Italy.

By applying this data visualisation approach, it is possible to identify quality of life patterns at a much higher resolution, not only relative to different statistical geographical units (like municipalities or neighbourhoods) but also to spatial patterns within these units. In this way, it becomes possible to better map QoL conditions in cities, towns and rural territories, by supplying granular evidence useful to implement better targeted policies addressing main challenges of local policy making. Such as basic services providing (public and private), to health and education standards, local labour market opportunities, the availability of green infrastructure, air quality and pollution control – just to mention some issues that would benefit most from the availability of detailed maps of related indicators.

<sup>15</sup> To upgrade the scale of analysis to NUTS3 level we have used an heuristic approach based on the observation of the empirical data, which allowed to define NUTS3 Level 0 as equivalent to the availability of more than 20 retail shops in the region, Level 1 of 20 primary schools or secondary schools, Level 1+ of 20 elementary and 20 primary schools, while Level 2 is Level 1+ plus an additional 20 banks and 20 pharmacies, Level 3- is level 2 plus 50 doctors, and Level 3+ adds five hospitals.

### 3.2.2 Local scale application of the TQoL methodology

The hectometric grid data available for the whole Europe allow to ‘geo-localise’<sup>16</sup> the information about where people precisely live within the region – detecting resident population and housing in each cell – and, by the same token, to check the proximity of facilities which are key for people’s everyday quality of living, i.e., identifying the cells where train or bus stations are located as well as, taking stock of the ESPON Profecy data, those where different levels of essential services are located, i.e., level 0 retail shops, level 1 primary and secondary schools, level 2 banks and pharmacies and level 3 doctors and hospitals.

Starting from this basic granular information, data scraping methods are applied to produce ‘heatmaps’, i. e., to delimit the areas of accessibility of each facility (namely an area of 400 metres around the point of interest, corresponding approximately to 15 minutes walking distance) and enumerate the associated housing and resident population living in each accessibility area. As an example of the results of this exercise, the first map in the background of Figure 3 shows the distribution of the population in Canton Ticino, which is a typical Alpine region where high and medium density settlements are concentrated in the valleys’ floor, and low density settlements in the surrounding mountain areas<sup>17</sup>.

A partial TQoL score – ‘partial’ because it is only considering indicators of accessibility to public transport and essential services available at spatial grid-level from the ESPON Profecy database 2021 and not the full set of TQoL indicators available for the analysis at the NUTS3 level across the whole Alpine area – is shown in the zoom image focusing on three different north-south valleys running north from the west-east axis of Locarno-Bellinzona, identifying the areas where the population live in challenging, average, or flourishing quality of life conditions (as measured partially by the two accessibility indicators combined)<sup>18</sup>.

The analysis of the different Quality of Life components at micro level allows us to identify differences among the three valleys, with a better performing profile of the easternmost valley stretching from Bellinzona to Biasca. This far more connected valley (leads to Gotthard pass) has bigger municipalities in terms of size, it is more equipped of public and private services and ends up performing better.

Going below that scale and zooming in further closer to the settlements, the same analysis allows us to better visualise Quality of Life scores at the very local level. In this case, we see higher performance in the more consolidated commercial town centres of the different municipalities or in the proximity of train stations. At this scale, we can perceive that settlements showing a higher degree of local polycentrism may be closer to the goal of the 15-minutes city, as the urban tissue offers services and opportunities within walking and cycling distances from residents’ homes. Here again, only by scraping data at micro-grid level, below LAU2 statistical units, the analyses of real patterns became possible.

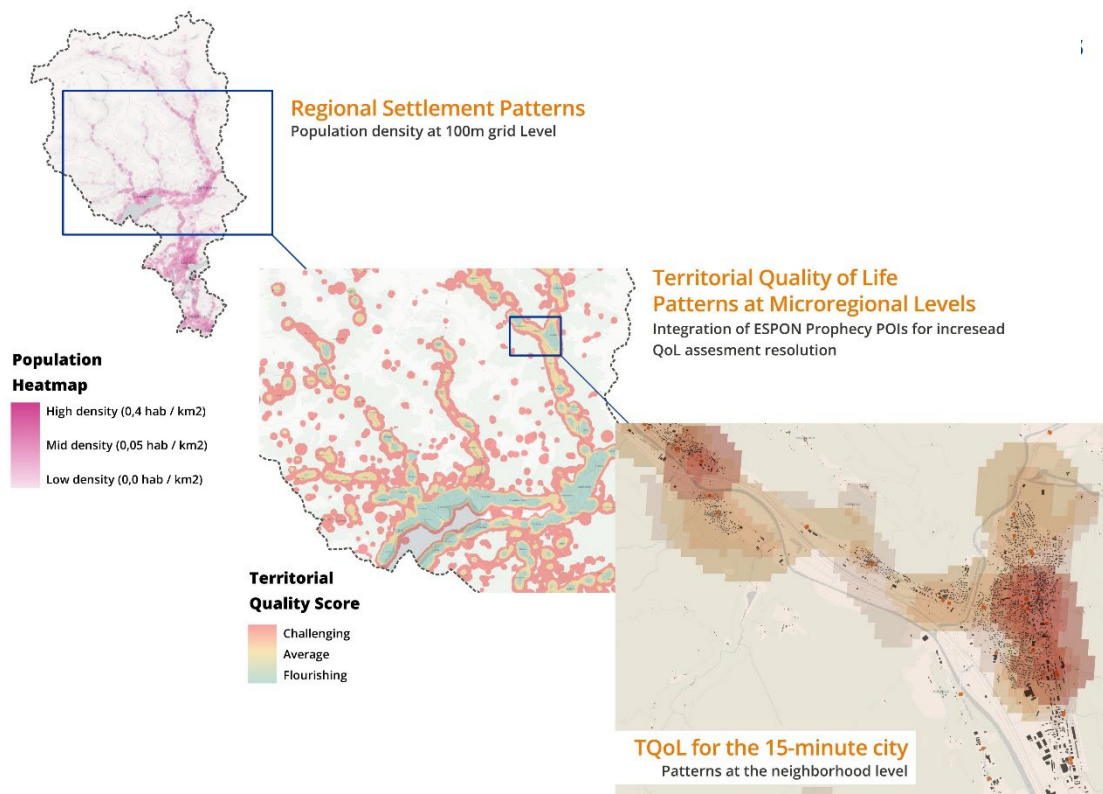
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<sup>16</sup> Geo-localisation allows to identify the exact geographical location of permanent attributes – buildings, resident population, transport infrastructures, typology of land use etc. Nowadays, dynamic localisation of individuals is also possible thanks to the diffusion of mobile devices and new urban analytics techniques, based on the collection of mobile traffic data complemented by those supplied by remote sensor data, can be applied to observe dynamic patterns of population behaviour (e.g., daily mobility) and would be useful to measure quality of life indicators related to those patterns (e.g., the daily time spent on congested routes). To analyse the potentiality of urban analytics for TQoL measurement is beyond the scope of this territorial study, but it could be the scope of future applied research.

<sup>17</sup> In the case of Canton Ticino the intensely populated portion of the region corresponds to the valley floor, identified thanks to the GEOSTAT data of the Federal Statistics Office (UST) as a territory below 500 metres above sea level, equal to 12% of the cantonal territory and in which 86.6% of the resident population was concentrated in 2018, and 92.7% of the total employees in 2017 (another element with which it is possible to measure the anthropized territory).

<sup>18</sup> The TQoL score sums the value given to living in the vicinity of a train or bus station (1) to the values given to living respectively in the vicinity of a retail shop (1), education facilities (2), banks and pharmacies (3) and doctors and hospitals (3), and the total score variable is then standardised to get a TQoL index in the range of 0 to 1.

**Figure 3 – Analysing Territorial Quality of Life at different scales.**



The main benefit of the approach based on data scraping methods to elaborate heatmaps, showing the density and impact of QoL tangible factors – the availability of services and facilities – on the population living in their accessibility areas, is its generality, i.e., can be applied to every region in the Alpine area and Europe, thanks to the available grid-level data.

In the Canton Ticino case, a wider set of geo-data is also available from the Swiss Statistical Office, and it has been used in study from OST – *Osservatorio dello Sviluppo Territoriale* – to develop a methodology for the analysis of quality of life of the elderly population within the region<sup>19</sup>. The GEOSTAT data of the Federal Statistical Office (UST) are partly like the grid-level data available for the EU, but they include more variables that – if harmonised and implemented also in the European geo-databases – could allow an extension of the TQoL application at local scale, including new variables related to QoL aspects (other than those included in the ESPON Profecy 2021 database used in our study).

More in detail, GEOSTAT geodata allow to develop a hectometric grid for the entire Swiss territory, with the detection of land cover and/or use for each hectare of territory. This information can be used to detect in the valley floors of the Alpine area the build-up areas (non-free spaces which include different categories of buildings, land attached to buildings, roads) and the free spaces (equipped green spaces, agricultural land, forest, other open spaces, abandoned areas, surfaces and waterways). On the same hectometric grid, numerous variables can be attributed relating to the presence of jobs and the settlement of the population, including in particular:

<sup>19</sup> Osservatorio dello Sviluppo territoriale (2023) – Qualità di vita nei quartieri anziani del Canton Ticino – Repubblica del Cantone Ticino, Dipartimento del Territorio: Rapporto esplicativo ([https://www4.ti.ch/fileadmin/DT/temi/piano\\_direttore/osservatorio\\_sviluppo\\_territoriale/rapporti/OST-TI\\_2023\\_rapporto\\_esplicativo.pdf](https://www4.ti.ch/fileadmin/DT/temi/piano_direttore/osservatorio_sviluppo_territoriale/rapporti/OST-TI_2023_rapporto_esplicativo.pdf)) e metodologico ([https://content.usi.ch/sites/default/files/storage/attachments/arc/arc-arc\\_ost\\_rapporto\\_metodologico.pdf](https://content.usi.ch/sites/default/files/storage/attachments/arc/arc-arc_ost_rapporto_metodologico.pdf))

- the resident population divided into age groups associated with different daily life needs: young people (0-15 years), adults (16-64 years) and elderly (over 65 years);
- buildings by construction period and single/multi-family typology;
- buildings with public transport service stops less than 1,000 metres away, for different service quality classes (class A: train with frequencies < 10 or buses with frequencies < 5 minutes; class B: train frequencies 10-20 minutes or buses frequency of 5-10 minutes; class C: train frequency of 20-40 minutes or bus frequency of 10-20 minutes; class D: train frequency of 40-60 minutes or bus frequency of 20-60 minutes; not connected: train or bus frequency > 60 minutes).
- average distance in metres of buildings from different categories of services (*basic daily services*: small retail businesses, restaurants and bars, post offices, hairdressers, garages or petrol pumps; *specialised regular services*: supermarkets and hypermarkets, food shops specialized butchers, bakeries, fruit and vegetable shops, others, textiles, household appliances, banks, sauna and/or solarium, gyms, fitness and other health centres; *occasional specialised services*: pharmacies, furniture shops, bookshops, hotels, hostels and others para-hotel facilities, general medical practices, other medical-social practices; *specialised irregular services*: specialised textiles, specialised electronics, taxis, specialist medical practices, dentists, veterinarians, cinemas, laundries, beauty institutes, funeral homes; *public services*: kindergartens nursery and facilities for pre-school children, primary and nursery schools, middle schools, general hospitals and private clinics, elderly homes, medical homes and home help services).

As mentioned, with these geo-referenced data, in Canton Ticino the OST study could measure the quality of life of elderly population developing a methodology which is of general interest, as it can be emulated to compute granular TQoL indicators in other regions of the Alpine area and Europe. For the purposes of analysing the quality of life of the resident population, the hectometric data were aggregated into a larger scale grid (400 metres per side) and the 'living places' with presence of population are identified, classifying them by density (low, medium, high) and ten-year variation in the number of residents (decreasing, stable, increasing). In this way, the 'territorial micro-units' of 400 metres per side in which at least one inhabitant/family unit is resident were identified. These territorial micro-units, by definition, do not include non-residential built areas (factories, office areas, etc. without residents). Given the intention to measure quality of life especially for the elderly population, the analysis was limited only to 'micro-neighbourhoods' with at least 50 residents over 65 years, excluding in this way (rural) areas with a low density of population living in scattered houses<sup>20</sup>.

To conclude, the following are some considerations in relation to the potential use and added value of collecting more granular data using data scraping techniques.

In previous ESPON Quality of Life projects the components linked to urban vitality were complex to be incorporated, in particular in low territorial scale analyses, e.g., City of Barcelona neighbourhood assessments (ESPON QoL 2020). QoL measurement was driven mostly by quality of housing, education opportunities (teachers, schools), health opportunities (medical practices, doctors) or transport and digital connectivity services, but it was hard to include specific measurements on the density of retail and leisure opportunities, even cultural assets where complex to be considered. Therefore, QoL was mostly portrayed based on public services offered to citizens, and with an implicit assumption that commercial and leisure services would be relatively homogeneous in a territory, only because it was impossible to map the real differences.

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<sup>20</sup> A further step, necessary for analysing more precisely the accessibility from each single home in the micro-neighbourhoods to the proximity and public transport services present in an area of 400 metres surrounding the home (corresponding to travelling 10-12 minutes on foot for young people and adults, and approximately 15 minutes for elderly people) involved calculating for each geo-referenced building in the micro-neighbourhoods the surrounding area that can be reached by walking a maximum of 400 metres on the pedestrian/road network, and then superimpose all the areas thus defined for the individual buildings on the map, obtaining a single "micro-area of accessibility" (within 400 metres on foot from the house) for each individual micro-neighbourhood. Besides evaluating the presence of proximity services and public transport stops in these micro-areas of accessibility, the methodology has considered indicators of noise exposure, air quality, road accident risks, proportion of green area and availability of public spaces within the accessibility area, assigning for each indicator standardized scores to represent low, medium or high impact on the quality of life.

Indeed, we know that close-by and/or neighbouring municipalities may have very different density of proximity shops, retail or public and private services. This stands both for different neighbourhoods in a large city, or for different municipalities in a same county or region, some being more vital and others eventually less. This being relevant in all cases, it is particularly relevant in remote locations and inner peripheries where population density is low and settlement patterns are sparse. Municipalities or neighbourhoods with higher density of commercial and entertainment services supply a much higher quality of life than those that have weak commercial tissue or services offer, and in the latter, citizens are often forced to move around. Municipalities in sparsely populated areas and in peripheries with low density of commercial services often experience over-ageing and shrinking population phenomena, that may be attributed to the scarcity of services.

The web-based data scraping techniques proposed in this ESPON QoL Alpine area project has allowed to include elements of the commercial services component and characterisations of urban vitality, as additional components in the computation of granular Territorial Quality of Life indices, although the latter are necessarily still partial until a wider range of grid-level variables can be collected to cover other aspects of QoL. However, what is considered in the partial TQoL index is the capacity of citizens to shop and participate in leisure and cultural activities close to their homes, within walking or cycling distance. This is a relevant policy aim, linked to the popular concept of the 15-minutes city. At the very local scale, this helps to identify vital self-sufficient municipalities or neighbourhoods, and those having a more residential character where residents are forced to rely on transport for accessing basic functions like shopping and leisure elsewhere.

Including urban vitality components in the Quality of Life measurements has been a major step forward of the methodology, and to do so, web scraping methods have been key enabling techniques, as statistics qualifying tertiary sector activities are not always easy to be accessed nor are always published by statistical institutes. Using the cartography based on the ESPON Profecy has also showed the potential for further territorial analyses allowed by this ESPON product.

Summing up, we suggest the following future research pathways to further exploit the potential of data scraping techniques:

- Considering more detailed analyses of the classes and subclasses of objects scraped from web sources, to explore if more refined service characterisation is possible. In this ESPON project we were only able to implement the method in a case study and for basic classifications of essential services.
- Implement the proposed methodology in sparsely populated areas, to test its capacity of assessing public and private services and its relative impact on the Quality of Life of these areas.
- Further explore if web data scraping could further be used to assess other components of the Quality of Life indicators, especially related to the social and ecological spheres.

### **3.2.3 Analysis of quality of life needs in high and low density areas.**

Besides the currently limited availability of geo-localised information covering the whole European territory, which hinders the application of the TQoL methodology at local scale described in the previous section for variables other than population, housing, land use, public transport stops and essential facilities – an obstacle that in principle could be offset by new data gathering techniques and statistical harmonisation efforts of European, national and regional offices in a foreseeable future – there is another and more serious limit to consider. Mimicking the concept of ‘15 minutes’ city, the proposed TQoL measurement approach implicitly assumes the ‘city life’ perspective, considering the quality of life needs of the population concentrated in medium and high density (urban) environments and somehow disregarding the different needs of the people living in rural and mountainous areas. Although – especially in the Alpine regions – most of the population can be concentrated in small parts of the regional territory (the valley floor), territorial quality of life policies (and measurements) should not neglect the minority of people living in the mountainous low density areas, ignoring their QoL needs that may be different from those making life in cities more attractive. According to the ancient Greek philosopher Aristotle a city is not just a big village but is fundamentally different: “...the partnership arising from the union of several villages that is complete is the city. It reaches a level of self-sufficiency, so to speak; and while coming into being for the sake of living, it exists for the sake of living well”. Today we understand of ‘living well’ as living a life of comfort, family satisfaction and professional success, surrounded by nice things. But for Aristotle ‘living well’ means leading a life of happiness and virtue and life in the city is therefore necessary for anyone who wishes to be completely human. Modern city life, however, is deceiving in this respect. Air pollution, traffic, crime, noise, time pressure, all seem to challenge the quality of urban life today. Indeed, in the past decades the increasing (car-dependent) accessibility of locations far

away from the city centre has caused an increased portion of households to escape from the congested urban environment, looking for a better quality of life outside central city boundaries, in the suburbs or even in the rural countryside. City centres increasingly experiencing an overwhelming concentration of office, shopping, or entertainment activities, which attract vast populations of commuters and/or tourists. What is worse is that social interaction and neighbourhood life – the very aim of gathering into the city – is seemingly loosening day by day. As discussed later in section 6.2, these tendencies can be reversed by the combined effect of new post-Covid 19 lifestyle trends, the raising quest for more flexible and smart balance between working and free time and spatial planning policies which may facilitate polycentric development of networks of compact, more liveable and sustainable cities – reducing the pressure on mobility and the environment – as well as supporting new lifestyles and quality of living in the countryside.

Ideally, in this context, TQoL indicators should be selected and calibrated to consider the different quality of life needs of the urban and rural population. For instance, urban residents need a frequent public transport service, while rural residents may need it only at certain times of the day, to reach nearby urban poles (and possibly including late evening rides)<sup>21</sup>. So, it would not make sense to evaluate, in this respect, the quality of transport adopting a uniform standard. It would be needed instead calibrating the same indicator, *access to public transport services*, by choosing different QoL thresholds (i.e., minimum quality needs) depending on the typology of living area, with a less frequent or flexible transport standard for rural/mountain areas compared to a more frequent standard for dense urban settlements. The same logic could be applied to other QoL aspects that may emerge an analysis of the different life needs of urban and rural residents. In practice, this approach would be feasible only by considering geo-referenced data, which would allow to measure place-based (per accessibility areas) and segmented (per meaningful categories of population, e.g., different age groups) quality of life needs and expectations. And the selection of indicators, as illustrated later in section 5.3, should always be based on engaging representative samples of citizens - selected randomly on the base of demographic criteria ensuring that the participants reflect the segment(s) of population and different living environments (urban, rural, etc.) – to express their own perceptions of quality of life priorities.

While it is beyond the scope and resource availability of our territorial study to identify, calibrate and test different indicators (or quality standards for the same indicators) for measuring the quality of living in urban and rural areas, we have addressed the issue in a qualitative fashion:

- At **macro-analysis level**, by making first a ‘pattern recognition’ exercise to cluster the huge number of 452 indicators suggested by the stakeholders involved in the four living labs for all 22 TQoL sub-domains. The consolidated list of suggested indicators is presented in Annex B to this report and the indicators which measure similar aspects of quality of life are grouped in **65 sub-categories named ‘TQoL conditions’** (for instance, in the sub-domain ‘housing and basic utilities’ we were able to recognise four groups of indicators for measuring house availability, house overcrowding, house cost, house services and so on for the other sub-domains). Quality of life is a complex and multifaceted concept and the TQoL framework exhibits therefore a fractal structure, with increasingly detailed levels: three dimensions, nine domains and 22 sub-domains to which we have added now 65 TQoL conditions. The table in Annex B includes in the first column the suggested indicators associated to each TQoL condition, and in the second column a description of the expected differences of TQoL conditions in urban and rural areas, elaborated by means of a systematic ChatGPT query of the form: “*Is the [TQoL condition] different for urban and rural inhabitants?*”.
- At a **micro-analysis level**, differences between living in urban and rural/mountain areas have been explored by asking to identify the most relevant QoL needs and expectations to a focus group of citizens living in mountain areas (low density), rural valley floor areas (intermediate density) and urban areas (high density) of Canton Ticino. This focus group has been organized online on Wednesday 13 December

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<sup>21</sup> Referring to the above-mentioned Swiss classification of public transport service quality, urban citizens could need a frequent transport – class A, while for those living at the other extreme, in mountain zones, less frequent bus schedules – class D, or even the availability of flexible services on demand could satisfy their needs.

2023, attended by seven citizens, and lasting one hour and 45 minutes, with an always lively and interesting dialogue, whose results are reported in Annex C to this final report<sup>22</sup>.

### 3.3 Living labs highlights on TQoL measurement.

The following are the main highlights stemming from each TQoL living lab:

- In the **Canton Ticino** living lab the participants appreciated the comprehensiveness of the TQoL framework, deemed useful above all to better coordinate the use of specific data that exist but are 'scattered' in the different USTAT (Canton Ticino Statistical Office) services – or among the different official and unofficial suppliers of data who currently have no opportunity to coordinate and collaborate – for the common purpose of measuring quality of life. In relation to the socio-economic sphere, the Corporate Social Responsibility (CSR) report drawn up by the Canton Ticino government in collaboration with the Ticino Industries Association and SUPSI – Italian Swiss University of Applied Sciences – it has been mentioned as a useful tool to complement the measurement of TQoL. The CSR report includes a template offered to all companies operating in Cantone Ticino as a tool for reporting the actions undertaken to improve performance in terms of social responsibility and benchmarks to compare actions and intensify exchanges of knowledge between companies on possible further interventions to be undertaken. The indicators of inclusive economy, work opportunities, self-actualisation and the environmental impact indicators considered in the TQoL methodology are in fact aligned with the objectives of this CSR report. In relation to the ecological sphere of the TQoL scheme, the importance of raising more and better awareness among the population on the nature and importance of ecosystems in the territory was underlined, to bring awareness of the consequences of one's behaviour and possible impacts on the ecosystem balance. It is particularly important to introduce new surveys and indicators capable of measuring the knowledge that the population has of the very notion of ecosystem and of concrete examples of vital ecosystem services to be maintained in their own living environment (at present this knowledge is limited to specialists). Finally, it has been highlighted by the statistical officer in charge of monitoring air quality in the canton that indicators computed for territorial unities (NUTS3 or municipalities) are not suitable for representing air pollution phenomena and the same problem can be found for other environmental variables. Depending on the nature and method of dispersion of individual pollutants, the appropriate scales are very small (for example at the micro-neighbourhood level) or broader, at district scale. In addition to the above-mentioned highlights, a detailed list of indicators available at local level, mostly from USTAT, has been also compiled, and it is included in Annex C to this report (Table C1).
- Experts and stakeholders engaged in the **Trento** living lab shared the feeling that a sound TQoL methodology with a plurality of indicators embracing more holistic and inclusive perspectives is needed both in the Alpine region and in the rest of Europe. The participants considered the most evident TQoL areas in need of improvement to be: 1) *mobility*, which suffers from years of short-sighted land use planning (given the morphology of the territory) and a historically car-dominated mentality of the population; 2) *closed mind-set*, stemming from the strong cultural identity of Trento residents, which have historically been tight-knit as a community but wary of outsiders (the 1960s establishment of the university has turned the tide and improved the inclusiveness of the city); 3) *wage conditions*, which grow slower than in other high TQoL parts of Italy; 4) *work-life balance*, which remains difficult despite being better served by good services; 5) *cultural assets*, which are rich and varied but scattered and poorly communicated, failing to meaningfully reach the audiences; and 6) *civic education programmes*, which are critically needed in an era of global political and civic disenchantment, even in a city that has always shined for its inclination toward cooperation and volunteerism. More civic sense and participation would improve interpersonal trust and thus trust in the institutions. In addition, rather than monitoring only the quality of life of those who already have high-quality living conditions, the focus should be on evaluating the quality of life of those who lag at the margins of society, taking an intersectional perspective (intergenerational, intercultural, inter-gender, inter-locational) and identifying dimensions that truly intercept vulnerabilities. Moreover, indicators capable of measuring quality in

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<sup>22</sup> This pilot focus group was obviously not representative of the Canton Ticino population, but the profiles of the participants were selected accurately to collect perceptions of everyday quality of life needs in different urban, peri-urban and rural living environments within the region, so to provide enough diverse and meaningful qualitative insights.

terms of actual service efficiency should be integrated. In addition to the above-mentioned highlights, a detailed list of indicators available at local level, mostly from the Trento Province Statistical Office, has been suggested, and it is included in Annex C to this report (Table C2).

- The participants of the TQoL Living Lab in the **Koroška region** were generally satisfied with the 22 sub-domains of the ESPON approach measuring territorial quality of life. However, there are significant differences in terms of their level of importance. The most important sub-domains for quality of life in the Koroška region relate to the dimension good life enablers, such as housing, services (especially healthcare and education), work opportunities, transport and green infrastructure. It was suggested that future studies should focus more on how the enabler pillar is reflected in both outcome pillars (life maintenance and flourishing). For example, the enablers of good life in green environments are perceived as above average, but the healthy environment and climate change indicators reflect a negative trend according to the participants involved<sup>23</sup>. Moreover, in their view, indicators should be introduced to monitor problems that may be purely local or region-specific. Given the recent flooding in the Koroška region, it would be useful to consider an indicator that measures, for example, the proportion of residential or commercial buildings in flood-prone areas. Elsewhere, instead, heat islands or overheating could be measured, which is not so relevant in the Koroška region. In addition to the above-mentioned highlights, a detailed list of indicators available at local level, mostly from regional and national sources, has been compiled, and it is included in Annex C to this report (Table C3).
- In the **Unterkärnten** region living lab, during the interviews, strategic planning stakeholders mentioned the OECD Quality of Life Index and that Carinthia performs very well in safety, educational opportunities, life satisfaction and civic engagement. Carinthia was mentioned by the stakeholders among the world's leaders in the availability of resources (water, renewable resources) and well performing in terms of provision of basic needs (health care). Carinthia is strong in agriculture and tourism, but also economically (compared with other regions of the same size, in terms of residents, only a few regions are performing so well) and has a beautiful landscape. Some positive and challenging quality of life aspects have been identified in relation to the Unterkärnten region. On the positive side: very good sense of togetherness in some areas of the region, important tourist region, beautiful landscape and nature, presence of many technology-orientated companies, plastic recycling and circular economy. Challenging aspects to be improved include: regional identity (including bilingualism – DE/SL) and attracting of innovation in the region, internet broadband expansion, further increases the energy and resources self-sufficiency. Considering the Territorial Quality of Life framework, participants highlighted some missing aspects: so far the framework does not consider explicitly the quality of life needs of different age groups (e.g., young people in the region have completely different needs than elderly people); Artificial Intelligence's (AI) impacts on quality of life should be considered by adding indicators of digital well-being (AI advantages) and threats (e.g., changing job opportunities); circular economy and food, energy and materials recycling indicators should be added in the picture; the degree of soil sealing is an important healthy environment factor and it is missing. In addition to the above-mentioned highlights, a list of indicators has been compiled, and it is included in Annex C to this report (Table C4).

### 3.4 How can we use the ESPON approach to measure Quality of Life in the Alpine area?

Looking across the case studies' highlights, it is possible to draw transversal key messages and recommendations of general validity for the Alpine area, answering the first policy question of our study: *How can we use the ESPON (place-based and citizen-centred) approach to measure QoL in the Alpine area?*

#### Key messages:

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<sup>23</sup> In the Mežica Valley, there is a project to monitor and remedy the negative effects of lead pollution (e.g., measuring lead levels in children's blood and removing dust by asphaltting roads) and the recent floods have exposed the full extent of this phenomenon or problem. Healthy environment indicators need to be defined differently for the Mežica Valley and now, after the floods, for the wider Koroška region.

- Recurrent QoL problems include transport (not surprising considering the orography of the Alpine area), obstacles for the young generation to find adequate work opportunities, no or slow growth of wages compared to the increasing cost of living (especially house values and rents in the urban areas), gender gaps, closed mind-set of the population, need of more protected areas and civic education to raise awareness of ecosystems services.
- There is a trade-off between developing European wide harmonised indicators and local or region-specific indicators. The former allow to map TQoL indices for sub-domains across the whole Alpine area (at NUTS3 level or below, for those indicators that can be elaborated using grid-level data and data scraping methods, as for instance the ESPON Prophecy services' accessibility indicators), but their scope is unavoidably limited and too generic to monitor problems that may be purely local or region-specific. The latter are more useful to measure local QoL performance and the effect of local policies but could not allow benchmarking across different regions. However, this problem is mitigated by the standardisation of the TQoL indices, neutralising the differences of unit of measurement: this means that a benchmarking of standardised indices is still meaningful if the specific proxy indicators used in two different regions to measure a same QoL aspect (sub-domain) measure phenomena in a similar way.
- Further research would be needed to better understand the connection between tangible good life enablers and less tangible or fully intangible outcomes (life maintenance and especially life flourishing) in the TQoL framework of indicators. This new research activity might apply system analysis techniques (e.g., Causal Loop Diagrams – CLDs) to describe the connection between the different sub-domains of the TQoL framework, to produce evidence about possible influence pathways and non-linear feedback loops linking good life enablers with the desired QoL outcomes. A better understanding of systemic interrelationships could therefore also contribute to better utilisation and implementation of QoL actions by stakeholders and target groups.
- The TQoL framework does not consider explicitly the quality of life needs of different age groups (e.g., young people have completely different needs than elderly people). By the same token, the TQoL analysis should be focused on evaluating the quality of life of those who lag at the margins of society, taking an intersectional perspective and identifying dimensions that truly intercept vulnerabilities<sup>24</sup>.

#### **Recommendations:**

The TQoL framework and dashboard tool should be developed in three directions:

1. **To reduce the gaps of territorially detailed data harmonised at European level**, by increasing the availability of geo-referenced information for demographic, housing, infrastructures and services, land use and environmental variables from EU databases, and harmonising them (or at least establish equipollence) with geo-data available for Switzerland, Lichtenstein and Monaco, to get a wider range of granular TQoL indicators and maps, especially related to good life enablers and life maintenance indicators, valid for the whole Alpine area. The best strategy recommended to integrate such geo-referenced data – whenever they will become widely available for Europe – in the TQoL dashboard tool is to develop partial applications for specific segments of the population and typologies of territories – for instance the quality of life of children living in urban or rural areas across Europe – using partial sets of indicators and parameters (e.g., minimum thresholds of nursery, primary schools availability, children healthcare services, playgrounds, etc.) relevant for measuring the QoL conditions, needs and expectations of the specific population segment in the diverse typologies of areas. Such partial applications of the TQoL dashboard may allow to highlight, for instance, the quality of living in urban neighbourhoods incorporating indicators of exposure to noise generated from living close to busy roads, railways or airports, exposure to air pollution, lack of urban green, heat island effects due to global warming, risks of road accidents, vulnerability to floods or other extreme weather events, etc. at a very detailed spatial level.

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<sup>24</sup> In the context of sociological research, intersectionality refers to the interconnected nature of social categories such as race, class, gender and other aspects of identity. The concept acknowledges that individuals experience multiple and overlapping social structures and systems of oppression or privilege simultaneously. Intersectionality emphasises that the effects of discrimination and inequality cannot be understood or adequately addressed by examining individual categories in isolation.

2. To **co-design and coordinate national quality of life surveys** with annual frequency and a sample sufficiently consistent and robust to support the computation of reliable indicators within the countries, at NUTS3 regions' level and for the sub-NUTS3 distinction of urban/peri-urban/rural areas, especially to measure life flourishing aspects related to personal self-esteem (e.g., mental health) and self-actualisation (e.g., achievement of different life aspirations), feeling of societal belonging and community flourishing, and on the ecological sphere the perception and awareness of ecosystems services' health and biodiversity losses. Coordinated surveys should allow to compute for the TQoL sub-domains the same or at least equipollent proxy indicators across all Alpine countries.
3. At local level (e.g., NUTS3 or city level), **promote and establish connections between the TQoL framework applications engaging public statistical offices and business associations' Corporate Social Responsibility reporting mechanisms** (as suggested for the Canton Ticino and Trento cases).

## 4 Impact of global changes on QoL conditions and management

### 4.1 Quantitative trends

The European Union has access to extensive sources of valuable data dedicated to predicting scenarios across various topics, which can be used to assess the main demographic, economic, energy and governance drivers influencing territorial development and the evolution of quality-of-life standards. The data sources used for the assessment were derived from various origins, including both the previous analyses conducted by ESPON Quality of Life and other complementary sources. The different origins of data considered are: i) ESPON TQoL (2020), ii) EUROPOP, Eurostat (2019), iii) JRC LUISA (2016), iv) QoG (2021), v) MASST4 projections (2021) and vi) ESPON Alps in 2050 (2020). As different indicators may provide data with different territorial scopes, a combination of NUTS0 (Member State) and NUTS2 levels was utilised for the analysis of quantitative trends and projections.

The most important demographic and economic trends and projections are summarised below:

- **Population dynamics:** For the whole Alpine area, population is projected to be broadly stable or slightly decreasing, while regional trajectories are very diverse. In the long run, urban and metropolitan regions tend to show more positive trends. In some inner Alps regions outmigration is an increasing challenge that is very difficult to mitigate. Specifically, in regions such as Ticino and Trento, there is an expectation that the population will remain stable or even experience a slight increase. In contrast, areas like Koroška and Unterkärnten may face population decline of up to 10%. These variations in demographic outlook highlight the nuanced nature of population trends in the Alpine Convention space.
- **Ageing:** Ageing population is a demographic challenge for the whole Europe, and especially evident in the Alpine Convention area. To assess this issue, the analysis focused on the proportion of the population aged 65 and above, which serves as a key demographic indicator. The graphical representation shown in the intermediate report reveals a consistent upward trend in the ageing population, with a projection to reach 30% of the total population. This indicates a significant 10% increase over the next 30 years, emphasising the substantial demographic shift towards an older population structure. The examination of specific case studies within the context of ageing populations reveals distinctive trends and projections. Unterkärnten stands out with a more pronounced ageing rate, indicating a faster increase in the proportion of the population aged 65 and above. Meanwhile, Trento, Koroška, and Unterkärnten show a similar pattern of stagnation, but with higher proportions, underscoring the sustained ageing trend in these regions. In contrast, Ticino appears to deviate from this trend, exhibiting a decrease in the proportion of ageing population in the latter part of the century, ultimately falling below the regional average.
- **GDP:** The GDP per capita projections offered by MASST4 reveal a consistent pattern of projected growth across the Alpine Convention area with a remarkable 50% increase in GDP per capita over a two-decade period up to 2030, highlighting a positive trajectory in economic activities and living standards across the region. However, GDP values for each of the selected study cases exhibit disparities. Ticino leads the group with the highest GDP per capita, while Koroška lags significantly behind. In contrast, Trento and Unterkärnten share similar GDP per capita values, which closely align with the average for the entire Alpine Convention area.
- **Employment:** The Total Employment Index reflects a consistent upward trend until 2019, indicating a sustained increase in employment within the Alpine Convention Area. However, this growth trajectory was disrupted by the outbreak of the COVID-19 pandemic in 2020, which had widespread impacts on labour markets and economies across the Alpine area. The employment trends in Trento, Ticino and Unterkärnten exhibit significant increases, with employment levels surpassing the regional average. However, Koroška presents a decreasing trend from 2000 onwards, indicating a long-standing decline in employment opportunities in that region. All the case study regions experienced a decrease in employment after 2019, which can be attributed to the impact of the COVID-19 pandemic.

## 4.2 Impact of global scenarios on territorial quality of life

A 'forward looking' territorial quality of life measurement methodology cannot be limited to analyse the present, but shall be extended to consider the possible evolution of territorial quality of life over the medium and long term. Such evolution is unpredictable, as to how economic, social and ecological conditions that support life evolve in a place depends on so many and interacting causes, drivers and factors that predicting where a territorial quality of life index could stand in a distant future would be eventually an irrelevant exercise. However, it is possible and useful instead to anticipate likely impacts on the future status of territorial quality of life of structural climate, technological, demographic, cultural (lifestyle) and governance change scenarios.<sup>25</sup>

### 4.2.1 Living labs highlights on global change impact on TQoL conditions and management.

The following are the main highlights stemming from each TQoL living lab:

- In the **Canton Ticino** living lab, the following topics have been highlighted in the interviews in relation to the future prospects for the quality of life:
  1. The great predisposition of the younger generations (up to 35 years old) to act in relation to the changing *global economic trends* and especially the evolution of job opportunities and quality of work and salaries that strongly influence their career and locational choices which needs a response from both business and governmental agents in the Ticino area.
  2. *Climate change* certainly has important impacts on various indicators relating to the quality of life in Canton Ticino, exposed to various environmental dangers caused by the rise in temperature and the frequency and intensity of extreme weather events. In addition to the impacts on health, it is important in an area such as Canton Ticino to consider the water cycle, with the variations due to the reduction of glaciers and/or the different rainfall regimes, which will require defining and/or better using indicators relating to availability and water flows in the region's territorial system. Also the monitoring of air quality will evolve: while monitoring the nitrogen oxides that are most relevant for air pollution (NO and NO<sub>2</sub>) is to become in the future a less relevant (as they are mainly linked to vehicle emissions, which will lose importance with the shift away from fuel-based to electric propulsion of private and public vehicles), the level of ozone in the atmosphere is increasingly relevant to measure in relation to expected increases in temperature (together with fine dust in winter). In relation to personal health and safety, it will become also increasingly important to monitor indicators relating to the impacts of increasing natural risks and extreme events.
  3. Finally, in relation to the future *demographic scenarios* of the region, there are three critical trends to consider: a) lack of manpower, b) ageing population, and c) birth rate decrease.
- In the **Trento** living lab, despite the different perceptions and expectations, all engaged stakeholders and experts affirmed that, compared to the rest of Italy, the quality of life in the Trento area is relatively high, and it is supposed to be on par with other Alpine regions. Indeed, significant improvements in life expectancy over the last 50 years indicate that people in Trento have progressively achieved longer and healthier lives, placing the capital city in the top tier of the national ranking<sup>26</sup>. However, two main challenges have been highlighted: 1) The ageing population in Trento, as in the rest of the region, presents

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<sup>25</sup> This has been done in all case studies using a same participatory foresight technique – the Three Horizons method – and a four transition scenarios meta-model, asking data experts, policy stakeholders and citizens engaged in each TQoL living lab to envisage how quality of life may change by 2050, respectively in an *inertial scenario* (H1) where the current drivers and trends will continue unchanged, and in a *transformative scenario* (H3) where new emerging paradigms will become dominant and which quality of life aspects should be monitored as a priority to be included in a *territorial QoL policy agenda until 2030* (H2), to facilitate the best future territorial quality of life outcome.

<sup>26</sup> Appointed Alpine Town of the Year in 2004, Trento consistently ranks in the top five Italian cities for quality of life measured by traditional rankings (i.e., Il Sole 24 Ore), which comprise indicators proxying private finances and consumption, employment and innovation, environment and public services, demography and society, crime and justice, culture and leisure.

the healthcare and welfare service system with constantly evolving social, organisational and economic challenges. Social and healthcare services are part of an integrated system of public and private services that promote actions aimed at preventing, eliminating, or reducing the conditions of disadvantage, need and individual or family distress; 2) Partly as a consequence of the high quality of life standard, the city of Trento is characterised by a high cost of living, as evidenced by its frequent placement at the top of the rankings in Italy for average rental rates (EUR 1,100 per month for new 100 m<sup>2</sup> apartments in semi-central areas) just behind some of Italy's major cities (Milan, Venice, Rome, Florence and Bologna) and Bolzano (EUR 1,200 per month). This, coupled with rising pressure from the growing student population and the scarcity of residential properties, makes it difficult for the potential demand to be met<sup>27</sup>.

Looking forward more broadly to future development and the prospects for quality of life, the following elements have been suggested by the participants to the living lab as winning factors for the city of Trento:

- *Centrality of the individual and human capital*, which means recognising and nurturing talents, passing on knowledge of entrepreneurship and the culture of work to shape the generations of entrepreneurs and workers of tomorrow.
  - *Business ecosystem and interdependence*, as the ability to create interconnected business systems (clusters) and support from institutions is deemed essential for the economic and social growth of a region in a globalised world where the effects – whether positive or negative – spread rapidly.
  - *Social and environmental sustainability*, recognizing that sustainability is not just ‘greenwashing’ but requires a collective awareness translated into concrete actions for the future.
  - *Hospitality and integration*, which means offering help and support to the most vulnerable in the face of global challenges to overcome increasing inequalities (e.g., in relation to housing affordability).
  - *Digital innovation*, recognising that Industry 4.0 and related technologies are vital for regions responding to the ever-evolving social landscape.
- In the **Koroška region** living lab, the strengths of the quality of life most frequently mentioned were the preserved natural environment, the border location with Austria, accessibility to services, social cohesion and the feeling of security. The weaknesses of the quality of life in the Koroška region most frequently mentioned were the poor transport accessibility and digital connectivity, the lack of diversified jobs with higher added value and the ‘old’ environmental burdens. When it comes to specific global impacts, participants mainly mentioned climate change and demographic change, as follows:
    1. *Climate change*: As a mountainous Alpine region, Koroška is vulnerable to climate change (e.g., flooding, landslides, avalanches). For most people in the Koroška region, the category of recent torrential floods is something completely new. It did not exist before, but now the region must adapt to such circumstances with more adequate housing and stricter spatial planning. In relation to recent extreme weather events, the lack of monitoring of natural disasters due to climate change was also frequently mentioned by the participants. In this context, the need to monitor climate change preparedness was emphasised.
    2. *Demographic change*: It is very likely that the population in Koroška, as a peripheral Alpine region, will continue to age and decline in the future. This is largely due to the emigration of young people to larger urban centres or even abroad, which is mainly a result of the transport remoteness and the lack of jobs, especially in non-industrial sectors. Among the adjustments to demographic change, participants mentioned the creation of suitable economic conditions (tax policy, business parks for high-tech industry, attracting people from other regions and countries), public services and digital solutions (e.g. homeworking). Among the new aspects of quality of life monitoring, the suggestion was made to monitor the area of demographic development (e.g. emigration and immigration).
  - The case study on Carinthia and the NUTS3-region of **Unterkärnten** shows that the different stakeholders engaged in the living lab have different knowledge needs and perception of quality of life related issues, mostly depending on their field of work. Generally, experts who participated in the

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<sup>27</sup> The lack of affordable housing for low-income families and students is increasingly perceived as a hard-pressing issue that is displacing these groups outside of the city with repercussion on the city's service, commercial fabric and identity.

stakeholder workshop and the participants in the citizens' focus group identified *demographic change* as the most important ongoing and future change. However, many other challenges have been discussed as currently important and so in the future: climate change, mobility and public transport, engagement of young adults in sustainable development, outmigration of the younger generation, migration to the countryside (climate reasons, security needs, price/performance), the need of a welcome culture for international and internal migrants (preparing the population for increasing immigration and interculturality), equal access to services for all, labour market access, fostering participation in matters of regional development (e.g., involvement of youngsters), access to affordable housing, fostering the sense of belonging and the regional identity of citizens living in the region, creation of appropriate caring structures for the elderly, deficits in infrastructure (road pavements, cycle paths, public transport), strengthening town centres and densification of living space and digitalisation making the place of residence less important (people no longer have to live near their work).

### 4.3 How present and future Quality of Life is perceived in the Alpine area?

Looking across the case studies' highlights, it is possible to draw transversal key messages of general validity for the Alpine area, answering the second policy question of our study: *How QoL is perceived in the different types of territories of the Alps? And which territorial profiles can be identified at sub-national level? What similarities and differences can be identified within Alpine regions/territories?*

#### Key messages:

- **Climate change certainly is perceived as having important impacts on the quality of life in the Alpine regions**, because of various threats caused by the rise in temperature and the frequency and intensity of extreme weather events. These include health impacts, unfavourable water cycle changes, air quality impacts, with ozone becoming the most relevant pollutant to monitor because of increasing temperature and nitrogen oxides becoming instead less relevant with the reduction of fossil fuels and transport emissions.
- **Population ageing – and in some Alpine regions also decline – presents several QoL implications and problems, especially for the healthcare and welfare service systems** increasingly challenged by constantly evolving social, organisational and economic factors.
- **Globalisation impacts on local labour markets are perceived as highly problematic, especially by the younger generations** due to the unfavourable evolution of job opportunities, quality of work and wages that strongly influence their career and locational choices, combined with the increasing cost of living (and especially the difficulty to find affordable houses).
- Besides the impacts on labour markets, the **digital transformation will produce its most significant effects in the way in which the different actors of society interface and are connected to each other**. This will give rise to new lifestyles, behaviour and business models. The result of this change will presumably be defined by the capacity of all the actors involved (companies, public actors and users) to gain the most complete understanding possible of the digital transformation and become aware not only of the technological aspects but also of the social and cultural ones. Some regions are aiming to build such capacities by adopting explicit digital transformation strategies (e.g., Canton Ticino). It is important to notice that there is a strong complementarity, at least potentially, between the aim of digital transformation strategies to improve the people experience online and that of the TQoL approach, of measuring and improving policies to enhance the quality of life in the territory, ensuring a good mix of 'off-line' and 'on-line' life opportunities and experiences for all.
- In the most innovative Alpine regions (Trento, Carinthia, Canton Ticino and other Swiss regions hosting important innovation clusters), **Artificial Intelligence is perceived not only as a risk factor, but as a much needed aid, particularly the use of AI in healthcare**. It is not about replacing healthcare and welfare staffs but rather to assist them with support tools and technologies both in care facilities and at patients' homes. Similarly, **AI could be used to mitigate potential difficulties due to climate change**. A good quality of life should be also measured by the ability to embrace emerging technologies to free up space and time for citizens, increasing the efficiency of their activities.
- As extensively discussed earlier in section 3 of the report, **territorial QoL profiles can be best identified at sub-national level by using geo-referenced data** available from official sources

(Eurostat, European Environmental Agency, national geo-data from Switzerland, Lichtenstein, Monaco), complemented with data scraping methods exploiting geo-localised open source information (Open Street Maps – OSM), to map the accessibility to consumption opportunities, education and health-care services, public transport infrastructure (rail and bus stations) at granular level – down to an hectometric grid of territorial cells covering the whole European space. **The granular accessibility data available for Europe allow to map the proximity to home of essential facilities and services** (e.g., within 400 metres or the equivalent of 15 minutes walking), which is one prerequisite for a good quality of life. **The same approach could be extended to include environmental variables, e.g., the presence of green areas, the exposure to air pollution sources, the quality of waters and soil.**

## 5 Delivering effective TQoL living lab processes

Citizens' engagement processes can reap surprising fruits but also backfire, and an effective way to stifle enthusiasm and dedication is to thwart continuity and feedback loops. Engaged citizens feel empowered and gratified when their efforts are tangibly recognised, through concrete and timely feedback from the local authorities and in time through reflection in policies, projects and services. There is nothing more frustrating for people, that are often very busy and sacrifice their own free time to attend living lab-like meeting, than seeing the process being abruptly interrupted or not followed up. A healthy living lab would have to be:

- spearheaded by a motivated local authority, championed by a particularly dedicated figure (a politician, high-profile civil servant);
- powered by a true multilevel institutional governance, which facilitates access to financial, infrastructural, and human resources needed to support the long-term sustainability of a living lab;
- ideally supported in the facilitation by a professional citizens engagement expert/organisation;
- consistently participated by key stakeholders from research, industry and other economic players, civil society;
- operated according to clear objectives, *modus operandi*, timetable;
- consistently ran; and
- adequately communicated to the public opinion in terms of aims, events and tangible results.

Creating an Alpine network of living labs, possibly funded or co-funded by Europe (for the efficient running and coordination of these initiatives entail high-level recognition and cost money) would further empower the living labs and attract participants, especially if cross-living labs activities were to be made possible.

### 5.1 Organisation of the testing of the TQoL living labs and lessons learned.

The TQoL living lab tests have been organised following a similar approach, based on sharing stakeholders mapping criteria and common templates for the interviews' questions, the stakeholders workshop world-café format and agenda of research questions, and the citizens' focus groups discussion. However, flexibility was also encouraged engage stakeholders and citizens in each case study, within the tight time window of the project. As a consequence, while respecting the basic design, each case study followed a tailored sequence of living lab events. The following are the main lessons learned from organising each TQoL living lab:

- In the **Canton Ticino** case study, the testing of the ESPON TQoL methodology was initiated by a series of interviews involving relevant stakeholders – producers (statistical offices) and users (departments of the cantonal government with political responsibilities in different sectors, territorial observatories, other stakeholders) collecting statistical information relating to Canton Ticino. Ten experts from six institutions have been interviewed. Two of them also attended the stakeholders' workshop organised at *Università della Svizzera Italiana (USI)*, Lugano, on 17 October 2023, which had a total of 20 participants from local government, the cantonal statistical office, civil society and business associations and university departments<sup>28</sup>. Moreover, to explore the differences between living in urban and rural/mountain areas within the canton, a focus groups attended by seven citizens of different age and a typology of residential location had been organised online on Wednesday 13 December 2023, lasting one hour and 45 minutes,

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<sup>28</sup> In the workshop, using a world-café format to organise the discussion, participants were divided into three tables. In the first two the discussion focused on providing feedback on the usefulness of the TQoL framework for policy formulation, and suggesting additional indicators, or better specifications of the indicators already included in the selection. The impact of global challenges (climate change, digital transformation, demographic, cultural and governance changes) on the future quality of life prospects in the region was also considered. In the third table the discussion concentrated on guiding ideas, methodological resources and data sources available in Cantone Ticino, to go to a more detailed territorial scale (sub-NUTS3) necessary to analyse the evolution of the quality of life within the canton in support of local policy objectives.

with an always lively and interesting dialogue. The Canton Ticino case study allows to draw useful lessons for any person that wants to develop a TQoL pilot living lab in a new region, without having any specific connection with it (as it was the case for ISINNOVA undertaking this case study to respond to ESPON and the Presidency of the Alpine Convention requirements). To be effective one should follow a step-by-step path:

- *First*, map the context by scanning the relevant information available on the web (particularly abundant in the Canton Ticino case);
  - *Second*, while making contacts with the key stakeholders to be interviewed, search for a local institution suitable for engaging the local stakeholders' and citizens engagement based on its knowledge of and rooting in the local context (universities are usually the most suitable actors for this, and we contacted and had the opportunity to find an agreement with USI to take this role);
  - *Third*, depending on the local context, be flexible in organising the sequence of the stakeholders' and citizens involvement steps. In our case, the successful approach was for ISINNOVA to initially complete most of the key stakeholders interviews while USI was inviting a wider list of stakeholders to the workshop organised at mid-October, and then to concentrate on engaging the citizens to a focus group held following the stakeholders' workshop and oriented to a more specific purpose, i.e. exploring the QoL differences between living in an urban and a rural context, the need of which emerged from the previous discussions with the stakeholders.
- In the **Trento** case study, the organisation of the living lab was *custom-tailored to the local circumstances*, resulting in what both participants and organisers considered a success that will hopefully be replicated in the future. The stakeholder audience was carefully selected based on commitment and enthusiasm, previous history of engagement, representativeness, availability during the electoral period. The format of citizens' meetings and final workshop sought to balance the study's needs for comprehensive QoL appraisal with the heartfelt thematic interests of participants. Throughout the Lab events participants and organisers set in motion a process of *continued QoL education and awareness-raising*, sparking a much desirable cross-contamination amongst stakeholders. Detailed preparation of each meeting with introductory dives on methodological aspects as well as research-driven global and local trends enabled participants to reflect on QoL facets ordinarily unobserved, contributing to build a more systemic view of QoL. The Lab confirmed the importance of *diverse stakeholders' involvement*. Engaging a wide range of participants from various civil and administrative organisations enriched the dialogue, ensuring that multiple perspectives were considered in the QoL decision-making processes. It also showed, perhaps unsurprisingly but nevertheless alarmingly, that stakeholders possess solid command of all the nuances of their sector's strengths, shortcomings, current and upcoming challenges, yet they tend to suffer from a lack of awareness of other sectors' circumstances, even if these relate to everyday life facets such as the impacts of individual modal choices on society, the environment and the economy. Such realisation reinforces the conviction that diversified stakeholders' engagement is a strong tool to foster transdisciplinary thinking, reciprocal acquaintance, awareness of otherwise overlooked needs and challenges, growth of shared community vision and values. *Obstacles faced included resistance to change*, often triggered by the above-mentioned limited awareness of issues outside the scope of personal/professional concern, as well as disparities in societal representation. This emphasises the need for more effective change management strategies and renewed efforts to increase the frequency of community engagement and ensure equitable participation across society, with special attention to groups that are often underrepresented, the youth, the elderly and vulnerable populations. Indeed, participants to community engagement events tend to be always the same and broadening the audience of concerned stakeholders should be the goal of future engagement efforts. Tackling quality of life considerations will entail further broadening the engaged stakeholders' spectrum, which can be challenging in times of global disenchantment with politics and civic identity. Trento is however still enjoying the long-term influence of a historical tradition of cooperation, which is confirmed by the cities having just been named the [2024 European Volunteering Capital](#).
  - In the **Koroška region** living lab, the testing of the ESPON TQoL methodology was organised in three steps. First, six interviews were conducted with some relevant stakeholders – producers (statistical officers, data analysts) and users (national and regional bodies with political responsibility in different sectors) of statistical information on the Koroška region. The citizens' focus group was organised on 9 November 2023 between 16:00 and 18:30 at MPIK – Network Business Incubator Koroška in Slovenj Gradec. A total of five local participants took part in the event. The stakeholder workshop was organised on 10 November 2023 at the Dr. Franc Sušnik Central Carinthian Library Ravne na Koroškem. A total of

17 stakeholders took part in the event. Based on the cooperation, interest and feedback of all participants, the implementation of the TQoL Living Lab in the Koroška region can be considered successful. Key factors that contributed to this success are the good preparation for the interviews and events by previous studies and tools for measuring quality of life (e.g., ESPON QoL – Quality of Life Measurements and Methodology, ESPON QoL – EUROPEAN DASHBOARD, Atlas on Quality of Life in Slovenia), the strong local support by the Regional Development Agency for Koroška (e.g., contacts, networking, organisational issues) and the support of the Ministry of Natural Resources and Spatial Planning, which is interested in the project results as the responsible representative of the Slovenian Presidency of the Alpine Convention for the period 2023-2024. The main challenge of the TQoL Living Lab in the Koroška region is in what will follow next. Indeed, the participants expressed the expectation that it is not a one-off exercise, but a step towards a better territorial quality of life consideration in the Koroška region policies.

- In the **Carinthia/Unterkärnten** region case study, interview partners/stakeholders and participants from government, economy, society and academia, all experts in the respective fields of quality of life, contributed to the living lab activities. In total, eight stakeholders covering the fields of economy, environment, statistics and regional management were interviewed. In the stakeholder workshop 10 people participated and in the citizen focus group eight. Some of the experts of the stakeholder workshop took place also in the citizen focus group, as they are also citizens living in the NUTS3-region for many years. In the composition of the stakeholder workshop and the citizen focus group, care was taken to ensure that persons belonging to the Slovenian minority were also represented<sup>29</sup>. In addition, one representative from a non-profit-organisation encouraging for a migrants' social and labour market integration also participated. A constraint in organising the stakeholders' workshop was the limited time frame (two and a half hours). Within this time frame, it was possible to work out key future developments as well as the advantages and disadvantages of the region, but the activity to identify new indicators could not be fully realised as part of the workshop. As the focus group took place immediately after, and the stakeholders present were also citizens of the region themselves, it was decided to implement the task of discussing and identifying new indicators together with the focus group participants. The geographical structure of the NUTS3-region of Unterkärnten was also a challenge<sup>30</sup>. Therefore, it was decided to place a special geographical focus on two districts within the NUTS3 region of Unterkärnten: Völkermarkt and Wolfsberg. Hence, in these smaller areas several stakeholders are active in different organisations with different functions. This became also evident during the living lab events. Some of those present, represented several roles (e.g. expert, entrepreneur or farmer, citizen). One particularly positive aspect to emphasise is that the stakeholders in the region know each other very well, their different responsibilities and functions, and work well together. It was only possible to organise both workshops thanks to the cooperation with the regional managers and their team.

#### **Cross-cutting lessons learned:**

- A key learning for the development of participatory research formats and living labs is that *cooperation with local/regional stakeholders is crucial*.
- The organisation of the living lab process needs to be *custom-tailored to the local circumstances*, being flexible in organising the sequence of the stakeholders' and citizens involvement steps (interviews, stakeholders' workshops and citizens focus group). However, flexibility is enabled by having modular formats and common templates for the different living lab blocks (i.e., a same template for the interviews and same questions for the stakeholders' workshops and citizens focus groups), which transform each TQoL living lab process building in a sort of 'lego' game.
- The TQoL living lab tests confirm the importance of *diverse stakeholders' involvement*, as well as the obstacles faced to overcome the attitude of the stakeholders to possess a solid command of all the

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<sup>29</sup> One person from the Slovenian minority was represented at the stakeholder workshop and one person in the citizens' focus group.

<sup>30</sup> With its 3,375 km<sup>2</sup>, the region is quite large, and the permanent settlement area covers 45% of the total permanent settlement area of whole Carinthia. JOANNEUM RESEARCH – Institut für Wirtschafts-, Sozial- und Innovationsforschung (2023).

nuances of their sector's strengths and weaknesses yet associated to a lack of awareness of other sectors' circumstances.

- An akin legacy point is the necessity of these participatory events to always plan for a follow up. Participants can be engaged and galvanised, but they rightfully require evidence of what their contributions have brought about. Stopping the interaction at the end of the engagement process is the best way to induce disenchantment and devaluation.

## 5.2 Living labs highlights on further developing the living lab processes

The four case studies have addressed the question of how to transform the TQoL living lab test – encompassing stand-alone events – into a permanent process, asking who might ensure a continuous ownership and leadership of the process and the other actors that could/should play a role, as well as concrete suggestions about potential mechanisms to further develop and implement continuously the approach. The following are the main highlights stemming from each TQoL living lab:

- In the **Canton Ticino** case, the living lab approach was found appropriate and somehow in continuity with a recent participation process to develop future regional development scenarios (Perspective 2040) coordinated by the Chancellery of the Republic and Cantone Ticino (regional government), especially to complement the qualitative scenario narratives with the selection of the indicators to be used to monitor the impacts of global trends on the quality of life in Canton Ticino. It has been found particularly important that the TQoL accounting methodology is also implemented in other contexts at European level (namely in other Alpine regions, with the support of ESPON and the Alpine Convention), a fact which can incentivise the promotion of the project also on a local scale and guarantee its future sustainability, supported by the federal and local government institutions in Switzerland. To implement in practice the living lab approach in Cantone Ticino it has been suggested: a) to create networks and shared working tables for monitoring the quality of life across the regions in the whole Alpine region, especially in relation to the ongoing climate change; and b) in addition to USI, to involve SUPSI for its professional practice approach, and MeteoSvizzera on the topic of climate change. In practice, the most relevant and appropriate actor that might take the political ownership and leadership of a continuous TQoL living lab process is the Chancellery of the Republic and Cantone Ticino, which may find it useful to engage on a permanent basis stakeholders and citizens in the definition of quality of life objectives and co-design of the QoL indicators which can be considered in the legislature programmes. Another member of the core team steering the process should be the “*Osservatorio dello Sviluppo Territoriale*” (OST)<sup>31</sup>. Its purpose is to monitor and control the effects of territorial development plans and implementation measures, suggesting corrective actions when needed, and it may integrate territorial QoL objectives and indicators stemming from the TQoL living lab in its monitoring and planning activity. Finally, it would be important to include the organisation that will be in charge of developing and implementing the strategy for digital transformation of Canton Ticino, to integrate digital services planning with territorial quality of life objectives and policies <sup>32</sup>.
- In the **Trento** case, the adoption of regular evaluation tools as the TQoL system was identified as a crucial instrument to ensure actual and continuous quality of life implementation and monitoring. Encouraging participants to be actively involved in the evaluation process would ensure that the assessment of the Lab's success is grounded and inclusive. A participatory approach would enhance the ability of the TQoL system to increasingly capture relevant and meaningful success indicators that truly resonate with all

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<sup>31</sup> Since 2007 the Observatory has been active at the Mendrisio Academy of Architecture through a performance mandate from the Council of State.

<sup>32</sup> The first objective of the digital transformation strategy is to create the necessary technical, organizational, legal and cultural framework conditions to the development and provision of digital services. At an organizational level, beyond the existing strategic bodies (Canton government and Municipalities) and those operational units internal to the cantonal administration, the establishment of an “intra-municipal operational body” is hoped for, as already happens in other Cantons, which would be responsible for coordination, promotion and support of local authorities' digital transformation. This inter-municipal body could be the preferred institutional interface for the permanent TQoL living lab, whenever digital quality of life aspects are concerned.

stakeholders. In addition, conducting participatory events and perception surveys to assess the community's sense for quality of life and its indicators is deemed of pivotal importance. As a city nestled in the heart of a natural and economic ecosystem that will be greatly impacted by global change, most and foremost the climatic one, being able to discuss and create adaptive scenarios becomes of paramount importance. Doing so with the backing of an established QoL system, and ideally with the possibility to cooperate with other Alpine communities, provides structure, direction, and validation. Indeed, the pilot Lab confirmed the value of learning from other Alpine regions. In Trento, the living lab could be composed of representatives from stakeholders such as a) the Municipality of Trento and the local offices responsible for mobility, energy, water, culture; b) the mirroring departments in the Autonomous Province of Trento, which could provide a broader, regional perspective on the topics addressed; c) representatives of business associations and companies (Chambers of Commerce, Industry, Crafts, Confindustria, Artisan Association, Merchant Association, Confagricoltura, Federation of Cooperatives, etc.); d) labour union representatives from both the public and private sectors; e) the University of Trento and other relevant research organisations; f) operators and utilities in mobility (Trentino Trasporti Spa), energy and water management (Dolomiti Energia Spa), healthcare and public health management (Provincial Agency for Health Services), and personal services (public companies for personal services and social cooperatives); g) the Employment Agency and organisations for lifelong and adult education; and h) local non-profit organizations (volunteer and community associations). The Municipality, still held in high regard in Trento just like the province, could play the key role in establishing and leading the proposed living lab, providing infrastructural and logistical support and facilitating the procurement and handling of financial support. High profile public figures, including the mayor, municipal council, and councilors, should be directly involved in the process and share with stakeholders, as a discussion platform, the relevant long-term strategic vision, plans and projects, as well as the existing key performance indicators (KPIs) to assess success.

- The participants of the TQoL Living Lab in the **Koroška region** agreed that a permanent TQoL living lab process could make an important contribution towards improving the quality of life in the Koroška region. Such a process could lead to the emergence of new ideas and new connections between stakeholders, which are lacking at regional level under the specific Slovenian circumstances with only national and local level of self-government. The Regional Development Agency for Koroška, which is responsible for designing the Regional Development Programme and the Regional Spatial Plan (from 2027), would be the most appropriate leader of the process, for monitoring the quality of life at the regional level. However, the biggest problems for the sustainability of a living lab in the Koroška region may be the lack of stable funding, the lack of systemic/continuous operation and the lack of interest of the public or invited stakeholders. So, a main prerequisite is strong support from national (especially the Ministry of Natural Resources and Spatial Planning) and local stakeholders (especially municipalities), adequate funding and a clear conceptual methodology. There are at least two mechanisms that could be associated with this process. First, the Regional Development Programme as the main strategic document at regional level, already ensures some fragments of the living lab that could be further exploited. Second, the forthcoming introduction of the Regional Spatial Plan may provide an even greater opportunity, as the methodology has not yet been finalised.
- In the **Carinthia/Unterkärnten** region case study, the most important point raised for the increased implementation of living labs is cooperation with local and regional stakeholders. A permanent TQoL living lab could follow the example and cooperate with already existing living labs. In this respect, there are already permanently installed living labs in Carinthia, such as the PROLIDA (Professional Living, Innovation and Development Lab for an Ageing Society) living lab, which is the base for applied research and initiating research and innovation processes in the fields of 'Active and Assisted Living' (AAL) as well as 'Active & Healthy Ageing' (AHA). The living lab is coordinated by the Carinthia University of Applied Sciences and is certified by the European Network of Living Labs (ENoLL)<sup>33</sup>. For the TQoL measurement approach to be continuous and truly effective, individual measurements and analyses should not be carried out and discussed at irregular intervals, but various areas of life should be analysed and discussed in detail at regular intervals. Depending on the level at which the Living Lab is set up (e.g. regional or

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<sup>33</sup> Krainer, D. (2019).

municipal level), the relevant political and administrative stakeholders should become active and organise a core team to establish the living lab. At NUTS3-level, for example, this could be the regional manager together with a scientific institution. To proceed systematically and not overlook any important participants who should be invited and involved, a stakeholder involvement plan and stakeholder mapping<sup>34</sup> should be drawn up. Like mind mapping, this involves recording and visualising all relevant stakeholders from the various political or territorial levels and sectors. Network structures can also be visualised in this way. Based on Arnstein's ladder of citizen participation<sup>35</sup>, it should be discussed with the Living Lab participants what level of active participation is expected of them and what decision-making and implementation competences and power they have.

#### **Key messages of general validity:**

- It is particularly important for the organisers and participants of local TQoL living labs not to feel themselves isolated, but to perceive of being a node of a wider network. This will happen if the TQoL accounting methodology is also implemented in other contexts at European level (namely in other Alpine regions with the support of ESPON and the Alpine Convention) a fact which can incentivise the promotion of the project also on a local scale. Moreover, cross-regional exchange of perspectives, experiences and practices can inspire innovative solutions and help each region address local and global challenges in a cohesive manner, collectively raising the quality of life of communities.
- It is also important to emphasise the benefits that could stem from the TQoL living lab permanent operation for all local stakeholders involved. Such a process could lead to the emergence of new ideas and new connections between stakeholders. There is also the need to bring the living lab as close as possible to the people and their everyday problems and not to organise it too often. Once a year seems to be an appropriate frequency.
- All representatives of government sectors, municipalities, and other relevant stakeholders (e.g., associations, local communities, various social groups) should be invited to participate in a permanent TQoL living lab process. However, there is a risk that such a group could become too large. To avoid this risk, a core team could be formed, which could then achieve effective operationalisation over time. The core team should work as a steering committee appointed by the higher political institution sponsoring the process, including a representative of the main political leader – depending on the regional or local level of the living lab could be a representative of a regional or municipal body – a representative of the technical institution in charge of collecting and monitoring the indicators (e.g., a regional or municipal statistical office) and the manager of the TQoL living lab events (usually an expert of facilitation processes).
- The adoption of regular evaluation tools is a crucial instrument to ensure actual and continuous quality of life implementation and monitoring. The TQoL system could well serve these aims and would become a particularly welcome tool if it was adopted comprehensively in other Alpine communities to offer a wide-ranging picture.
- The biggest obstacle to permanent TQoL living labs remaining is the amount of time, staff and financial resources that a permanent participatory laboratory would require to function. In addition to the willingness of the various actors to collaborate, this requires a strong political will in the region, which grasps the strategic need for such a system, and the adoption of a lean management approach. In this respect, as suggested in the Carinthia/Unterkärnten case, a permanent TQoL living lab could follow the example and cooperate with living labs or evaluation units already existing in the local context.

#### **Recommendation:**

- To promote the use of the opportunities offered by the TQoL method for measuring quality of life in the regions, **more regional workshops** should be offered (e.g., by the programme committee introducing the programme and the project) to increase the level of information and knowledge. It

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<sup>34</sup> Gruber, M./Lobnig, C./Scheiflinger, S./Stainer-Hämmerle, K. (2020)

<sup>35</sup> Arnstein (1969)

would also be helpful if the regions and living labs involved in the project (in Austria, Italy, Slovenia, Switzerland) could continue to exchange ideas and learn from each other mutually in a **joint, transnational workshop**. In order to increase the usability and application of the ESPON TQoL-indicator set in the regions, it would be favourable if **the regions hear experiences and practical stories from other regions that already have more experiences in the application and use of this indicator set and measurement system** (e.g., usage of indicators, which information and planning needs and for which purpose, challenges of application, benefits).

### 5.3 How TQoL living labs should be tested and further developed, involving citizens, civil society and public actors?

Looking across the case studies' experiences and performance, it is possible now to make a critical review of the TQoL accounting approach underpinning the living lab tests, with the intention to describe an approach of general validity for further testing and developing similar living labs in the Alpine area, answering the third policy question of our study: *How Territorial Quality of Life living labs in the Alpine Convention area should be tested and further developed? How can citizens, community initiatives, associations, and public actors be involved?*

All case studies have followed a same *systems thinking approach*, using two TQoL 'boundary objects'<sup>36</sup> – the TQoL framework of indicators for measuring quality of life aspects and the Three Horizons scenarios meta-model for reasoning on the impact of global changes on future quality of life – to let invited citizens, business and civil society stakeholders and public actors to converse and exchange their views on the quality of life situation, prospects and priorities for action in their regions. Rather than a scientific methodology, systems thinking is crafting art which requires to accumulate facilitation skills and experience of moderating dialogues among people living in different personal and professional life contexts, but all sharing the same place of living – the everyday life space – and motivated by a common purpose: maintaining or improving quality of life in their place.

The fundamental assumption of systems thinking is that we all create mental models that summarise and can describe the real world, predicting and altering our behaviour in it. Ideally, we want our mental models to reflect the salient aspects of the real-world situation or problem we are trying to solve – in our case the quality of life in the place where we live and what should be improved to make it better (or at least not the see it deteriorating against future challenges). The way we know whether our mental model is right (or at least satisfactory) is that we try it out in the real world and see the results. If what we expect to occur happens, then the feedback we receive from the real world tells us our mental model is well constructed. If we expect something to occur and it does not, then the feedback we receive from the real world tells us our model needs some work. So, learning, both individually and organisationally, entails the development and selection of mental models; the ones that work survive. Those that do not work have no future use<sup>37</sup>.

The ambition for a TQoL living lab is to enable conversations to let people become more aware, by sharing and comparing their mental models with those of others, favouring 'unusual' interplay between experts of different fields, and with lay people, on quality of life matters that are of concerns for all of them (the 'experts' are citizens themselves). In this process, a distinction is made between *experiential mental models* that guide us in our everyday life and choices (the people's worldview) and *scientific mental models* (the disciplinary experts' worldview). The latter use theories, quantitative measuring (indicators) and, whenever appropriate and

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<sup>36</sup> In the context of cross-disciplinary research, a boundary object refers to an artifact, concept, or entity that is shared and understood by different disciplines or groups, acting as a point of interaction and communication. Boundary objects facilitate collaboration and knowledge exchange between people who have different backgrounds, perspectives and terminologies. They help people from different walks of life, but sharing a common purpose, to develop a common language and mutual understanding by accommodating multiple perspectives and meanings, to mediate between different knowledge systems, practices, and disciplinary cultures, and eventually they can stimulate research collaboration and policy co-creation (e.g., to identify collaboratively quality of life indicators and policy priorities).

<sup>37</sup> Of course, this interplay between mental models and reality can be quite complex as you might develop mental models with the purpose of keeping yourself in denial, because the truth is simply too difficult to handle. You test the model and if it works, the model is preserved, even if the purpose is not always about getting closer to the truth!

feasible, modelling tools to investigate phenomena and in some cases simulate the real-world behaviour under changing conditions<sup>38</sup>.

At its core, system thinking can be understood as a humanistic field of study that attempts to understand how people (experts and non-experts) may think better about complex real-world problems they face. These involve many interlinked issues, cutting across the usual silos (e.g. economy, health and environment), multiple agencies (across the public, private and voluntary sectors) acting at multiple scales (local, regional, national and global), many different views of the problem and potential solutions, conflict over desired outcomes or the means to achieve them (and power relations making change difficult) and uncertainty about the effects of action. These often nonlinear, complex and unpredictable, real-world systems and problems seldom correspond with our desire for simplistic, hierarchical and linear explanations. Summing up, the intent of system thinking is to interface the experiential and scientific knowing and learning modes, to let us get a better understanding of the real world, by coming up with new and improved mental models of it – i.e., to a more closely alignment of our current mental models with the real world.

In practice, the TQoL living lab experience is grounded on this intention, by aiming to implement at territorial level – in any regional or local context – conversations on the universal issue of improving territorial quality of life, combining the following categories of people and their perspectives:

- a. Citizens and their perception of quality of life conditions<sup>39</sup>.
- b. Public decision-makers in charge of strategic, sectoral and spatial planning policy objectives and programmes related to quality of life.
- c. Public statistical experts in charge of producing official statistics and indicators related to quality of life objectives and phenomena.
- d. Business stakeholders (entrepreneurs and workers association) in charge of Corporate Social Responsibility (CSR) and sustainable business goals and programmes.
- e. Social entrepreneurs and civil society association pursuing sustainable social and ecological goals.
- f. Researchers and planning practitioners.

Ideally, representatives of all these six categories should be always involved as participants in the TQoL living lab process. In addition, the TQoL living lab facilitation should be ensured by a ‘third-party’ managing organisation – not holding specific policy or business interests – well rooted in the local context and with a good credibility and connections to ease the local stakeholders’ engagement (ideally a university or an equivalent institution). Participants in the six categories are identified and invited in *structured dialogues*<sup>40</sup>, to explore quality of life conditions, how they may change under the pressure of global demographic, economic and environmental trends, to what extent and how these conditions can be measured, and how they can be improved to make quality of life in the territory better and more resilient to global pressures.

Conversations focus on the TQoL framework and the Three Horizon meta-model of climate change, digital, demographic and lifestyle, governance transition scenarios<sup>41</sup>, asking participants to express their views on

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<sup>38</sup> Examples of experiential mental models are all around us. Examples of scientific mental models also abound, of which some are shared by (almost) all of us – for instance the Copernicus and later Keplero’s mental model of how the Earth and other planets are orbiting around the sun (on an ecliptic plan following gravity rules expressed by mathematical equations) – while others are much less diffused, being related to new and still highly uncertain discovery fields – for instance the reality and consequences of climate change.

<sup>39</sup> The perspective of citizens is multiform, as quality of life needs and perceptions are obviously different depending on age, gender, attitudes and cultural habits of the population. This means that, to investigate correctly citizens’ perceptions of quality of life, focus groups shall be representative of the population living and working in a given territory, i.e., including different age profiles (elderly, young people), gender balance and specific attitudinal categories when relevant in relation to the quality of life aspect under scrutiny (e.g. the distinction between car owners and not for a focus group on mobility planning issues).

<sup>40</sup> In practice, as it was tested in our case studies, these can take different forms – bilateral interviews of about one hour, citizens focus groups of about two hours, half-day stakeholders’ workshops – all sharing however the same boundary objects (TQoL framework and transition scenarios meta-model) to ignite and support the conversation.

<sup>41</sup> This is extensively described in the inception report of this study.

quality of life conditions, setting priorities and suggesting ways to improve TQoL measurement and policies. These ‘across the boundaries’ conversations will help participants to disclose the ingrained disciplinary or mind frames, filtering their own vision of the reality of such things as, for instance, what is causing the greatest quality of life concerns. Scientific analysts could discover hidden motivations and drivers, that would need to be considered in territorial and quality of life measurement efforts to make them more realistic, while stakeholders could overcome their mental barriers against territorial innovations by better understanding potential benefits or how to handle trade-offs. The outcome should entail, for all participants, achieving a greater awareness and mutual understanding of territorial quality of life needs, expectations, and ways of monitoring them. In this respect, the TQoL living lab process is an instance of ‘decision-gardening’ rather than directly decision-making, because it prepares the ground for the policy makers to eventually take more inclusive and potentially effective decisions to improve quality of life for all. In practice – being place-based – this co-creation process policy would be best integrated in spatial planning, preparing the ground to integrate more explicitly quality of life priorities and indicators in strategic, sectoral and spatial planning policies at regional or local level, as discussed later in section 6 of the report.

To promote and upscale the visibility of the TQoL accounting methodology in the Alpine area we suggest anchoring it to the recent European Commission Recommendation on promoting the engagement and effective participation of citizens and civil society organisations in public policy-making processes (European Commission, 2023). This recommendation asks Member States to promote and facilitate a ‘framework for participation’, ensuring that is implemented in accordance with the guidance criteria set out in the Recommendation. These criteria include, amongst others, establishing *structured dialogues* with civil society organisations on specific topics related to public-making processes, introducing citizens-led participatory and deliberative exercises on specific decisions and policies, and support and promote individual and collective ways of participation, such as citizens panels, citizens assemblies, and other dialogue and co-creation formats. The guidance criteria of the EC Recommendation are all aligned with the criteria followed or recommended in our pilot TQoL living lab tests<sup>42</sup>.

### Recommendations

- **Upscale the visibility of the TQoL living lab approach by promoting its implementation as an instance of ‘framework for participation’**, following the recent European Commission Recommendation in the Alpine regions of the EU Member States, and promote covenants as well with Switzerland<sup>43</sup> and the micro-states of Lichtenstein and Monaco for the same purpose. **This will help to strengthen citizens’ empowering in the definition of quality of life indicators and deliberation of QoL policies** better aligned with their needs and expectations in the whole Alpine area, achieving a better balance between citizens, civil society and other government and business stakeholders contributions to the TQoL living lab processes.
- To ensure an effective **multi-governance and multi-stakeholders’ cooperation and involvement**, the suggested TQoL framework of participation should, amongst other things: 1) **ensure participation on topics of public interest in a continuous and regular manner** and not only during electoral periods; 2) **enable participation in the early stages of the policy-making processes**, in the identification of the needs, priorities and the definition of possible policy options, and **regularly invite**

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<sup>42</sup> The only criteria that we could not follow in the TQoL living lab tests, due to time and budget limits of the project, is the requirement of invite citizens for the focus group discussions in a balanced and equitable way, that to be done properly entails using the best available statistical random sampling and sorting techniques to select a panel of representative citizens out of a wider pool of candidates, However, an heuristic approach has been followed to ensure at least a good diversity of the participants, even if not selected with a rigorous sampling methodology.

<sup>43</sup> It is worthwhile to remind that Switzerland is a confederation of 26 small state institutions (the Cantons), with a high degree of autonomy, a long historical tradition of democracy (the first self-government covenant between four core regions was stipulated in the year 1291), a mix of three linguistic groups (almost 70% of German speaking, 23% French and 10% Italian speaking population), and an increasing multicultural context (in the period 1950-2012 the foreign population increased from 6,1% to 23,3% of the total resident population). The hybridisation of EU member states frameworks of participation with the deliberation traditions of Swiss cantons could fuel policy innovation. An embryonal bilateral covenant could be established between Canton Ticino and the Province of Trento in Italy, both showing interest to continue the TQoL living lab experience.

**citizens and civil society organizations to participate at follow-up monitoring stages** of the policy process; 3) **provide appropriate and necessary information** regarding a specific participation exercise in a timely manner and in easily accessible formats, including the context and the type of measures envisaged, the procedures, the timeline for participation, the authority responsible for the exercise and the widest possible access to information and to key documents **both offline and online**; and 5) **envisage sufficient resources and time to ensure meaningful impact**. On this latter point, and with reference to the EU Member States, we can reiterate the recommendation given at the end of a previous pilot ESPON QoL study focusing on the Slovenia, Croatia, Italy cross-border region, i.e. asking Member States to dedicate **specific funding to support the implementation of the TQoL framework of participation at all levels of government**.<sup>44</sup>

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<sup>44</sup> More in detail, as stated in ESPON 2021, p. 63, “the TQoL living lab approach aims to establish an innovative policy practice in Europe, so one practical recommendation for scaling up to a Europe-wide diffusion is to turn it into an EU research ‘mission’ for enhancing quality of life policy making across Europe. (...) EU Missions are a coordinated effort by the Commission to pool the necessary resources in terms of funding programmes, policies and regulations, as well as other activities. They also aim to mobilise and activate public and private actors, such as EU Member States, regional and local authorities, research institutes, entrepreneurs and investors to create real and lasting impact. There are five EU missions currently running: Adaptation to climate change; beating cancer; restore our ocean and waters; 100 climate-neutral and smart cities; a soil deal. A new EU mission could support the implementation of Territorial Quality of Life living labs, coordinating research, policy actions and legislative agendas aiming to enhance territorial quality of life in Europe”.

## 6 Integrating the TQoL approach in spatial and sectoral planning.

To integrate the TQoL approach in spatial and sectoral planning processes would require fitting the TQoL living labs in a context of *multi-governance* – connecting the different layers of local, regional, national and international governance, *multi-sectoral* – connecting different stakeholders, and *democratic* – connecting with the citizens – *cooperation*. In practice, this means the active involvement of different actors, geographical levels and sectors as quality of life is a main concern of all public policies and territories that need to be considered in a functional place-based approach, i.e., linking all jurisdictions functionally interrelated by dealing with the same territorial quality of life changes (so, transport policies to improve the quality of daily mobility in a city may involve regulations and measures to be decided at local, regional, national, or even EU level).

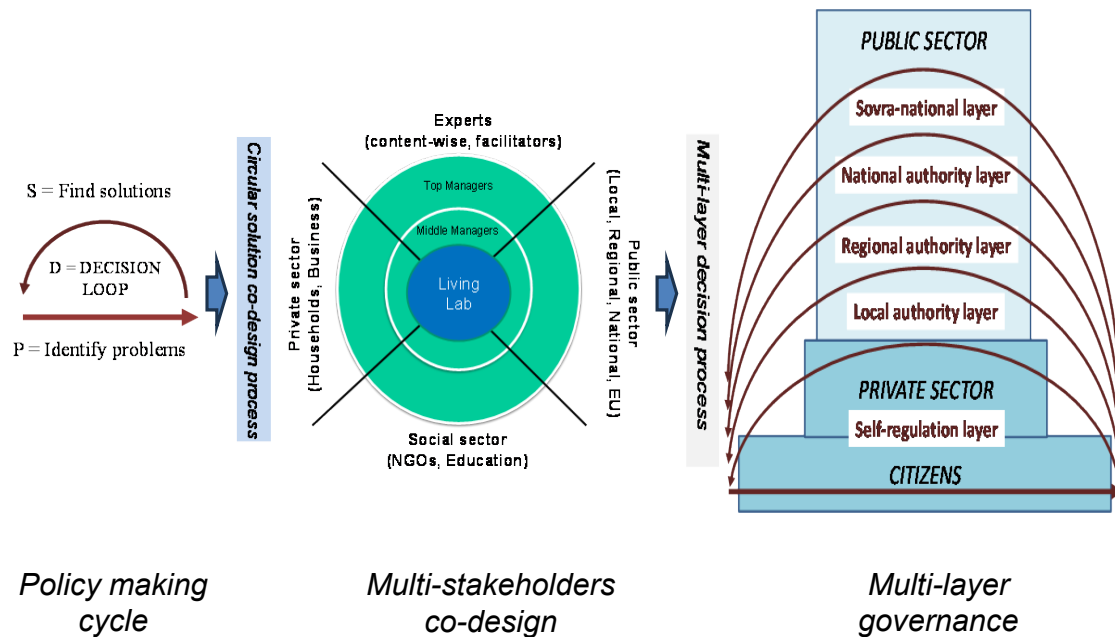
The TQoL living labs can be considered a playground for multi-governance and multi-stakeholders policy co-creation, a new policy innovation milieu that could be generalised in Europe to cope with complex and multifaceted policy issues and complex problems that usually require to take decisions at different layers of authority and regulation. This would entail a ‘governance transition’ transforming a vertical model where the responsibility to take decisions is allocated according to the principle of subsidiarity<sup>45</sup> – from the bottom (citizens, private sector) to higher (local, regional, national, EU) decision levels – into a ‘circular model’ where decisions are designed, negotiated, and ultimately deliberated after a solutions’ multi-stakeholders co-design process. The circular model engages representatives from the different public governments and agencies, the private sector and civil society, with the support of experts to feed with technical knowledge and manage a living lab process as appropriate.

This advocated transition to a circular model of policy co-creation and governance is illustrated in Figure 4 below.

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<sup>45</sup> According to this principle the competence to decide is given to the lower level of decision making that can solve the problem, so that solutions to small problems – without spill-over effects on others – can be decided directly by the citizens or private business themselves, while solutions that would have a significant impact at local, national or international (EU) level shall be decided by the corresponding level of government. In practice, the solutions to complex problems always require the competence of different layers of government, and this makes the decision process often overwhelmingly complicated and slow.

**Figure 4 - Multi-stakeholders and multi-governance model of policy co-creation**



In a nutshell, **policy co-creation** starts on the left with the identification of problems (P) which will require a decision loop (D) to find solutions (S). **Multi-layer governance** is represented on the right as entailing decisions which, depending on complexity, may be taken directly by the citizens and/or business agents themselves (self-regulation layer) or require government decisions/regulations at the local, regional, national, or sovra-national governance layers (multi-lateral treaties, e.g. EU, or bilateral agreements). In the middle the living lab approach enables a **multi-stakeholders co-design process** where all the relevant actors, from all sectors of society, are represented and involved simultaneously (e.g., in a workshop) to work out together solutions to the problems identified at the start of the policy innovation cycle. These solutions – the living lab outcomes – need then to be translated in decisions taken by responsible agents (managers, policy makers) in the multi-layer administrative machine, realising a transparent and effective implementation process.

The main advantage of this process is its potential transparency, because solutions are discussed by convening all actors concerned in one (physical or online) room to participate in a structured dialogue, and provisions can be added to let the actors involved to monitor and whenever appropriate contribute to the policy implementation process. However, the main problem with this co-creation approach is that its greater strength – creating a ‘neutral’ and trustful dialogue where people with different competences and powers are free to express their ideas and devise new solutions to common problems, still without the urgency of negotiating and deliberating administrative decisions – is also potentially its main weakness. Indeed, the whole process delivers a recommended agenda and roadmap for action which depends for its implementation upon decisions that should be approved and then pursued by different actors and level of governments, according to their administrative competences and procedures. To overcome this problem and ensure an effective integration in spatial or sectoral planning processes, it is important that participants in the TQoL living lab include also the middle and top managers in charge of implementing spatial and sectoral plans and policy measures.

## 6.1 Living labs highlights on the integration of TQoL in spatial and sectoral planning.

The following are the main highlights stemming from each TQoL living lab, related to how the TQoL approach could be integrated in existing multi-governance spatial planning processes:

- In the **Canton Ticino** case, a favorable context to TQoL integration is provided by two main regional policy instruments. The first instrument is the strategic legislature policy programme which, in accordance with Art. 5 of the Cantonal Planning Law, the Council of State of Canton Ticino is required to prepare issuing a document on a regular basis, called *Rapporto sugli Indirizzi* (Legislature Guidelines).

Through this strategic policy document, the Council of State updates the framework for different policy sectors, expressing the underlying strategic choices to guide the Canton in the coming decades towards sustainable development and a social and competitive relaunch of the Ticino society. To prepare for the next legislature 2024-2028, the Council of State was committed to elaborate a new strategic document 'Perspective 2040', which, although non-binding, will provide an overview of the most important challenges and opportunities for Ticino, from now until 2040, with the intention of favouring an anticipatory and coherent government policy. In the meantime, the Programme for the 2019-2023 Legislature includes 34 objectives divided in three strategic axes of intervention: 'Relations with citizens and institutions', 'Development and attractiveness of Canton Ticino' and 'Quality of life'. For each goal, the Programme recommends some actions and suggests indicators to measure the goal achievement. Most of the objectives – 25 out of 34 – are well aligned with the TQoL framework categories, and this would make it easy to integrate the TQoL measurement tool with this strategic policy programme. The second instrument are the territorial development plans implemented since 2007 under the umbrella of the so-called *Piano Direttore* (Master Plan). The key idea of the Master Plan is the vision of Ticino as a unique city in evolution. A city with its own green and leisure areas, its multifunctional districts and specialised ones, its centre of business and commerce, its administrative headquarters, its production areas, its cultural spaces, those for leisure and protected areas. This Master Plan incorporates 29 cantonal planning objectives, which constitute the backbone of territorial management goals of the Ticino area. Therefore, they must be followed by all authorities with tasks of territorial impact – Canton, regions, municipalities – within their respective areas of competence. As for the strategic legislature programme above (RI), we have found a good alignment between half (14 out of 29) Master Plan objectives and the TQoL measurement categories.

- In the **Trento** case study, the Province and the Municipality need to be more involved in future QoL endeavours. QoL matters to them, so much so that a wealth of QoL data is already collected at the provincial level. The Province is however a composite territory with Trento being the only urban area with more than 100,000 inhabitants, and thus with its own specific issues. The living lab approach is not new in Trento, it has been and is being used in domains such as mobility, youth and health policies to strengthen multi-level governance and foster stakeholders' engagement. Recently, living labs have gained traction as effective tools for collaborative innovation; the city is experimenting with concrete operational models for ever more effective community engagement in view of consolidating a reference practice. Tackling quality of life considerations will entail further broadening the engaged stakeholders' spectrum, which can be challenging at times of global disenchantment with politics and civic identity. Trento is however still enjoying the long-term influence of a historical tradition of cooperation, which is confirmed by the cities having just been named the [2024 European Volunteering Capital](#). The TQoL system should be formally proposed to both inspire policy, foster cooperation with other Alpine communities, promote engagement of the local community with a specific focus on QoL (currently lacking). In this context, there is an opportunity for enhanced collaboration with Trento's University to facilitate an alignment of academic research and educational initiatives with the broader goals of territorial development. Collaboration with other local social innovation and awareness raising institutions, such as *Fondazione De Marchi* and *Fondazione Antonio Megalizzi*, which can boost awareness of European goals, environmental sustainability, economic development and social well-being is also recommended. The TQoL lab also advocates for a phased integration of TQoL in local spatial planning, starting with grassroot-inspired pilot projects. These initial steps are crucial for assessing the effectiveness of new strategies and ensuring their scalability and adaptability to the broader context. A crucial aspect of integrating TQoL into spatial planning and sectorial policies is the active involvement of the economic sector. This includes businesses, industry leaders, and economic development organisations. Their participation is essential in ensuring that TQoL initiatives pragmatically align with economic objectives and contribute to sustainable regional growth. By incorporating insights and priorities from the economic sector, TQoL strategies can be designed to support economic resilience, foster innovation, and enhance overall competitiveness. This collaboration can lead to the development of policies that not only improve the quality of life but also drive economic prosperity, creating a mutually beneficial relationship between community well-being and economic health. Finally, the Trento TQoL Living lab can establish itself as a model for other provincial/regional communities seeking to enhance their QoL through participatory and inclusive foresight approaches. The lessons learned, ranging from the need for a forward-looking customised approach to the importance of diverse stakeholder involvement, provide a valuable framework for replication initiatives. The lab's declared commitment to continuous evaluation, adaptation to global changes and integration of findings into

broader spatial planning processes sets a precedent for sustainable and resilient community development. The lab is willing to continue applying, monitoring and refining the TQoL methodology, nurturing and expanding stakeholder involvement, establishing collaborative relationships with other Alpine communities, in view of ensuring that QoL is seamlessly integrated in the region's strategic planning and policy-making process.

- In the **Koroška region** case study the elements of quality of life, even if they are not named as such, are part of development plans and are therefore included in the Regional Development Programme, the most important strategic document at regional level. At the same time, quality of life is also discussed in detail in the municipal and national sectoral strategies. However, the participants pointed out a large gap between the strategic level and the implementation level. A major problem in this respect is the absence of regions as a second tier of local self-government in Slovenia, which pushes the interests of municipalities to the foreground and limits the capacities to implement the Regional Development Programme. The participants made various proposals for integrating quality of life into the planning instruments and policies of the Koroška region. One of the first suggestions was a stronger delineation of responsibilities between the local/municipal and regional levels. This proposal would be better served in the near future with the creation of the Regional Spatial Plan (from 2027), which could be responsible for territorial quality of life, from two points of view: 1) to include quality of life as an objective and identify the themes that can contribute most to it, and 2) to identify a method of formulating the objectives and projects for quality of life in the region. The establishment and standardisation of cooperation fora (e.g. in the form of TQoL living labs) within and between development regions is a possible way to overcome the negative effects of the lack of an intermediate level of self-governance or administrative regions.
- In the **Carinthia/Unterkärnten** region case study the participatory living lab activities generally encouraged the participants to take a closer look at the topic of measuring quality of life, future scenarios and their integration in regional planning. To promote the use of the TQoL indicator set and measurement approach in spatial planning procedures of regions like Carinthia and its NUTS3-region of Unterkärnten, the actors involved would need first more information about the ESPON initiative and the TQoL approach in general. It could be very helpful if a cross-border workshop is organised in which reports were given from the perspective of other public administrations and regional planners, about e.g. which indicators they use for which planning areas and what the benefits of this indicator set are. As the organisation of the Living Lab in the region of Unterkärnten has shown, multi-level governance and multi-sectoral cooperation are necessary. This means that different political and territorial levels must be involved in such a living lab. If only one level is involved, this brings the risk that, for example, issues that are important at the level of a region may have little significance for individual municipalities in the region. If, for example, a living lab is organised at NUTS3-level (as in the example of 'Unterkärnten'), the regional managers and local stakeholders (LAU, municipalities, mayors/municipal councillors, heads of office and heads of department for various specialist areas) as well as stakeholders at the federal state level (NUTS2-level) must be involved. The practical implementation of the Living Lab has also shown that, depending on the size of the NUTS3-region, it is not possible to involve all municipalities in this region. It may therefore make sense to set a special geographical focus within the region. As the TQoL measurement system is very broadly based and includes various topics and areas of life in the analysis, (professional and everyday) experts from the various economic sectors should be involved.

## 6.2 How can TQoL be integrated into spatial planning and sectorial policies in the Alpine area?

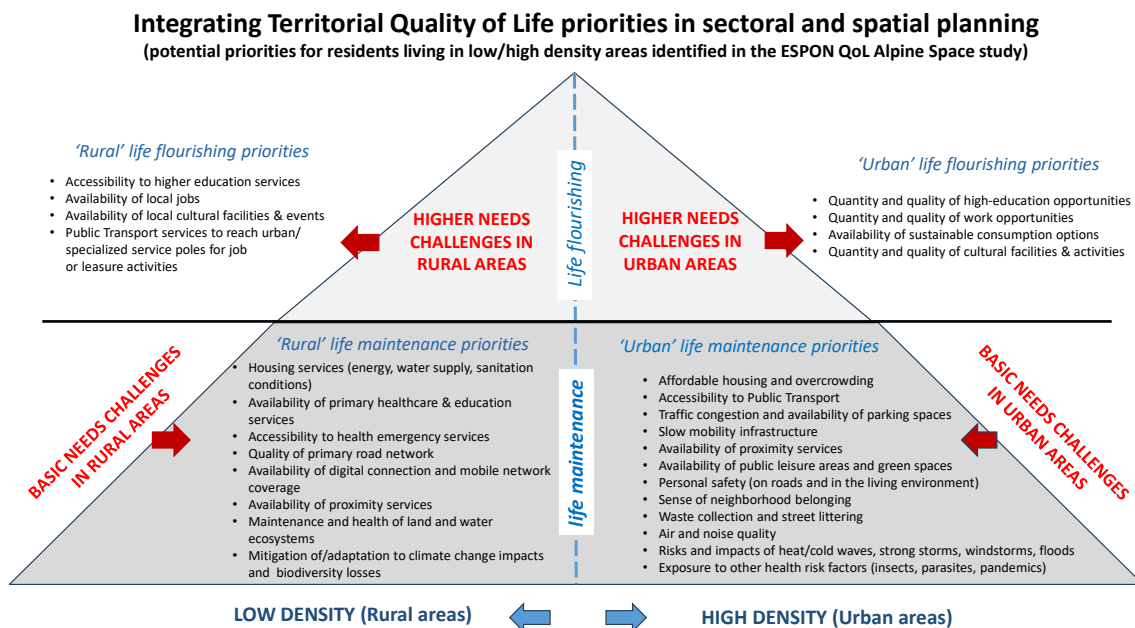
As it was shown by the case studies' experiences, a TQoL Living Lab offers a policy innovation milieu where experts from competent and trusted institutions (departments of national, regional and local governments; statistical agencies; universities; business associations) and citizens (engaged in focus groups) discuss territorial quality of life issues and priorities. These stakeholders jointly address QoL through co-creation and lateral thinking. For each sphere of QoL, they define their shared understanding and priorities and test possible indicators. In an ideal case, the living lab remains active to further monitor and evaluate possible improvements or changes. In this process, people are actors of change and not just consumers of policies.

As discussed earlier, eventually the aim of a generalised adoption of this TQoL living lab approach is to integrate the results of the discussions in spatial planning and sectorial policies, answering to the fourth

policy question of our study: *How can TQoL be integrated into spatial planning instruments/processes and sectorial policies in the Alpine Convention space?*

Thanks to the outcomes of the case studies and the identification of indicators and expected differences in QoL conditions, needs and expectations for urban and rural residents shown in Annex B to this report, we can now suggest – as our study answer to the above question – using the pyramid of urban and rural quality of life priorities illustrated in Figure 5 below as starting point to consider the potentially different priorities of citizens living in high and low density settlements in the sectorial and spatial planning agendas at national, regional and local level in the Alpine area.

**Figure 5 - Pyramid of urban and rural quality of life priorities**



Basic needs to be satisfied to ensure people quality of *life maintenance* are listed at the bottom of the pyramid. In principle, these basic needs are spatially universal – they should be addressed in every place where people live – but the QoL conditions they entail to be satisfied are different when living in low density (rural areas) and high density (urban areas) contexts. By the same token, in the top of the pyramid, we represent higher needs to be satisfied to ensure people quality of *life flourishing*. These higher needs again entail different QoL conditions to be satisfied in rural and urban contexts. The nomenclature of priorities listed in the figure are those best addressing the *basic* and *higher needs* of rural and urban inhabitants, as emerged from the discussions undertaken with the stakeholders and the citizens involved in the TQoL living lab tests and confirmed by a machine learning exploration – using ChatGPT queries – of the vast literature on different QoL conditions in the rural and urban living environment.

These QoL priorities have been thought in the perspective of the ongoing green and digital transition challenges and opportunities - which are not only transforming infrastructures and technologies, but also our daily lives – to create more balanced life maintenance and flourishing conditions in urban and rural areas.

By acknowledging the *diversity* of climate change and digital transformation challenges and opportunities in high density urban and low density rural areas, and their possible impacts on QoL conditions, regional spatial plans may contribute to create more attractive living environments both in the cities and in the countryside. People living in the countryside could not be obliged any more to emigrate for better job opportunities, which might be available at home thanks to the diffusion of local jobs (e.g., regenerative agriculture practices, eco-tourism, digital fab-labs and 3D printing shops, ecosystems protection services, etc.) or the spread of smart working and the availability of public transport services, which can facilitate living in the countryside while continuing to work in the cities/towns. By the same token, appropriate climate change adaptation measures (e.g., flood preventing or nature-based solutions to reduce heatwaves’ vulnerability), renewable energy communities, green maintenance and biodiversity regeneration measures, sustainable consumption options

etc. could be promoted both in the urban and rural areas, equalising the opportunities to conduce a 'green' life for all.

Eventually a polycentric spatial development vision may emerge as the leading paradigm, with present sprawling suburban metropolises increasingly replaced by more densely packed cities, connected by public transportation. In this vision the space outside the cities should be imagined not as an untouched wilderness, but more like Latour's description of the manmade nature of France's national parks: "a rural ecosystem complete with post offices, well-tended roads, highly subsidised cows, and handsome villages"<sup>46</sup>.

### Recommendations

- **Promote TQoL living labs as an experimental approach to participatory spatial planning**, making citizens and stakeholders more actively involved in spatial planning processes, by organising systematically interviews, stakeholders' workshops and focus groups with balanced panels of randomly selected citizens, to discuss quality of life priorities, indicators and policies.
- The '**pyramid of urban and rural quality of life priorities**' identified as those best addressing the *basic* and *higher needs* of rural and urban residents - at the outset of our living lab discussions and machine learning exploration of typical QoL conditions in low and high density areas - could be used as a reference frame either to identify specific quality of life priorities for sectorial plans (e.g., by setting goals related to house affordability in urban housing policies) or more broadly to consider rural and urban quality of life priorities in spatial plans aiming to balance the distribution of urban and rural functions and services within the regions. By acknowledging the diversity of climate change and digital transformation challenges and opportunities in high density (urban) and low density (rural) areas, and their possible impacts on QoL conditions, **regional spatial plans may contribute to create more attractive living environments both in the cities and in the countryside.**

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<sup>46</sup> Bruno Latour (2012)

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