D3.3: Report on local barriers and drivers to the implementation of Visionary Solutions in pilots

VARCITIES | Work Package 3, Task 3.2

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04-03-2022	v.07	Valentina D'Alonzo, Alice Borsari, Amy Segata	Final version of the deliverable, including conclusions and executive summary

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Abbreviation list

Term	Description
EU	European Union
H&WB	Health and Well-Being
NBS	Nature Based Solution
PESTLE	Political, Economic, Social, Technological, Legal, Environmental
SDG	Sustainable Development Goal
SWOT	Strengths, Weaknesses, Opportunities, Threats
VS	Visionary Solution
WP	Work Package
WS	Workshop

Executive Summary

The Work Package 3 of the VARCITIES project is dedicated to identifying problems affecting the pilot areas and adequate solutions to address them through digital transformations, cultural-based interventions, and the adoption of nature-based solutions (NBSs) at urban level. Its main objective, in line with the project vision, is to provide a common knowledge baseline to guide and support local administrations of the pilot areas in establishing sustainable models for increasing the health and well-being of citizens.

Within this WP, the Task 3.2 set out to identify the local needs and challenges as well as the barriers and drivers to the project implementation.

Accordingly, the present Deliverable 3.3 aims to highlight the main drivers (meant as enablers, forces, and opportunities) and barriers (like challenges, and constraints) that can affect the implementation of the Visionary Solutions, how they can be detected and how the main impacts can be assessed. This report contains all the activities carried out for performing different analyses (PESTLE, SWOT, and Impact Assessment) and the related outcomes of the 1st and 2nd co-creation workshops for each pilot area. In this document, the focus is on the pilot area level, while the results of the same analyses at the level of Visionary Solutions for each pilot area are presented in the Annexes F (part of the Deliverable 3.6).

The co-creation workshops have been organized in each VARCITIES pilot area during the year 2021 and were the occasion to present and co-design the Visionary Solutions with local stakeholders. They demonstrate how the co-creation process represents a fundamental component of the VARCITIES project.

The results of the PESTLE, SWOT and Impact analyses show that the pilot areas are intensely working in view of the implementation of the Visionary Solutions they propose, however some challenges and gaps are in place as the process is complex and several aspects have to be taken into account.

Briefly, the most relevant findings emerging from the present work are:

- Political, economic, and legal factors are the ones less identified among the PESTLE categories, speaking about the drivers for the health and well-being (H&WB) in the pilot areas.
- Concerning the barriers, 3 pilot areas out of 7 didn't identified possible challenges to be faced during the Visionary Solutions (VSs) implementation.
- SWOT analysis shows how almost all the pilot areas have recognized some internal and external, as well as positive and negative, factors affecting the H&WB in their area; only in the case of Novo mesto there are no weaknesses nor threats identified.
- From the analysis of the main impacts expected from the implementation of the VSs, the common topic among the pilot areas is the collaboration among peoples.
- While the common expected impact of the VARCITIES project has been found to be the improvement of quality of life.

In general, the results of the two co-creation workshops were not homogenous among the pilot areas and this made it difficult to have a complete overall view and properly compare all the analyses' outcomes. Anyway, an effort of summarising all the relevant aspects and comparing them was done in the present document and can be found mainly in chapters 5 and 6 of the deliverable.

A deeper investigation of some concepts mentioned within the report, such as the notion of Multiple Benefits and the sketches of Visionary Solutions proposed by each pilot area, can be found within other project deliverables related to WP3 (i.e. D3.4, and D3.5).

1 Introduction

In the VARCITIES project, the Work Package 3 (WP3 – "Problems identification and design of visionary solutions") is led by Eurac Research and is dedicated to identifying problems affecting pilot areas as well as adequate solutions to address them through digital transformations, cultural-based interventions, and the adoption of nature-based solutions (NBSs) at urban level. The main objective is to provide the common knowledge base and framework among the pilot areas, which collectively achieve visionary and integrated solutions to foster health and well-being (H&WB) in cities and contribute to their achievement of Sustainable Development Goals (SDGs).

In this context, Task 3.2 ("Understanding of pilot needs, challenges, barriers and drivers"), stemmed from the knowledge gathered in Task 3.1, set out to identify the local needs and challenges as well as barriers and drivers to the project implementation. Technical, administrative, managerial, cultural, social, economic, and environmental drivers and barriers are investigated, building also on insights from similar EU projects. A preliminary list of contributing factors is collected from all the VARCITIES pilots during the T3.1 activities and is available in Deliverable 3.2 (D3.2) [1] (section 19.1 "Synthesis of identified needs and challenges, barriers and drivers" and in the Annexes of the pilot areas). This task is also planned to actively contribute to Task 3.3 on the design of a set of solutions for each pilot area based on a multiple benefits approach, and to Task 6.2 on the implementation of solutions for all pilots (in terms of parameters that can affect the solutions and for setting the baseline for the pilots' implementation plans). The main part of T3.2 is the PESTLE analysis aimed at discussing the most significant factors affecting the pilot areas with the relevant stakeholders considering different perspectives: Political, Economic, Social, Technological, Legal and Environmental contexts. Indeed, the PESTLE analysis aims to overcome local barriers and guide the development of the proposed Visionary Solutions. The H&WB needs and expectations of each pilot area are also included in the analysis. In this framework, using two co-creation workshops organised for each pilot area in June 2021 and November/December 2021, respectively, specific discussion sections were established about drivers and barriers. The two workshops were coordinated by Prospex Institute, in line with the development of an overarching co-creation strategy (Task 4.2).

This Deliverable 3.3 aims to present all the activities carried out for performing the different analyses (PESTLE, SWOT, and Impact assessment) and the related outcomes of the two workshops concerning these topics. The main objective of the document is to highlight the main drivers (meant as enablers, forces, and opportunities) and barriers (like challenges, and constraints) that can affect the implementation of specific actions (in this case, the visionary solutions), how they can be detected and how the main impacts can be assessed. Within the VARCITIES project, these aspects are uncovered and analysed through the evidence coming from the application of two strategic planning tools (i.e. PESTLE and SWOT analyses) that can provide both micro and macro perspectives [2]. In particular, the PESTLE analysis is applied

for the detection of external factors that can affect the analysed project/action and the SWOT analysis is useful for linking these external forces with the internal ones. The combination of the two strategic planning methods derives from the need to have an overview of the whole context from several angles. This is necessary for better addressing the significant different implications and to achieve a widespread adoption and use of the Visionary Solutions. While the SWOT analysis identifies issues in generalised categories of strengths, weaknesses, opportunities and threats, the PESTLE analysis classifies issues as political (P), economic (E), social (S), technological/technical (T), legal/legislative (L) and environmental (E) [3].

In the context of this report, the PESTLE analysis is focused on issues that the developers of VARCITIES Visionary Solutions should address in order to ensure effective implementation and adoption of VSs, which can help communities to achieve sustainable and healthy livelihoods and the accomplishment of the millennium development goals.

The D3.3 is also closely aligned with another one, the Deliverable 3.4 "Report on Multiple benefits expected from Visionary Solutions" (D3.4) [4], whose main objective is to identify the potential multiple benefits deriving from the implementation of the VSs through a treated review of EU projects co-financed in recent years. After an in-depth investigation of 10 NBS projects and 10 Smart City projects, the multiple benefits have been grouped by type of solutions:

- Nature-based Solutions;
- Digital Solutions;
- Socio-cultural Solutions.

The methodology followed for framing the analysis of multiple benefits and the impact assessment is contained in the above-mentioned Deliverable 3.4.

This Deliverable 3.3 is organized as follows:

- Section 2 introduces the methods used for the analysis of drivers and barriers affecting the health and well-being in the pilot area and the Visionary Solutions (for the methodology about multiple benefits and impact analysis see the D3.4);
- Section 3 announces the work done by TSI on the lessons learnt from sister projects concerning a similar analysis of NBSs implementation;
- Section 4 presents the two co-creation workshops performed in the pilot areas, for what concerns the sections about drivers, barriers and challenges, and multiple benefits;
- Section 5 describes the outcomes of the workshops for each pilot area;
- Section 6 illustrates the main conclusions and recommendations derived from the performed analyses;
- Section 7 (Appendix I) consists of the complete analysis of the sister projects (ref. Section 3).

2 Methods and tools

2.1. The PESTLE analysis

A project's success is influenced by internal and external factors. The project promoter(s) can increase the success rate by adopting strategies that take into account these factors to its advantage. The promoter(s) needs to execute these strategies before beginning the project development process. The PEST analysis is used to identify the external forces affecting an organization or a specific project/action. It analyses the Political, Economic, Social and Technological elements. A PEST analysis incorporating also Legal and Environmental factors is called PESTLE analysis [3], see Figure 1:

- P for POLITICAL factors;
- E for ECONOMIC factors;
- S for SOCIAL factors;
- T for TECHNOLOGICAL factors;
- L for LEGAL factors;
- E for ENVIRONMENTAL factors.

The categorization of each issue raised is not important when using the PESTLE technique because the purpose of this tool is to identify as many factors as possible. Categories can be anyway useful to build up the discussion in a more productive way and to perform a more analytic review.

The PESTLE analysis aims to identify issues that meet two key criteria [5]:

- They are beyond the control of the promoter(s) organization (in VARCITIES case, the local working group composed of the demo leader, experts, and other project partners);
- They will have some level of impact on the design and implementation of the product or service (in this case the bundle of Visionary Solutions).

All discussions should be carefully moderated to keep the focus on identifying problems rather than trying to solve them. Although it may be useful to consider the implications of all the identified factors and the likelihood of them occurring, it has be avoided as the discussion of possible solutions or strategies is out of scope at this stage [6]. This process should give a much clearer understanding of the external environment and the framework conditions. This "big picture" view will allow the involved partners and stakeholders to assess the potential risks to face and the impacts that current external factors will have.

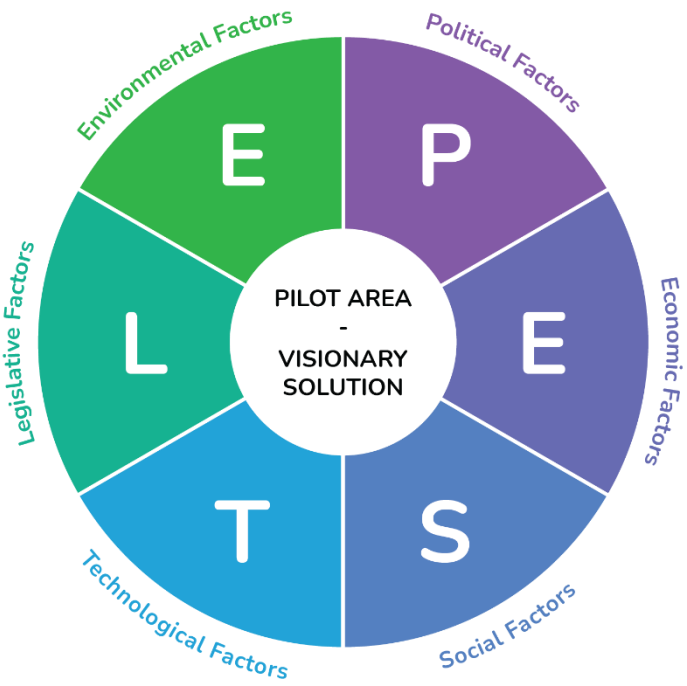

Figure 1: The 6 PESTLE categories. Source: own elaboration

In the VARCITIES project, the purpose of PESTLE analysis is to monitor the pilot area's environment so that strategic decisions can be made once each issue has been fully investigated. Another objective of the PESTLE analysis is to evaluate the feasibility of each VS considering the different political, economic, social, technological, legal and environmental implications. It is an analytical tool that allows pilots to assess the strategic viability of the different solutions based on a series of questions. This will make it possible to study the feasibility of their implementation, but also can set priority for solutions with a favourable context and analyse the barriers for the others. The VSs with a difficult context can be compared with similar ones set up in other pilots/projects and actions can be sought to overcome the identified barriers.

Looking at the literature, the PESTLE analysis has been conducted on a range of different topics, such as renewable energy production in Malawi, Indonesia's fossil fuel industry, and the tidal energy industry in the UK [7]. This method is particularly useful for exploring issues that are mainly qualitative in nature and ensuing a holistic approach in the project (that is one of the main features of the VARCITIES project). Within this framework, the PESTLE analysis was conducted to break down and evaluate the various factors influencing the implementation of VSs, filling the gap of limited information with the consultation of experts and stakeholders of the VARCITIES pilot areas.

2.1.1. Political factors

The political factors are the most important influence on the regulation of any business and can have a strong impact also on actions promoted by public administrations. Here we are talking about all those factors related to government action.
In general, examples of political factors can be:

- Legislation such as the minimum wage or anti-discrimination laws;
- Voluntary codes and practices;
- Market regulations;
- Trade agreements, tariffs, or restrictions;
- Tax levies and tax breaks;
- Health and safety requirements;
- Weight of bureaucracy;
- Level of corruption;
- Government policies on the economy: role of public, private, or joint (public-private partnership) sectors.

2.1.2. Economic factors

All factors related to the economic situation. The economic context is the environment in which businesses operate. It includes the systems, policies and nature of an economy, trade cycles, economic resources, level of income, etc. It is very dynamic and complex in nature.
In general, examples of economic factors can be:

- Local and national economic situations and trends;
- Overseas economies and trends;
- General taxation issues;
- Market routes and distribution trends;
- Interest and exchange rates;
- Current cost of living;
- Unemployment;
- Inflation;
- GDP.

2.1.3. Social factors

Social factors are all those related to population, attitudes and norms. Sociological attitudes and profiles are constantly changing. These factors scrutinize the social environment of the market, and gauge determinants like cultural trends, demographics, population analytics, etc.
In general, examples of social factors can be:

- Demographics;

- Distribution of income;
- Social mobility;
- Lifestyle trends;
- Educational levels;
- Division of population (male / female);
- Age groups of population;
- Attitude to living;
- Attitudes towards health and environmental issues;
- Ethnic/religious factors;
- Ethical issues.

2.1.4. Technological factors

Technological environment means the development in the field of technology which affects business and society by new inventions of products and other improvements in techniques that can influence the business work and daily life. Technological advancements are becoming faster and faster, and changes often come from unexpected sources.
In general, examples of technological factors can be:

- Rate of replacement technology;
- Rate of obsolescence;
- Information and communications level;
- Research and development level;
- Technology access, licensing, patents;
- Consumer buying mechanisms;
- Discoveries and innovations;
- Speed and cost of technology transfer.

2.1.5. Legal factors

Legal environment means all factors relating to laws and legal orders which affect business and its working. With law we intend a system of rules, usually enforced through a set of institutions. Many regulations are applied at both regional and national levels and create another level of complexity that is needed to consider when developing a strategy.
In general, examples of legal factors can be:

- Employment laws;
- Health and safety regulations;
- IPR laws, copyright and patent;
- Discrimination laws;
- Antitrust laws;

- Environmental protection laws;
- Law enforcement;
- Regulatory bodies.

2.1.6. Environmental factors

Environmental factors include those factors that influence or determine the surrounding environment. They talk about how people's perception of the environment can affect business. These factors have become increasingly important in recent years because of the scarcity of raw materials, increasing pollution, amount of waste generation and it's disposal. In general, examples of environmental factors can be:

- Geographical location;
- Climate change;
- Disposal of waste material;
- Energy availability and consumption;
- Recycling procedures;
- Limited natural resources;
- Attitude towards the environment;
- Environmental consequences of production processes.

2.2. Combining PESTLE and SWOT analyses

As presented in the previous section, PESTLE is a powerful tool for analysing the external environment, but it should only represent one component of a comprehensive strategic analysis process that takes into account all the relevant aspects. PESTLE analysis describes a framework of macro-scale factors that combined with external micro-scale factors and internal drivers, can be classified as opportunities and threats in a SWOT analysis. Indeed, by subdividing them into internal and external factors as well as into positive (drivers) and negative (barriers), it returns the 2x2 matrix of the SWOT analysis.

SWOT analysis is one of the most common techniques currently used for the strategic evaluation of projects [8]. This is a logical procedure, which makes it possible to structure the information collected on a specific topic (Figure 2):

- Strengths and Weaknesses are the internal factors; these are the variables that are part of the system itself, on which it is possible to intervene towards the achievement of pre-established objectives. By working on these variables, it is possible to stress those that can favour the pursuit of certain objectives and remove others hindering or delaying the process.
- Opportunities and Threats are the external factors; these are variables external to the local system which, however, can affect it both positively and negatively. Negative

external factors cannot be avoided or removed but should be considered and mitigated.

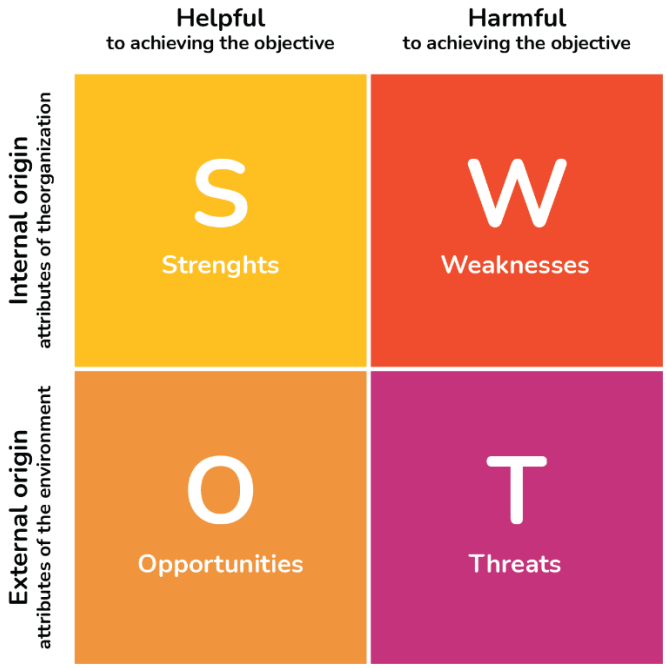

Figure 2: SWOT diagram. Source: own elaboration

Directly comparing SWOT and PESTLE is likely not suitable here. They are both strategic planning methods that give insights to successfully execute projects. The main disadvantage of PESTLE analysis is that it does not consider the internal factors of the analysed context. Instead, it deeply analyses the external factors that might affect the project. SWOT analysis considers both the internal and external factors. It captures the external factors in the opportunities and threats section. However, when creating a SWOT diagram, a deep analysis of external factors is not performed, at least not as extensively as a PESTLE analysis. So it is possible to miss out on external factors that can benefit the project [9]. A possible approach is then to combine the two tools, performing an extensive PESTLE analysis and then using that finding in the opportunities and threats section in the SWOT analysis.

The major advantage of using a SWOT+PESTLE analysis is related to the combined analysis of both internal and external factors that have an impact on a project, particularly since the latter aspects are usually beyond the control of the organization and more difficult to identify [6]. Examples can be found in literature about the combination of existing methods and strategic planning frameworks to help understand which aspects are relevant to the decision-making process. For instance, in [10] the strengths, opportunities, aspirations, and results (SOAR) analysis is presented that helps organizations focus on their current strengths and opportunities to create a vision of the future and to develop its strategic goals. They applied SOAR and PESTLE frameworks to help the classification of proposed management strategies for controlling air pollution in Mashhad city, Iran.

While [11] developed a similar approach for addressing specific water management problems, using a SWOT+PESTLE analysis for identifying the internal and external factors that influence a given water system. They grouped the factors according to the six PESTLE categories: political, economic/financial, social, technical, legal, and environmental, and divided them afterward according to the positive or negative influence on the system. In general, the result of these combined analyses is a set of factors that can be used for selecting the more relevant criteria in the decision process concerning a specific issue [11].
In particular, for the VARCITIES project, the final aim is to provide recommendations for the successful implementation of the Visionary Solutions, i.e. how to increase strengths, eliminate weaknesses, take advantage of all opportunities, and reduce threats. The synergy between SWOT and PESTLE delivers extensive and more accurate analysis of the pilot areas' context and its internal and external interactions, anticipating the relevant influences within the context and from the external environment.

3 Lessons learnt from sister projects

The analysis of drivers and barriers for the implementation of Visionary Solutions is also based on the lessons learnt from similar NBS projects:

- Thinknature [12];
- NAIAD [13];
- Naturvation [14];
- Nature4Cities [15];
- Unalab [16];
- Urban Green Up [17];
- GrowGeen [18];
- Connecting Nature [19];
- OPERANDUM [20];
- Clever Cities [21];
- EdiCitNet [22].

The information presented in Appendix I has been collected by the Telecommunication Systems Institute (TSI, lead partner of VARCITIES project) team in the framework of the activities for Task 3.2 – Knowledge base creation: Understanding of pilot areas' needs, challenges, barriers, and drivers. In the following, a summary is presented. Insights from EU projects similar to VARCITIES have been collected so as to support the identification of barriers and challenges that VARCITIES pilot areas could come across regarding the NBSs implementation. The lessons learnt from other projects offer a basis for work during the PESTLE analysis for local needs assessment and specifically for identifying risks related to the local political, economic, social, technological, legal, and environmental contexts in each pilot area.

Moreover, in the attached document the lessons learnt from similar EU projects on the NBSs contribution to Sustainable Development Goals (SDGs) or other frameworks are presented. Since Task 3.2 aims to contribute to the design of a set of solutions based on the multiple benefits approach, the activities of T3.2 include the collection of insights from similar EU NBS projects on the NBS contribution to SDG or other frameworks. These have been collated with the information on expected impacts collected from the pilot areas in T3.1 as well as with reviewed NBS scientific literature on multiple impacts. This information also contributes to the Deliverable 3.4 "Report on multiple benefits expected from visionary solutions".

4 The co-creation Workshops

The co-creation workshops organized by pilot experts in each pilot area – supported by E2Arc, and Eurac, and coordinated by Prospex Institute – were the occasion to present and co-design the visionary solutions with local stakeholders to demonstrate how the co-creation represents a fundamental component of the VARCITIES project.

The 1st round of workshops took place in June 2021 in seven VARCITIES pilot cities (the pilot area of Bergen followed a slightly different approach, see Section 5.3 of this document). The main goal was to introduce the VSs to the local stakeholders to validate and refine them collectively, before starting the co-design processes. The 2nd round of workshops was organized in November 2021 and the main goal was to finalize the co-design processes of the VSs.

More information about the executed workshops will be public available at the end of the VARCITIES project, in the Deliverable 4.3 "Overview report on stakeholder engagement activities in pilots".

4.1. The first Workshop

Purposes of the 1st round of co-creation workshops were to:

- Introduce VARCITIES project and pilot areas to the stakeholders;
- Present, validate, and refine the first drafts of VSs;
- Collect inputs on external factors that affect the implementation of the local VSs;
- Collect inputs on stakeholder-driven KPIs for monitoring and evaluation framework;
- Present a first draft of the H&WB Platform;
- Collect inputs on preferred communication channels.

4.1.1. Drivers

During the first workshop, the following question was asked in order to identify the drivers: *What are the most important drivers that impact your health & well-being in our area?*

The main aim was to map all the drivers impacting health and well-being in the pilot area, detailing how the Visionary Solutions can address these drivers or factors.

- Time allocated: ca. 20 minutes.
- Moderator introduced the concept of drivers: drivers are factors that have an impact; the impact can be direct or indirect.
- It did not matter whether drivers were seen as "positive" or "negative" – they simply needed to have an impact.

Following, the moderator could introduce a new question for a final round of comments: *To make sure we have a comprehensive overview of drivers, I want you to think about the following*

categories: political, economic, social, technological, legal and environmental. Looking at what we collected so far, and hearing these categories, are there additional drivers you see along these?

4.1.2. Barriers and challenges

During the first workshop, the following question was addressed to the stakeholders to identify the main barriers and challenges: *What are important barriers or challenges do you see for turning these visionary solutions into reality, across the set of solutions, as well as for individual ones?*

- Moderator introduced discussion and elicited answers from participants in a free discussion.
- Time allocated: ca. 10 minutes
- Note: the barriers and challenges could refer to a single Visionary Solution or to the set of Visionary Solutions.

To elicit further answers at a final stage, the moderator could introduce a final question: *Think about the following categories: political, economic, social, technological, environmental, and legal. When hearing these, are there additional challenges / barriers that come to mind?*

4.1.3. Multiple benefits

During the first workshop, between the various analyses and reflections, the focus was posed also on understanding what potential multiple benefits could be provided with the implementation of the proposed VSs by each pilot area. The objectives of this preliminary analysis were to provide a comprehensive methodology capable of understanding the wide range of positive or negative results that the implementation of the project could bring to the involved urban areas. This reflection aimed to guide cities through their choices, understanding how the implementation of certain actions can produce effects considering their time of appearance (immediate or delayed).

During the workshops, a first theoretical overview was proposed to the pilot areas. The stakeholders were invited to start asking themselves about the conceptualization, identification and quantification of the multiple benefits, through the question: *What other benefits do you think the Visionary Solutions could bring to your area?*

The final goal (pertaining to D3.5 which previously set the guidelines for drawing the VSs [8]) was to get to discuss and further model the VSs in order to arrive in the next phase of the second workshop with a detailed overview of the situation to analyse. Therefore, following the theoretical overview of the expected multiple benefits, in the second workshop an impact assessment was performed in more detail for each proposed VS.

4.2. The second Workshop

Purposes of the 2nd co-creation workshops were to:

- (Re)introduce VARCITIES project and pilot areas to the stakeholders (some of the stakeholders had already attended the 1st WS, some others were attending for the first time);
- Present the updated version of VSs (if available);
- Collect outputs from the context analysis and employ them to check the updated versions of VSs;
- Present the updated version of H&WB Platform;
- Present upcoming dissemination activities.

4.2.1. Discussion on PESTLE analysis

During the second workshop, a session was dedicated to providing the stakeholders an overview of the pilot area, including a high-level overview of the set of Visionary Solutions and the contextual analysis (PESTLE analysis at the pilot area level).
The following questions were asked by the moderator:

- *Do you have any additional comments on the presented analysis of the pilot area?*
- *What might have changed since June that you think needs to be added to the analysis?*
- *Think in terms of different categories: political, economic, social, technological, legal, and environmental (follow up comment if needed).*

Later during the workshop, for each Visionary Solution the PESTLE analysis at the VS level was presented (when available). After the presentation, the moderator addressed some discussion points:

- *Is there anything missing in this analysis on this Visionary Solution? What might have changed since June that you think needs to be added to the analysis?*
- *Is there anything we can learn from this analysis to improve the Visionary Solution? Do you have any final comments?*

4.2.2. Impact and multiple benefits analysis

During the second workshop particular attention was paid to the Impact Assessment of the proposed VSs. Following the Deliverable 3.4, an evaluation grid was shown to the stakeholders (Figure 3), aimed at understanding the positive or negative impacts that the implementation of the related VSs would have produced.

5 Impact dimension	Impact questions each dimension seeks to answer
What	What impact is occurring in the period? Is the impact positive or negative? How important is the impact to the people (or planet) experiencing them?
Who	Who experiences the impact? How underserved are the affected stakeholders in relation to the impact?
How Much	How much of the benefit is occurring across scale, depth and duration?
Contribution	Would this change likely have happened anyway?
Risk	What is the risk to people and planet that impact does not occur as expected?

Figure 3: Impact analysis schema used during the 2nd round of workshops. Source: own elaboration

Therefore, the following questions were asked:

- *To what extent do you believe that the updated VSs, if implemented using the feedback you provided during this workshop, will be effective in improving H&WB in the area?*
- *What do you think will be the most important impact of VSs on your local area once implemented?*
- *What are the expected impacts of the VARCITIES project on your organization/group or you as an individual?*

5 Summary of outcomes per pilot area

In the following sections, the outcomes of the first and second round of workshops are presented for each VARCITIES pilot area. In this document, the focus is on the outcomes of PESTLE, SWOT, and impacts analyses at the pilot area level. While, the results of the same analyses at the level of Visionary Solutions for each pilot area are presented in the Annexes F that are part of the Deliverable 3.6.

5.1. Novo mesto

Sports and recreational park Češča vas

With the aim of countering the dispersed settlement model according to which the city has developed in recent years, the municipality has established strategic objectives to make Novo mesto a smarter, more sustainable and inclusive city, making it a place to stay and socialize in a regional, national and cross-border context. The VARCITIES project will contribute by increasing physical activity, recreation, relaxation and promoting a healthier lifestyle and quality of life thanks to the creation of the Sports and recreational park Češča vas.

PESTLE+SWOT analysis

Drivers affecting the Health & Well-Being in the pilot area

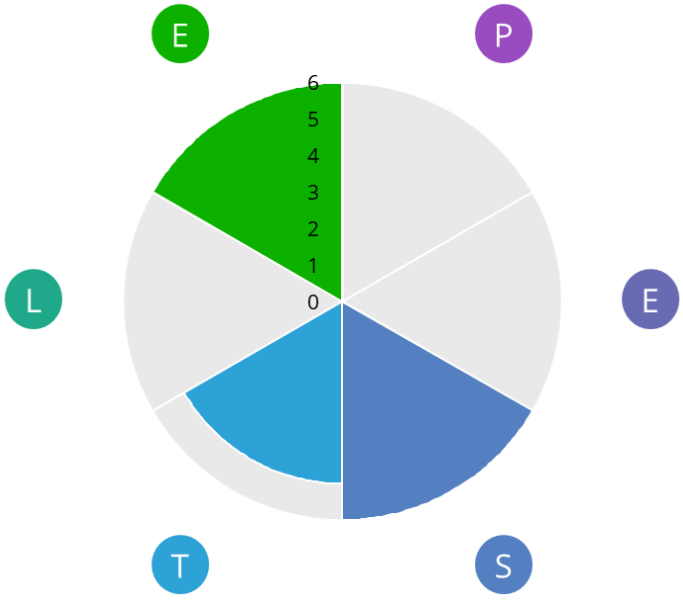

Figure 4: Number of drivers identified in the 6 PESTLE categories for the Novo mesto pilot area. Source: own elaboration

Table 1: Combined PESTLE+SWOT analysis of drivers for the Novo mesto pilot area. Source: own elaboration

	Strengths	Weaknesses	Opportunities	Threats
Political				
Economic				
Social	- A culture of healthy living / healthy living environment - Different programs for cultural activities		- Motivation and space - Regular physical activity - Arranged space for socializing and cultural activities - Involvement of peripheral groups	
Technological	- Suitable space - Infrastructure, accessibility		- Movement as a value - Connection - Development of motor skills	
Legal				
Environmental	- Clean and green environment - Lots of sports areas - Movement in nature - Air quality		- Access to unspoiled nature and recreational activities - Healthy food	

Impacts and multiple benefits analysis

In the following lists, the inputs collected thanks to the questions concerning multiple benefits and expected impacts of VARCITIES project and VSs are reported. To be noted that the second workshop in Novo Mesto was mainly focused on VS3 "Interconnectedness of sports, recreational and therapeutic facilities".

What other benefits do you think the Visionary Solutions could bring to your area?

During the first workshop no inputs were gathered concerning the questions about multiple benefits of VSs.

What do you think will be the most important impact of VARCITIES solutions on your local area when they are implemented?

- Greater children's health.
- Intergenerational involvement of all stakeholders.

- Connecting different societies and enriching the diverse offer in a really small area.
- The trim track that can be very interesting if it is equipped with information.
- Improving movement in a pleasant environment.
- Inclusion of all age and vulnerable groups of the population.
- A joint training program for elementary school students.
- Swimming pool, trim track, etc. all in one place (sports park).
- Healthy environment, digital aid.
- Improving the motor skills of young people, promoting the movement of the elderly and thus better aging.
- Population activity, swimming pool, movement, etc. "all in one place".
- Carrying out several activities in one location.

What are the expected impacts of the VARCITIES project on your organization / group or you as an individual?

- More opportunities to participate in projects.
- Connecting kindergarten – family.
- Improving training offer.
- New space that will be equipped for recreation.
- New training offer, new space, new activities.
- Possibilities of better implementation of existing training programs for a wider range of participants.
- Arrangement of trails, installation of sports facilities, planting of trees and implementation of a sports program in nature.
- For individual: swimming training, children's room, picnics, etc.
- Better quality of life, better well-being, motivation for a healthier life.
- Better access to recreational opportunities in nature.
- Measured parameters to improve the quality of living.
- Presentation of the activities of vulnerable groups to the general public.

Main expected impacts of the VSs implementation:
Intergenerationality, improved sense of community, involvement of vulnerable groups, improved motor skills, improved relation with public space.

Main expected impacts of the VARCITIES project:
Improved training offer, involvement of vulnerable groups, co-design and participation, improved quality of life (healthier life).

5.2. Skellefteå

Transforming an old landfill area into a residential and educational area using green & blue solutions

With the aim of coping with the ongoing industrial expansion in the field of ecological batteries and ecological mining and metals in the Skellefteå region, the city seeks to respond to greener models to meet the growing regional and European demand for housing, electricity, heating, cooling, mobility, transport and education sectors.

PESTLE+SWOT analysis

Drivers affecting the Health & Well-Being in the pilot area

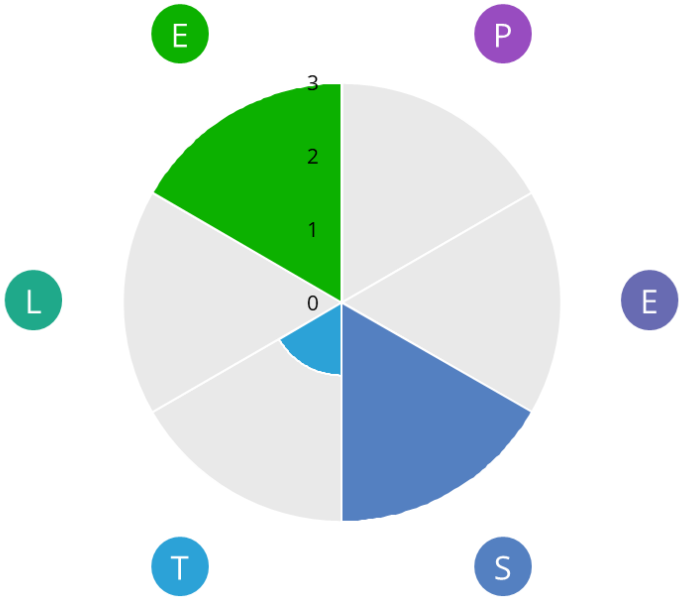

Figure 5: Number of drivers identified in the 6 PESTLE categories for the Skellefteå pilot area. Source: own elaboration

Table 2: Combined PESTLE+SWOT analysis of drivers for the Skellefteå pilot area. Source: own elaboration

	Strengths	Weaknesses	Opportunities	Threats
Political				
Economic				
Social	- Sense of community between younger and older people - Education on the importance of diversity to		- City walks, guided tours are a good way to reach out (websites do not reach everyone)	

	engage the general public			
Technological		- Accessibility to the park		
Legal				
Environmental		- Water quantity and quality		- Invasive plant species - Climate change (water quantity decreased during dry and hot summers)

Barriers/Challenges affecting the implementation of VSs in the pilot area

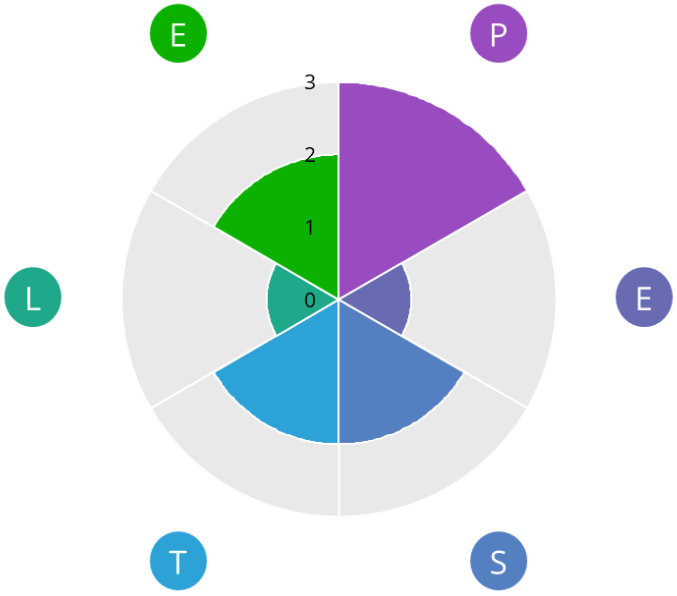

Figure 6: Number of barriers identified in the 6 PESTLE categories for the Skellefteå pilot area. Source: own elaboration

Table 3: Combined PESTLE+SWOT analysis of barriers for the Skellefteå pilot area. Source: own elaboration

	Strengths	**Weaknesses**	**Opportunities**	**Threats**
Political			- How to prioritize diversity (green space vs. housing) - Good if the project would be politically	- Ecological sustainability is not always so neat

			anchored in a plan or similar	
Economic		- Maintaining the park in the long term		
Social			- Encourage winter activities - The vision (of the project) should be a common target to reach, so that it becomes a reality	
Technological		- Are the parking facilities disappearing?	- How to tie in parking and the ecological theme	
Legal				- Legal support to avoid invasive species
Environmental		- Dry vs wet areas	- Create a surface that can be used even in winter	

Impacts and multiple benefits analysis

In the following lists, the inputs collected thanks to the questions concerning multiple benefits and expected impacts of VARCITIES project and VSs are reported.

What <u>other benefits</u> do you think the Visionary Solutions could bring to your area?

- Improvement of air quality.
- New approaches to park management.

During the second workshop, no inputs were gathered concerning the questions about the project and VSs impacts.

5.3. Leuven

Regeneration of former hospital site (Hertogensite)

Leuven is a city that addresses challenges in an innovative and pioneering way. The goal is to work collaboratively to become a smart, healthy and sustainable city and society. This also includes the improvement of the urban environment and the promotion of better health and well-being for the citizens. Within the VARCITIES project, the pilot area will foster recreational activities, relaxation and social interaction, more physical activity, as well as improved air quality.

PESTLE+SWOT analysis

Drivers affecting the Health & Well-Being in the pilot area

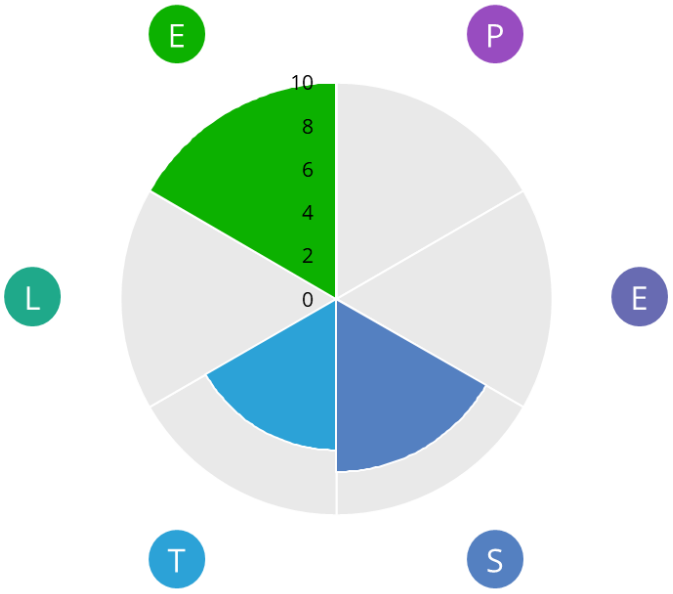

Figure 7: Number of drivers identified in the 6 PESTLE categories for the Leuven pilot area. Source: own elaboration

Table 4: Combined PESTLE+SWOT analysis of drivers for the Leuven pilot area. Source: own elaboration

	Strengths	**Weaknesses**	**Opportunities**	**Threats**
Political				
Economic				
Social	- Feeling at home - Mixed generations - Culture for the mental health	- Anonymity, feelings of insecurity	- Meeting and social contact; Perception and social interaction; Cohesion facilities; Togetherness;	

	- Accessible and nearby care providers		Places to meet; MATE-app - Experiencing culture	
Technological	- Technology can help to achieve a number of things - Easy accessibility, especially for the disabled; Accessibility from outside the city - Sports facilities; Presence of play and exercise incentives; Covered areas for sports - Short walking distances between facilities (15 minutes city) - Variety of places to sit		- Technology can be used at different levels, including in the field of health literacy (demonstrative and educational), individually and collectively - Technology can contribute to all these elements	
Legal				
Environmental	- Nature, green spaces	- Peace and quiet, noise pollution - Mobility, traffic	- Greenery and water - Shady spaces - Shaded areas - Environment that encourages healthy behaviour	- Air quality/air pollution

Impacts and multiple benefits analysis

During the first and second workshops, no inputs were gathered concerning the multiple benefits of VSs nor the project and VSs impacts.

5.4. Castelfranco Veneto

"Healing Garden" for the elderly and people suffering from Alzheimer's

The VARCITIES project focuses on the benefits of nature on health, promoting physical activity, reducing stress, and improving the psychological well–being and quality of life of elderly people. The municipality aims at implementing nature-based solutions for integrating digital, social, and cultural innovation, with high replication potential. The project aims at developing a new concept for green public spaces in cities, including a co-creative approach (together with the public, the local authorities and the industry), and developing new key performance indicators (KPIs) for health and well-being.

PESTLE+SWOT analysis

Drivers affecting the Health & Well-Being in the pilot area

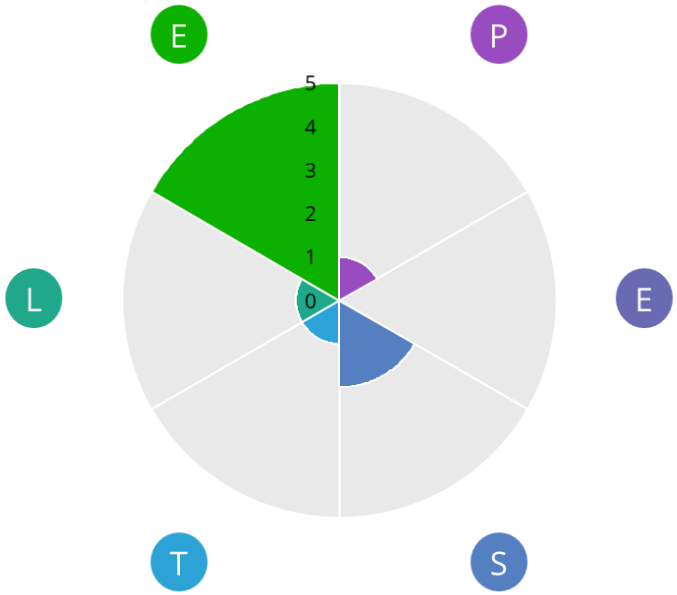

Figure 8: Number of drivers identified in the 6 PESTLE categories for the Castelfranco pilot area. Source: own elaboration

Table 5: Combined PESTLE+SWOT analysis of drivers for the Castelfranco pilot area. Source: own elaboration

	Strengths	Weaknesses	Opportunities	Threats
Political	- Urban dimension (livability of the city, provided with the main services)			
Economic				

Social	- Accessible spaces for socializing or staying alone with nature			- Lack of a culture of the environment as an element of psychophysical well-being
Technological	- Availability of systems and sensors (also low cost) to digitize public green spaces			
Legal			- The presence of historical architectural constraints requires careful discussion with the protection bodies	
Environmental	- Presence of "open territory" that maintains some connotations of green - Presence of environments with high regenerative characteristics (gardens, ...) - Presence of an area as "unexpectedly" green in an urban context	- Surrounding sounds and noise	- Opportunity to stay in the middle of nature and to reach some benefit from it	

Impacts and multiple benefits analysis

In the following section, the inputs collected thanks to the questions concerning multiple benefits and expected impacts of VARCITIES project and VSs are reported.

What <u>other benefits</u> do you think the Visionary Solutions could bring to your area?

During the first workshop, no inputs were gathered concerning the questions about the multiple benefits of VSs.

During the 2nd co-creation workshop (held in presence), the partners of the Castelfranco Veneto pilot area developed with the participants a deeper impact analysis. First, the impacts that each VS would have (in a positive and negative way) on the different categories of stakeholders were identified (Table 6). Secondly, each impact was assessed according to its greater, equal, minor, or no effect on the category of stakeholders compared to the community in general (Figure 9).

The identified categories of stakeholders are:

- people with dementia and Alzheimer;
- people with heart diseases;
- people with learning disabilities;
- young people;
- environmentalists;
- professionals in the field of psychology;
- technicians of the green sector.

The assessed Visionary Solutions are:

- VS1: Renovation of the access road to the garden and adaptation of the paths within the garden based on the mobility needs of the users;
- VS4: Development of a best-practices manual for the (re)design of green public spaces in relation to human health and wellbeing and establishment of the Local Landscape Observatory with a focus also on the therapeutic effects of green and blue areas;
- VS5: Implementation of ICT tools to support a rewarding experience of garden users and for the assistance of visitors with disabilities with the aim of increasing safety during the visit to the garden;
- VS6: Adaptive and intelligent information system for visitors.

Visionary Solutions 2 and 3 were not discussed during the second workshop because they are considered "research issues" and in the workshop the discussion was focused on those VSs that will mostly affect the stakeholders.

Table 6: Impacts on VSs for different stakeholder categories in Castelfranco Veneto. Source: own elaboration on information from Notetaker template Workshop 2 (in presence)

	VS1 🟡	VS4 🔵	VS5 🔴	VS6 🟢
People with dementia and Alzheimer	- Greater impact: improvement of accessibility and viability of the garden - Greater impact: strengthening of social relations through the	- Equal impact: for both the community and the stakeholder category	- Greater impact: impact on frail elderlies	- Minor impact: they will not have the skills or competences to use the devices autonomously

	construction of "friendly communities"			
People with heart diseases	- Greater impact: they will be able to walk in the garden with less effort required	- Equal impact: for both the community and the stakeholder category	- Minor impact: in case people are alone visiting the garden	- Equal impact: for both the community and the stakeholder category
People with learning disabilities	- Greater impact: it will have different levels of impact according to the specific disability of the user	- Minor impact: it will have first an impact on healthcare professionals and professionals who care for this category of people	- Equal impact: for both the community and the stakeholder category	- Minor impact: this VS is not suitable for the category of stakeholders, as they might have hallucinations or other disturbs due to the interactive screens
Young people	- Minor impact: they do not report difficulties in walking or approaching harsh surfaces	- Equal impact: for both the community and the stakeholder category	- Minor impact: if the devices will be implemented with other functionalities the VS could impact the present category, otherwise no	The VS will not affect this category
Environmentalists	The VS will not affect this category	- Equal impact: For both the community and the stakeholder category	The VS will not affect this category	The VS will not affect this category
Professionals in the field of psychology	- Equal impact: for both the community and the stakeholder category, as it would allow for wider access to the garden	- Greater impact: the manual will be of great interest for this category of stakeholders, mainly in terms of research communication and good practices	- Equal impact: For both the community and the stakeholder category, but it will have to be integrated based on the data collected during the research and the other project phases	- Equal impact: for both the community and the stakeholder category

Technicians of the green sector	- Equal impact: for both the community and the stakeholder category	- Great impact : the manual could become a guideline for the implementation of their activities	The VS will not affect this category	- Minor impact: possible impact of the devices would show a specific part of the garden

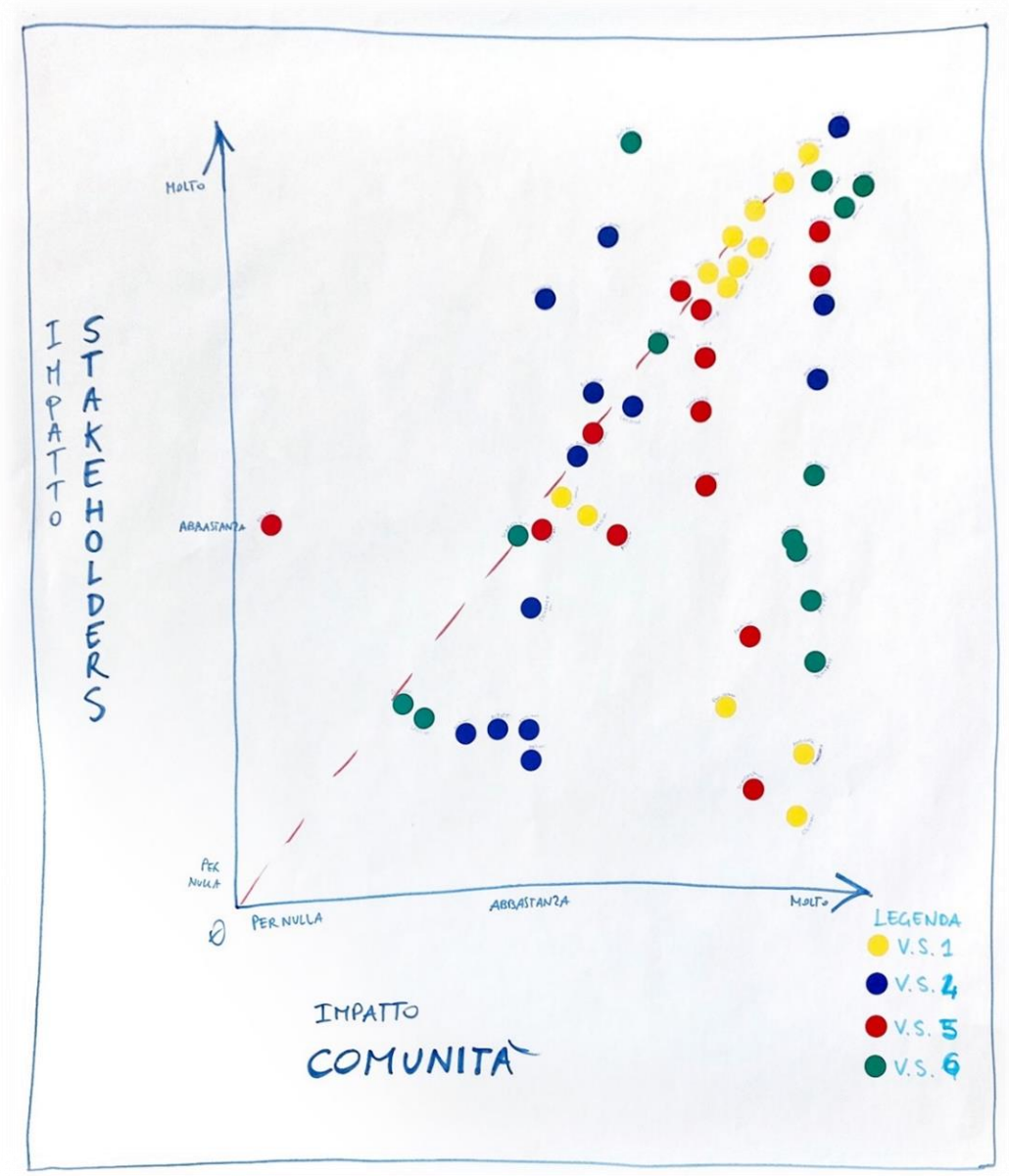

Figure 9: Impact Analysis exercise during the 2nd co-creation workshop in Castelfranco Veneto. Source: Notetaker template Workshop 2 (in presence)

5.5. Dundalk

Dundalk Library and Museum Quarter

The key objectives for Louth County Council are to form a new identity for the City Library / Museum creating a quality public space for all members of the community (visitors and tourists) by improving its connectivity with the outside world. The ultimate goal is to reproduce the principles of sustainable development by minimizing energy consumption and maximizing the use of renewable energy technology.

PESTLE+SWOT analysis

Drivers affecting the Health & Well-Being in the pilot area

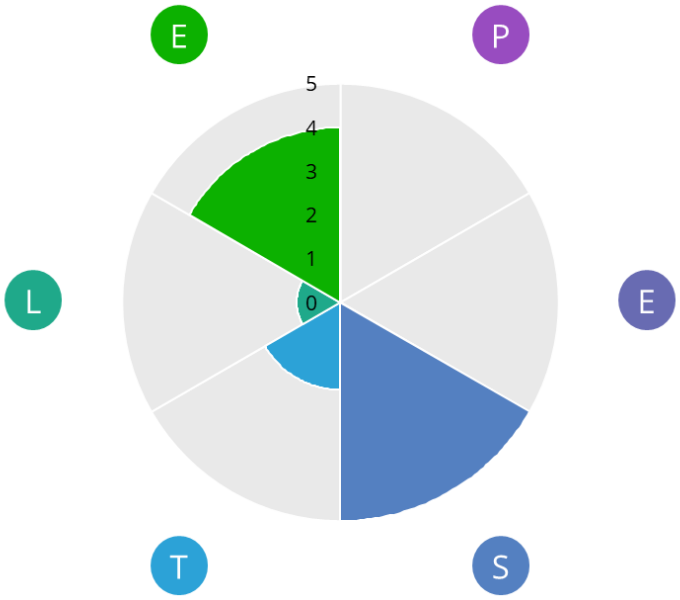

Figure 10: Number of drivers identified in the 6 PESTLE categories for the Dundalk pilot area. Source: own elaboration

Table 7: Combined PESTLE+SWOT analysis of drivers for the Dundalk pilot area. Source: own elaboration

	Strengths	**Weaknesses**	**Opportunities**	**Threats**
Political				
Economic				
Social	- Public safety - Volunteering - People using shared spaces where they feel connected and safe		- Urban regeneration	- Loneliness because of covid

Technological	- Safe and easy-to-use infrastructures with strong feel-good factors	- Understand what is appropriate and what's not regarding bike stations/racks		
Legal	- Policing and security measures			
Environmental	- Wide variety of nature-based attractions		- Green space management - Outdoor therapy	- Climate change mitigation & adaptation

Barriers/Challenges affecting the implementation of VSs in the pilot area

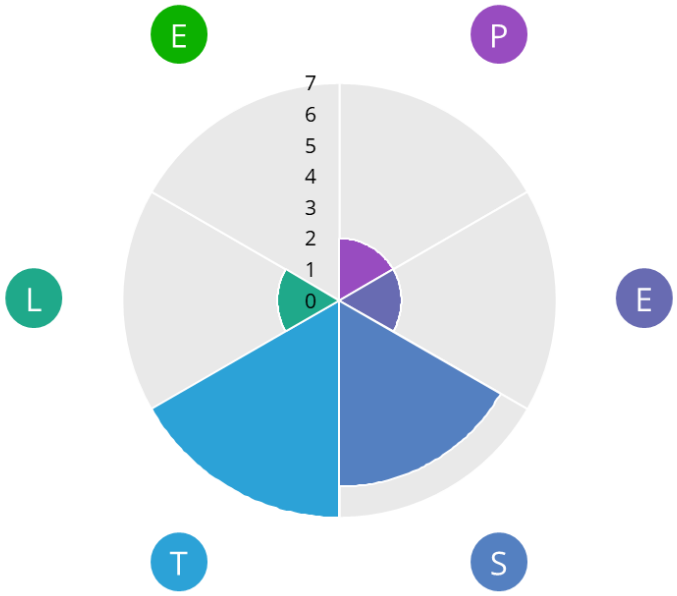

Figure 11: Number of barriers identified in the 6 PESTLE categories for the Dundalk pilot area. Source: own elaboration

Table 8: Combined PESTLE+SWOT analysis of barriers for the Dundalk pilot area. Source: own elaboration

	Strengths	**Weaknesses**	**Opportunities**	**Threats**
Political			- Inputs needed from volunteer sector, education sector and business sector - Integrating VSs with other County Council immediate	

			facilities already available	
Economic		- Cost of the project - Put some money into the library to insulate it		
Social	- Involvement of volunteer groups	- Anti-social behaviors	- Build a link between the site, the town center and the Marshes shopping center - How to attract people to the area	- Risk to take away people from the current use of the library / museum facilities - Risk of overcrowding
Technological		- Management and maintenance in the long term - Need for utility analysis to see if these spaces are the correct spaces - Rainwater harvesting (design considerations) - Access to the museum must be maintained	- Seating placement and design so that people want to use the facility	- Noise coming from adjoining Youth Centre - Transport: people living not near the site, how are they to get to this space?
Legal		- Safety it is a major concern for users of any of these solutions (need for CCTV?) - Potential blocking of access to rear of buildings especially considering fire safety		
Environmental				

Impacts and multiple benefits analysis

In the following lists, the inputs collected thanks to the questions concerning multiple benefits and expected impacts of VARCITIES project and VSs are reported.

What other benefits do you think the Visionary Solutions could bring to your area?

- Community safety usage.
- Intergenerational interaction.
- Better connectivity with the surrounding area.
- Connection with the surrounding community.
- Improvement of public safety in the area.
- Employability of the people using the service (learners and volunteers).

What do you think will be the most important impact of VARCITIES solutions on your local area when they are implemented?

- Feeling of safeness and security.
- Feeling of being in a comfortable place that enables improved mental health and opportunities for increasing physical health.
- Mental and physical health by having a wide variety of attractions to increase mental health and opportunities to improve physical health.
- General good feeling and good factors associated with being there.
- Experience nature and feel well (mental health from contact with nature).
- Mental health – feel sober and well.
- Mental and physical health – feel accepted and have a place to go that enables improvement in physical health too.
- Mental and physical health from feeling good and being able to undertake physical exercise in a pleasant feel-good environment.

What are the expected impacts of the VARCITIES project on your organization / group or you as an individual?

- Reduced noise pollution.
- Improved accessibility for cultural events.
- Higher levels of outdoor physical activities.
- Improved quality of life.
- Higher economic activity in the area and job creation.
- Solutions replicated in other areas of the city/region.
- Reduced spending on healthcare.
- Higher public/private investment in the area.

Main expected impacts of the VSs implementation:
Improved mental and physical health, feeling of safeness and security.

Main expected impacts of the VARCITIES project:
Improved quality of life (healthier life), higher economic activities, investments in the area, replicability of solutions.

5.6. Chania

Creation of a Mobile Urban Living Room in open public spaces

The objective proposed by the city is to implement innovative solutions, consistent with the objectives of increasing citizens' awareness, the sense of respect for public spaces and the integration of green spaces in everyday life. The development of a healthy green mindset for children and the improvement of economic opportunities through the learning of green and digital strategies are the cornerstones of the proposed project.

PESTLE+SWOT analysis

Drivers affecting the Health & Well-Being in the pilot area

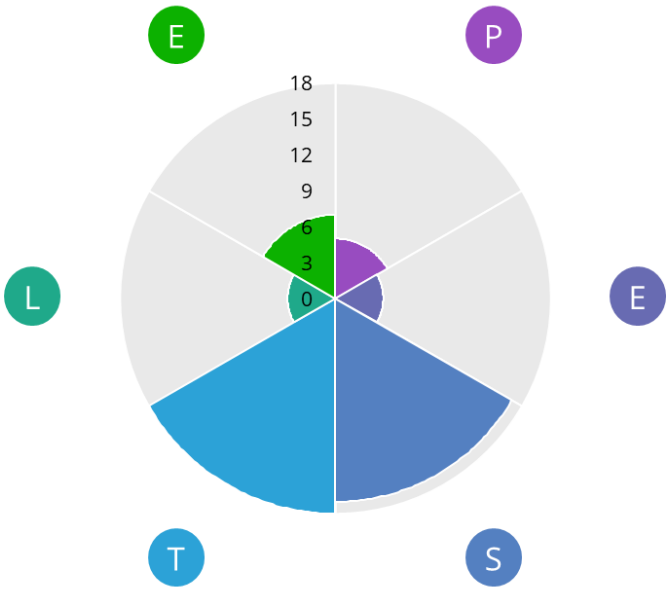

Figure 12: Number of drivers identified in the 6 PESTLE categories for the Chania pilot area. Source: own elaboration

Table 9: Combined PESTLE+SWOT analysis of drivers for the Chania pilot area. Source: own elaboration

	Strengths	Weaknesses	Opportunities	Threats
Political	- Public space management	- Dependence of public spaces on the tourists - Infrastructure maintenance	- Cooperation, vision	- Impossibility of elaboration of long-term planning due to the "discontinuity" of state administration
Economic	- Orientation of funds towards wellness	- Insufficient network of		- Degradation of areas due

		sidewalks and bicycle paths		to lack of infrastructures - Degradation of primary health care at the level of prevention and health education. The natural and healthy way of life is "expensive" for the poor
Social	- Social interest training for public areas - Traffic education - Open cultural spaces - Accessibility - Public spaces – communication	- Lack of training in road safety and behavior - Lack of tolerance - Sense of safety (transportation in the city is not safe) - Social detachment - Unhindered movement of people with disabilities	- Equality in the use of public spaces - Green infrastructure - Development of intercultural competences - Acceptance of different needs - Opportunities for creativity and expression - Sense of commons - Promotion of the Old Town	
Technological	- Data collection - Educational use to attract young children and adolescents - Free sports spaces; Sports facilities - Bike paths	- Presence of urban green spaces - Lack of smart systems - Inadequate lighting of public spaces - Absence of operational transport	- Ease of use of new technologies - Intelligent parking management - Technological equipment in schools - Street lighting - Accessible public spaces for all people - Free urban transport	
Legal	- Use of personal data - Easy partnership of partners	- Feeling safe at night	- Framework for innovation and reform	

Environmental		- Lack of green spaces - Noise pollution - Poor maintenance of green spaces - Municipal waste and cleanliness - Insufficiency of equipment for the use of free spaces regardless of the weather conditions and the season		- Air pollution - Climate change

<u>Barriers/Challenges</u> affecting the implementation of VSs in the pilot area

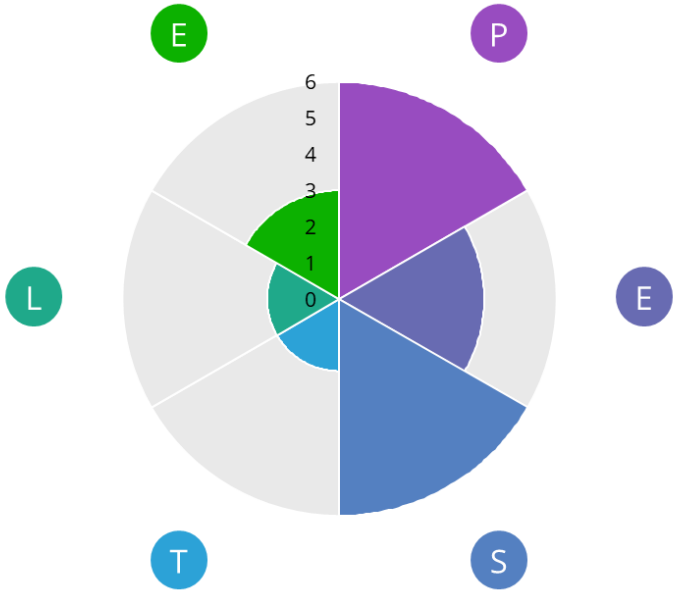

Figure 13: Number of barriers identified in the 6 PESTLE categories for the Chania pilot area. Source: own elaboration

Table 10: Combined PESTLE+SWOT analysis of barriers for the Chania pilot area. Source: own elaboration

	Strengths	Weaknesses	Opportunities	Threats
Political		- Lack of political initiative on free spaces and bike lane issues - To be systematically and effectively used	- Overall political vision - Raising awareness of volunteer groups and organizations - Independence - Creation of a management body by citizens	
Economic		- Overpricing of materials and labor - Maintenance and construction costs - Personnel/maintenance	- Cooperation with no-profit organizations	
Social		- No education; younger ages should be trained and involved - Not yet sensitized local society on public space and bicycle issues	- Informing citizens - Creating the feeling of belonging to everyone - Encourage each neighborhood/school to build its own urban living room - Acceptance, care, protection	
Technological		- Flexibility for moving from space to space	- Energy autonomy using RES	
Legal		- Need for approvals - Licensing		
Environmental			- Use of sustainable and durable materials without continuous needs for maintenance - Energy autonomy using RES - Harmonizing the aesthetics of the construction in accordance with the site's location and environment	

Impacts and multiple benefits analysis

In the following lists, the inputs collected thanks to the questions concerning multiple benefits and expected impacts of VARCITIES project and VSs are reported.

What other benefits do you think the Visionary Solutions could bring to your area?
During the first workshop no inputs were gathered concerning the questions about multiple benefits of VSs.

What do you think will be the most important impact of VARCITIES solutions on your local area when they are implemented?

- Suburban extension of cultural activities.
- Quality of life improvement.
- Enthusiasm, response, positive feedback – acceptance.
- Accessibility, mobility of vulnerable groups.
- Provide activation, coordination of actions.
- Improving the relation with the public space.
- Urban mobility will be increased.
- The citizens of the Municipality of Chania will learn to use a bicycle.

What are the expected impacts of the VARCITIES project on your organization/group or you as an individual?

- Job renewal, challenge - innovation, innovative program, response, enthusiasm, new experiences.
- There will be more innovative actions due to the smart box.
- It will expand the possibility of socialization and learning for the disabled.
- The population will benefit from our knowledge.
- It should bring together people who are socially active in environmental awareness.
- I hope it will be an inspiration.
- I will have the chance to attend cultural events in places I would not have visited before.

Main expected impacts of the VSs implementation:
Increased mobility, Collaboration among people, improved relation with public space.

Main expected impacts of the VARCITIES project:
Innovation, opportunity to learn/raise awareness, bring people together.

5.7. Gzira

Regeneration of a high traffic road

The city's goal is to improve air quality through nature-based solutions, providing for urban regeneration through eco-compatible interventions. The local council is also committed to supporting co-design and transition management approaches, promoting active citizenship, engagement and participation in implementing nature-based solutions. The pilot site will contribute to the improvement of air quality and the reduction of noise pollution, aiming at the promotion of a healthy lifestyle (physical activity, recreation, relaxation, sense of security, psychological benefits).

PESTLE+SWOT analysis

Drivers affecting the Health & Well-Being in the pilot area

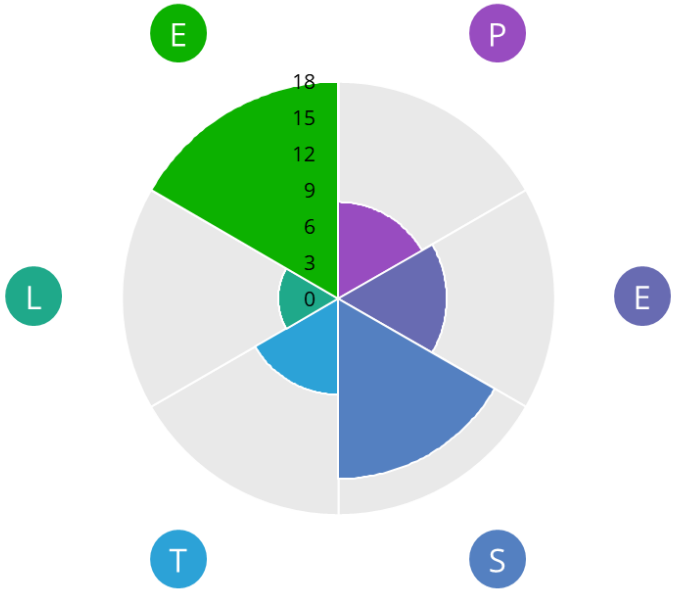

Figure 14: Number of drivers identified in the 6 PESTLE categories for the Gzira pilot area. Source: own elaboration

Table 11: Combined PESTLE+SWOT analysis of drivers for the Gzira pilot area. Source: own elaboration

	Strengths	Weaknesses	Opportunities	Threats
Political	- Compliance with regulations and EU commitments - Local council and central	- Public spaces should remain public - Traffic management in the area	- Sensitive timing to access local funding sources - Political will, empowering the municipality to make its own	

	government interaction		decision with budget access - Investments should be possible through EU funding - Quality of life should be at the centre of government's political agenda	
Economic		- Input needed from companies, CSR needs to be implemented in the community - Cars and restaurants are prioritised over residents - Overly privatised areas	- Possible financial contribution to public space by economic operators as well as boat owners - Direct access for municipalities to the RRF - Support of local business in the area - Support innovation in the field - Creating green jobs/skills (such as green space maintenance) - Improve financial support and other grants for sustainable actions	
Social	- Exercise and sports	- Not much focus on the residents well-being both in short and long term - Need to improve lifestyle and well-being of residents - Consider accessibility for different abilities	- Awareness of recent demographic changes and trends can help to develop appropriate solutions - Support a different lifestyle - Urban farms even on accessible roofs - Involvement of local-based ONGs	- Complex area that needs stakeholder mapping - Incomers to the area should be involved as there may be a social/linguistic barrier in communication

		- Identify areas which can be pedestrian, even if for a limited time - Cycle lanes and parking for bikes - Hot to create sense of ownership?	- Organise events linked to a community garden to give it life - Reimagine and reuse existing spaces	
Technological	- Open data portals - Data sharing that is important for evidence base		- Green roofs to cool buildings and improve air quality - Modern technologies to improve research and development - Crowd sourcing of data, also social media analysis - Alternative traffic routes, using real-time traffic and mobility data - Use tools for citizen science to interactively report biodiversity, environmental issues, etc. - Develop shading devices that can also serve as greening facilities	
Legal		- School restrictions means that a playscape garden would be hardly accessible for citizens	- Implementation of EU environmental laws - Compliance with EU standards (air quality and noise thresholds)	- Low health and safety - Lack of enforcement for infringements of building developers
Environmental		- Pavements are horrible to walk on - Greenery to improve air	- Support local species - Research on sustainable materials	- Air quality targets

	currents, exchange, etc	- Build natural corridors between gardens and nature spots in vicinity - Shade is important to enjoy outdoor areas - Large built areas reduce air exchange and have heat and pollution pockets - Implementation of cool, green city actions - Find ways how the sea can be valorised for the residents - Aesthetic assessment of the urban space, with recommendations for improvement - Crate shade with trees to encourage social interaction in the streets - Involve NGOs to contribute and make use of resources developed by the project - Integration of relevant policy areas, i.e. environment, spatial planning, transport - Increase all greening to avoid flooding - Breathable pavements and roads - Assess the possibility to	

		install shading material Improve the ambient air by improving air currents	

<u>Barriers/Challenges</u> affecting the implementation of VSs in the pilot area

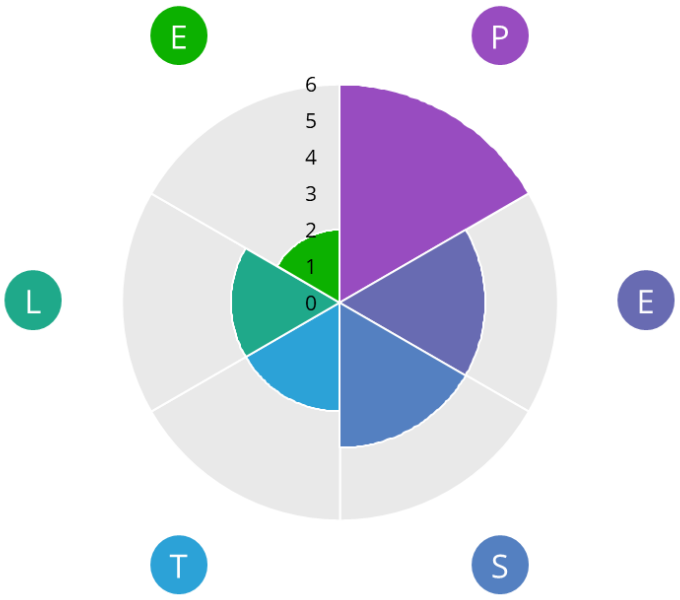

Figure 15: Number of barriers identified in the 6 PESTLE categories for the Gzira pilot area. Source: own elaboration

Table 12: Combined PESTLE+SWOT analysis of barriers for the Gzira pilot area. Source: own elaboration

	Strengths	**Weaknesses**	**Opportunities**	**Threats**
Political		- Public spaces should remain public spaces for free use - Who will take care of maintenance of green walls? Local council or Ministry?	- Identifying a common approach with all entities - Public integration	- Fragmentation in governance of the area - Political buy-in or lack thereof
Economic		- Making sure the outcomes of the project are maintained upon completion;	- Funding/co-funding via blending finance, attracting	

		long-term maintenance - Private interest, land is very expensive	private investment - Engage local businesses to get their buy-in	
Social		- Lack of openness to innovative solutions	- Health and safety rules for playgrounds - Take consideration of all different stakeholders - Create a sense of community where there is high turnover of resident	
Technological		- Lack of space - Green facades and green roofs need much less maintenance than green walls	- Infrastructures that create shades	
Legal		- Permitting - Strict uninformed H&S rules	- What if facades are protected?	
Environmental		- High volume of traffic		- Air pollution can have a big impact on well-being

Impacts and multiple benefits analysis

In the following lists, the inputs collected thanks to the questions concerning multiple benefits and expected impacts of VARCITIES project and VSs are reported.

What <u>other benefits</u> do you think the Visionary Solutions could bring to your area?

- Incentivising private sector involvement.
- Slow down traffic, remove parking spaces and introduce a cycle lane.
- The project acts as a good example to other areas and incentivises change.
- Greater awareness of benefits (and challenges) of participatory co-design of urban areas.
- More investments, which might cause gentrification.

- Comparing the ambition and successes/challenges faced by other partners in other cities of the project.
- Clear cycle lanes, more focus on pedestrian lanes.
- Focus on parking spaces for bikes and charging areas for e-bikes.
- Green bus shelters for shade.

What do you think will be the most important impact of VARCITIES solutions on your local area when they are implemented?

- Building the community and sense of community in central Malta.
- Showing that change in very challenging situations is possible, especially through collaboration.
- Demonstration of co-design example in urban design and place marketing.
- Better way to monitor and understand of public space, pollution and factors affecting wellbeing.
- Reduction of stress from noise and pollution.
- Getting people together to talk about improving the local area. Piloting a very important intervention that will hopefully be a start to creating a long lasting change locally and wider afield.
- The knock-on effect of evident change, and the feedback from the community to effect change elsewhere from the ground up, leading to active than passive community members.
- By using a co-design approach it will give people a sense of place.
- Sense of care (community and environment) in a central area, hopefully inspiring more projects all around the island.
- Increase the importance of co-design and involvement in working together on future projects by raising awareness of more architects in Malta.
- Improved public space and quality areas for encounter for a diversity of users.

What are the expected impacts of the VARCITIES project on your organization/group or you as an individual?

- Expanding the charity and locations we can host our walk events, reaching more inclusion.
- Encourage in the future design of other areas around Malta to improve people well being and livelihood.
- Creating cultural events in unexpected spaces that shift perspective and perception of Rue d'Argens as nothing more than a thoroughfare to be avoided.
- Show architects and urban designers in Malta the importance of co-design and engagement.
- Showing that there are alternative people-focused uses for public spaces in our localities, beyond car-centred functions.

- New open space by using what there is in innovative flexible ways, to hopefully encourage more of these projects. A sense of togetherness and co-ownership that will be instilled throughout the participatory process a better experience in this area.

Main expected impacts of the VSs implementation:
Improved sense of community, Improved care of places, collaboration among people

Main expected impacts of the VARCITIES project:
Shift from a car-centred perspective to a people-focused one, co-design and participation.

5.8. Bergen

The Bergen pilot has no data concerning the outcomes of workshops. The pilot leaders decided not to organize the two workshops since they had already several co-creation activities with stakeholders in the framework of the overall project for the urban city beach – Bystranda, not directly related to the VARCITIES project.

The only document provided is a report on the co-creation strategy that they followed for the Bystranda project and it focuses neither on the VARCITIES Visionary Solutions nor on PESTLE, SWOT, and impact analyses of the solutions to be developed.

For more info on the pilot area, please see the D3.2 [1] for which the Bergen pilot has provided sufficient data concerning the baseline situation and the framework conditions.

6 Conclusions

The present deliverable contains the description and outcomes elaboration of the activities carried out during the two co-creation workshops for what concerns PESTLE and SWOT analyses, and Impact assessment, for each pilot area. The main objective of the document is to highlight the most important drivers (as enabling factors, strengths and opportunities) and barriers (such as challenges and constraints) that could influence the implementation of the proposed Visionary Solutions, evaluating at the same time their main impacts. Therefore, these analyses have made it possible to recognize the most significant factors affecting the VARCITIES pilot areas.

The following sections illustrate the key conclusions and main messages derived from the above-mentioned analyses. In the following sections, the outcomes of the different performed analyses will be presented by comparing all the pilot areas, thus showing an overall overview of the results obtained.

6.1. General overview on PESTLE outcomes

The present section summarizes the results of the PESTLE analysis on drivers and barriers performed for the VARCITIES pilot areas. This representation allows to have a general overview of what are the Political, Economic, Social, Technological, Legal, and Environmental factors analyzed in the previous sections. The colors of the charts refer to the colors attributed to the 6 PESTLE categories (Figure 1: The 6 PESTLE categories. Source: own elaboration).

Table 13: Summary of PESTLE results on drivers affecting the Health & Well-Being in pilot areas. Source: own elaboration

	Novo mesto	Skellefteå	Leuven	Castelfranco	Dundalk	Chania	Gzira	Bergen
Political factors								
Economic factors								
Social factors								
Technological factors								
Legal factors								
Environmental factors								

Table 14: Summary of **PESTLE results on barriers affecting the VSs implementation in pilot areas. Source: own elaboration**

	Novo mesto	Skellefteå	Leuven	Castelfranco	Dundalk	Chania	Gzira	Bergen
Political factors								
Economic factors								
Social factors								
Technological factors								
Legal factors								
Environmental factors								

6.2. General overview on SWOT outcomes

As well as the previous one, the present section summarizes the results of the SWOT analysis on drivers and barriers performed for the VARCITIES pilot areas. This representation allows us to have a general overview of what are the Strengths, Weaknesses, Opportunities, and Threats analyzed in the previous sections. The colors of the charts refer to the colors attributed to the 4 SWOT categories (Figure 2).

Table 15: **Summary of SWOT results on drivers affecting the Health & Well-Being in pilot areas. Source: own elaboration**

	Novo mesto	Skellefteå	Leuven	Castelfranco	Dundalk	Chania	Gzira	Bergen
Strengths								
Weaknesses								
Opportunities								
Threats								

Table 16: Summary of **SWOT results on barriers affecting the VSs implementation in pilot areas. Source: own elaboration**

	Novo mesto	Skellefteå	Leuven	Castelfranco	Dundalk	Chania	Gzira	Bergen
Strengths								
Weaknesses								
Opportunities								
Threats								

6.3. General overview on Impacts

The present section aims at showing, through a "word clouds" representation, the common impacts identified by the pilot areas, considering both the proposed Visionary Solutions (Figure 16) and the VARCITIES project (Figure 17). The weight of the labels (or tags) is rendered with characters of different sizes and it's intended as the frequency of the used words by the pilot areas. The larger the character, the higher the keyword frequency.

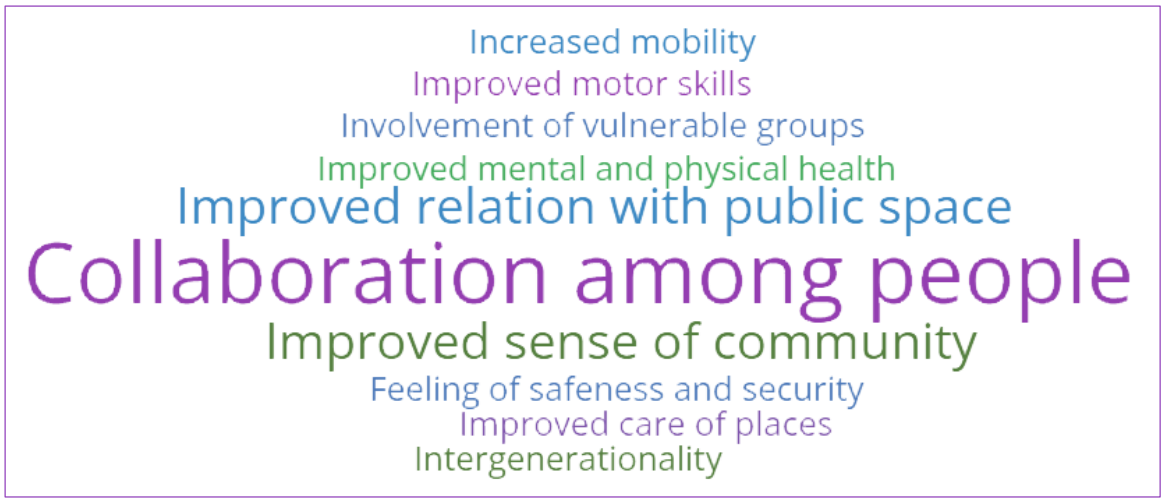

Figure 16: Summary of the main expected impacts of the VSs implementation. Source: own elaboration

Figure 17: Summary of the main expected impacts of the VARCITIES project. Source: own elaboration

6.4. Main messages

The present section illustrates the key conclusions and main messages derived from the above-mentioned analyses.

First, according to the PESTLE outcomes (see section 6.3), it's evident how the **Political, Economic, and Legal factors are the ones less identified** among the PESTLE categories, for what concerns the drivers for the H&WB in the pilot areas (Table 13). Concerning the barriers, 3 pilot areas out of 7 didn't identify possible challenges to be faced during the VSs implementation. At the same time, where recognised they covered almost all the PESTLE categories (

Table *14*).

Reading the outcomes of PESTLE analysis in the view of the most common barriers and challenges for the implementation of nature-based solutions that have been identified in other EU projects (see section 7.2), can help us to understand why some PESTLE categories have been less considered. For example, concerning the Political factors, the main lessons learned from other projects are related to the following issues: i) fragmented local governance structure and lack of cooperation among sectors and administration levels; ii) lack of political commitment and support that discourage interest in long-term investments; and iii) **lack of political awareness at local and national level on the benefits of NBSs**. This last point seems of particular interest to interpret the stakeholders' trouble in identifying political drivers affecting the pilot areas. With regard to the Economic factors, the main issue that seems to play a relevant role in the stakeholders' identification of drivers can be the **difficulty to imagine/calculate costs and benefits, i.e. the lack of evidence to support the business plan**. About the Legal factors, the main lessons learned seem to be the ones related to the **lack of regulations for NBSs** (planning through managing) and/or the **complex legal framework**.

Secondly, the SWOT analysis (see section 6.3) shows how almost all the pilot areas have been able to recognize some internal and external, as well as positive and negative, factors affecting the H&WB in the pilot areas (drivers, Table 15). **Only in the case of Novo mesto there are neither weaknesses nor threats identified**. For this pilot area, it's then recommended to further develop and complete the part about SWOT analysis. Concerning the barriers, only a few pilot areas discussed possible challenges to be faced during the VSs implementation (Table 16), and this makes it difficult to have an overall view and compare the analyses' outcomes.

As before, to gain some insights on how to overcome the recognised barriers (and hopefully help the pilot areas to identify the main challenges where currently missing), we strongly encourage to refer to section 7.3, where a **collection of potential solutions** for addressing the different kinds of barriers have been highlighted. The sources of these suggestions are the same similar EU projects on NBSs.

In the end, the analysis of the commonly identified impacts among the pilot areas (see section 6.3) shows that the topics addressed by the various pilot areas within the Impact analysis activity are in general the same. On the one hand, from the analysis of the **main impacts**

expected from the implementation of the VSs, the common subjects have been found to be: i) ***Collaboration among peoples***, ii) *Improved relation with public space*, and iii) *Improved sense of community*. On the other hand, from the analysis of the main expected impacts of the VARCITIES project, the common subjects have been found to be: i) ***Improved quality of life***, ii) *Co-design and participation*, and iii) *Bring people together*. It should be kept in mind, that the pilot areas of Skellefteå and Leuven are not included in this analysis as they didn't carry out the Impact analysis activity during the second co-creation workshop. While for the case of Castelfranco Veneto, please refer to its specific section 5.4, which illustrates the impact analysis in detail. In this case, the outcomes of the Impact analysis activity were not compared with the others as they are very different.

7 Appendix I – Lessons learned from other EU projects in contribution to Task 3.2 (D3.3)

Author: Angeliki Mavrigiannaki (TSI)

Executive Summary of Appendix I

The information presented here has been collected in the framework of the activities for Task 3.2 - Knowledge base creation: Understanding of pilot needs, challenges, barriers, and drivers. Insights from EU projects similar to VARCITIES have been collected to support the identification of barriers and challenges that pilot areas could face regarding the NBS implementation. The lessons learned from other projects will offer a basis for the PESTLE workshop for mapping local needs and identifying risks related to the local political, economic, social, technological, legal, and environmental contexts in each pilot area. Therefore, this work is included in the current Deliverable 3.3 "Report on local barriers and drivers to the implementation of visionary solutions in pilots".
Moreover, the lessons learned from similar EU NBS projects on the NBS contribution to SDG or other frameworks are presented in this Annex. The Task 3.2 aims to contribute to Task 3.3 for the design of a set of solutions based on the multiple benefits approach. For that purpose, the activities of T3.2 include the collection of insights from similar EU NBS projects on the NBS contribution to SDG or other frameworks. These will be collated with the information on expected impacts that has been collected from the pilots (T3.1) as well as with reviewed NBS scientific literature on multiple impacts. This information will also be part of the Deliverable 3.4 "Reports on multiple benefits expected from the Visionary Solutions".

7.1. Barriers and drivers identified in other EU projects

Insights from similar EU projects have been collected to support the identification of barriers and challenges that VARCITIES pilot areas could come across regarding the NBS implementation. The lessons learned from other projects will offer a basis for work during the PESTLE workshop for local needs assessment and specifically for identifying risks related to the local political, economic, social, technological, legal, and environmental contexts in each pilot area.

Table 17: List of reviewed projects. Source: own elaboration

PROJECT	YEAR	TOPIC	WHERE
Think Nature	2017-2019	Development of a platform that supports the understanding and the promotion of NBS	N/A
NAIAD	2016-2020	Operationalise the insurance value of ecosystems for water related risk mitigation, by developing and testing concepts, tools and applications on 9 demo sites	9 cities

		across Europe, under the common concept of NBS	
Naturvation	2016-2021	Develop understanding of what nature-based solutions can achieve in cities, examine how innovation can be fostered in this domain, and contribute to realise the potential of nature-based solutions for responding to urban sustainability challenges by working with communities and stakeholders.	6 partner cities + research on and study trips to 6 cities in Europe and 6 cities around the world
Nature4Cities	2016-2021	Create a comprehensive reference Platform for NBS, offering technical solutions, methods and tools to empower urban planning decision making.	4 cities
Unalab	2017-2022	Develop smarter, more inclusive, more resilient and increasingly sustainable societies through innovative NBS	3 front-runner European cities, 5 follower European cities, 2 follower non-European and 2 observer
Urban Green Up	2017-2022	Development, application and replication of Renaturing Urban Plans	3 front runner cities, 5 follower cities
GrowGreen	2017-2022	Create climate and water resilient, healthy and livable cities by investing in NBS	6 European cities and 1 non-European (China)
Connecting Nature	2017-2022	Form a community of cities that fosters peer to peer learning and capacity building in delivering large scale NBS	8 European cities
OPERANDUM	2018-2022	Develop NBS to mitigate the impact of hydro-meteorological phenomena in risk-prone areas	5 open air laboratories (natural and rural areas)
Clever Cities	2018-2023	Demonstrate that greener cities work better for people and communities	9 European cities and 1 South America
EdiCitNet	2018-2023	Make cities around the world better places to live through the real-life implementation and institutional integration of Edible City Solutions (ECS).	11 cities

7.2. Barriers and Challenges

P	E	S	T	L	E
4.0	5.7	5.5	5.6	3.3	0.6

Table 18: Most common barriers to the implementation of NBS that have been identified in other EU NBS projects. Source: analyzed EU projects

Type of barrier	Reference	Probability
POLITICAL		**4.0**
Political awareness - Lack of awareness at local and national level on the potential and benefits of NBS	[23], [24], [25], [26]	0.5
Local Governance - Local governance structure is fragmented in its procedures and lacks cooperation among sectors and administration levels, silo thinking	[23], [24], [25],[27], [28], [29], [30], [31], [32], [33]	1.6
Bureaucracy - Bureaucratic time consuming processes	[24], [29], [30], [33]	0.4
Political support - Lack of political commitment and support, linked to short term cycles of local authorities and changes to them that discourage interest in investing in long-term plans	[23], [24], [28], [30], [33], [34],	1.5
ECONOMIC		**5.7**
Securing investments/financial support	[29], [32], [35], [36], [37], [38]	0.6
Defining ROI	[24], [32], [35], [38]	0.5
Limited EU funding opportunities, low awareness and difficulty to access	[29], [35], [39], [40], [41]	0.8
Need for upfront costs and long-term resources	[24], [36],	0.4
Private investors interests	[31],[32], [33], [36]	0.4
Investment-Benefit temporal mismatch	[32], [36]	0.3
Difficulty to calculate costs and benefits, meaning lack of evidence to support the business case	[23],[24], [29], [25], [36], [39], [40], [42], [38]	1.4
Maintenance costs	[28], [29], [31], [32], [35], [36], [37]	0.7

Municipality budget barriers	[24], [30], [33], [41]	0.7
SOCIAL		**5.5**
Social awareness for NBS - Lack of citizen awareness that leads to lack of trust in the NBS and hinders acceptance	[23], [28], [29], [32], [33], [36], [37], [39], [40]	1.5
Social Engagement - Lack of communication/dissemination/education	[24], [32], [28], [39], [27]	0.5
Social awareness for climate - Lack of social awareness about climate change and sustainability	[23], [24], [30], [33], [41]	0.5
Resistance to change - Resistance to changing existing practices, learning and adapting to new mindset for planning, implementing and managing NBS	[24], [32], [33], [37],	0.9
Social inclusion - Lack of mapping and inclusion of multiple stakeholders in the process (i.e. lack of inclusive co-decision/co-creation process	[30], [35], [37], [39], [40], [43]	0.8
Conflicting interests - Varying priorities and visions among stakeholders	[24], [28], [31], [32], [33]	0.8
Socio-economic, health and cultural background	[33], [37]	0.5
TECHNOLOGICAL		**5.6**
Technical knowledge - Lack of knowledge/skills/experience for designing, implementing and maintaining NBS	[23], [24], [28], [30], [32], [33], [35], [36], [39], [40], [26]	1.5
Technical Guidance and Standardisation - Lack of guidance/protocols/technical instructions/standards	[25], [28], [29], [33], [35], [36], [42], [40]	1.2
Lack of round knowledge and experience for decision making and supporting uptake	[29], [33], [35], [39], [38]	0.7
Existing conditions - Site limitations for implementing NBS (limited area, interference with other infrastructure, structural capacity)	[23], [24], [30], [31], [32], [33], [37], [39]	1.1
Technology gaps - Limited technological solutions that are adequately developed, easy and ready to use	[24], [30], [35], [37],	0.5

Evidence gaps - Insufficient monitoring and evaluation framework and lack of data	[24], [28], [35], [40]	0.6
LEGAL		**3.3**
Land ownership	[30], [32], [33], [40]	0.6
Regulation barriers - Lack of regulations for NBS (planning through managing), while existing regulations hinder the adoption of NBS	[24], [30], [32], [33], [39]	0.8
Complex Legal Framework - new legal form and responsibilities within it	[25], [33]	0.4
NBS specific policies and regulations - weak regulatory and policy framework for supporting NBS	[25], [29], [33], [35], [36], [42], [39], [26]	1.5
ENVIRONMENTAL		**0.6**
Locality barriers: Site and Environment Characteristics	[32], [33], [31], [39]	0.5
Designing for a changing climate	[40]	0.1

7.3. Overcoming barriers

7.3.1. Political

Knowledge-Awareness

Towards overcoming lack of knowledge and awareness at local level on the potential and benefits of NBS, the following potential solutions have been highlighted:

- Cross-learning - sharing of knowledge, experience and best practices among cities [29], [31], [24];
- Increase knowledge and awareness of decision makers, policy makers, municipality through pilot projects implementation and cost-benefit analysis [23], [24], [29] (e.g. use VARCITIES pilot as an opportunity to raise awareness and learn by implementation).

Political commitment and support

For enabling the success and uptake of NBS a consistent political commitment is needed [31],[33].

To address the lack of commitment that is related to the short term cycles of local administration and change of political direction, the following solutions have been identified:

- Green policy enforcement and compliance for longer term [24];
- Design of *successive "waves of interventions"* [33];

- Ensure governmental support for implementation of municipal strategies on non-municipal owned areas in and around the city [24];
- Incorporate NBS in the political agenda by demonstrating the *importance of capitalising on policy windows.* [23].

City strategies/initiatives

Municipality/City level strategies and sustainability initiatives can further support commitment for mainstreaming NBS implementation [31]. The Municipal Governance guidelines developed by in the framework of UNALAB project, propose the Development of a resilience strategy in order to support NBS uptake [23].

In Manchester, the Green and Blue Infrastructure Strategy integrates nature-based solutions into urban development [36].

Considering the opportunities for NBS, as part of the participation in UNALAB project, Cannes propose to try to identify possibilities of NBS integration in existing plans as well as try to identify possibilities of NBS integration in plans that are under development [24].

Governance

Cross-sectoral cooperation structures and coordination actions need to be developed in the municipality [23], [28], [31]. This structure could include a cross- departmental body, interdisciplinary bodies and links of departments to specific strategic objectives [23]. As such, cross-sectoral cooperation structures support cross-sectoral learning [31].

Examples of such new governance structures are given by NATURVATION project:

In Munich, a structure for mainstreaming climate mitigation and adaptation consisted of an interdepartmental steering committee, thematic working groups and climate managers. Each urban development project team included a landscape architect. The development of the new governance structures is formed through experimentation that can turn into common practice, as in the case of Malmö where the interdepartmental collaboration that was formed has been in place for 2 decades [31].

Connecting Nature has produced a five-step guide for developing collaborative governance [27].

7.3.2. Economic/Financial

Funding mechanisms

Lack of funding is a limitation that can be overcome by establishing co-financing mechanisms and partnerships [39].

The Think Nature project identifies three types of funding opportunities: Public (Municipalities, regional authorities, national governments, international organisations), Private (philanthropic organisations, institutions) and Business. A list of tools and guides for mapping financing is given in the Think Nature Handbook [35].

Multiple mechanisms have been identified in the participating cities of other EU projects, these include:

- Water and forest funds, creation of trusts and partnerships, donations [31];
- Crowd funding, philanthropy, impact investment, responsible investment, mainstream investment, risk reduction for insurance companies, cost savings, blended finance and private sponsorship for corporate social responsibility purposes [36];
- Private-Public partnership, crowd-funding, international grants [33];
- European funds (H2020, LIFE, UIA structural funds) to expand the network, training opportunities [24];
- Public-private-partnerships, Citizen-led initiatives [28];
- Crowd-funding [38].

The mechanisms available and applicable vary according to the local context [33], [36]
An overview of financing approaches is offered in a working document prepared by Grow Green [44].
Linking to the establishment of policies and regulations, funding for NBS implementation and maintenance can be secured through the establishment of planning regulations [29].

Business case development

Different stakeholders will be interested in funding different types of NBS [23]. Towards building a business case, linking benefits of NBS to stakeholders that can be benefited is suggested for identifying and attracting funding [35], [36], [23].
Grow Green, highlights *the insurance industry's interest in climate risks* [36].
The eco-services valuation approach supports the definition of financial benefits. However focusing on financial benefits poses a risk to overseeing/ignoring environmental and social benefits [33]. This is also the risk with private-public partnerships that has been listed in the barriers, since private actors might focus on monetary value and limit solutions in favor of economic profit. The involvement of the public sector can reduce this risk, supporting health, well-being, social and green space revenues [36].
Potential business models mentioned by Grow Green are: local stewardship, green diversification/quality of life/development, vacant public space/community initiatives, urban conservation offsetting, and nature as a service offering [36].
Connecting Nature has produced a Business Model Canvas Guidebook [45].

Municipality budget

Political and administrative support is prerequisite for securing Municipality Budget for NBS and protecting this budget from cuts [28], [38].

7.3.3. Social

The Social Barriers hinder acceptance of the NBS and could also lead to mistreatment of the implemented NBS.

Keys to raising the social barriers are raising awareness and developing trust of all possible stakeholders [33], [29], [37].

Towards this direction key activities are:

- Education and Training: environmental education, awareness of climate change and impacts [24],[28]; educate a stakeholders on NBS and multiple benefits [24], employ *knowledge actors (e.g. academics)* [31]; decision-maker's education (working with policies) [35].
- Dissemination and communication campaign [23], [41]: communicate NBS multiple benefits [28],[43], [41], [27]; communicate decisions [35]; communication to foster citizen understanding on benefits and risks though easy-to-understand informative tools, [35]; workshops [23]; social media [23]; promotion of NBS through targeted events/festivals [24], [23]; demonstrations of existing projects/pilots [24], [23]; familiarization with concepts [31].
- Mapping and understanding of key stakeholders, social dynamics, and local context [36], [27], [28], [30]. Stakeholder mapping is essential for identifying all relevant stakeholders [11], their interests [28] and potential contributions [33]. These include but are not limited to: Citizens, researchers, professionals, NGOs, businesses, government bodies, educational institutions [30], [12], [11].
- Fostering interaction, collaboration and understanding among key stakeholders [36], [43], [39], [23], [31], [27].
- Engagement and participation of multiple stakeholders: engagement from early stages [24], [36] and throughout planning/ decision making/ implementation/ managing NBS [36], [35], [39], [33], [23]; specifically local community/citizen involvement and participation [23], [35], [28] , [29], [33], [31], [37], [27].
- Fairness and Transparency: fair strategy development, fair/transparent decision making, fair participation [37], [35].
- Ensure social inclusion for the wider citizen community: marginalized citizens, people with different socioeconomic backgrounds [28], [31], especially target green-deprived neighborhoods [31]; aim for inclusive and just green space planning where public health and well-being are prioritised [23], [34].

7.3.4. Technological

Knowledge

The steps that can be taken to overcome the technological/technical knowledge gap are:

- Make use of existing knowledge base and knowledge carriers (e.g. local experts, NGOs, employ municipality personnel with expertise) [28], [35];
- Draw on experience from pilot projects [28];
- Develop and maintain technical knowledge though: learning, education and training of staff [23], [31];
- Develop guidelines based on experience and exchange of knowledge [28], [35].

Connecting nature has developed the Connecting Nature Enterprise Platform to support reaching and connecting with enterprises and professionals with skills and experience in NBS [46].

Valuation tools

Valuation tools easy to use for municipalities to support decision making exist as presented in Grow Green [36].

Monitoring

Opportunities for overcoming the monitoring and evaluation gaps appear through emerging technological advances in the field of monitoring [35] . The work of VARCITIES is expected to contribute to this direction.

Data governance strategy and structures are encouraged to be developed at municipality level to support monitoring and co-benefit evaluation of NBS [23].

To support performance monitoring of the NBS a list of environmental and sustainability management systems that are already available are presented in UNALAB's Guidelines for Municipality Governance [23].

7.3.5. Legal

Towards overcoming the policy and regulatory framework gap, opportunities exist on local/municipality level.

Cities are encouraged to adopt multiple relevant policies to endorse and mainstream NBS [23], [35], [31].

The main solution to be employed on local/municipal level is the integration of NBS into existing local sustainability policies and strategies [23], [29], [28], [35], [33], [36], [31]. For example:

- Urban resilience strategies [29];
- Green/Blue Infrastructure strategy [23];
- Sustainable urban mobility plans [29], [23], [35];
- Environmental protection plans [35], Climate change adaptation/ mitigation, Biodiversity, Water management [23];
- Spatial development plans [35];
- Strategic development plans [35], Low carbon economy plans, long- term financial forecast of a city [35];

- Smart city strategies [23];
- Energy strategies [23];
- Social development strategy [23].

Adaptation and update of regulations at local level is also a driver towards supporting implementation and overcoming regulation barriers [28], [24]. For example the city of Başakşehir, participating in UNALAB, proposed the adaptation of construction permits so as to integrate rules and regulations for waste and water NBS for new constructions [24]. Adoption of NBS planning laws in proposed in Clever Cities [28]. Financial incentives (e.g tax benefits, pollution taxes etc.) are proposed to be part of the policy and regulatory framework [23], [28], [24], [36], [38].

Policies and regulations can create motive for NBS investment and funding with a view of providing the NBS benefits expected by regulatory requirements [36].

Green procurement models can be used to encourage NBS implementation in municipal tenders [23], [24].

7.3.6. Environmental

It is important to understand the specific environmental limitations (climatic, topography, etc.) of each place so as to select the most appropriate NBS (including species for the NBS) as well as to design and adapt accordingly [33], [32]. The political will and transparency of the process has been highlighted to have a key role in this aspect too, for balancing the solutions and their expected outcomes while respecting the local environment and existing local habitats [31].

Besides, when designing for NBS, future climate scenarios should be taken into account for solutions to be able to survive and adapt [40].

7.4. Contribution of NBS to SDG or other frameworks

The Task 3.2 aims to contribute to Task 3.3 for the design of a set of solutions based on multiple benefits approach. For that purpose, the activities of T3.2 include the collection of insights from similar EU NBS projects on the NBS contribution to SDG or other frameworks. These will be collated with the information on expected impacts that has been collected from the pilots (T3.1) as well as with reviewed NBS scientific literature on multiple impacts. This information will build the Deliverable 3.4 Reports on multiple benefits expected from visionary solutions.

Here the lessons learned from similar EU NBS projects on the NBS contribution to SDG or other frameworks are presented.

The Think Nature Handbook identifies as major benefit of the NBS their “multi - functionality”, meaning that they have multiple benefits on multiple scales.

The projects NAIAD [25], OPERANDUM [39] and NATURVATION[47] have linked their contribution to specific Sustainable Development Goals:

Goal	Notes and references
Natural Capital	
SDG 6. Ensure availability and sustainable management of water and sanitation for all	[39], [47],
SDG 13. Take urgent action to combat climate change and its impacts	[39], [47]
SDG 14. Conserve and sustainably use the oceans, seas and marine resources for sustainable development	[47]
SDG 15. Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation	[25], [39], [47]
Economic capital	
SDG 7. Ensure access to affordable, reliable, sustainable and modern energy for all	
SDG 8. Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	
SDG 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	[25]
SDG 12. Ensure sustainable consumption and production patterns	
Human Capital	
SDG 2. End hunger, achieve food security and improved nutrition and promote sustainable agriculture	
SDG 3. Ensure healthy lives and promote well-being for all at all ages	[47]
SDG 4. Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	
Social Capital	
SDG 1. End poverty in all its forms everywhere	
SDG 5. Achieve gender equality and empower all women and girls	
SDG 10. Reduce inequality within and among countries	
SDG 11. Make cities and human settlements inclusive, safe, resilient and sustainable	[25], [47]
SDG 16. Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	

SDG 17. Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	

In addition to contribution to the SDG the following frameworks have been identified in EU projects:

The NAIAD project [25] has identified links with:

- The Sendai Framework for Disaster risk reduction,
- The EU Adaptation strategy,
- The EU Urban Agenda in line with the UN Urban Agenda,
- The EU Strategy on Green infrastructure.

The OPERANDUM[39] project has identified links with:

- The Sendai Framework for Disaster risk reduction,
- Paris Agreement for Climate Change.

The Phusicos [48] project also identifies that NBS contribute to:

- The UN Sustainable Development Goals (SDGs),
- The Sendai Framework on disaster risk reduction (2015),
- The Paris Agreement (2016) on climate change,
- The Global Commission on Adaptation (2019),
- The EU Biodiversity Strategy.

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