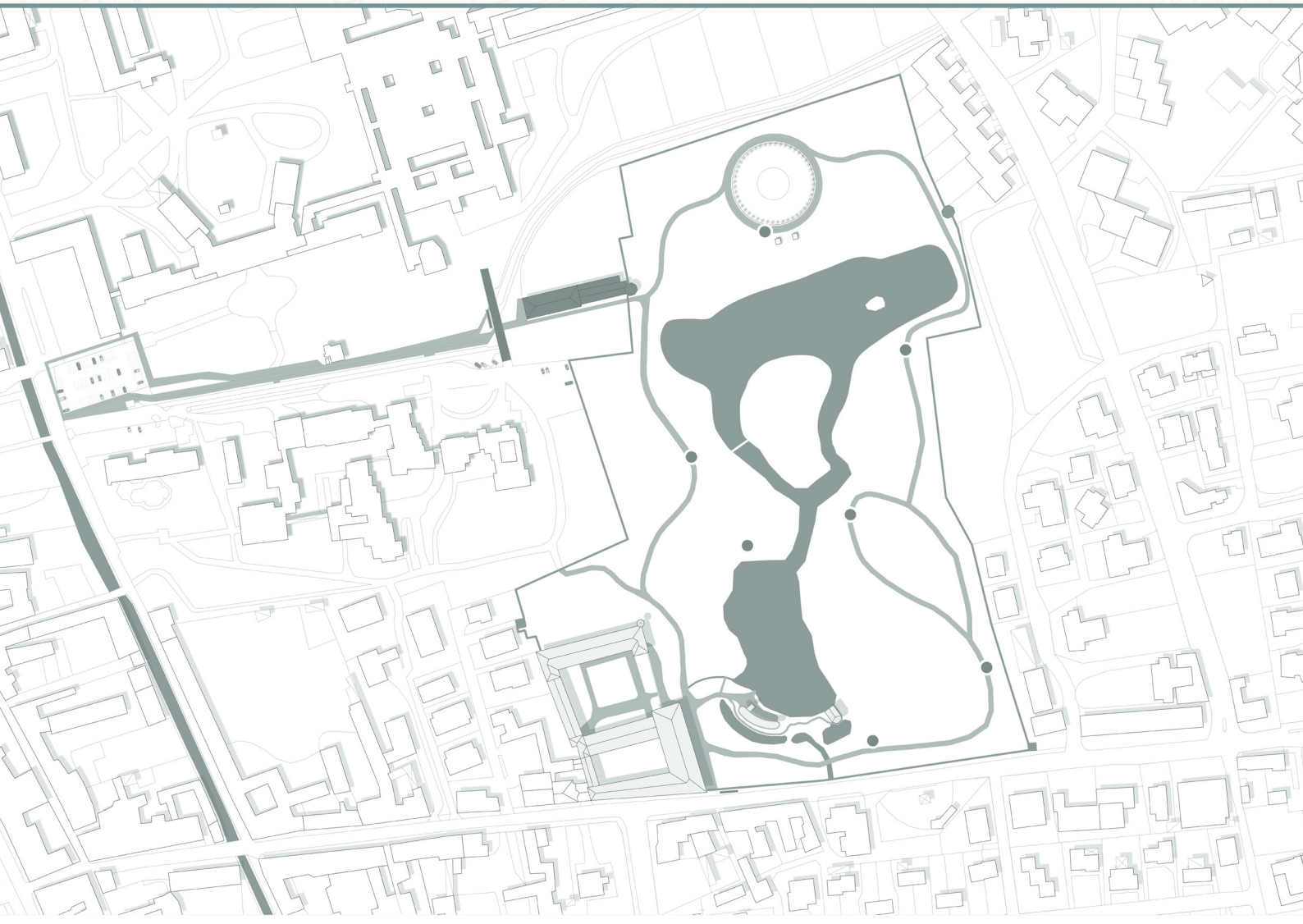
POLITECNICO DI TORINO

Corso di Laurea Magistrale in Architettura per il Progetto Sostenibile

a.a. 2021-2022

Master's Degree Thesis

Social Return on Investment application on urban renewal projects based on Visionary Nature-Based Solutions: the case of the VARTIES – Future cities Project



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"Social Return on Investment application on urban renewal projects based on Visionary Nature-Based Solutions: the case of the VARTIES – Future cities Project"

Supervisor: Lombardi Patrizia

Co-supervisor: Sara Torabi Moghadam

External supervisor: Bisello Adriano

Candidate: Vasiliu Elisa-Elena

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An important encounter was with Human Foundation for the SROI implementation, topic of my thesis. They involved me in all the analysis stages, allowing me to gain first hand experience while conducting in parallel my research.

SUMMARY

FIGURES AND TABLES

ABSTRACT (EN)

The consequences of global climate change are already being felt worldwide. Global warming is expected to have a multitude of negative consequences, including the exacerbation of the intensity and occurrence of natural disasters. After dealing with the COVID-19 pandemic crisis and being aware of the need to cope with climate change adaptation and mitigation, cities promote new ideas, striving to implement inclusive co-design processes rethinking human-nature urban planning.

This work focuses on the emerging necessity of defining impact assessment frameworks capable of considering the multiple facets of urban innovative interventions. This research is inserted in the ongoing H2020 VARCITIES project. VARCITIES aims to resolve well-known local urban issues by addressing them from the new "Visionary Nature-Based Solutions" (VS) perspective, a concept coined within the project that embeds Nature-based Solutions (NBS) combined with SMART City Solutions and Socio-cultural Solutions.

A consistent barrier to the expansion of these solutions is the lack of easily measurable or quantifiable evidence of benefits generated, given the complexity of ecological systems, as well as of their cost-effectiveness compared to traditional alternatives. Visionary Solutions are generating positive effects on multiple levels: environmental, and economic, but it has also been recognized that the social sphere is increasing its relevance both in terms of benefit awareness and in terms of active participation in the co-creation, monitoring, hence operational phase.

To shed light on the social component, the Social Return on Investment Analysis (SROI) was selected as the evaluation framework. This method was developed to measure the value of organizations' activities, and here is proposed to account in terms of monetary, social, economic and environmental value based on changes experienced by key stakeholders. SROI is presented as an efficient tool for social impact determination and monitoring. Literature provides a limited quantity of case studies of urban applications, however, recent publication evidence its potential and recommend its use in built environment interventions.

A proposed cross comparison between Cost-Benefit Analysis (CBA) is of paramount importance in the impact assessment of VS interventions from multiple aspects. The SROI framework, which although deriving from the CBA, proposes a tool consenting to assess the impact on society's welfare from a bottom-up perspective.

The proposed methodology was tested in a medium-sized Italian city, VARCITIES project pilot area, which can provide a model to be generalized and applied to other European urban contexts. SROI consented to perform a forecast valuation of the outcomes hypothesized and validated by the stakeholder groups engaged along the assessment stages.

Finally, a literature review on a series of case studies provided insights on possible alternatives of the VARCITIES analysis variables to highlight further merits and barriers of the SROI methodology and give points of reflection on how to cope with some of the framework's limitations observed when applied to urban planning.

ABSTRACT (ITA)

Le conseguenze del cambiamento climatico si fanno già sentire in tutto il mondo. Il riscaldamento globale è destinato ad avere una moltitudine di conseguenze negative, tra cui l'esacerbazione dell'intensità e del verificarsi di disastri naturali. Dopo aver affrontato la crisi pandemica COVID-19 e consapevoli della necessità di far fronte all'adattamento e alla mitigazione dei cambiamenti climatici, le città stanno promuovendo nuove idee, adoperandosi per attuare processi di co-progettazione inclusiva ripensando la pianificazione urbana incentrata sul rapporto fra uomo e natura. Il lavoro si concentra sulla necessità emergente di definire quadri di valutazione di impatto in grado di considerare le molteplici sfaccettature degli interventi innovativi urbani. La ricerca è infatti inserita nel progetto H2020 VARCITIES, che mira alla risoluzione di noti problemi urbani locali affrontandoli dalla prospettiva introdotta dalle "Visionary Solutions" (VS), concetto coniato all'interno del progetto che incorpora Nature-based-Solutions (NBS) combinate con soluzioni SMART City e soluzioni socio-culturali. Una barriera rilevante nella diffusione ad ampia scala di queste soluzioni emerge essere la mancanza di prove sui benefici generati e sulla loro convenienza rispetto ad alternative tradizionali. Le Visionary Solutions stanno generando effetti positivi su più livelli: ambientale, economico, ma è stato anche riconosciuto che la sfera sociale sta aumentando la sua rilevanza sia in termini di consapevolezza dei benefici sia in termini di partecipazione attiva alla fase di co-creazione, monitoraggio, quindi operativa. Per fare luce sulla componente sociale è stato scelto come quadro di valutazione il Social Return on Investment (SROI), un metodo nato per misurare il valore delle attività delle organizzazioni, qui proposto per rendere conto, in termini monetari, del valore sociale, economico e ambientale basandosi sui cambiamenti vissuti dagli stakeholder chiave. SROI è presentato come uno strumento efficiente per la determinazione e il monitoraggio dell'impatto sociale. La letteratura fornisce una quantità limitata di casi studio di applicazioni urbane, tuttavia, pubblicazioni recenti ne evidenziano il potenziale e ne raccomandano l'uso negli interventi sull'ambiente costruito. È stato proposto un confronto incrociato tra l'analisi costi-benefici (CBA), di fondamentale importanza nella valutazione d'impatto degli interventi di VS da molteplici punti di vista, e il framework SROI, che pur derivando dall'ACB, propone uno strumento che consente di valutare l'impatto sul benessere della società da una prospettiva dal basso. La metodologia proposta è testata in una città italiana di medie dimensioni, area pilota del progetto VARCITIES, che può fornire un modello da generalizzare e applicare ad altri contesti urbani europei. SROI ha consentito di effettuare un'analisi previsionale del valore degli outcome ipotizzati e validati dai gruppi di stakeholder coinvolti nelle fasi di valutazione. Infine, una revisione della letteratura su una serie di casi di studio ha fornito approfondimenti sulle possibili alternative delle variabili dell'analisi VARCITIES al fine di evidenziare ulteriori pregi e limiti della metodologia SROI applicata alla pianificazione urbana.

LIST OF ACRONYMS

B/C ratio	Benefit-cost ratio
CBA	Cost-Benefit Analysis
CF	Castelfranco
DS	Digital Solutions
EC	European Commission
ENPV	Economic Net Present Value
ERR	Economic Rate of Return
ESA	Ecosystem services Assessment
FDR	Financial Discount Rate
FDR	Financial Discount Rate
FNPV	Financial Net Present Value
GDP	Gross Domestic Product
HACT	Harmonized Approach to Cash Transfers
HEAT	Health Assessment Tool
IUCN	International Union for Conservation of Nature
KPI	Key Performance Indicator
NBS	Nature-Based Solutions
NPV	Net Present Value
QALY	Quality-Adjusted Life Year
ROI	Return on Investment
SCS	Socio-Cultural Solutions
SDR	Social Discount Rate
SROI	Social Return on Investment
STK	Stakeholders
SuROI	Sustainable Return on Investment
VOSL	Value of Statistical Life
VS	Visionary Solutions
WHO	World Health Organization
WTP	Willingness-to-pay

SROI GLOSSARY

Inputs: they are the investments used to carry on the activities. They can be financial or "in-kind", but they must be associated with a value regardless of the nature of the resource.

Outputs: they are the measurable activities of an intervention.

Outcomes: the changes generated on stakeholders as a result of an intervention, they can be both positive and negative, expected or unexpected.

Financial proxy: it is the approximation of the monetary value obtained from market prices, where possible, to which can be associated the same benefit as of a given outcome.

Deadweight: it indicates the percentage of change that would have happened regardless of the intervention.

Displacement: it is a component that tells how much of the outcome caused a transfer of an issue to another area.

Attribution: : it is a percentage that assesses how much of the outcome was caused by the contribution of other organizations or people.

Drop-off: it is a discount rate applied on interventions that have outcomes which last more than one year. Longer than a year the influence on the project outcomes will be lower as they will be influenced by other factors.

Material: relevant, associated to information whose omission would influence the analysis result.

Impact: the social value generated to stakeholders after taking into account the discount factors and the duration of an intervention's effects, therefore the drop-off.

PART I

THE IMPORTANCE OF ASSESSING SOCIAL VALUE CREATION

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND AND PROBLEM STATEMENT

The current challenges related to climate change and mitigation and the lack of resilience in cities and communities stress that direct actors of the change, such as municipalities, policy makers, and planners, develop innovative strategies to cope with an uncertain future characterized by natural disasters. One of the most alarming trends observed in the last decades is the growth of the population, which tend to concentrate in urban areas. By 2050, it is predicted that urban areas will host 70% of the global population, thus, cities are the core of the main transformations that societies must face to guarantee healthier and sustainable living areas. Cities are in fact the centers of growth, societal and economic innovation, but at the same time the most exposed to climate change repercussions, they are the centers of pollution creation and biodiversity loss.[1]

A key element of the built environment is the preservation and enhancement of urban green spaces (UGS) that support multiple benefits in terms of energy saving, microclimate, and aesthetics, however, the value they have for human beings is the ability to contribute to health and well-being by allowing users to live gratifying experiences such as access to a scenic view, fresh air, and natural sounds. Despite the positive impacts, provision of adequate UGS is challenging due to housing, retail and commercial developments and transport infrastructure all competing for limited space [2]. To contrast the traditional business-model innovative approaches aiming at increasing sustainability in urban areas Nature-based Solutions and SMART City Solutions are well documented actions in assuring multiple benefits, undertaken by international agreements and initiatives such as: Sendai Framework for Disaster Risk Reduction, the Sustainable Development Goals (SDGs), and the Paris Climate Agreement [3].

The disparity of implementation opportunities mentioned above have benefited from interventions which provide financial benefits. The advantages Nature-Based Solutions and Digital-Solutions contribute are not yet common knowledge, especially among the municipal heads and planners who need standardized monitoring methods, reporting protocols and guidance at the different stages of the NBS life cycle [4] to lead them towards credible and conscious understanding of the multiple dimensions that these solutions affect.

The EKPLIPSE Handbook for practitioners stresses the idea of the necessity of a “Theory of Change” as a procedure capable of building bridges between the willingness of applying NBS and the awareness of creating a multiplicity of benefits. The theory of Change links the positive change to be achieved and the parameter necessary to transform in the natural and built environment for that specific purpose.

Specific Problem Statement:

Social Return on Investment is proposed here to evaluate the social impact of urban interventions. However, the SROI methodology was not developed to evaluate urban projects’ outcomes. The literature lacks, in fact, similar applications. The study aims to provide a new perspective on the SROI as a tool to be used to quantify the value that projects provide in terms of social return. As it is also highlighted by SROI operators: “[...] economic evaluations, should have a broader lens than previously used, incorporating health, wellbeing, social, environmental and economic outcomes”[5].

The method has limitations and critical passages in its application, whilst its potential is overseen by international organizations such as the World Health Organization (WHO), in the context of the Health 2020 and the 2030 Agenda [6], which considers it an adequate way to

promote the understanding of the benefits to health and wellbeing that actions for sustainability can provide.

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1.2 VARCITIES PROJECT OBJECTIVES

Project card

Name: VARCITIES (Visionary Nature-based Actions for Health, Well-being and Resilience in Cities)
Funds: European Union Horizon 2020 Research and Innovation Programme
No pilots: 7 (Castelfranco Veneto, Italy; Chania, Greece; Dundalk, Ireland; Gzira, Malta; Leuven, **Belgium**; Novo mesto, Slovenia; Skellefteå, Sweden)
No partners consortium: 24
Duration: 2020-2025
Twin projects: IN-HABIT, GO GREEN ROUTES, euPOLIS

Goals

Varcities aims at responding to the challenges cities are facing and which threaten to worsen in the future, such as urban population growth, climate change, lack of resilience in urban areas, by implementing solutions centered on improving health and well-being of citizens. In the project's vision are embedded multiple facets of the transitional process towards smart and sustainable cities and communities.
The project is based on an innovative approach of **Visionary Nature-Based Solutions** (VS). This term was coined to collect three types of interventions developed within the project: **Nature-based Solutions**, **Digital Solutions** and **Socio-cultural Solutions**. The reason lays in the need of operating the urban transformation in a **holistic** and integrated manner, by acting contemporarily on the social, cultural, digital and natural level.
A central role is reserved to **public spaces**, which are at the base of the **social interaction** and **urban innovation**, while it is important that these urban places have a sustainable design and are assuring an equitable access and distribution for communities, since to these spaces are recognized numerous benefits to urban populations. In line with the relevance public spaces play in the urban transformation, Varcities aspires at the direct **inclusion of stakeholders** in the co-design process, to empower the communities and inspire similar actions in other urban contexts. The project provides innovative monitoring systems to assess the impact of interventions through advanced KPIs, and so measure effects and report the multiple co-benefits created by VS for citizens' **well-being** and **health**.
Lastly, VARCITIES aims at the transfer and **replicability** of the knowledge derived from the VSs implementation.

1.3 THESIS OBJECTIVES

1. Investigate what is the social value of the Visionary Nature-Based Solutions in terms of socio-cultural impact through the SROI approach on sustainable cities.

This work aims at providing a view on how social value can be created and quantified by a project which acts at the urban scale. The methodology applied is the Social Return on Investment (SROI) Analysis. The thesis will focus on the application operated to one of the VARCITIES Project pilot areas, since the analysis is thought to give an example for other contexts willing to undertake this social value assessment process.
It emerged from the literature review that Social Return on Investment is a consolidated analysis of social value and one of the few expressed monetarily. There is a conspicuous quantity of articles and SROI reports that gives evidence of its effectiveness as well as of its limitations. SROI analysis is widely applied in the field of Not-for-Profit organizations and in the delivery of services to society, especially in the sphere of health, wellbeing, education, while I found the literature resulting insufficient when investigating the outcomes generated by spatial and/or technological changes in the urban environment.
The challenge prospected for this thesis is to translate the intangible outcomes of urban projects' actions in monetary value that is created for key STK. In urban interventions the social aspect usually has a marginal space in the project benefits' description. There is an emphasis on the achievement of environmental and climatic KPIs, while the social value is not scientifically defined in its components. SROI methodology is a framework with a huge potential in shifting the attention on the socio-cultural benefits. The research work carried on in this thesis is meant to answer the contemporary attention to social implications on health and wellbeing, elevated at the level of the economic and environmental ones, as the SROI analysis is a holistic framework that takes into account all the three elements here mentioned.
In the fourth chapter there will be detailed the evaluation of an SROI Analysis applied in one of the VARCITIES pilot areas.

2. Compare two monetization techniques of SROI on the same case study.
To contribute to enlarging the studies of SROI from a practical point of view, two different monetization processes will be analyzed within the same VARCITIES case study. This comparative approach is meant to highlight the merits and deal with the limitations that will be further described in the second chapter, which is the Literature review.
The stages provided by the Social Return on Investment framework will remain the base for the whole evaluation process, while the contribution will regard the challenging nodes, the gaps and barriers that SROI presents when addressing the identification of social value generated by urban projects.

1.4 THESIS STRUCTURE

The thesis is articulated into 3 main parts and 5 chapters. Starting from the introduction of the topics and findings from the literature review to then give a practical case study application of the Social Return on Investment methodology. Finally, there are the considerations on the future developments of the work carried out.

PART I - The Importance of assessing Social Value Creation

1. Introduction

The Part 1 is a theoretical introduction to the main themes that are of concern in this thesis. The research presented investigates "T**he Importance of assessing Social Value Creation**" through the lenses of the SROI framework. At first it will be discussed the difficulty of giving a proper evaluation, that can include the social perspective, to urban interventions such as the Visionary Nature-Based Solutions (VS) proposed by the VARCITIES Project.

2. Literature Review

Initially it focuses on giving an understanding of VSs' terminology, as the project actions propose Nature-Based Solutions, Digital Solutions and Socio-Cultural Solutions, and what are the challenges in their evaluation. The most conspicuous part of the literature review addresses the comprehension of the SROI framework, starting from its methodological stages which will be applied on a VARCITIES pilot area in the second part of the thesis, in chapter 4. A part of the research focuses on considering SROI's potentialities along with the merits, while another concentrates on the limitations, finding that the Social Return on Investment Analysis is characterized by a series of gaps linked to its application range, at the state of art are still unsolved.

PART II - SROI Application

3. Methodology

The methodology will have two focuses, one on how to obtain the first thesis objective, which is the application of the SROI framework to a case study, while the second will explain the way to achieve the second thesis goal, namely the comparison of two monetization techniques within the same case study application. For the first objective, the methodology is the SROI's framework described in the Literature review chapter, for the second, the comparison of the two monetization approaches will provide a critical analysis of the steps necessary to arrive to the evaluation's results.

4.1. Application Part 1

This chapter is dedicated to the case study: Castelfranco Veneto pilot area, and the whole SROI process performed jointly by Human Foundation Organization (HF) and Eurac Research, HF in the role of Social Return on Investment experts and Eurac Research as project partners. In particular I was the most involved delegate from Eurac to follow and participate in all SROI application stages, under the guidance of Human Foundation.

4.2. Application Part 2

In the second part it will be explained how the two monetizations are different, one in fact is using the "anchoring" technique, while I propose the "standard" method, but the final aim will be showing the multiple facets of the outcomes' valuation within the methodology. In fact, the determination of the monetary values will occur in my case from the cross comparison of different case studies, while Human foundation relies on the experience gained as an expert from other past SROI applications.

Part III: Future Developments

5. Conclusion and future developments

In the last chapter are discussed the findings resulting from both the research process and the application phase concerning the methodological gaps observed. In response to the limitations found I will provide suggestions on how SROI could be further improved based, on one side, on experimentations already envisaged in some of the case studies, on the other, on the issues encountered during the Castelfranco's implementation. The recommendations provided are meant to be of support to eventual SROI employments by the other VARCITIES pilots.

CHAPTER 2

LITERATURE REVIEW

2. LITERATURE REVIEW PROCESS

The research presented in this thesis is based on the selection of articles divided into different topics. At first were explored the concepts of Nature-based-Solutions, Digital Solutions and Socio-cultural Solutions together with their implications in the creation of health and wellbeing as well as the methods used in the evaluations of their impact. After this initial phase where connections have been established between how these solutions are evaluated and the multiple benefits they provide, the next step has been made towards the examination of how these elements are associated with social value.
Afterwards, the Social Return on Investment methodology was examined: there have been taken into consideration SROI's application, its roots, alternative frameworks, and limitations, finally case studies.
What immediately strikes is an unbalance in the application fields of SROI analysis, this framework, in fact, is established to measure the social value generated as surplus by third sector enterprises or not-for-profit organizations that need to demonstrate the legitimacy of their interventions. Thus, there is a rich literature on evaluation of the benefits provided by services concerning fields such as education, health, social inclusion, sport facilities. The application directly correlated to urban projects showed to be scarce. There have been found more recent examples of SROI applied to the built environment which reflects the growing interest in this methodology for its ability not only to monetize social value, but especially for determining relevant outcomes for the final users of interventions. Another characteristic observed is the necessity to adapt the SROI methodology in order to capture all the benefits brought by projects.
Another finding was the so-called Sustainable Return on Investment, which will be more in depth discussed in the following paragraphs. The latter framework is described as an integration into the same evaluation tool both the SROI and the Ecosystem Service Assessment (ESA) as to consider the added value by the environmental component of urban interventions.
Finally, the research focused on finding suitable case studies comparable in terms of outcomes, stakeholders analysed and in some cases of activities proposed, to the VARCITIES pilot area, which provides a complete example of the SROI stages, explained in detail in chapter 4.

2.1 ASSESSMENT OF THE VISIONARY NATURE-BASED SOLUTIONS

In the following paragraph it will be discussed the importance of having standardized evaluative methods for Visionary Nature-Based Solutions.

2.1.1 Overview on Nature-Based Solutions: definition, evaluation and challenges

Definition
It is here presented an overview on the concept of Nature-Based Solution and the necessity of providing standardized assessment frameworks for their implementation. The set of is-

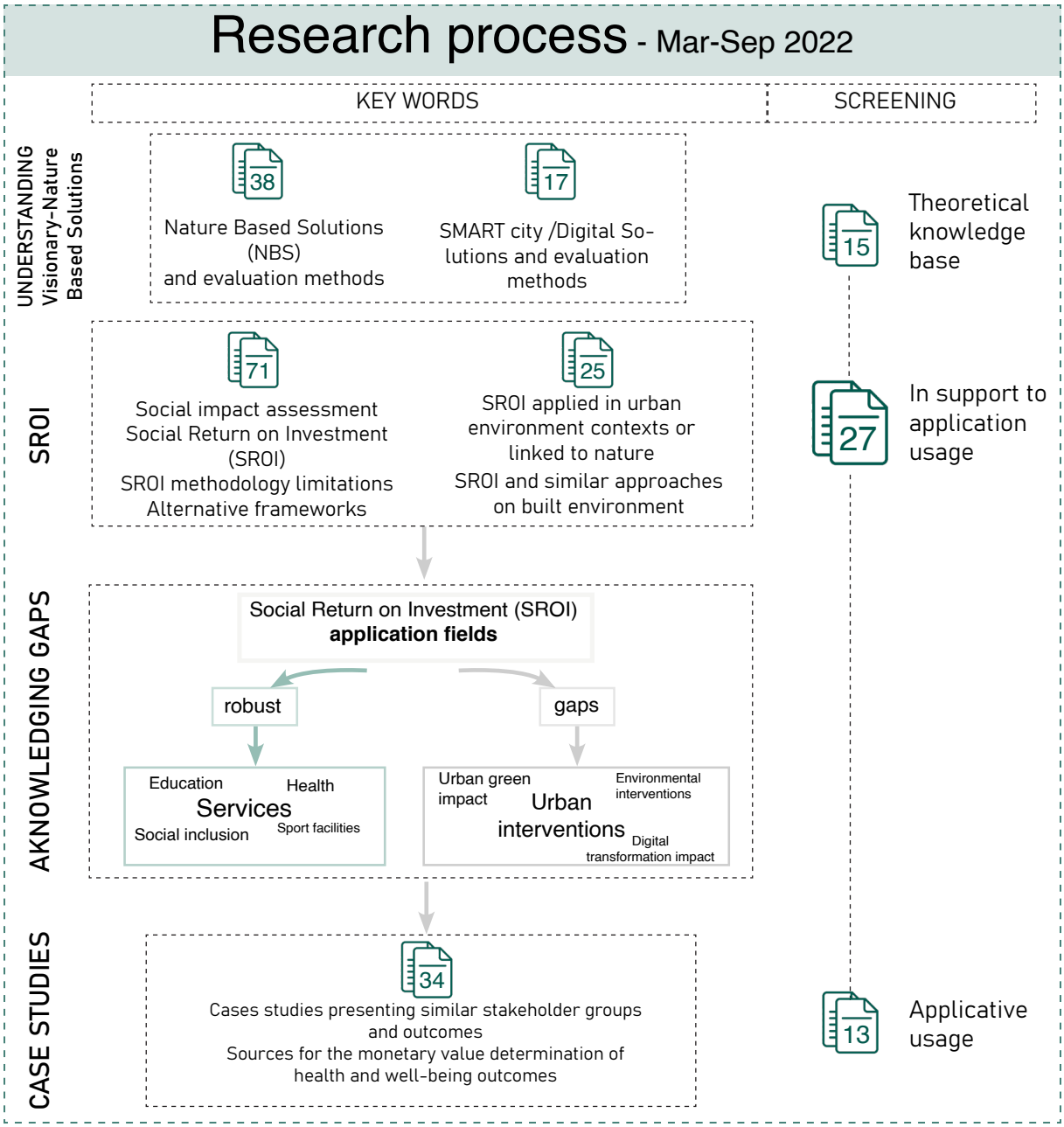

Figure 1: Research Process

sues encountered are representative also for Digital-Solutions and Socio-Cultural Solutions. Nature-based solutions consist in approaches that use nature and natural processes to respond to contemporary environmental, societal, climate change challenges which affect both urban and rural areas. [4] The NBS term is used as concept to indicate a broad set of actions which operate within the climate change mitigation and adaptation as well as nature conservation and restoration. A universally accepted and comprehensive definition is still to be formulated. Studies focused on the identification of the actions Nature-Based Solutions embed suggest that NBS should be considered an umbrella term [7]. It is seen how other frameworks, along with their assessment and implementation processes, dealing with natural resources and ecosystem management can be represented under the NBS concept.[8] [7] There are two most influential definitions of NBS in literature.

Definition provided by the European Commission:

NBS are "inspired and supported by nature, which are cost-effective, simultaneously provide

environmental, social and economic benefits and help build resilience. Such solutions bring more, and more diverse, nature and natural features and processes into cities, landscapes and seascapes, through locally adapted, resource-efficient and systemic interventions." [9]

Definition by International Union for Conservation of Nature (IUCN) and UNEP 2022:

NBS are "actions to protect, sustainably manage, and restore natural or modified ecosystems, that address societal challenges effectively and adaptively, simultaneously providing human well-being and biodiversity benefits" [10]

Looking at these definitions the one given by the European Commission is the only one that specifically includes the cost-effectiveness as being a fundamental feature of the Nature-Based Solutions. However, it needs to be noted that NbS represents an umbrella term, integrating concepts such as Green Infrastructure and ecosystem services approach. Related definitions, depending on the geographical area, can address the subject of cost-effectiveness. This in particular applies to definitions resulting from the US. [11] p. 39

Importance of evaluating NBS

It is recognized that, besides the disaster reduction results and other natural environment improvements, they provide benefits to single individuals and society at large, by increasing health and well-being, and to the economy: jobs, cheaper infrastructure, business productivity, tourism and recreation value, as well as long-term economic growth associated with increasing food and water security.[1].

The main challenge of a larger spread of Nature-based Solutions is represented by a lack of evidence on the quantifiable or monetized benefits generated as well as of their cost-effectiveness compared to grey infrastructures. In fact, they can determine large gains by offering green alternatives and at the same time ecosystem services. There is ongoing research on the most suitable frameworks to assess the benefits and trade-offs of their implementation in response to the 12 challenges they are meant to tackle according to the EKLIPSE Handbook.

12 key societal challenge areas:

1. Climate Resilience
2. Water Management
3. Natural and Climate Hazards
4. Green Space Management
5. Biodiversity Enhancement
6. Air Quality
7. Place Regeneration
8. Knowledge and Social Capacity Building for Sustainable Urban Transformation
9. Participatory Planning and Governance
10. Social Justice and Social Cohesion
11. Health and Wellbeing
12. New Economic Opportunities and Green Jobs

More recently and in relation with the UNEA resolution NbS are more closely linked to Sustainable Development Goals (SDGs). [12]

Two main works that provide instruments to assess, through indicators and evaluation methodologies, Nature-Based Solutions are:

IUCN Global Standard for NbS (2020) –The Standard proposes 8 criteria and a set of indicators against which users can self-assess their NBS intervention. The final purpose is to mainstream Nature-Based Solutions by providing a facilitative tool capable of guiding non-experts in NBS implementations.

EKLIPSE NbS Integrated Evaluation Framework: Evaluating the Impact of Nature-based Solutions: A Handbook for Practitioners - The EKLIPSE Handbook provides a monitoring and evaluation framework articulated in 6 steps developed based on the experience of H2020 Projects, in order to capture the benefits and non-benefits related to NBS application.
The EKLIPSE Handbook, compared to the IUCN standard for NBS intended to provide standardised methods of NBS monitoring and evaluation guidance based upon best practices learned during NBS project work, whilst the IUCN standard does not cite definitive thresholds.[4] Besides these divergent aspects, the 8 IUCN criteria and indicators are aligned with the evaluation framework proposed by the EC document.

Current barriers in NBS implementation

As NBS constitute relatively slow solutions whose results cannot be immediately benefited from, there is a bias in terms of perception from policy makers' side. Other impediments are: rigid regulations, unavailability of long-term commitment both in waiting that NBS are fully operative according to the designed performance and in long-term maintenance, finally the difficulty of finding fundings for large scale projects.[1]
Having a unified framework consents to build trust in these solutions as evidence is provided by the application in increasingly larger numbers of case studies, especially it is of aid to municipalities and planners who have little knowledge of how to carry out Nature-Based Solutions. An effective way to achieve a broader implementation of NBS is providing results in terms of issues tackled and benefits brought to STK through clear communication, by translating the KPI goals into changes that improve human health and well-being.

The Theory of Change concept

The NBS concept is distinguished from more traditional and top-down conservation, e.g., via protected areas towards finding solutions that aim to meet the needs of a diverse range of stakeholders. [8] Evaluations embedding a Theory of Change can take into account the effects that Nature-Based Solutions operate for people.
A Theory of change is the definition of a process which connects through a causal chain the investments, the actions and the changes, or outcomes, an intervention produces for final beneficiaries. It helps assessing how and why specific changes of the environment provide desired or undesired outcomes that will be experienced by stakeholders.
Within the Theory of Change definition, engagement of local communities is essential to, on one side, identify the local challenges by providing better quality information, on the other, it increases the trust in the results of the evaluation while giving a sense of stewardship to local STK.[4]

Digital Solutions in VARCITIES and their evaluation

Digital Solutions are embedded in the concept of SMART City, and it refers to the means which consent the improvement of services and traditional infrastructures inside a city.
Whitin VARCITIES Project one of the aims is to create an ecosystem of fully connected intelligent sensors and devices to help the pilot cities during the implementation and the evaluation phases. [13]
The concept of multiple benefits is necessary in order to create a more comprehensible understanding of the SMART City Solutions implementation. In fact one of the major obstacles in the actions kick-off is the lack of support from the stakeholders' side, since people might be hesitant to undertake these new solutions for several reasons: they do not see the climate

change as an emergency, because they lack a long-term vision of the phenomenon, they do not have clear the benefits in the short term compared to the costs. Cost-Benefit Analysis is usually employed to assess Digital Solutions direct and indirect benefits and trade-offs. [14]

2.2. SOCIAL RETURN ON INVESTMENT (SROI) FRAMEWORK DEFINITION

Social Return on Investment (SROI) is an instrument thought to allow the accounting for interventions that have an added social, economic and environmental value. The direct recipients are Governments, investors or organizations whose projects aim at making a difference in the society. Therefore, the SROI analysis is defined as follows:
"Social Return on Investment (SROI) is a framework for measuring and accounting for this much broader concept of value; it seeks to reduce inequality and environmental degradation and improve wellbeing by incorporating social, environmental and economic costs and benefits."[15].
SROI is considered one of the most complete instruments when evaluating social value, one of the reasons being that it is based on real data, the results are disseminated using 'return on investment' language that is familiar with investors and commissioners.[16].
SROI is based upon the principles of accountancy and cost-benefit analysis that assign monetary values to social and environmental returns to demonstrate wider value creation. The key difference between Cost-Benefit Analysis and Social Return on Investment is that SROI has its focus on the third sector and explicitly attempts to involve stakeholders at every stage of the application through assessing how much stakeholders value a given change.[17].

2.3 SROI ROOTS

With the introduction of new degrees of bureaucratic complexity among private, public and third sector, the health and social care organizations have experienced reforms leading them on the same path as other enterprises, i.e. of competition and choice stimulation. On one hand they were being called upon to assess the outcomes of their activity in order to demonstrate their social, economic and environmental value. [17]. On the other hand, as social enterprises, they base their actions on the achievement of the triple "bottom line" and so they need accounting tools to allow them the expression of social value.
At this purpose a technique widely advocated is Social Return on Investment. SROI framework was first devised by the Roberts Enterprise Development Fund (REDF) as an attempt to capture and monetize the full value creation of their employment services programmes in San Francisco. The objective was to develop a credible methodology for the financial calculation of the often-unreported benefits of work integration activities that could then be set against programme investments to form a more holistic (and, therefore, realistic) cost-benefit analysis. [18].
In the 1990s REDF developed the first version of SROI which was recognizing three types of value: economic value, social value, and socioeconomic value, this last one generated by accounting for resulting public expenditure savings and increase in public revenues.[19]

2.4 MONETARY VALUE VS SOCIAL VALUE CONCEPT

To understand the SROI methodology there is the need to make a step back and reflect on the specific concept of value that the framework is striving to determine. Traditionally the assessment methods were thought to measure the financial success of enterprises. However, these methods needed to extend and to adapt to socially entrepreneurial organizations for two main reasons: the first is the need to report the results of their actions, the second regards the need to assess benefits that otherwise would not have been taken into consideration, bringing to an underestimation of the overall welfare.
The process that brought to the definition of the SROI analysis is entailed with the concept of social value which counterposes with the traditional concept of financial value. In [20] there is made clear a difference between two types of investors: the financial investor and the social investor. These two figures both aim at creating value, but while for the first the only matter are the monetary benefits, for the second the goal is the social value of the organization's actions. Therefore, they are pursuing different outcomes, but by following similar principles. Both financial and social figures aim at choosing the best option among multiples alternatives. But while for the former this process is dictated exclusively by the investor who simultaneously makes the investment, takes the risk, and receives the benefit, a social investment is intended to benefit someone in addition to or instead of the investor [20]. The beneficiaries of the social interventions are in fact the stakeholders. They also represent a new variable in the decision-making process and outcomes' monetization.
Another discrepancy which interferes in the comparison of financial to social investments is that a market doesn't exist for the latter, this leads to the necessity of the creation of a hypothetical one. At this purpose serve multiple techniques such as: willingness to pay, hedonic pricing, etc.
Once overcome the obstacle of obtaining the monetizing of what in SROI analysis is called "outcomes", i.e. the direct and indirect changes experienced by the target stakeholders and their communities [15], another level of complexity is introduced by the stakeholders, who are the ones entitled in the value definition of the changes, based on their own experience.

2.5 SROI STAGES AND PRINCIPLES

The framework is articulated in six stages and 7 principles that consent a correct execution of the Social Return on Investment Analysis.
SROI principles:
- Involve stakeholders
- Understand what changes
- Value the things that matter
- Only include what is material
- Do not over-claim
- Be transparent
- Verify the result

Stage 1 – Establishing scope and identifying key stakeholders
The starting point is to make clear what are the actions performed by the organization to

achieve its goals. The first challenge when undertaking SROI analysis, since it is a framework based on the stakeholder's participation and feedback, is to establish which stakeholder groups are to be involved. The choice is guided by the SROI "materiality" principle, in fact it is considered "material" only the information whose omission has the potential to affect the readers' or stakeholders' decisions [15]. This principle therefore asserts that the stakeholders considered are only the ones which experience material change. Finally, it will be established how the stakeholder's involvement will occur, their roles and their contribution modality with material data to the evaluation.

Stage 2 – Mapping outcomes

The second step is fundamental in the development of the analysis since it is the part where the Impact Map is introduced for the first time. The Impact Map proceeds stage by stage in the resemblance of a table. Mapping the outcomes covers the first two stages of the Impact Map. To complete the Map, three terminologies must be clarified: input, output and outcome. For each stakeholder an outcome is identified, to each outcome it corresponds an input and one or more outputs. The inputs are the investments used to carry on the activities. They can be financial or "in-kind", but they have to be associated with a value regardless of the nature of the resource. The outputs are the measurable activities of an intervention, while the outcomes are what it will change or changed for the stakeholders. The outcome column can only be completed after interacting with the stakeholders.

The outcomes' identification is the most delicate passage of the Impact Map filling. They can be generally divided into soft and hard outcomes. The latter is easy to measure and identify, but if a 'soft outcome' is significant to the stakeholders it has to be included in the SROI analysis, so it will be necessary to find a way to measure it.[15]

Outcomes can be added later, sometimes one event causes a chain of events, so all the outcomes must be recorded. If needed, new stakeholders must be recognized.[15].

Stage 3 – Evidencing outcomes and giving them value

The stage involves finding data that shows whether outcomes have happened and then valuing them.

The indicators are the mean used in assessing the outcomes' realization. They can be subjective or objective, both are necessary, and both need to be measurable. Stakeholders are often the most suitable candidates to facilitate the indicators' identification, by asking them how they know that change has happened to them. Although the outcome is a subjective component, the indicator must report something measurable.

To the outcome indicators' identification follows the definition of a time horizon, which is a key factor to calculate the social return and it refers to the duration in which the activities implemented exsert influence on the STK. The longer the time, the less the evaluation is accurate. The cause is that the influence of an organization's work will be less effective in time since other events will influence the stakeholders' life.

Another challenging passage is given by the allocation of a monetary value to the outcomes. Every outcome will be associated with a financial proxy. Some proxies are easy to source, while others are more challenging. In fact, SROI gives value to things routinely left out of traditional economic appraisal as hard to value. There are several value calculation techniques available at SROI service:

-contingent valuation

-hedonic pricing

-travel cost/time value method
- comparison cost
- willingness to pay
- required compensation
- average household spending
- cost-of-use estimates
- opportunity costs
[15], [21]
Further in-depth representation of the intangible benefits evaluation techniques is provided in figure 5.

Stage 4 – Establishing impact

Following one of the seven SROI principles, "do not overclaim", at this stage the impact must be defined based not only on the activities proposed but also by including in the impact assessment all the factors that may have influenced the outcomes of the activities. There are therefore four ways to evaluate how much of the results derived from the analyzed actions and to eliminate those aspects of change that would have happened anyway. The discount factors are:
Deadweight: it indicates the percentage of change that would have happened regardless of the intervention.
Displacement: it is a component that tells how much of the outcome caused a transfer of an issue to another area.
Attribution: it is a percentage that assesses how much of the outcome was caused by the contribution of other organizations or people.
Drop off: it is a discount rate applied on interventions that have outcomes which last more than one year. Longer than a year the influence on the project outcomes will be lower as they will be influenced by other factors.

Stage 5 – Calculating the SROI

This passage considers for how long the effect of project activities would last for the stakeholders, to then calculate the total value of all the years considered, discounted by the drop off rate established in stage 4.
Once calculated the Present Value, the SROI ratio is obtained by dividing the Present Value by the Inputs Value, i.e. the initial investments.
Sensitivity analysis monitors the changes of the SROI ratio if one variable of the evaluation would change. This process is used to see from one side which of the variables are more relevant, on the other, whether the assumptions made in the previous stages are solid enough. Generally, the changes that could have more impact regard the deadweight, attribution and drop-off, the financial proxies, the quantity of outcomes and the value of not financial inputs. The Sensitivity analysis aims at assessing the range of the analysis variability. Overall, this passage contributes to strengthening the whole process.

Stage 6 – Reporting, using, and embedding

This last step constitutes the characteristic which differentiate SROI analysis from other assessing approaches.
Consequently to the ratio calculation, it is necessary to produce the SROI report. This document is the analysis interface given to the audience as a communication tool. It explains to

the stakeholders, and to whoever would want to verify the accuracy of the process, the work made.

2.6 SROI LIMITATIONS

The Social Return on Investment framework allows the translation of social benefits into monetary value. To this method there are alternative ways of measuring and transforming social value: we have to consider that out of more than 40 approaches that have been developed for measuring social impact [22], SROI analysis is one of the most widespread. A fundamental reason that stands behind the SROI's success must be identified in the immediacy of communication which can facilitate the decision-making process, as the final result is expressed in the form of the ratio between Present Value and Initial Investments.
To have a comprehensive view of the SROI both merits and limitations must be taken into consideration. The merits can be summarized in a few points which are recurring in the literature. Firstly, the mistake to avoid when dealing with SROI is to see only the quantitative information that the analysis provides, instead what makes this method stand out is its capacity of telling the story of the change operated through certain activities. Secondly, the SROI is used to confer legitimacy, since it bases itself on well-established evaluating tools from the business field such as cost-benefit analysis. Thirdly, the SROI contributes to forcing the organizations to clarify their goals and to be explicit about assumptions. Lastly, it shifts attention from outputs to impacts [23].
From the opposite perspective, many controversial opinions developed around the SROI analysis which put in result its limitations and critical passages. The literature points out how the framework is not to be considered as a one-size-fits-all kind of approach and rather it is more suitable to certain case studies than others. The main strength and weak- ness of the SROI is its conversion into a monetary value, because to achieve that result there are a series of operative steps highly customizable and arbitrary.
Any discussion of limitations of SROI analysis needs to be put into context: most challenges or points of criticism also apply to other methods of social value measurement. Also many tensions emerge out of a **gap between ideal and practice** [23].
The limitations will be divided into two categories: theoretical framework limitations, trade-offs intrinsic in the method that cannot be overlooked, and practical application limitations, which refer to boundaries that can be more or less impacting based on the specific case study and on the experts that run the analysis.

2.6.1 Theoretical framework limitations

Subjectivity is one of the most common traits of the SROI analysis since it is based on case studies which are extremely heterogeneous. The subjectivity is a characteristic that accompany every stage of the method starting from the stakeholders' choice to arrive to the final report. (...) a SROI analysis that is objective, in the sense of avoiding value judgments, is impossible. Analysts have to take many decisions according to their own discretionary judgment. [23]. The variety of cases to which the SROI framework has been applied highlights another boundary of the process which concerns the **comparability** of the results, and many times of the outcomes as well. In fact, the only comparison that can be operated is that of the whole analysis. One of the reasons is that the final result of the methodology is a ratio, which

would be misleading to look at without considering all the stages that led to that conclusion. A variable that is underestimated is **the scale of projects**. The SROI can be applied to any scale of intervention, but that causes significative variations. For example, a high SROI ratio does

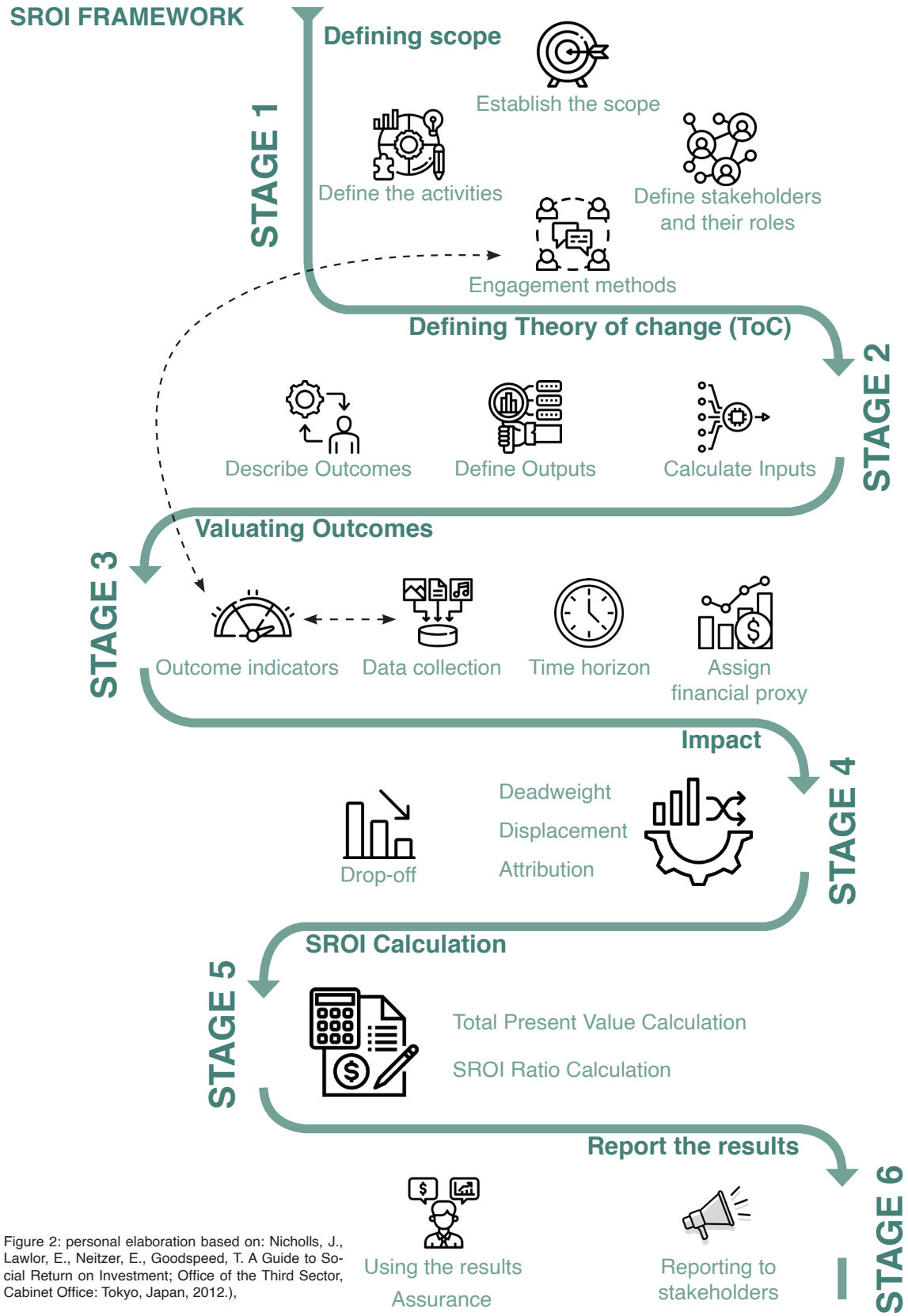

Figure 2: personal elaboration based on: Nicholls, J., Lawlor, E., Neitzer, E., Goodspeed, T. A Guide to Social Return on Investment; Office of the Third Sector, Cabinet Office: Tokyo, Japan, 2012.),

Figure 2: SROI methodology representation, own elaboration

not guarantee that people should invest
only in a specific activity, because if the scale of the application is reduced, then there will be less inputs and more value generated, but it does not mean that the activity itself is superior or brings more social value on an absolute scale.

2.6.2 Practical application limitations

The Social Return on Investment is characterized also by limitations inside each of its stages, these limitations represent challenging points, but they can depend on the accuracy of the experts that employ it.

The first relevant challenge lays in the **difficulty in determining a strong causal relation among stakeholders, actions and outcomes**. There are no references which can determine the exact chain of events, so in this phase the support in the decision depends on the operators' logic and expertise.

The third step of the SROI is characterized by the transformation of social outcomes in monetary value. The challenges inherent to this part concern three main variables: the time horizon, the **balance between customization and standardization**, the **risk of pitfalls caused by scarce data availability and the inexperience of operators**. Due to the method's low standardization and pervasive need for researchers to make discretionary decisions, it is highly unlikely that two analysts working on the same case would arrive at the same SROI ratio. [23].

The decision of the time span is crucial in determining the final SROI ratio and at the same time it is accompanied by a great amount of uncertainty, due to the reduced control over the activities influence on the stakeholders, and of inflation.

Up to date the SROI analysis is a high resource consuming practice aggravated also by the lack of report publication as a coping mechanism against the growing competition. One of the suggestions that usually rise when dealing with SROI is the potential of a standardization approach applied to the method, which would simplify procedures, make SROI teaching and training easier, and thus lower the costs of SROI analyses. But at the same time, it would prevent tailoring SROI analyses, thus making them potentially less valid and less useful for organizational learning [21]. So, the key question could focus on which aspect of the SROI framework should be standardized.

Finally, when switching from theory to practice the **data availability** is a variable that can strongly compromise the methodology application quality at the point of making it not reliable and so lead to the abandon of the process.

Once found the way to monetize the social value the next challenge is to establish the discount rates as counterfactuals. In this phase the question focuses on what would have happened anyways in the interventions' absence. The issue arising employing these percentages: **deadweight, attribution, drop-off**, is that they will be always an approximation, leading necessarily to an over/underestimation of the results.

Returning to one of the key features of the Social Return on Investment, which is the stakeholders' influence over the outcomes validation and value attribution: stakeholders might have strong opinions and they could value even null some of the outcomes agreed by the analysts. Then it becomes not significant to have only one ratio. The expert at that point has to find a way to bring to the surface the weight of each of the outcomes from the final ratio. In fact, to view SROI as a single ratio is overly simplistic [20], a suggestion would be to consider families of ratios that provide different perspectives on success. [20].

The last SROI limitation emerged regards the quality assurance through auditing. Once the

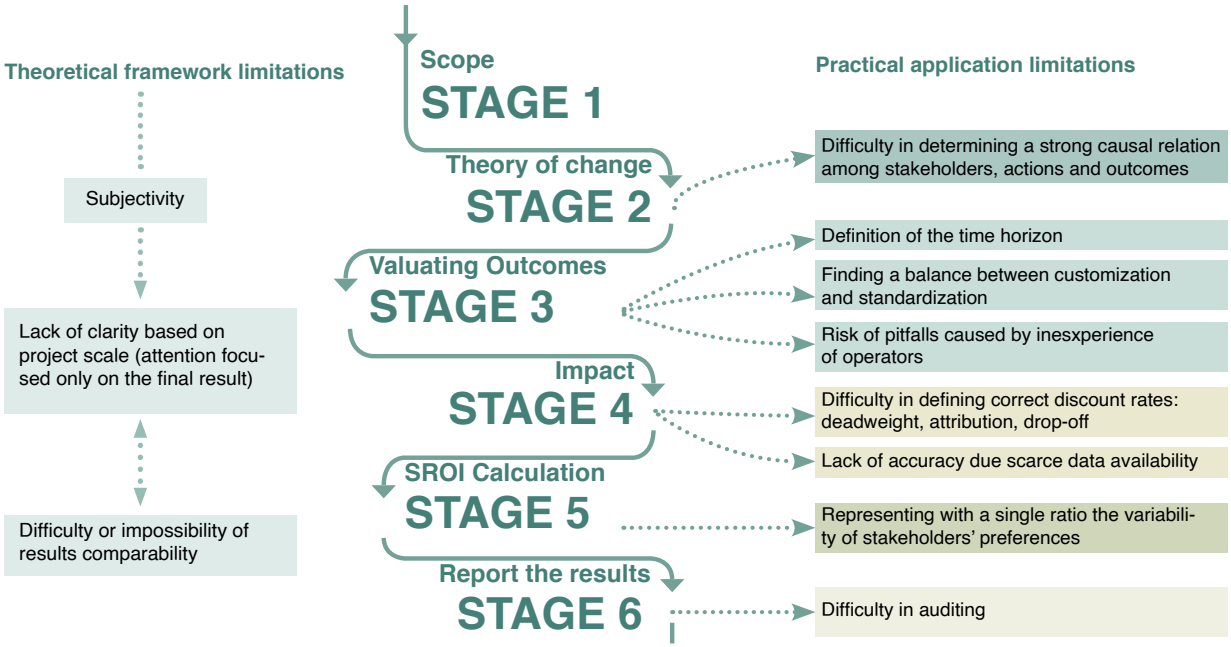

Figure 3: SROI limitations

SROI report is completed, how can the quality of it be assessed? Lack of well-defined quality criteria and therefore clarity in auditing the analysis makes reviews difficult.
Social Value UK, known also as SROI Network, is the professional body for social value and impact management. It aims at assuring minimum levels of expertise of SROI practicioners and quality standards of reports. However, **auditing** would add costs to an approach that is already **resource consuming** [23]. Some suggestions on the development of quality criteria are: feedback from peers, talking and writing about SROI methodology in peer-reviewed contexts, and engaging with the method from a teacher's perspective. [23].

2.7 CROSS COMPARISON BETWEEN CBA AND SROI

The aim of performing a cross comparison between the Cost-Benefits Analysis (CBA) and Social Return on Investment (SROI) is to highlight further SROI features as it derives from the CBA methodology even more than from the Return on Investment (ROI), which is modelled on business-oriented analysis. However, the CBA does not have a wide economic focus, while the latter is the main concern in the Social Return on Investment. The two analyses also vary in multiple other aspects such as the indicators employed in the benefit calculation, the benefit monetization approaches, current preference in the application to specific projects based on scale and type, the different roles they play in decision-making dynamics, yet, both methodologies are advancing in acknowledging and overcoming to date limitations.
Two major distinctions between the CBA and SROI are: the first is that the CBA is more suitable to be applied in order to find the best project alternative rather than to measure the performance of a single project, while SROI allows to determine the impacts of a specific project or programme; the second difference is that the social benefits analyzed within the Cost-Benefit are aiming at supporting broader public interests, while the SROI approach is based on the stakeholder's characteristics and their direct engagement.

2.7.1 Overview on the Cost-Benefit Analysis

Cost Benefit Analysis (CBA) is an analytical tool for judging the economic benefits and trade-offs of an investment by assessing its costs and benefits in order to assess the welfare gains or losses attributable to it [24]. The main use of the framework relates to CBA capability to provide guidance towards the choice among multiple scenarios of public policies, programmes or projects, especially large infrastructures. It consents the allocation of resources in fields where market prices are not developed by applying a series of evaluation tools to determine the value of intangible assets: well-being, environment, health [25]. The method is suitable for large scale interventions that have broader effects on social welfare, but to date it extended to smaller projects as promoters and practitioners became more familiar to the procedure.

The method is applied both ex-ante, to forecast future investment consequences at the financial and economic level and ex-post, aiming to evaluate the effects of an already implemented project or public programme. However, the ex-ante applications constitute the net majority since the methodology was born primarily as a decision-making tool.

The Cost-Benefit Analysis is a microeconomic approach which assigns monetary value to benefits and costs based on individual preferences by offering useful concepts and analytical methods in calculating social benefits such as social opportunity costs and willingness to pay. The latter techniques will be discussed in the following paragraph which gives an overview of the Cost-Benefit Analysis stages. [26]

As CBA is a methodology which aims at facilitating decision-making on the best option from a variety of perspectives, the procedure contemplates 7 main steps which start from the context data to then propose multiple scenarios that will be analysed accordingly to their purpose; at this point the process is characterized by high reversibility until the best alternative is chosen by testing it against the profit generated to the promoter and the costs and benefits weighted on the final beneficiaries, i.e. the general public.

Cost-Benefit Analysis steps:

1. Description of the context

The analysis starts from the consideration of the status quo, in terms of population data, such as GDP and population growth, relevant for the determination of the counterfactual scenarios.

2. Definition of objectives

Setting a project's objective is essential in determining its effects, thus the benefits and trade-offs of a specific set of actions will be consequently monetized within the financial and economic analysis steps. Non the less, it should be provided evidence that the project's rationale responds to a priority for the territory for example to reaching the EU policy goals and national/regional long-term development plans in the specific sector of assistance. [24]

3. Identification of the project

Once the analysis of the context and the theoretical basis of the project are settled, the next step is to define, from a practical point of view, which will be the activities performed within the project as well as the physical interventions. Hence each of the professional figures that will follow the operative phases to its realization and the final beneficiaries in terms of welfare.

4. Technical feasibility & Environmental sustainability

In this phase the focus is on the feasibility and sustainability analyses of the project by relying on additional evaluations such as Environment Impact Assessment (EIA) and Strategic Environmental Assessment (SEA).

5. Financial analysis

This step indicates the financial performance of an investment assessed through a series of

indicators. What is measured is the profitability that a project can generate to the investor: cash inflows and outflows at the condition that Value Added Tax (VAT) equals to zero for both costs and revenues. Once the time horizon is decided, to the values obtained an appropriate Financial Discount Rate (FDR) must be applied, hence the financial profitability will be calculated by applying the Financial Net Present Value (FNPV = the ratio between the balance of cash flow at time t discounted each year) and the Financial Rate of Return (FRR = Financial Rate of Return), which gives the same information as the FNPV but expressed in percentage.
6. Economic analysis: It aims at the measurement of the project's contribution to welfare. The shadow prices concept, adjusted prices that can reflect the opportunity cost of goods and services, instead of prices observed in the market, which may be distorted [24], become of paramount importance. The difficulty of this step lays on one side in transforming market value of tangible benefits in shadow prices, while on the other in the impossibility of finding any value of the intangible benefits that the project is generating on society's behalf. The intangible benefits that shadow prices allow to calculate reflect the value of the so-called externalities, which can be positive, i.e. the added benefits to the community, or negative, i.e. cost caused by the project, that can be pollution, environment degradation, social exclusion. In some cases the value of externalities can be more relevant that than the direct benefits and costs.
It is exactly the economic analysis the focus of the comparison between CBA and SROI, while the scenario analysis steps are not generally included in the Social Return on Investment, but they are performed by other techniques and vary consistently from a case study to another. The SROI is a methodology capable of measuring the social impact derived from interventions at different scales, it started, in fact, as an evaluative tool for Not-for-Profit Organization activities, while recent applications demonstrate its suitability for projects, policies and programmes.
7. Risk assessment.
The risk assessment it expresses the uncertainty connected to future events that can contradict the assumptions elaborated in the Cost-Benefit Analysis. This stage foresees four main steps starting from the identification of the most critical variables of the system to arrive at the definition of risk management measures. The sensitivity analysis is the first step, it identifies which of the investment components is generating the greatest variation by calculating the amount of change that must be done to obtain the minimum acceptable performance indicators, i.e., ENPV, FNPV equals 0 or B/C ratio is 1:1. Further, a risk matrix containing the possible causes of an investment failure and a probabilistic risk analysis, which shows the probabilistic distribution of critical variables identified by the sensitivity analysis and how the performance indicators such as the ENPV vary, will follow. Finally, based on the risk matrix it should be elaborated a risk prevention and mitigation one.

2.7.2 CBA perspective and SROI perspective in calculating impact

Cost-Benefits Analysis and Social Return on Investment are two rigorous frameworks articulated in stages, the question is how these methodological steps interact with the social impact determination.

Who gets the benefits?
If we answer this question within the economic analysis in CBA, the beneficiaries are regard-

ed as the general public or society as a whole, rather than focusing on smaller and specific groups. The main distinction, however, is performed by considering a group of "winners", who are all the individuals that will have a positive gain after the intervention, i.e. benefits, and the "losers", meaning those who will experience negatively the project externalities, i.e. costs. The analysis considers an intervention acceptable when the benefits exceed the costs. The CBA might appraise however the distributional effects as the benefits might not have the same value for people with different income, thus a distributional matrix is made where different weight are assigned to society divided categories according to GDP data. Typical stakeholders are users, operators, infrastructure managers, contractors, suppliers, and government. [24] The identification of the key stakeholders plays a central role in the SROI Analysis, in fact it is the result of preliminary studies to define who are the stakeholders directly affected by the activities of a specific project which leads to a final list of beneficiaries, usually investors, policy makers and planners are excluded, since the question to answer is "who will experience the change?". The choice belongs to local actors engaged in the analysis.

Determination of the benefits/outcomes

The benefits, or according to the SROI terminology, the outcomes, are the effects on the social welfare produced by an intervention, hence each of the elements to which a monetary value will be assigned. Therefore, we can say that identifying these effects in a rigorous manner is of crucial importance to guarantee accurate analyses. This decision in CBA is reserved to the experts who will determine them by operating multiple analyses on the context, while for specific areas of interest, for instance environmental, there will be used assessments such

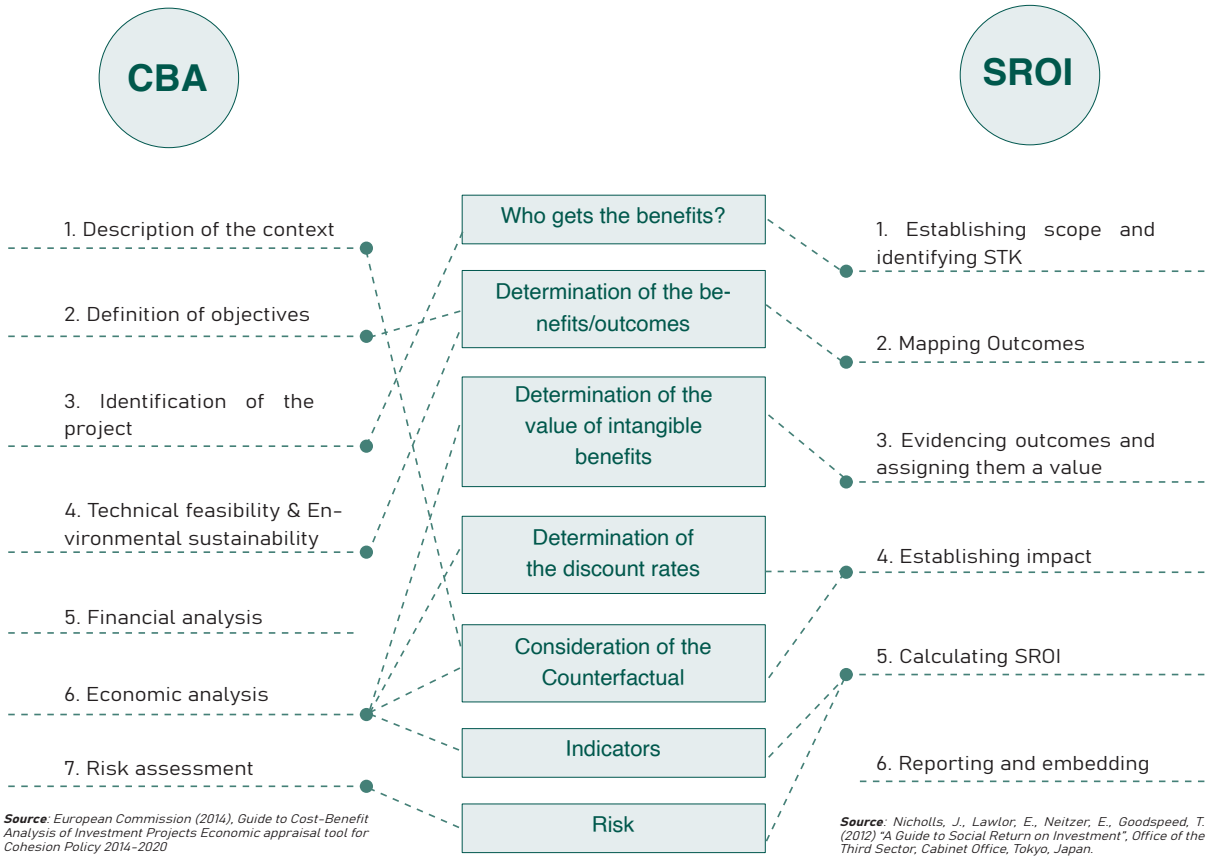

Figure 4: Main steps to determine the social welfare connected to the CBA and SROI stages

as Environment Impact Assessment (EIA) and Strategic Environmental Assessment (SEA).
The Social Return on Investment instead proposes an overturn of the Cost-benefit Analysis top-down approach by collecting the data directly from the stakeholder groups identified. In fact, the SROI approach considers the STK the best candidates who can suggest, validate or change the outcomes hypothesized.

Determination of the value of intangible benefits

Both CBA and SROI operate within intangible benefits whose value can be determined by applying two approaches within willingness to pay technique: revealed preference method, stated preference methods and benefit transfer (see figure 5).
The market values of goods or services are distorted by the application of duties on import, excises, VAT and other indirect taxes, income taxation on wages, etc., which are fiscal requirements included in prices. In CBA, the aim is to liberate the prices from the imperfections due to competitiveness and define the so called "shadow prices".
SROI considers in the calculation of the Net Present Value indicator both implementation costs as inputs, while the CBA preliminary transforms the latter prices in shadow prices (the taxes are to be maintained only when they concern environmental taxes to discourage the GHG emission for instance).

Determination of the discount rates

Discount rates within the economic analysis calculation is used to express the depreciation to which social costs and benefits are subjected over time from the society as a whole, for CBA, or STK group perspective, in SROI. The discount rate reflects the social view of how future benefits and costs are to be valued against present ones. A positive discount rate indicates a preference for current over future consumption. [24]
The Cost-Benefit Analysis provides two types of Social Discount Rate (SDR) applicable to project investments: the social rate of return on private investments (SRRI), and the social rate of time preference (SRTP). The latter is preferred in the European countries, and it takes into account the time preference and the consumption growth.
The discount rate considered in SROI applications within the public sector is established by the HM Treasury's Green Book and it's of 3.5%. The main depreciation expressed in Social return on Investment Analysis is the drop off, a specific discount rate which varies for each of the outcomes. The drop off derives from the conception that the outcomes a single individual experience due to an intervention will decline in time after a good or services will not be provided anymore, or it will diminish its performance. This discount rate reflects the origin of the SROI as assessment tool for the third sector, Not-for-Profit Organizations or enterprises which wanted to measure their surplus in social terms. Normally the drop off is directly dependent on the estimated duration of an outcome and, in absence of additional data available, it is meant to almost annul the change created by the end of the duration hypothesized for an outcome. Otherwise, the drop off reflects desk collected data concerning for instance studies or national trends.

Consideration of the Counterfactual

Determination of the baseline scenario is necessary to state that the intervention will improve the situation by considering what would happen anyway in the absence of a project. Generally, for Cost-Benefit Analysis, two main hypotheses can be made: the Business as Usual scenario, which considers maintenance intervention of a given good or service, and do minimum

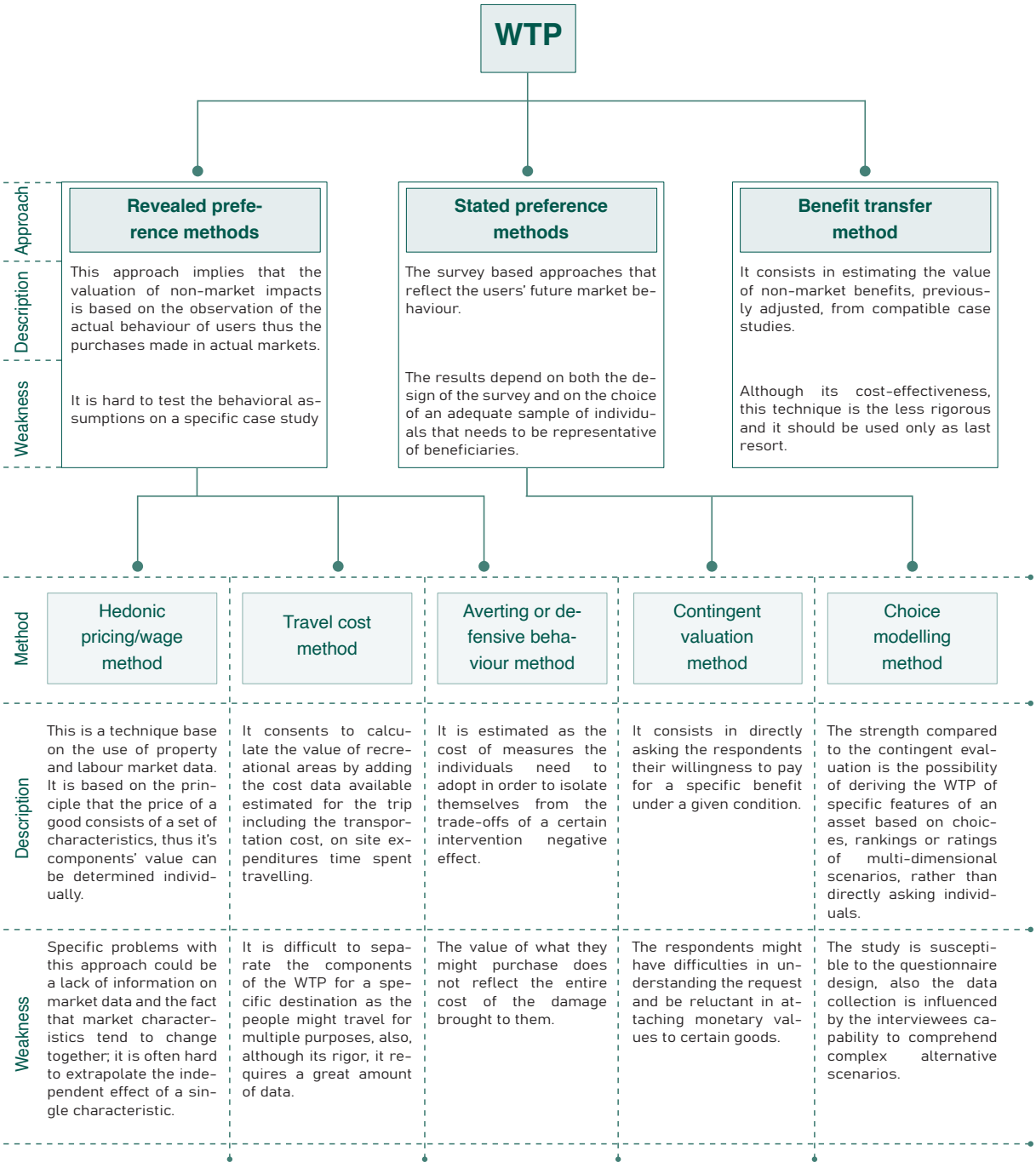

Figure 5: Table of evaluation techniques of non-market goods and services, [24] and [27]

scenario, the case where small adaptations to the status quo are made. The choice between the two depends on the uncertainty towards the future, the do minimum option stands only if the assumptions are credible, since costs and benefits should be determined.
In the SROI the without-project scenario is calculated by applying two discount factors: the Deadweight and the Attribution, while the Displacement is used to value negative effects of a project.

Indicators

Clear similarities can be observed between the economic performance calculation within SROI and CBA. In fact the Cost-Benefit Analysis is based on three indicators:

Economic Net Present Value (ENPV): the difference between the discounted total social benefits and costs;
Economic Rate of Return (ERR): the rate that produces a zero value for the ENPV;
B/C ratio, i.e. the ratio between discounted economic benefits and costs. [24]
SROI results are determined by applying the same concepts. First a Total Present Value (TPV) and a Net Present Value (NPV) are calculated to then find the SROI ratio, the latter is given by dividing the TPV or NPV, both are legit as long as the choice is specified, and the total investment costs, including operational costs and revenues.

Considering risk

The sensitivity analysis is the pillar for risk determination for both Cost Benefit Analysis and Social Return on Investment. CBA arrives to determine through the risk prevention and mitigation matrix possible strategies to reduce or face future adverse events. While the SROI, aside from the sensitivity analysis can optionally calculate the Payback Period, which gives information on the level of risk based on the time span necessary to have the investment back, as longer periods of time are more imply more risky interventions.

Conclusions

Both approaches are suitable for decision making, however, as their results are expressed through the same indicators, for the Social Return on Investment it is misleading looking solely at the final ratio.
The usual employment of the Cost-Benefits Analysis regards the definition of a series of alternatives among which the one with the best Net Present Value and Benefit-Cost ratio will be chosen, thus this methodology is predominantly used ex-ante. The Social Return of Investment instead is usually used to evaluate a set of unique combination of conditions created by a project; thus, it is usually used to assess the outcomes produced by an intervention ex-post. The SROI is less focused on the analysis of the context as its utility is mostly expressed by valuing the changes that a specific project can generate to specific groups of STK. In fact the added value of the SROI is that the data collected is a precious first-hand database for predicting future changes (as only the relevant outcomes are chosen consequently to the STK validation) from planned projects, while with the CBA the assumptions are based on, however rigorous, market data and statistics data on the population.
SROI is described as a form of CBA and can be thought of as a localised CBA. [28]

2.8 FROM SROI TO SUROI

The SROI method can work in synergy with additional assessment frameworks that can enlarge its application within interventions affecting the environment. Explorations on the SROI methodology were proposed by [29] who advanced the Sustainable Return on Investment framework (SuROI).
The SuROI follows the same stages as the SROI, the latter being an emerging approach characterized by a rigorous set of stages which aim at measuring the social impact of projects. The methodology is originated by adapting and combining two frameworks, Social Return on Investment and Ecosystem Services analysis, in a single format to provide an integrated evaluation approach.
The potential of this “enhanced SROI” is to provide more instruments to built environment

	CBA	SROI
Usual Scale	**large** scale public projects, policies and programmes	**local** scale public projects, policies and programmes, **organization scale**
Period of time	ex-ante and ex-post **ex-ante preferred**	ex-ante and ex-post **ex-post preferred**
Who gets the benefits?	**society as a whole** distinction based on GDP **Determination through:** research - distributional effects matrix	**smaller and specific STK groups** distinction based on the effects they will experience **Determination through:** STK engagement
Determination of the benefits/ outcomes	**Determination through:** analyses run by experts - specific analyses based on environmental changes	**Determination through:** engagement of the key stakeholders which suggest and validate the hypothesised changes
Determination of the value of intangible benefits	Determination of shadow prices Willingness to Pay approach: **Predominantly** Revealed preference method Stated preference method on beneficiaries sample Benefit transfer	Willingness to Pay approach: Stated preference method performed on key stakeholders
Determination of the discount rates	**SDR** which can be: **SRRI** - predominantly used on private investments or in extra EU countries **SRTP** - predominantly used in EU countries	**3.5%** - Established by the HM Treasury's Green Book **Drop-off** - specific for each outcome
Consideration of the Counterfactual	Business as usual scenario Do minimum scenario	Deadweight Attribution Displacement
Indicators	ENPV ERR B/C ratio	TPV or NPV SROI ratio which is a B/C ratio
Risk	Sensitivity analysis Qualitative risk analysis Probabilistic risk analysis Risk prevention and mitigation	Sensitivity analysis Payback Period

Figure 6: Cross comparison of CBA and SROI frameworks

professionals in measuring and recording evidence of social and environmental value, also if it is considered that in certain sectors this evidence is demanded either by regulations or is likely to contribute to competitive advantage. It could also help to convince investors to finance projects that may not appeal in terms of benefits, based solely on conventional valuation methods. [30] For CBA approach, which focuses on both financial and economic costs and benefits, the social and environmental costs are often treated as secondary compared to the capability of a project to create economic growth. The advantage of monetising social and environmental impacts is that all of the influences of the project can be weighed using the same metric. [30]

The SuROI was already tested, and it appeared to be effective in multiple case studies of built environment interventions. This methodology it prospects to solve one of the trade-offs of

employing Social Return on Investment which consists in prioritizing, purely in a social perspective, the stakeholders' will without considering the weight a certain decision could have on the environment.

PART II

SROI APPLICATION

CHAPTER 3

METHODOLOGICAL FRAMEWORK

3.1 THE SROI METHODOLOGY

To achieve the objectives of this thesis the Social Return on Investment framework will be employed. The analysis is articulated into 6 stages, and they will be all developed within the evaluation performed for Castelfranco Veneto case study.
Premise:
The work presented in this thesis is meant to give a deeper understanding of how to apply the SROI to an urban project case study, while also providing a practical example analysis of the methodology itself by comparing two different monetization processes, one called "anchoring" while the other is the standard technique. The monetization within the SROI methodology covers the stage 3 and 4. For the first alternative of the monetization the work of Human Foundation Organization will be presented, while the second alternative is a contribution I personally I developed, which will give a range of possible options in the choice of financial proxies and a review of discount factors assignation in the different case studies.
Human Foundation is the organization which ran a Social Return on Investment analysis in Castelfranco Veneto and arrived at the calculation of the SROI Ratio and report writing. I participated as a trainee in this journey by being involved in the whole process and reasoning which gave me a firsthand "learn by doing" experience. The STK engagement tools and data collection phases, stage 1 and 2, will be explained in a detailed manner in the next chapter, regarding the Application.
The contribution I bring is the discussion on the monetization part, which in fact constitutes one of the most subjective procedures within the SROI, but at the same time it is the part that communicates in an accessible manner to everyone the value that interventions and assets generate for stakeholders.
As anticipated, the first two stages, establishing scope and defining outcomes as well as the information collected through STK's involvement constitutes the base for both the monetizations as the "exercise" I propose is that of showing alternatives to a specific part of the SROI analysis.

3.1.1 Monetization 1

The monetization of the social benefits is developed in the stages 3 and 4 of the SROI analysis. Retracing all the steps necessary to the economic value there is the need to define the **outcome indicators** which in this case are the estimated number of people that will experience the hypothesized changes. What has been done was a disaggregated analysis of the population which combined precise data provided from the Villa Bolasco Garden management office on the number of local and outside visitors. Further the number of fragile visitors and caregivers has been calculated by considering national statistical data and proportionating them to the number of CF citizens and then to the number of park visitors. The workshop activities consented further **data collection** of the percentage out of each target STK group that will experience the changes. The outcome validation occurred in the first round of focus groups organized, one for each STK category. The **time horizon** has been defined at 1 year, considering the complexity and the uncertainties prospected in the future, in fact, the SROI guide has a special session on the evaluation on long life expectancy assets. The **financial proxies** have been defined according to research in the literature and own wealth of knowledge of experts

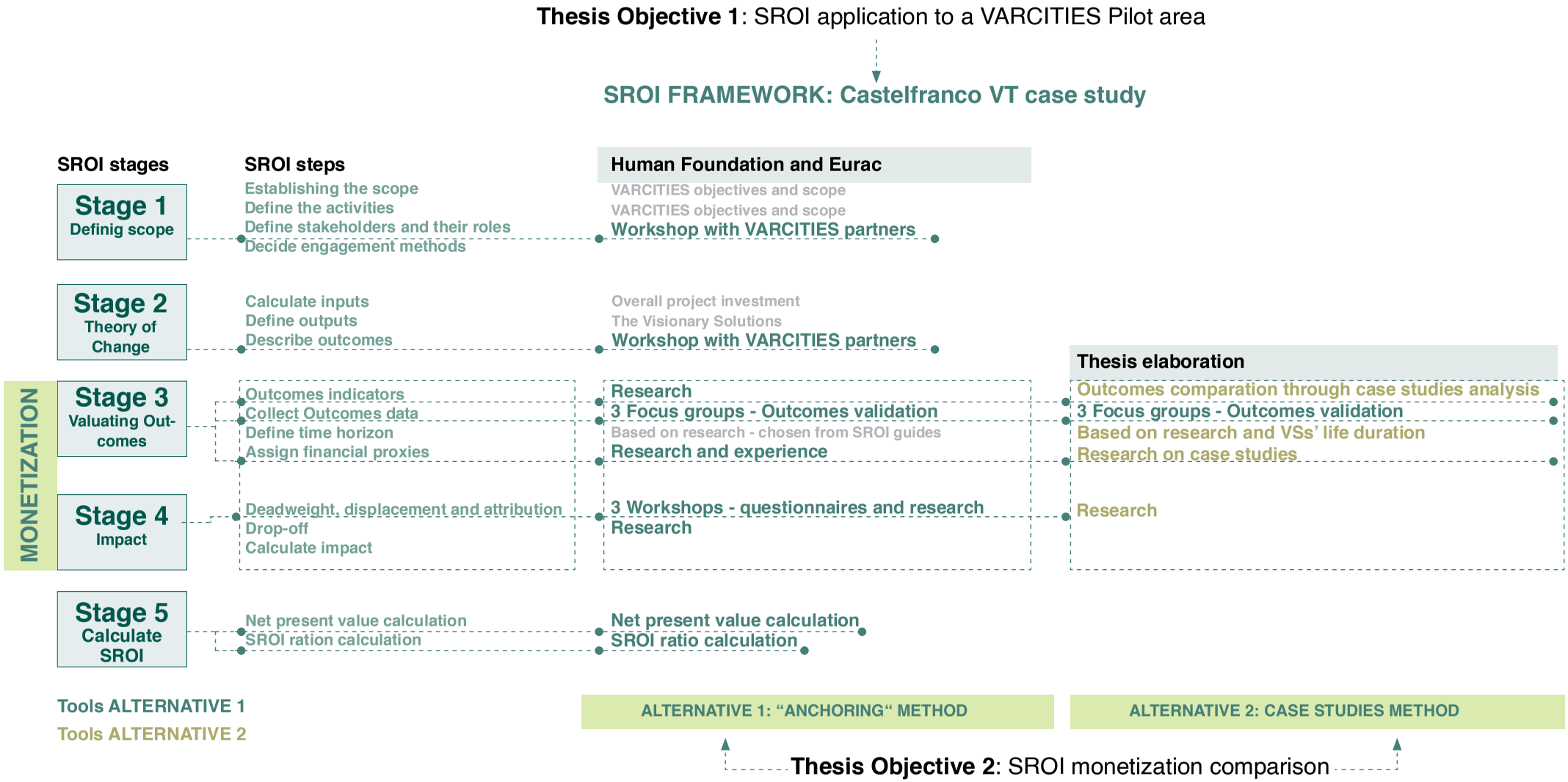

Figure 7: Methodology applied to achieve thesis objectives

gained from past experiences on other SROI applications. Also, in the identification of proxies lays the major difference between the method employed by Human Foundation and the one that I elaborated as a second option within the thesis. Human Foundation chose, the "anchoring" technique, consisting in finding one financial proxy for each STK group to then proportionate the other monetary values based on the relevance scoring given by the stakeholders. Finally, the estimation of "what would happen anyway", determined through **discount factors**, have been defined partly on research on national data and partly by considering the answers received by the STK during the workshop activities when they were asked to provide an estimation of the "**attribution**" discount due to other subjects or entities of the territory that would determine the same outcomes. **Drop off** and **Displacement** have been set at 0%. The details of this first monetization approach will be further discussed in the next chapter.

3.1.2 Monetization 2

The second monetization aims at giving other possible value determinations to the outcomes outlined in the Theory of Change, defined and validated by the stakeholders. The method used is based on the analysis of case studies chosen due to the affinity of the activities carried out and of the outcomes to be evaluated for each stakeholder group.
The **outcome indicators** change compared to the first monetization only for one of the proxies proposed. The **time horizon** was set at 10 years, 10 years being the life expectancy of the VARCITIES implementations. The assignment of the **financial proxies** instead aimed at finding a pertinent value based on the cross analysis of similar activities, hence outcomes. The research gave further validation to the changes hypnotized and provided a range of limited proxies possible, as it has been observed they often repeated among the studies, the most suitable was chosen as type of financial proxy to use. This overview gave a main direction to the determination of the final financial proxies chosen for the Castelfranco pilot area. For the **discount factors**, especially the deadweight and the attribution, given that the displacement and drop off have been set at 0%, the cases studies offered a range of methods of determining them that could be useful for future applications.
SROI recognizes the uniqueness of each case study, reason for which the usefulness of cases studies lays in being a source of methodological guidance rather than allowing the direct benefit transfer. Therefore, the information found for each outcome constitutes a guidance on how others did, but the final decision must be sized on the specific case study the application is made on.

Limitations of the second monetization

The second monetization is thought to provide alternatives to the complete application carried out by Human Foundation and not give another unique result due to two main reasons:
1. The stages 3 and 4 are dependent on the stakeholders' feedback and validation, therefore for every new decision, especially for the discount factors, it is necessary to return and collect the data on field. Reason for which the case studies offer a consistent aid in selecting financial proxies, while the discount cannot be derived from other applications. The only information that can be transferred for discount factors is the method it has been used to determine them.
2. A discussion on different possible ways of monetizing outcomes enriches the knowledge on the SROI framework.

ALTERNATIVE 1: “ANCHORING“ METHOD

SROI steps

Outcomes	Score	Outcome indicator	Financial proxy
Outcome 1	3,2	Outcome indicator 1	Financial proxy 1
Outcome 2	4,5	Outcome indicator 2	Financial proxy 1*
Outcome 3	3,5	Outcome indicator 3	Financial proxy 1*

Research on 1 proxy value

* the value is proportionated to the score

Outcomes indicators

Research on the number of subjects living the changes

Research on population data

- Park visitors: local and not local
- General park visitors
- Vulnerable park visitors
- Cargivers park visitors

Collect outcome data

3 Focus groups - Outcomes Validation

Scoring on a scale from 1 to 5 the relevance of outcomes and giving a motivation

	1	2	3	4	5
“outcome 1“	○	○	○	○	○

Define time horizon

Based on a single reference year of the project

Assign financial proxies

Research on market values of services

What services?: known from experience

Personal knowledge learnt from experience of other SROI applications

SROI reports undertaken in the past

Discount factors

3 Workshops - questionnaires and research

Values derived from 3 proposed exercises

1. (for previous stage) Outcomes Ranking
2. Percentage of people estimated living the outcomes
3. Attribution estimation by stakeholders

Drop off

Not relevant

Figure 8: Monetization 1: methodology

ALTERNATIVE 2: CASE STUDIES METHOD

Outcomes	Score	Outcome indicator	Financial proxy
Outcome 1	3,2	Outcome indicator 1	Financial proxy 1
Outcome 2	4,5	Outcome indicator 2	Financial proxy 2
Outcome 3	3,5	Outcome indicator 3	Financial proxy 3

Research on all proxy values

SROI steps

Outcomes indicators

Outcomes comparison through case studies analysis

The indicators have been identified from the literature review undertaken on thematically similar case studies: SROI reports and articles.

Note: Population estimation from previous analysis

Collect outcome data

3 Focus groups - Outcomes Validation

Scoring on a scale from 1 to 5 the relevance of outcomes and giving a motivation

1 2 3 4 5

"outcome 1" ○ ○ ○ ○ ○

Define time horizon

The whole duration of the project's effects

Assign financial proxies

Research on market values of services and other tools

What services?: Research on cases studies

5 case studies on vulnerable subjects

1 case studies on urban projects

7 case studies on urban environment related programmes

Discount factors

Research

Considerations on discount factors from similar case studies

Drop off

Not relevant

Figure 9: Monetization 2: methodology

Case studies selection

One of the main features of the framework are its highly customizable stages, a trait that simultaneously guarantees an accurate evaluation and constitutes a limitation in the comparability with other analyses. A series of topics are more suitable for comparison when taking into consideration the methodology application because they are more consolidated and so there is a great quantity of reports available.

After the completion of the first two phases of the SROI, once the rationale, stakeholders and outcomes are defined, the next stage is the exploration of ways of quantifying the changes produced by the project activities. To arrive at the monetary value, it is necessary to find indicators for each of the outcomes, which means that for every change hypothesized a measurable element must be associated. To facilitate the causal link between outcomes and monetary value, similar case studies must be chosen. The election criteria are the similarities in the activities, in the stakeholders, finally in the outcomes. By choosing similar benchmark cases there is a good chance that outcomes present affinities or that they coincide with the outcomes defined for the SROI analysis to be developed. The analysis context, meaning in the specificity of the activities and stakeholders, is important in the establishment of links between the outcomes and indicators, however, some outcomes can be compared regardless of the context, so there can be chosen groups of case studies to address different kinds of outcomes. In fact, outcomes can be divided into categories (socialization, physical activity, education, etc.) to overcome the gaps that cannot be covered by integral reports. If there are no similar case studies or outcomes, then the indicators can be established by experts' logic. At the present date, SROI does not have a full range of cases that can cover all possible applications, aside from the reticence in making public the reports due to competitiveness. What is emerging from literature review is the willing to enlarge the field applications, as in this case study proposed, for urban projects. Few benchmark examples can be considered as such. The lack of information leads to obtaining them from sideway research of indicators and financial proxies suitable for each of the outcomes. This is a method also confirmed by experts in SROI analysis, who need come up with new ways in the determination of social monetary value.

CHAPTER 4

APPLICATION

4.1 VARCITIES IN CASTELFRANCO VENETO PROJECT PRESENTATION

4.1.1 Castelfranco Veneto pilot area

Castelfranco Veneto is a small city of 33112 inhabitants in Northern Italy. The VARCITIES pilot area is Villa Bolasco Park, placed in proximity to the old medieval castle, in the very heart of Castelfranco. The garden is adjacent to the main health structures of the municipal area: "Istituto Oncologico Veneto", Elderly Center Domenico Sartor and the Alzheimer's Day Center ATTIVAmente. The presence of these institutions gave the historical garden a wellbeing connotation since it is available for hospital patients and other fragile categories.

On the current park site several aristocratic families were settled since the beginning of the Sixteenth century. In 1808, the Revedin family succeeded in the site possession to then build Villa Revedin Bolasco between 1852 and 1865. A relevant change in the Park's morphology happened in 1868 when the garden has been transformed from its original geometric Italian garden features to curvilinear bodies of water and trails. Between 1924 and 1967 the Park and Villa were owned by Bolasco Piccinelli who donated the naturalistic and architectural complex to Padua University. The latter restored it and managed it up until now. It was in fact by virtue of the restauration works that the Park and Villa was opened to the public after decades of abandonment. The garden opened to the public again in 2018, the same year Bolasco Park won the "Parco più bello d'Italia" award.

Although this place is often regarded as a "jewel" in the center of the city, there are architectonical barriers that make it not accessible. First of all, the garden is surrounded by a tall wall, part of the historical complex, which precludes the view towards the inside, while the current access is located in the north-west corner of the park, a place not intuitive to reach when considering that the road from where the visitors arrive is Borgo Treviso Street. This road connects the Villa to the train station, yet the garden is not minimally perceived along its length. Beside the physical elements that make the garden not easily accessible, there are also managerial factors: the Villa is opened only during the weekend and on Friday, fact that is considered a major fruition limitation.

Figure 10: Villa Bolasco Park, source: https://ilbolive.unipd.it/

Sources for Castelfranco Veneto pilot area:
https://it.wikipedia.org/wiki/Villa_Bolasco
https://www.villaparcobolasco.it/la-storia/
Reports on the sketched Solutions: Castelfranco. Deliverable 3.6 of the Horizon 2020 Project VISIONARY NATURE BASED ACTIONS FOR HEALTH, WELL-BEING & RESILIENCE IN CITIES, Grant Agreement No. 869505

4.1.2 Visionary solutions applied

The pilot case in Castelfranco will, and partly are already, implemented a total of 6 Visionary Solutions that have been classified into three clusters:

Cluster 1: basic actions
The actions grouped under this cluster have been called "basic actions", since they are a necessary condition for all the other VSs' implementation. They consist in the monitoring of the psychological and physiological well-being of people visiting the park while registering the garden's microclimatic data.
(VS2, VS3)

Cluster 2: complementary actions
Development of tools to support and facilitate the visit of the historic garden. These actions are thought as both physical environmental change and implementation of digital devices that can make the visit more pleasant and enriching. (VS1, VS5, VS6)

Cluster 3: transfer actions
They consist in the divulgation of the results primarily to the citizens, hence at a territorial level. Nonetheless the knowledge produced within the VARCITIES project have the potential of being a model for other similar urban interventions. (VS4)

VS1 – Accessibility

The intervention involves the creation of paths that facilitate the park's use for people with specific mobility needs. The solution includes the new paving of the trails inside the garden and the creation of a cycle-pedestrian path to connect the Sartor Elderly Center's parking lots, which will be expanded on a lot given by the hospital, and the entrance located on the north-west side.

VS2 – Physiological and Psychological conditions

Through this solution is monitored the psychological and physiological well-being of elderly and people with Alzheimer's in relation to the environmental conditions they experience in the garden. These measurements will take place through to the use of devices that track the eye movement and the cerebral activity.

VS3 – Microclimatic conditions

The Visionary Solution 3 will monitor the microclimatic and environmental conditions in the garden itself; for this purpose, sensors are installed. The parameters in analysis will be correlated with the users' reactions. The measurements include: temperature, humidity of the air, solar radiation, sounds, scents, chromatism, lights and shadows, air quality.

VS4 – Divulgation

The VS4 offers two main tools of knowledge creation and promotion of active participation: the development, printing, and dissemination of a manual of good practices on the therapeutic effects of green and blue urban areas and the Observatory of the local landscape, which will


Castelfranco Hospital
Location inaccessibility
The actual gate position is remote and not indicated by signage.
Long distance accessibility
Lack of parking lots for vulnerable subjects or people arriving from long distances
Elderly Day center Domenico Sarrtor and ATTIVAmente center
Villa Revedin Bolasco
City historical center
Schedule inaccessibility
The park is opened to the general public 3 days a week


Physical inaccessibility
Inaccessible paths
for disableed people
Villa Bolasco
Park
Visual impermeability
The park is not perceived
from the main connection
street due to the perimetric
wall
Train station
CRITICALITIES SYNTHESIS MAP
Park perimetric wall
Park internal paths
Borgo Treviso Street
Inter-municipalities connections
Graphic scale
[m]
0
50
100
150
200

change headquarters in the former “Casa del Giardiniere”. The latter is placed at the park’s entrance, as the project pursues the interaction with the citizenship.

VS5 – ICT tools

The implementation of ICT tools (Information and Communication Technologies) considers the design of sensor furnished benches that measure the number of people by which they will be used with the time duration, and the possibility to use a smartphone equipped of emergency button that monitors the user’s movement, hence it determines a possible risk situation.

VS6 – Informative tools

The adaptive and intelligent information systems for visitors have the role of creating a virtual “window” between the park and the outside. Screens will provide images, sounds and information on the microclimatic conditions of the garden. The placement of such systems has been thought along the south side of the park, on the Borgo Treviso Street, in health centers and in strategic nodes of the city.

4.2 SROI ANALYSIS IMPLEMENTATION

Why applying this methodology?

In relation to the major global transition towards a more sustainable World, which accompanied the design process for planners and policy makers, there is the shift from an individual planning perspective to a multidisciplinary and participatory approach. A growing interest is registered in the impact that urban regeneration projects have on the communities they affect and on the social benefits that are created.
The Social Return on Investment Analysis was chosen to show the social value of VARCITIES project for the Castelfranco Veneto citizens and other Bolasco Park users, as the main objective of the interventions is to generate health and wellbeing for citizens. The SROI methodology investigates the social component of the benefits that European projects can produce for the communities.
Aside from this general purpose, as the method is transparent and includes several moments of stakeholder engagement where they are called to validate the outcomes, the SROI as an evaluation tool it is meant to build trust in the solutions adopted which might translate, according to the interviews taken to the municipal technicians, in a longer life of the solutions, and the willing of extending the lessons learned from VARCITIES for other urban spaces in the city.

4.2.1 Stage 1: Establishing scope

Establishing the scope and Define the activities

The VARCITIES project was established to generate benefits to citizens by transforming the built environment through a set of six Visionary Nature-Based Solutions. As a result, the changes space between physical modifications of the urban context, implementation of digital devices, finally participatory and knowledge-based actions. SROI analysis inquires how these measures can produce changes in the social sphere.

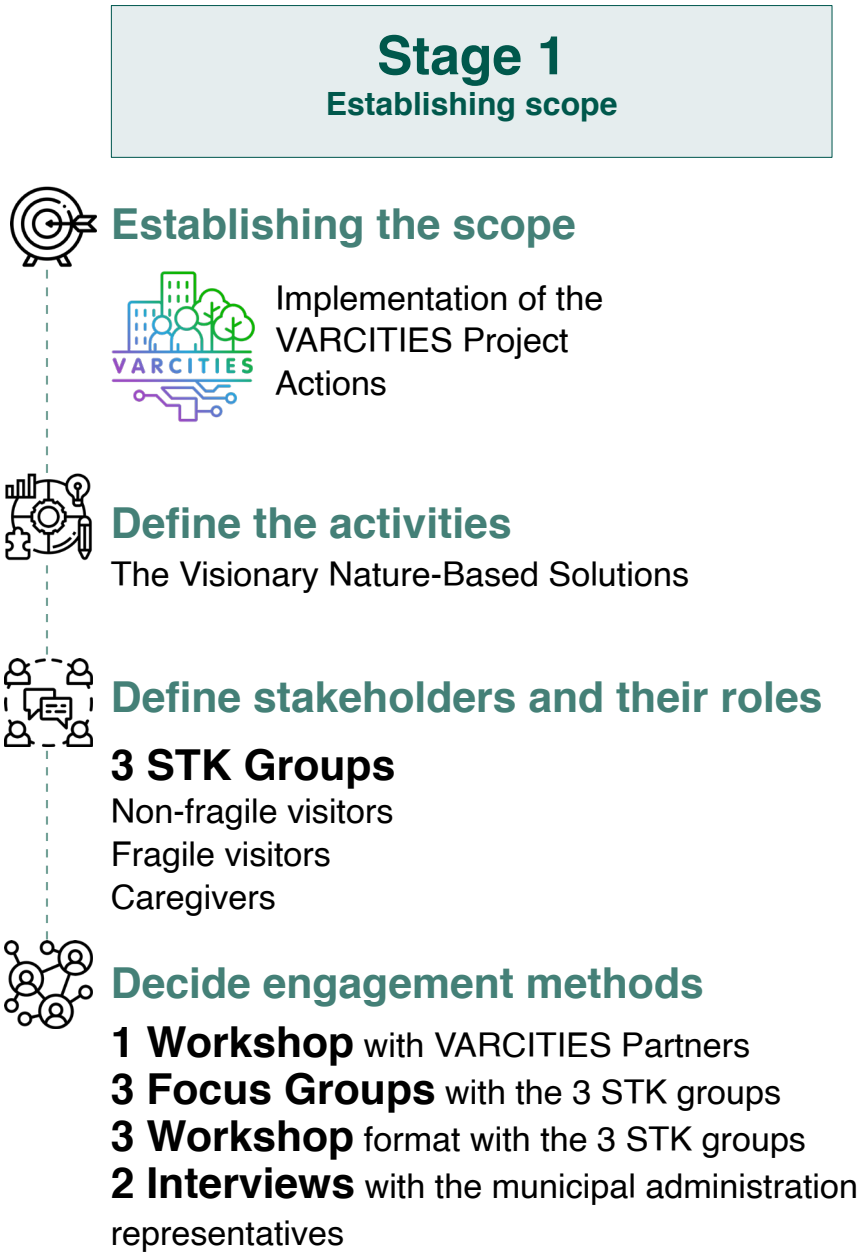

Figure 11: SROI stage 1 - steps implemented in Castelfranco

Define stakeholders and their roles

The Analysis was run by Human Foundation Organization in quality of experts in the methodology application.

Together with the project partners, the first stage saw the stakeholders' selection, as the actions and outputs were already defined in a complete way by the project itself. The stakeholders have been divided into three main categories of subjects that could live the changes:

-The Citizenship of Castelfranco Veneto

-The fragile subjects, which include elderly people, Alzheimer's patients, neurodiverse people (the visually impaired subjects haven't been considered in the project – information by STK observation).

-The caregivers, considering both the formal and informal ones.

- Municipality administration, group that in the end have been excluded because the outcomes hypothesized for them were considered not material enough.

In the Citizenship group have been called to participate in the stakeholder engagement activities around eleven associations active in Castelfranco's territory, with competences in various fields, among which: environment preservation, cycle mobility and volunteering. The fragile subject's category was initially thought to include people affected by the above-mentioned conditions, but it was suggested by the caregiving institutions that it would have not been possible due to their severe disorders. So, in this group participated the representants of the medical and caregiving associations in Castelfranco and immediate surroundings. The latter stakeholders have been the same for the caregiver's category.

Decide engagement methods

The stakeholder engagement was designed as follows:
1 Workshop with VARCITIES Partners: Predefinition of outcomes
3 Focus Groups with the 3 STK groups: Outcome Validation necessary in stage 2
2 Interviews with the municipal administration representatives: Information provided on the project implementation from the Municipality perspective and Outcome Validation
3 Workshop format with the 3 STK groups: Outcome data collection necessary of stage 3 and 4.

4.2.2 Stage 2: Theory of Change definition

Calculate inputs and outputs

The inputs are the investments made to the completion of the actions analyzed by the SROI framework, they can, aside from monetary, be expressed in employed time. These data have been provided by the costs analysis made by the VARCITIES partners and they can be found

Eu Commission, Municipality of Castelfranco Veneto, Eurac, University of Padua	Total financial inputs, including operating cost and subtracted revenues per year	1,141,500.00 €
Municipality of Castelfranco Veneto, Eurac, University of Padua	Total direct personnel costs	456,252.00 €
Municipality of Castelfranco Veneto, Eurac, University of Padua	Total indirect costs	173,297.40 €
		1,771,049.40 €

Table 1: Total inputs

The outputs in this case are the visionary solutions.

Describe outcomes

The outcome identification is the result of two phases, in the first experts organized a workshop with VARCITIES Partners which gave a draft of the outcomes hypothesized that will be experienced by the 3 STK groups also defined during this first meeting. The outcomes, thus the Theory of Change outlined went through a validation phase which materialized in 3 workshops and 2 interviews.

Phase I – Predefinition: Workshop VARCITIES Partners

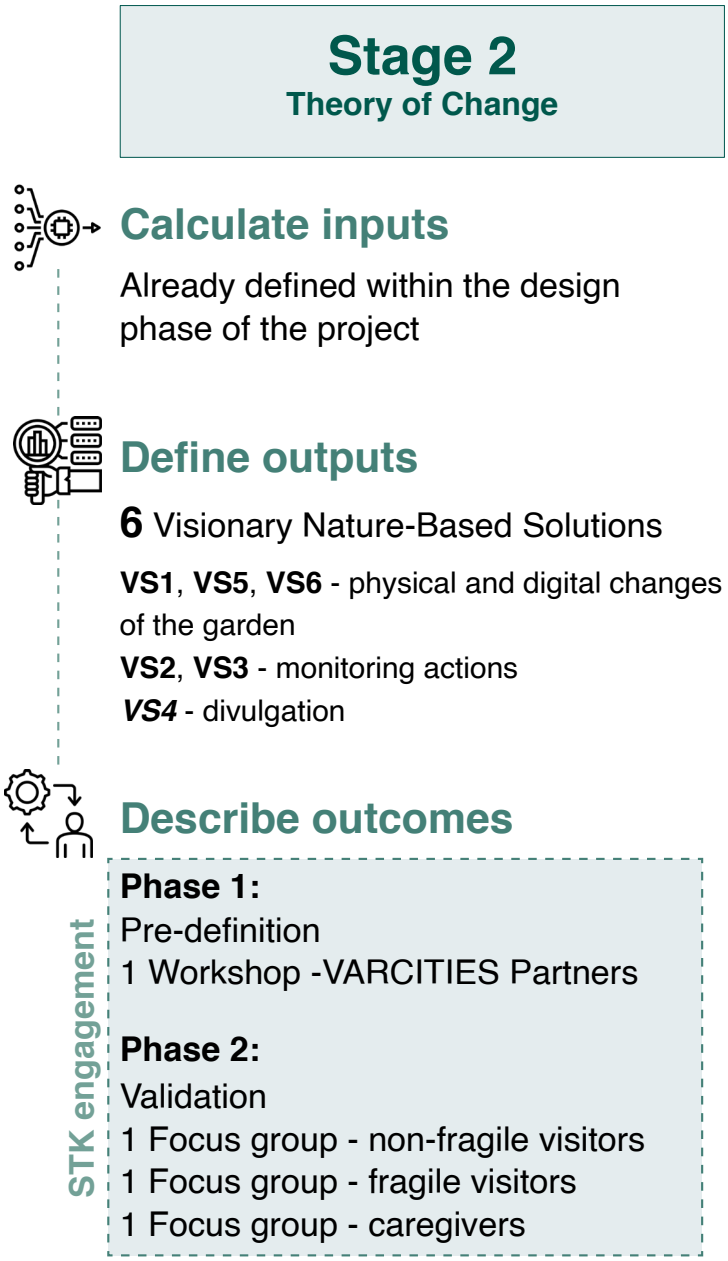

Figure 12: SROI stage 2 - steps implemented in Castelfranco

Causal Chain non-fragile visitors – hypotheses made before the STK feedback

The actions that directly affect this group are: VS1, VS4, VS5, VS6. The project aims at the creation of paths accessible for all mobility necessities, both inside the park and in connection to the city. Thanks to these interventions, it is expected that VARCITIES will generate a**n increase of the accessibility to the facility** and an **improved visiting experience**, the latter also thanks to the implementation ICT (Information and Communication Technologies) tools (VS5). Over time, these first two outcomes may favor the development of the other outcomes expected in the causal chain of changes, i.e. those inherent to the **social interaction among users** and to an **increased interest towards the garden** as more than just a historical heritage object. In fact, it is awaited, with regard to the aspirations reported by the citizens of Castelfranco during the focus groups, that the garden will vary its uses: possibly for cultural events. Another theme that appears in the chain of expected changes is the **deepening of social ties among users**, that comes necessarily only at the condition that the previous outcomes have

happened, while enjoying the spaces of the garden will lead to a **greater of a sense of belonging of the historical garden as a local community good**.
The creation of the manual for the redesign of green and blue urban areas, which will include evidence of their therapeutic effects on people's wellbeing (VS4), combined with the change of the local landscape observatory headquarters to a more reachable location for citizens, since the old Local Observatory was born within the University domain and so located inside Villa Bolasco, were hypothesized to **strengthen the involvement of citizens in decision-making processes**. The VS6 instead, provides adaptive and intelligent information systems materialized as a screen at the entrance to the historic garden to create a "virtual window" that can transmit images, sounds, microclimatic data from within the park. Finally, VS4 and VS6, are solutions with the potential of a**rising the knowledge related to green spaces and the benefits to the health and well-being of citizens**.

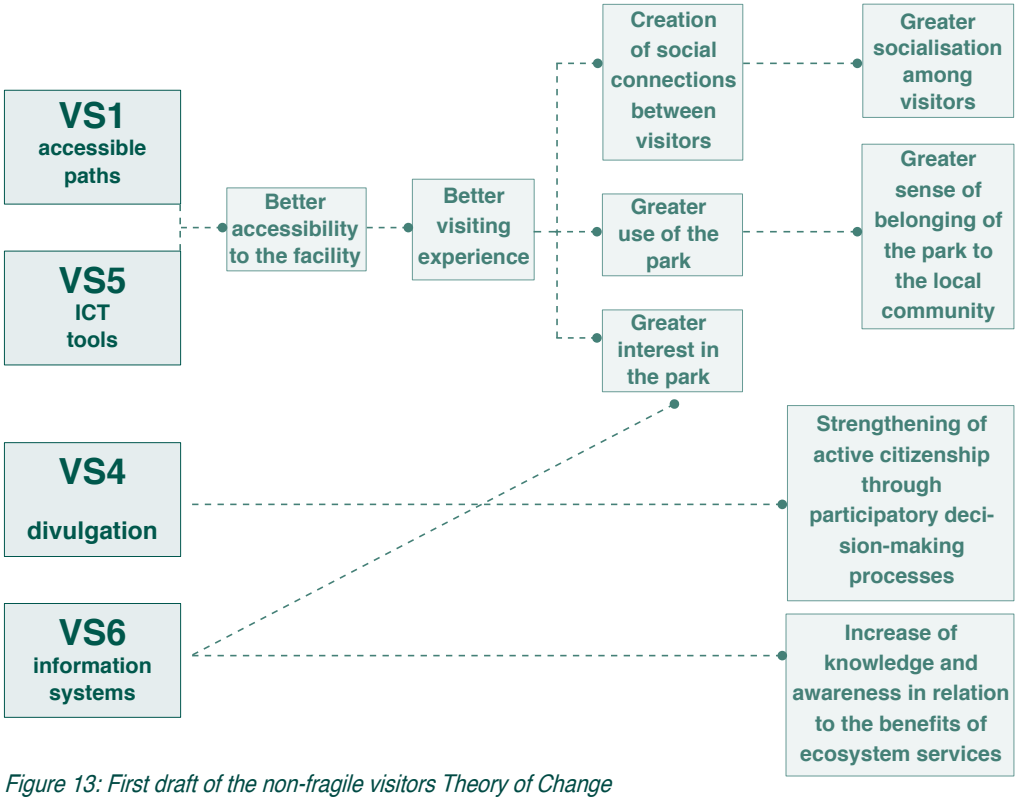

Figure 13: First draft of the non-fragile visitors Theory of Change

Causal chain fragile visitors – hypotheses made before the STK feedback
People with vulnerability constitute a specific type of user that will be directly affected by two of the project's Visionary Solutions: VS1 and VS5. The creation of paths suitable for people with any mobility need and the implementation of ICT systems will lead to **greater accessibility to the facility**. Elderly people, patients with Alzheimer's and disabilities will benefit from the new paving provided internally and the rethinking of the accesses to the historic garden, while the benches equipped with sensors and the application that detects dangerous situations when visiting the park, should **increase the autonomy** of fragile individuals as well as their sense of security. It is expected that the greater independence and increased **sense of security** of the subjects lead to **a better visiting experience**, therefore, to an **increase of the psycho-emotional well-being** of subjects with physical and / or psychic vulnerabilities, as they will benefit from the positive effects of the green and blue inside Villa Bolasco Park. The effect of the previous changes may favor an increase in the use of the garden by these categories of people, therefore aliment the creation of social ties and, in the long term, an

enhanced sense of belonging of the park to the local community. The historic garden of Villa Bolasco will be a place to initiate **greater acceptance and social inclusion** towards all citizens, a change that can induce **increased socialization** and **loneliness reduction**, condition often perceived by fragile categories such as elderly and people with pathologies or disability.

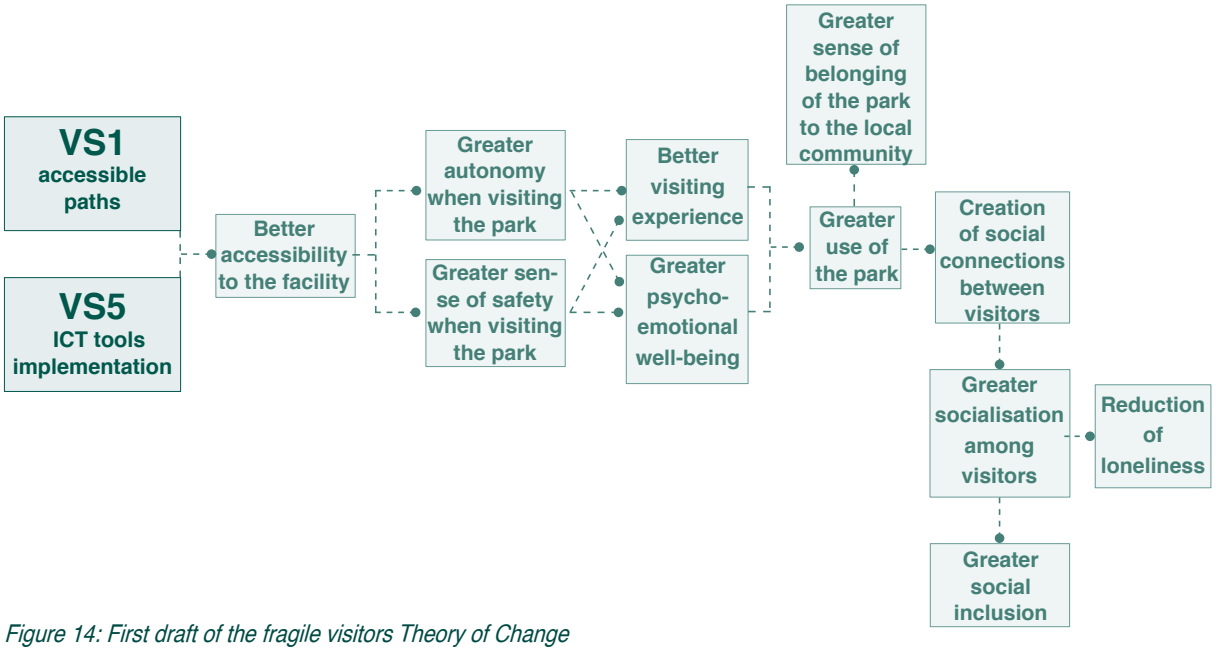

Figure 14: First draft of the fragile visitors Theory of Change

Causal chain caregivers – hypotheses made before the STK feedback

This group of stakeholders is of support to fragile individuals who may visit the park, as they must be considered with elderly or people with psychical/physical disabilities, they experience the same Visionary Solutions as the latter, VS1 and VS5. Within the SROI analysis it was hypothesized that the caregivers will experience an i**mprovement of the access to the facility** beneficiating of the new parking lot and the access path which connects to the park as well as of the internal paving. The implementation of ergonomic benches and the availability of the movement tracing app could contribute to a **reduction of stress and anxiety associated with the caregiver experience**. Another outcome is expected to be the improved visiting experience, the latter being able to induce an i**ncreased use of the garden**, thus **creating social bonds with the other users of the park**. The frequency of visits to the structure may have the effect of increasing the sense of belonging both to the local community that regularly visits

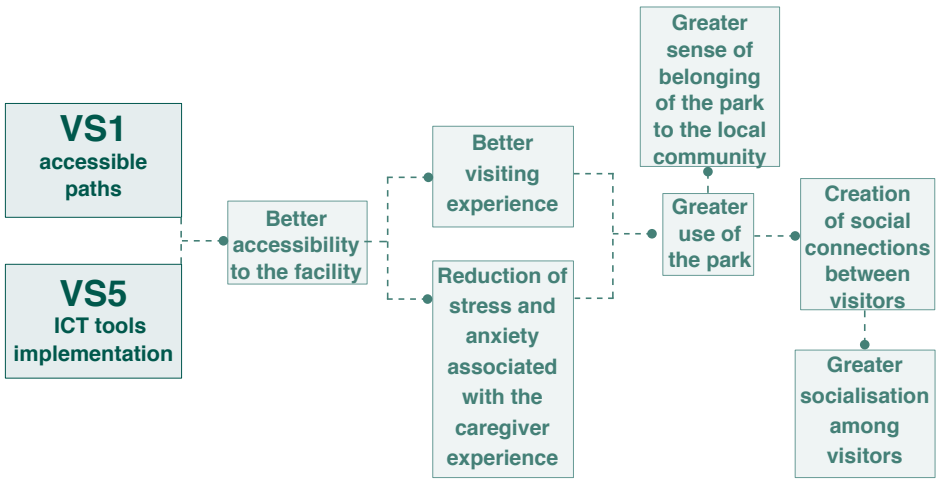

Figure 15: First draft of the caregiversTheory of Change

the park, and to **feeling the park as a common good of the community**.

Phase II – Validate Outcomes

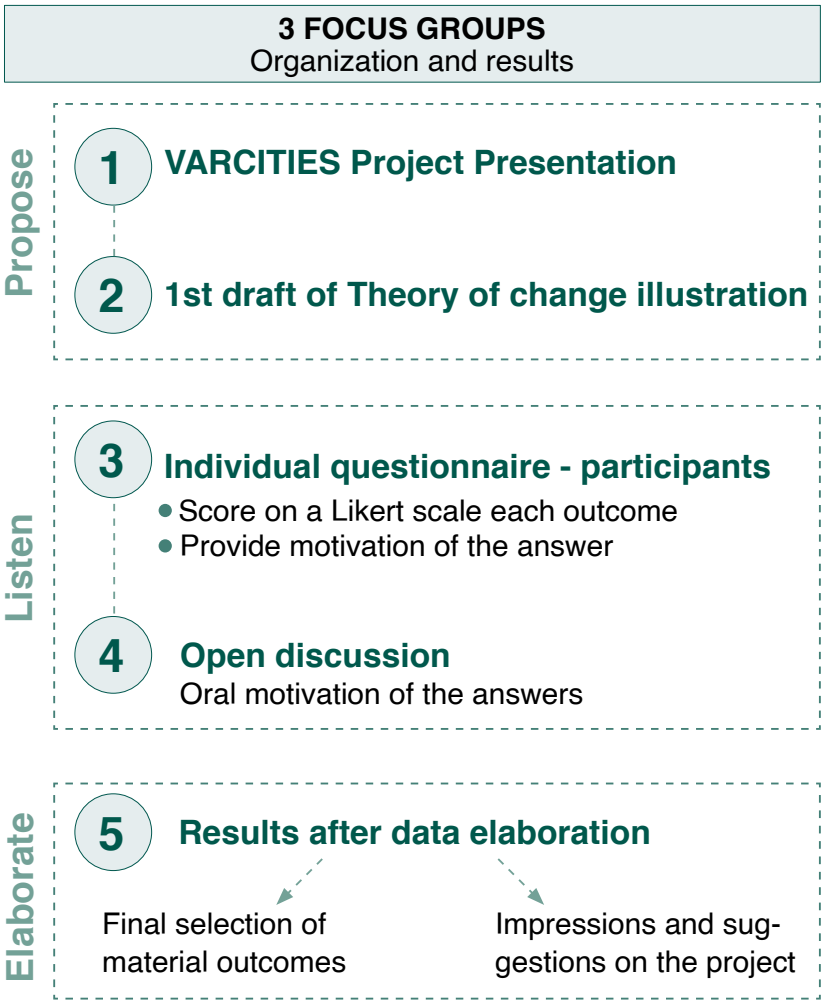

Figure 16: Focus groups organization

Figure 15: Stakeholders' engagement

The outcomes previously defined together with the project partners were subjected to the STK's feedback. Three focus groups have been organized to validate the changes hypothesized while listening to further comments and suggestions that gave an overall picture of

the general opinions on the Villa Bolasco Historic Garden. The participation of municipality administration STK group took place in the form of individual interviews.
After an informative moment aimed at explaining the purpose of the analysis and the VARCITIES project interventions, the participants have been asked to give a value from 1 to 5 to each of the outcomes. The value given would have reflected the relevance of the change based on some support questions that the participants have to keep in mind:
How important is the outcome to the beneficiary?
How many will live the change?
How much is it connected to the VARCITIES project?
How long will it last in time?
To each outcome, aside from the score from 1 to 5, a comment to justify the numeric value was given.
This exercise took place in two different moments, first the participants were given a paper version of the task to fill in with score and comment, after leaving them 10 minutes to answer, it started an oral discussion where the table they had in paper form was projected on a screen and filled in with the participants numeric answers, while the paper answers were put aside to be examined in back-end after the focus group, to receive instead oral comments. An average was calculated based on the scores from 1 to 5. The discussion was mediated by one of the coordinators of the focus group, while the other and me, were registering the answers given orally on the excel file of the exercise, so the participants could see their observations in real time on the screen. The discussion was articulated as follows: first were discussed the extremes of the table, the highest and the lowest average, to then move inwards to the median values. The stakeholders were invited to communicate their answers. One of the important achievements for the SROI was to obtain a comparison between those who handed out a high mark and those who gave a low one.
This technique consented an interactive discussion with the organizers and among the STK themselves. It allowed the flow of ideas and remarks that gave the needed information to run the SROI Analysis, but also it provided an insight on how the park is perceived.
In the following sections there will be described the feedbacks for each of the outcomes evaluated.
We digitalized the noted and the written comments provided by the participants during the focus groups to create an overview of everyone's answers, further, we transcribed the most relevant answers from the audio recordings, as to offer an as complete picture of the overall as possible. All the data collected are important for the analysis, in fact, Social Return on Investment, as broadly discussed in the previous chapters, it is not just an economic assessment framework, but a whole storytelling of the change produced in a social context.
The results obtained will be presented in the form of "synthesis sheets", one for each of the STK groups. Aside from a general overview there will be included also the aspirations of the STK that are not directly encompassed in the VARCITIES project vision. Finally, where emerged, there are the critical issues come out during the focus groups.

Outcomes non-fragile visitors – qualitative results
Fields represented - keywords: environment preservation, cycle mobility, volunteering, alpine sports, retired people socialization.

Better accessibility to the facility: it generally received positive feedback from all the participants, as this change is regarded to be fundamental for all the other project solutions.

Aspirations: the need to improve the accessibility to the park by dealing with a more extensive concept of accessibility which concerns the Borgo Treviso Street, from which people arrive to Castelfranco, that at the present time is an impermeable structure, although its huge connective potential.
Critical issues: Not enough parking space. At present date the garden is too hard to reach even for disabled people living in Castelfranco.

Better visiting experience: it was recognized the positive role of the VSs' implementations in making the visit more pleasant and fulfilling.
Aspirations: Aside from the physical and technological solutions there would be the need of the human factor involvement to improve the visit.

Creation of social connections between visitors: it is a change considered not feasible without providing for specific organized activities that give a reason to people to meet each other, therefore, to socialize.
Aspirations: Conversion of the Local Landscape Observatory in a node for Castelfranco's environment concerned associations and more broadly for the Citizenship.
Critical issues: the opening time schedule is considered too limited to allow the creation of social links.

Greater use of the park: it was generally considered a change on which the intervention could have a significant contribution.
Aspirations: use of the garden for educational and cultural purposes. Have the possibility to go there daily.

Greater socialization among visitors: this outcome obtained the lowest score. Four of the participants considered that the increased socialization can only take place if specific activities that encourage interaction between users are planned.
Aspirations: we can think of forms of socialization linked to cultural operations. Have the possibility of using the garden as introspection place instead of socialization.

Greater sense of belonging of the park to the local community: this element emerged as being a sensitive topic for the Castelfranco's citizens and they think that the project has the tools to change the current feeling of alienation towards the Villa Bolasco Park.
Aspirations: Be opened to everyone for longer time intervals. A higher frequency of visits will contribute to the perception of the park as a precious Common.
Critical issues: The park is the University's property, the Municipality didn't have financial resources to restored it, therefore the long decades of abandonment and the actual situation of little public opening, never allowed a feeling of belonging towards the garden.

Greater interest in the park: the outcome is one of the last on the relevance ranking, as the STK pointed out a great interest already, even considering the absence of the VARCITIES project.
Aspirations: The potential perceived from the VARCITIES implementation is the capacity to make the Villa Bolasco Park best known at the territorial scale. It is expected in fact, that the Visionary solutions, including the establishment of the Local Landscape Observatory will attract more people from outside Castelfranco.

Strengthening of active citizenship through participatory decision-making processes: it is considered that the project VSs will facilitate the participation of the citizenship representants in decision-making. The reason stays in the awareness towards green spaces that the project generates, therefore more interest in protecting the park as Common or create events to promote it.
Aspirations: "A participatory process potentially creates awareness, increases the sense of community and in any case allows us to understand what we are talking about, involving a whole series of stakeholders or users that had not previously been taken into account. (Stakeholder 8)
Critical issues: Lack of a participatory culture in Castelfranco Veneto.

Increase of knowledge and awareness in relation to the benefits of ecosystem services: the STK showed great interest towards the theme of knowledge creation and education on urban green and blue areas as an approach which should stay at the base of their fruition.
Aspirations: The knowledge and awareness of the eco-systemic meaning and benefits will lead to the creation of specific policies, mitigation, and adaptation measures for city development. Creation of an IoP (Internet of People), aside from the IoT (internet of Things) planned by the project, involving schools, more generally, creating a network.

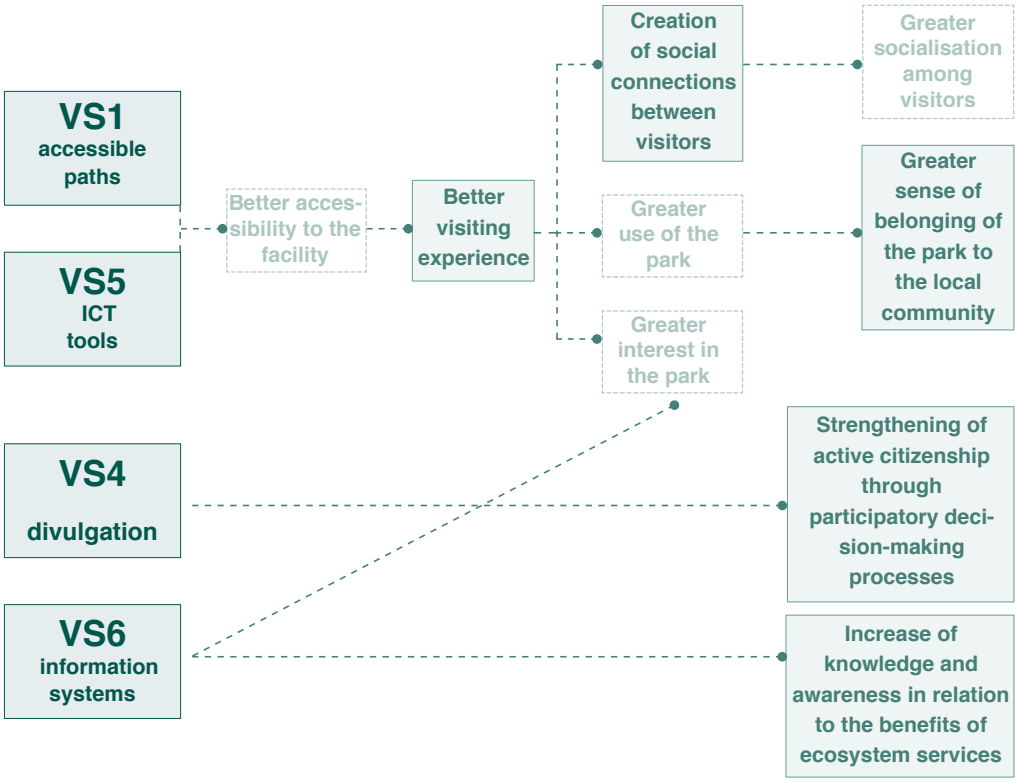

Figure 17: Final version of the non-fragile visitors Theory of Change

Outcomes fragile individuals – qualitative results

Fields represented - keywords: Alzheimer's treatment and research, neuro-diverse people support, elderly centers, volunteering.

Better accessibility to the facility: The STK described this outcome as being fundamental. They underlined the importance of the accessibility by car, key challenge from assisting fragile individuals' prospective.

Aspirations: having enough parking lots.

Greater autonomy when visiting the park: the participants recognize that the VSs could have a positive contribution in offering to the fragile individual more sense of freedom, however, this could apply only in the case of physical disabilities, but not psychical ones.
Critical issues: People with psychic disabilities cannot visit the park without a caregiver for security reasons.

Greater sense of safety when visiting the park: the VARCITIES interventions are useful, but still, they do not cover the needs of all disability niches.

Better visiting experience: with regard to initiatives in other historical gardens, the STK evaluated this outcome as being relevant, especially vulnerable subjects are highly stimulated by these kinds of urban spaces.
Aspirations: the experience will be completed only by involving also guides and volunteers that can interact and explain to the visitors.

Greater psycho-emotional well-being: highly rated, the VSs are thought to bring a material change. One of the themes brought up by the participants was the digital fruition of the garden.
Aspirations: Digital tours. Extend the wellbeing generated by the garden also in treatment centers by installing screens for people who cannot physically reach the park.

Greater use of the garden: it is possible to, and the digital systems employed can facilitate the garden's fruition in different ways compared to the past.
Aspirations: Extend the opening time of the Villa Bolasco Garden.

Creation of social connections between visitors: this outcome is regarded as surely important in the fragile individuals' life, but the project interventions are not deemed as enough to generate it.
Aspirations: The only solution suggested was by having more time access to the park.

Greater socialisation among visitors: possible, but not feasible without the possibility of daily visits.
Aspirations: create spaces or activities that can facilitate aggregation and conviviality in a targeted manner.

Reduction of loneliness: this is a central condition that this individual need to fight. The loneliness reduction is considered possible only if the socialization component succeeds.

Greater social inclusion: it is a theoretically possible outcome, but the obstacle is linked to the vulnerability these people suffer from, which complicates the interaction with able-bodied/minded people.
Aspirations: the interaction between fragile and regular people could raise the awareness towards the disabilities and make it become "normal".
Critical issues: vulnerable individuals need special behaviour when interacting with them

Greater sense of belonging of the park to the local community: It was raised the importance

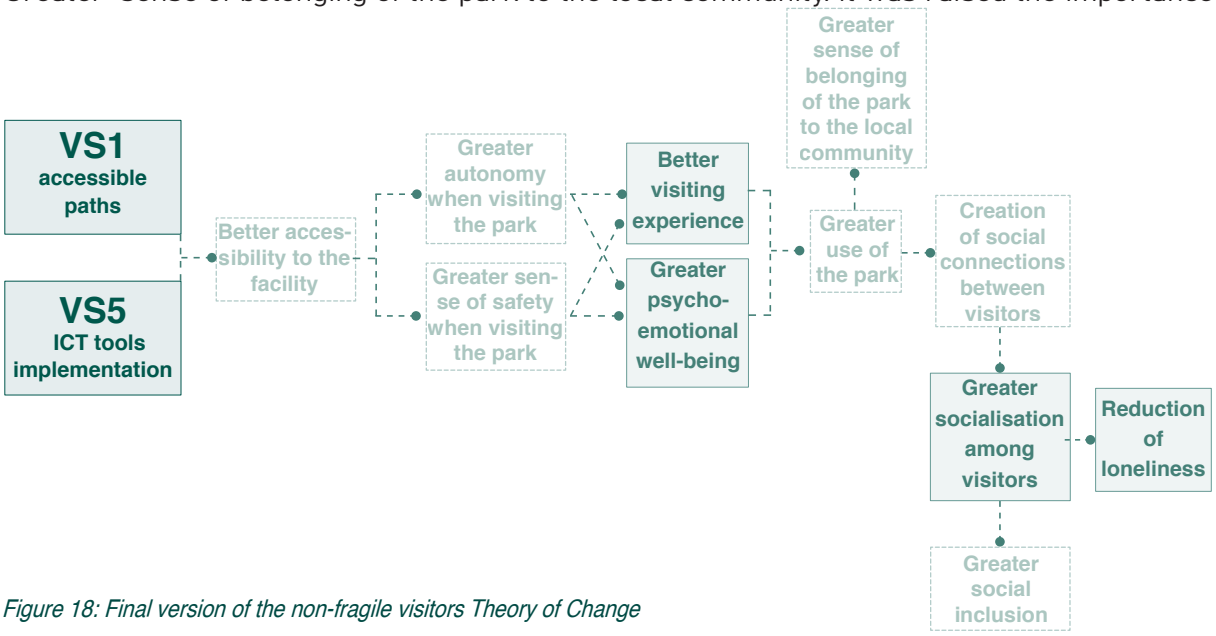

Figure 18: Final version of the non-fragile visitors Theory of Change

of accessing the park at any time, without needing of planning ahead every visit.
Aspirations: Community sense creation thanks to the visit of both fragile and able-bodied/ minded people.

Outcomes caregivers – qualitative results

Fields represented - keywords: Alzheimer's treatment and research, neuro-diverse people support, elderly centers, volunteering.

Better accessibility to the facility: it is regarded as the first outcome to be reached. The caregivers believe that having secured the accessibility to cars and buses will motivate caregivers and fragile individuals to come more often.
Aspirations: Increase of the opening time.
Reduction of stress and anxiety associated with the caregiver experience: The caregivers validate the importance of the VSs that are implemented, the new pathways, the benches and the smartphone with the app that traces visitor's movement, in the stress reduction.

Better visiting experience: The participants expressed favorably to this hypothesized change.

Greater use of the garden: the STK deem that the VARCITIES implementation will contribute to the realization of this outcome, but they raised concern towards the way that the interaction between fragile subjects and citizens will occur.
Aspirations: Provide information to people about the presence of people with frailty facilitating the interaction with them while creating awareness towards these categories of people, therefore increase the acceptation into the society. Transform the simple use of the garden into a working activity for people with psychic disability, as activities such as the green care helps them relieve the anxiety.
Critical issues: Potentially all people can make activities together, but the presence of professional people to take care of the mediation is a necessary condition.

Creation of social connections between visitors: According to the participants, the social ties

Figure 19: Spacial representation of the VS and STK feedbacks

VS1 ACCESSIBLE PATHS AND PARKING

Improving the physical accessibility to the park

Feedback

The opening time available stays a limitation

VS4 DIVULGATION

development of a manual of good practices on the effects of green and blue urban areas and the Observatory of the Local Landscape

Feedback

The education on urban green and blue areas should stay at the base of their fruition

VS5 SENSOR EQUIPPED BENCHES

Benches for people's rest that register the time they are used

Feedback

To enhance the visiting experience there would be the need of guides

MOVEMENT TRACKING APP

Improving security by providing vulnerable people of tracking smartphones.

Feedback

For psychic-disabilities the solutions cannot substitute the caregiver figure

VS6 INFORMATION SYSTEMS

Screens in strategical places to create a "virtual window" to the garden

Feedback

Providing hospitalization centers with screens to extend the WB benefits

should be correlated with training and professionalization activities of the caregiver.
Aspirations: small meeting rooms could be envisaged, or the villa could be thought of as a place for discussion and knowledge of the various niches of disability.
Critical issues: Caregivers might neglect they primary purpose, taking care of a fragile person, by engaging themselves in interactions and excluding the disabled.

Greater sense of belonging of the park to the local community: the STK expressed their desire that the VARCITIES project will return to them a so called "jewel" inside the city. However, it emerged that most of the caregivers are not Castelfranco's citizens, as they may live in the surrounding towns and so feel less the park as a Common by default.
Aspirations: Have access for the organization of cultural iniziatives

Greater socialisation among visitors: According to the participants the caregivers must be involved in a type of interaction organized in the form of training and professional exchange

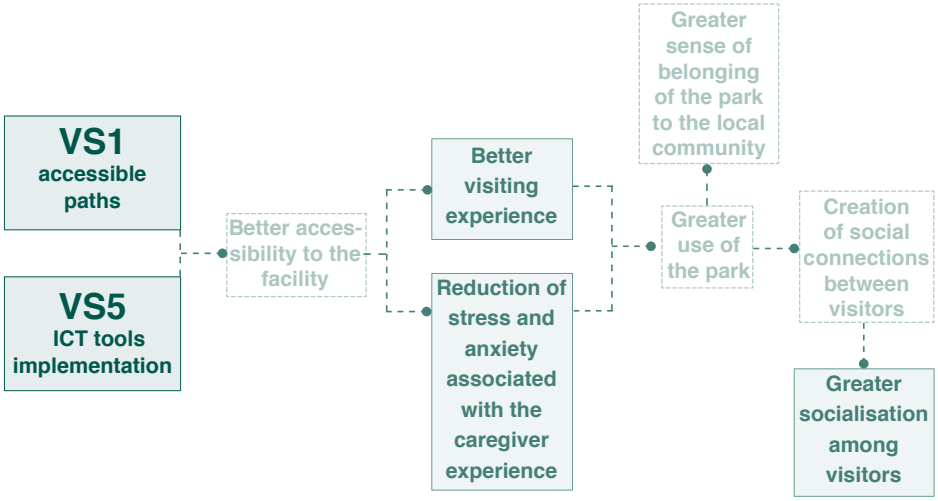

Figure 20: Final version of the caregivers Theory of Change

events.
Aspirations: Creation of more knowledge, therefore sensitization towards vulnerable categories of citizens, for example by involving local key actors: the firemen, the cashiers, etc.

APPLICATION PART 2: MONETIZATION 1

4.2.3 Stage 3: Valuating Outcomes

Once the outcomes are validated by the STK, the next step is moving closer towards the SROI ratio calculation. In Stage 3 the aim is to define the outcome indicators, the time horizon and finally the financial proxies.
The data collection for these SROI steps can occur in different manners, but STK involvement is needed, as they are the most suitable in recommending the indicators that should be used to quantify the outcomes, help defining for how long the intervention influence could last and also suggest or validate the financial proxies.
It is opportune reiterating that the Social Return on Investment stages are not always chronologically aligned and the research process of all the steps can be anticipated or delayed, one of the decisive factors in these choices it usually regards the possibility of interacting with

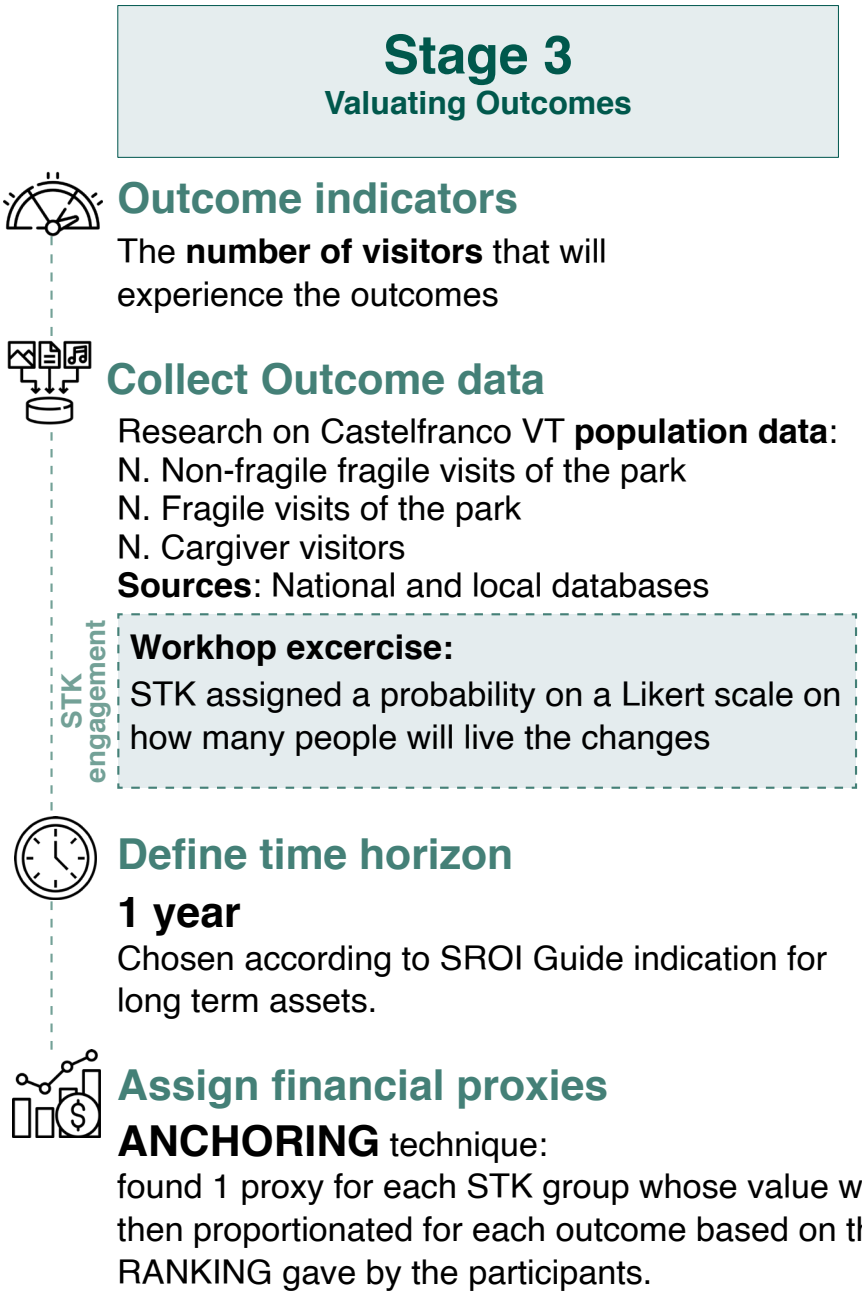

Figure 21: SROI stage 3 - steps implemented in Castelfranco

the stakeholders. Therefore, a key factor on the availability of data is exactly related on how well the STK involvement moments are organized. There are not defined ways of doing so, neither a precise number of meetings that need to be allocated. Also, all the focus groups or workshops must be exploited to collect the greatest number of information, often collecting data for more SROI steps at once.
For each of the matters brought up here it will answer the case study run in Castelfranco in the next paragraph.

Outcome indicators

The indicators are determined based on the outcome chosen, usually the indicator is the number of individuals estimated to experience a certain change in virtue or despite an intervention. As for the outcomes, the numbers hypothesized need to be validated. In the case of

Castelfranco we calculated the
target number of stakeholders for each group:
Citizens:
Starting from the data provided by the "Gestione Orto Botanico" office, we had the total number of visitors in 2021 disaggregated between residents and not residents, respectively 3310 and 7725, 11035 total.
Fragile individuals:
To these category belong multiple components which have been estimated based on National population data for each of the vulnerability type: people over 75 and subjects with disability. The value of these categories have been then proportionated to the number of local park visitors.
Caregivers:
Caregivers number was determined thanks to National Statistic data, then the value obtained for Castelfranco has been reduced according to the total number of resident visitors.

Collect Outcome data

Workshop proposed: (make a table!)
The last meeting with the stakeholders was organized in the form of a workshop containing three exercises.
1. Outcome Ranking
As the method employed is the "anchoring" it is necessary to find the most representative outcome on which the research will be made. The ranking would have been already defined from the previous focus group when the relevance has been defined, however it happened that many outcomes received the same average score. The participants were asked to assign a position to each of the outcomes which received with equal merit. Finally, the STK were able to see the new ranking projected on the screen.
2. Estimation of the target subjects that will live the outcomes
The number of individuals represents one of the SROI Map requirements to the SROI Ratio calculation. For each of the outcomes a target number must be identified. These values have been determined from research on one hand and information given by the Park's administration on the other.
The STK were asked to provide a qualitative judgement on the amount of people that will experience the outcomes on a scale of 5 going from "minimally probable" to "absolutely probable".

3. Determination of the Attribution
The Attribution is a percentage that assesses how much of the outcome was caused by the contribution of other organizations or subjects.
What people have been asked was to name for each of the outcomes which are operating provide the same changes, and indicate on a qualitative scale from 1 to 5 how much they think the other entities operating on the territory will contribute in reaching those specific changes described in the Theory of Change. The impact of the project will be the difference between a baseline of 100% and the percentage of attribution to assign other associations.

Define time horizon

As the Castelfranco's SROI Analysis represents a forecast on the future value that the project will generate to the material stakeholders identified, the choice was to consider only one year

of inputs and social value, according to the indications provided by the SROI Guide (A Guide to Social Return on Investment, 2012) on long life expectancy assets. In fact, the whole life duration of the Visionary Solutions was estimated to be of 10 years. The analysis performed with Human Foundation takes into account this information by dividing the all the costs by 10 years, while the benefits are calculated only for the first year after the completion of the project's interventions.

Assign financial proxies

The financial proxies have been assigned by applying the "anchoring" technique which consists in finding the most representative outcome of the set delineated in the Theory of Change for each of the STK group, to then assign a monetary value to the material changes chosen. Once found a proxy for the most relevant outcome, the other values are calculated based on this "anchor" which will be multiplied by the average score from 1 to 5 received from the stakeholders during the first 3 focus groups. Thus, the monetary results will be proportionated based on their relevance.

The outcome considered for the non-fragile visitors is the "increase of knowledge and awareness in relation to the benefits of ecosystem services", which had the highest score, and it was recognized during the open discussion as being the key change be attributable to the VARCITIES implementation. "Greater psycho-emotional well-being" was chosen as "anchor" for the fragile visitors, as it was regarded as not only fundamental, but also as the most likely to happen. Finally, the caregivers agreed that "reduction of stress and anxiety associated with the caregiving experience" was most characteristic outcome for their STK group.

Non-fragile visitors	Increase of knowledge and awareness in relation to the benefits of ecosystem services	Annual subscription to National Geographic magazine (average cost between full and discounted costs)	48,9 €
Fragile visitors	Greater psycho-emotional well-being	Monthly yoga course (4 lessons + annual card cost)	45,0 €
Caregivers	Reduction of stress and anxiety associated with the caregiving experience	Minimum cost of an individual session of stress management, according to the Order of Psychologists' tariff	45,0 €

Table 2: Financial proxies chosen with Human Foundation for the "anchoring"

4.2.4 Stage 4: Impact

Deadweight

The deadweight, meaning a discount factor which reduces the total impact based on what would happen anyway without the VARCITIES project, was determined by considering national and local data on population habits. (see appendix V)

Displacement

During the meetings with the stakeholders there were no clues regarding the assumption of any displacement, therefore it was chosen at 0%.

Attribution

The evaluation of how much the results may be attributable to the activities proposed by the project is calculate by subtracting the percentage of effects for which are responsible other entities or subjects on the territory. To assign the attribution to each of the outcome it has

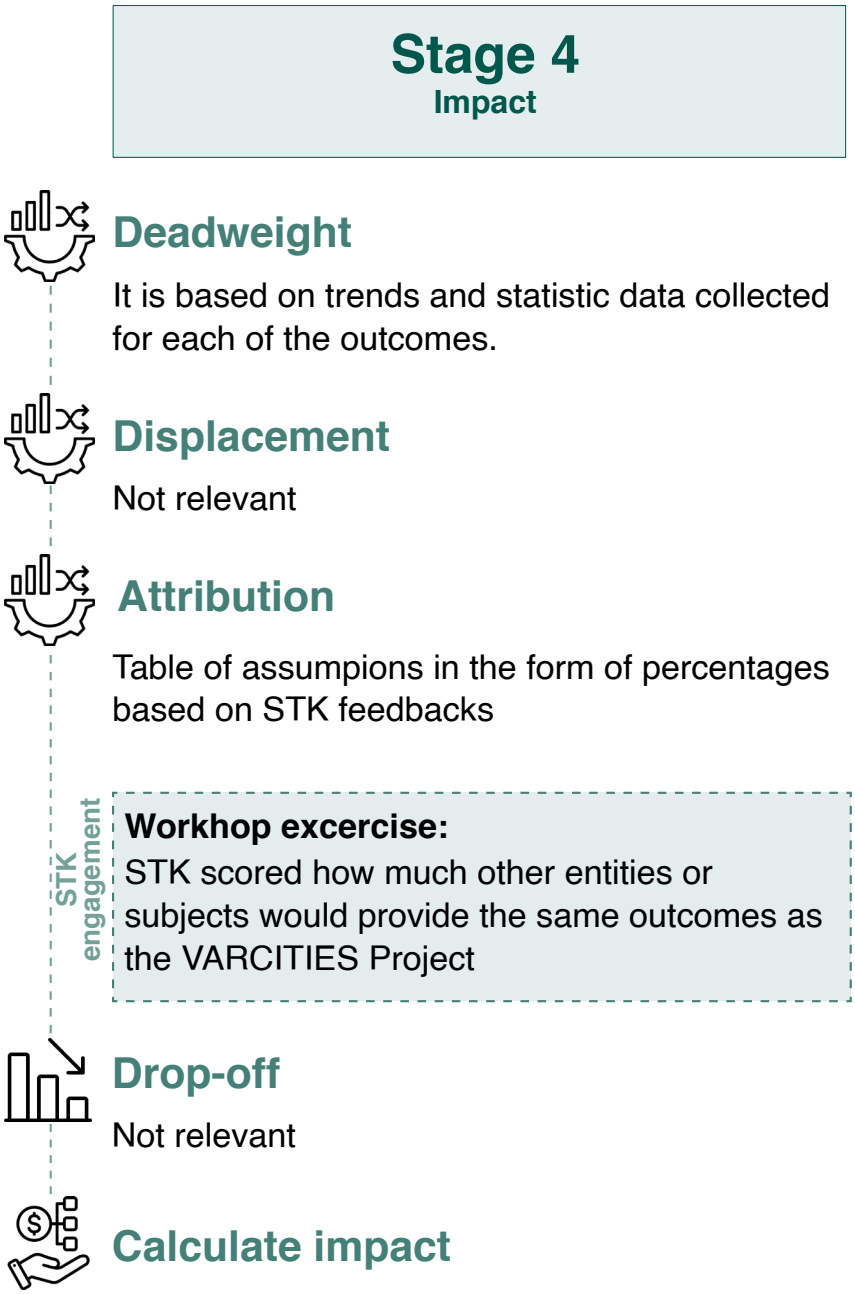

Figure 22: SROI stage 4 - steps implemented in Castelfranco

been used a table (for values see appendix VI). The latter was determined by considering the answers given during the workshop and from further consultation with the municipal representatives.

Drop off

As the time horizon was set at 1 year, the drop off does not apply, therefore it was considered at 0%.

4.2.5 Stage 5: SROI calculation

At this point all elements necessary for the Social Return on Investment are ready. In order to calculate this indicator, first either the Total Present value or Net Present Value must be determined, to then devide the value obtain by the total costs of the investment, which in SROI

Stage 5
Calculate SROI

Present Value calculation

$$\text{Present Value} = \frac{\text{Year 1}}{(1+r)^1} + \frac{\text{Year 2}}{(1+r)^2} + \ldots + \frac{\text{Year n}}{(1+r)^n}$$

SROI ratio calculation

$$\text{SROI Ratio} = \frac{\text{Present Value}}{\text{Total Inputs}} \text{ or } \frac{\text{Net Present Value}}{\text{Total Inputs}}$$

1 : 2,04

Sensitivity analysis

START	NEW	RATIO
Displacement assumed 0%	Displacement is raised to 40% for all outcomes.	1 : 1,22
Deadweight is below 60%	Deadweight is raised to 60% for all outcomes	1 : 1,08

Figure 23: SROI stage 5 - steps implemented in Castelfranco

SROI calculation example: impact determination

Outcome: increase of knowledge and awareness in relation to the benefits of ecosystem services

Quantity of outcome indicator (a): 2,165

Value financial proxy (b): 48.90 €

Deadweight (c): 30%

Attribution (d): 40%

1. Multiply the outcome indicator by the financial proxy
2. Apply the deadweight
3. Apply the attribution

Impact Year 1: a x b x (1-c) x (1-d) = 44,472.99 €

Present Value calculation

After obtaining the impact for the first year, in case the intervention effects would last longer than one year, the discount rate must be applied, namely the drop off and the HM Treasury's Green Book for social assets, 3,5%. In Castelfranco's specific case no discount rate were applied since the time horizon was set at 1 year.

$$\text{Present Value} = \frac{\text{Year 1}}{(1+r)^1} + \frac{\text{Year 2}}{(1+r)^2} + \ldots + \frac{\text{Year n}}{(1+r)^n}$$

Where r is the sum of the drop off and the social discount rate.

SROI ratio calculation

The SROI is a benefit-cost ratio made between the total value created by the project and the inputs, i.e. the investments. It is calculated with the following formula:

$$\text{SROI Ratio} = \frac{\text{Present Value}}{\text{Total Inputs}} \text{ or } \frac{\text{Net Present Value}}{\text{Total Inputs}}$$

Castelfranco's result: **1 : 2,04**

Sensitivity analysis

This last step serves at indentifying the limit values of some of the analysis variables before the ratio gets lower than 1 and . The procedure is to chose some of the variables, usually is is recommended to check the discount factors, the financial proxies or the quantity of an outcome, and observe how the ratio changes by slightly modifying their value, in this way the most sensitive to change variables are found.

For Castelfranco's is was chosen to vary the displacement and deadweight values, which are values on which there is both less evidence to support them and they affect more the outcomes.

START	NEW	RATIO
Displacement assumed 0%	Displacement is raised to 40% for all outcomes.	1 : 1,22
Deadweight is below 60%	Deadweight is raised to 60% for all outcomes	1 : 1,08

Table 3: Sensitivity analysis

SROI map

The data coming from all the SROI steps need to be inserted in order in a spreadsheet (see appendix VII for Castelfranco). Once calculated all the impacts, it is interesting to notice which outcome create more social value also based on the projects purposes. It can be noticed in figure 24 that the "better visiting experience" is largely predominant for all STK groups, mostly because the outcome quantity was higher than for the other changes hypothesised, including both local and not local visitors. The other outcomes instead, are contributing in almost equal parts, except for the "increase of knowledge and awareness in relation to the benefits of ecosystem services" which reflects the STK perception as it was rated the most relevant.

STK	OUTCOME			DISCOUNT FACTORS		IMPACT
	DESCRIPTION	QUANTITY	VALUE (€)	DEAD-WEIGHT	ATTRI-BUTION	VALUE (€)
NON-FRAGILE VISITORS	Increase of knowledge and awareness in relation to the benefits of ecosystem services	2165	48,9	30%	40%	44,473.0
	Strengthening of active citi-zenship through participatory decision-making processes	2165	41,9	20%	80%	14,521.79
	Better visiting experience	9144	39,9	25%	20%	219,015.8
	Creation of social connections between visitors	2093	38,9	30%	80%	11,405.7
	Greater sense of belonging of the park to the local commu-nity	2093	37,9	10%	60%	28,576.8
FRAGILE VISITORS	Reduction of loneliness	419	45,5	30%	80%	2,673.1
	Greater psycho-emotional well-being	535	45,0	35%	80%	3,131.8
	Better visiting experience	439	43,9	25%	20%	11,556.9
	Greater socialization among visitors	419	43,4	30%	80%	2,545.8
CAREGIVERS	Reduction of stress and anxiety associated with the caregiving experience	468	45,0	20%	80%	3,369.6
	Better visiting experience	540	43,5	25%	20%	14,094.0
	Greater socialization among visitors	468	42,5	30%	80%	2,784.6

Table 4: SROI Map - semplified

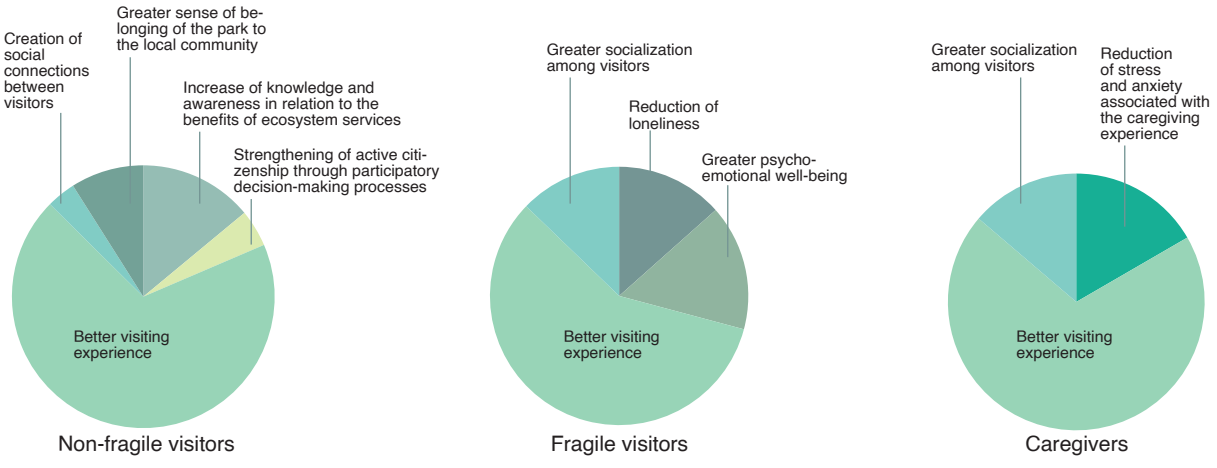

Figure 24: Disaggregated social value for each outcome

correspond to the inputs.

4.3 APPLICATION PART 2: MONETIZATION 2

4.3.1 Why running a second monetization?

The Social Return on Investment methodology, as it has been broadly discussed in the literature review chapter, it does not have a univocal way to be run. In the specific case of Castelfranco the differences are even more challenging as in the Human Foundation application it is used the "anchoring" technique for financial proxies' definition, while I propose in the following paragraphs the "standard" SROI monetization process.
SROI is known for its subjectivity, and the lack of similar studies concerning Social Return on Investment applied to urban planning interventions treating the specific outcomes analysed for Castelfranco adds further complexity. To cope with this gap, I propose a literature review mostly on SROI reports where the same outcomes as in VARCITIES could be found. The examples will offer a different view both on how many different proxies and discount factors alternatives there can be associated to the same outcomes and give an example of an approach to the SROI monetization by using case studies in a systematic way.

Case studies approach utility in stage 3

The main difficulty will be in determining the financial proxies for each outcome. In fact, SROI allows and encourages the use of similar case studies for the hypothesis of possible material outcomes, in further stages, precisely 3 and 4, case studies are useful as inspiration for outcome data collection, while helping in the proposition of the most suitable type of financial proxies.

Case studies utility approach in stage 4

The data concerning of the discount factors, namely deadweight, attribution, displacement and drop off, are less transferable than the determination of the financial proxy data. This means that if for the choice of a proxy the "weekly stress counselling sessions", if suitable, could be used as such, completing the process by searching the prices of the geographical area of interest, but keeping the same kind of service, for the discount factors the information are unique for each case study. Thus, the latter can be useful to understand how the values have been determined, as they depend directly on the STK characteristics and feedback.
The aim of the comparison I propose is to open more the discussion towards the potential of this methodology by addressing the critical issues encountered.

4.3.2 Stage 3 – Outcome data

Limitations of the approach

1. The activities which generate the outcomes of the case studies are different from the actions proposed by VARCITIES Project and therefore not perfectly comparable. Also they differ among each other in terms of number of people involved, the activities they propose, in some cases, the stakeholder engagement methods.
2. The discount factors cannot be determined from the reports analysed as they need to be

provided by the engagement of key stakeholders.

Outcome indicators and outcome data collection

Outcome indicators will be provided from the case studies analysed, however they do not constitute a difference compared to the first monetization process.

Define time horizon

The choice made within the SROI run in Castelfranco reflects one of the ways the Social Return on Investment Guide indicates to follow when dealing with long life expectancy assets. However, the Guide lets the practitioners free to choose mainly between two options: either consider the whole life expectancy, even though it exceeds the SROI maximum duration (i.e. 5 years), or consider 1 year of analysis, namely one year of costs and one year of the benefits. This second alternative turns useful especially for ex-ante applications such as the one performed for Castelfranco, when the prolonging of the effects of a structural asset depends on future additional income each year. (A Guide to Social Return on Investment, 2012)(SROI guides) Yet, by considering only one year of costs and benefits it is not perfectly aligned with considering the whole life duration. The main difference is that in considering one year the discount rate embedded in the SROI calculation, 3,5% according to the HM Treasury's Green Book, applied to one year does not correspond to the application of the mentioned discount rate for the whole life duration. Also potential drop offs are not accounted.

VARCITIES is a project which changes the built environment, and it has as a long-life expectancy, we hypothesized 10 years not to overestimate the impact, as this was the value estimated also by the project partners, especially considering the technological devices which inevitably will get obsolete over time. Other solutions instead, the Observatory of the Local Landscape and the new paving is meant to last even longer than 10 years.

Another possible result would be given by considering 10 years of outcomes duration.

It could seem a risky decision that of forecasting benefits that will prolong so much in time, in fact the SROI guide advises not to exceed the 5 years, however it was developed to evaluate not for profit organization actions which result incompatible to urban projects. Thus, choosing one year or choosing 10 years does not mean that the analysis loses its validity, but it must be given a proper justification of the choice.

Regularly, the Social Return on Investment considers the outcomes as lived by a single individual which in time will experience a drop off of the benefits once a service or activity stops being provided. For Castelfranco's application case, the social value is not based on a single person, but on the park visitors as a collective target, the information we have in fact regards the number of visits registered every year. Assuming that the number will stay the same or it is likely to increase, due to the end of the pandemic and the project implementations, we will have the outcomes repeating in time for either the same visitors or new ones. Considering the beneficiaries as a target group of park visitors which change in time, but remains constant in quantity leads to consider the drop off 0%, as the outcomes will not change in their intensity during the years. In the best of scenarios, they will gradually increase.

Financial Proxies

To arrive to the financial proxies, I moved by following two main directives: either by comparing the proxies found in the case studies and create an overview on the possible alternatives used to evaluate the outcomes; or by considering independently a proxy, determined by using the revealed preference method, as it has been done with Human Foundation for the "anchor"

proxies. The proxies defined without the use of case studies could be associated to some of the most "structural" outcomes which depend in a specific way on the VARCITIES interventions and for which there are not similar benchmarks.
Regarding the choice based on case studies I will provide two examples of how the SROI reports found have been used to guide the monetization phase.

Excursus: databases for financial proxies:
Social value creation is studied by multiple International Organizations among which the most known are Social Value International[1], HACT (Harmonized Approach to Cash Transfers) Social Value Bank[2], the Social Value Portal[3]. All these entities strive in determining tools that can support organizations in assessing the social impact of their activities through the employment of standardized monetary values. Although the existence of these tools, working as calculators, based on a "theme/domain – outcome – outcome indicator – units – proxy (optional) – value" sequence, they do not take into account the specificity of each intervention or the local dimension, which could constitute a problem in widening their application. Furthermore, these tools express an average value per person which could consistently vary by changing the geographical area.

4.3.3 Assign Financial Proxies

The determination of the monetary value followed the standard method employed for outcomes monetization, which consists in assigning to every each of the material changes hypothesized a financial proxy. They have been chosen based on the analysis of multiple case studies. This approach allowed me to understand which financial proxy was more suitable.
The outcomes validated for Castelfranco VT regard mainly changes related to individual benefits achieved thanks to the recreative value of the park enhanced by the Visionary Solutions implementation. They concern the following spheres: socialization, health and well-being, knowledge creation.
The choice of the case studies was guided by three principles:
- similarity to VARCITIES activities and scope proposed
- correspondence of outcomes
- correspondence of STK groups

By screening the reports and articles according to these criteria, I chose mainly, on one hand, reports concerning activities made with fragile elderly subjects and the benefits brought to the caregivers in charge of them; on the other, reports proposing walking activities in urban spaces for people either elderly or socially isolated. One case study discusses the Social Return on Investment derived from the construction of a greenway.

1. Social Value International = It is a s the global network specialized on social impact and value. It promotes the use of mainly 2 softwares that can calculate social value: Social Value Engine, and, from an environmental point of view, RIDDL which consents to calculate the impact by considering the measurements of Environmental, Social and Governance (ESG) parameters. (www.socialvalueint.org)
2. HACT Social Value Bank = Launched in 2014 by HACT, the Social Value Bank is the largest database of social value derived from surveys made by housing providers on their tenants. At present it includes domains such as: health, employment, local environment [31].
3. Social Value Portal = The TOMs methodology is based on principles of socio-economic cost-benefit analysis and is designed to be consistent with the Treasury Green Book. As such, it recognizes the importance of the economic benefit that business expenditure locally creates [32].

TABLE WITH THE CASES ANALYSED

CASE STUDY	REFERENCE
CASE 1	R. F. Hunter, M. A. T. Dallat, M. A. Tully, L. Heron, C. O'Neill, and F. Kee, "Social return on investment analysis of an urban greenway," Cities Health, pp. 1–18, Jun. 2020, doi: 10.1080/23748834.2020.1766783.
CASE 2	Carrick, K. (2013), "Glasgow Health Walks Social Return on Investment Analysis"
CASE 3	Carrick, K., Lindhof, J. (2011), "The Value of Walking: a Social Return on Investment study of a Walking Project."
CASE 4	PricewaterhouseCooper (2020), "Cathay Life Cathay Walker Health Incentive Project Social Return on Investment Report".
CASE 5	Lobley, N., Carrick, K.(2011) "Social Return on Investment Evaluation Report. Bums off Seats Executive Summary".
CASE 6	Greenspace Scotland (2011), "Woods for Health on Kinnoull Hill Perth greenspace Scotland Perth and Kinross Council Ranger.
CASE 7	Human Foundation, AIL Bologna (2020), "La Valutazione SROI dei Servizi di Assistenza Sanitaria e Sociale di AIL Bologna sui Pazienti onco-ematologici, sulle loro Famiglie e sui Volontari".
CASE 8	AUSER Piemonte (2018), "L'impatto sociale dell'AUSER Piemonte tramite il progetto 'i pony della solidarietà'".
CASE 9	Social Value Lab (2011), "CraftCafé: creative solutions to isolation and loneliness, Social return on Investment evaluation".
CASE 10	Raine et al. (2016), "Measuring Well-being Outcomes In Older People Receiving Help From The Age UK 'Together for Health' Initiative: A Social Return on Investment Analysis". https://eprints.leedsbeckett.ac.uk/id/eprint/2887/
CASE 11	Semple, A., Willis, E., de Waal, H. (2015), "Peer Support for people with dementia A Social Return on Investment (SROI) study Health Innovation Network".

Table 5: References - Case studies

Financial Proxies – Non-fragile visitors group

OUTCOMES	ANCHORING with Human Foundation		STANDARD thesis elaboration	
Increase of knowledge and awareness in relation to the benefits of ecosystem services	Annual subscription to National Geographic magazine (average cost between full and discounted costs)	48,9	One hour of guided visit on Ecosystem Services learning	**50,00**
Strengthening of active citizenship through participatory decision-making processes	anchored	41,9	HACT social value calculator - value of being active among tenants	10,00
Better visiting experience	anchored	39,9	the cost of a sensorial/digital/ guided tour garden	8,00
Creation of social connections between visitors	anchored	38,9	ISTAT data - cost of a day of vacation in 2020	76,00
Greater sense of belonging of the park to the local community	anchored	37,9	NOT FOUND	/

Table 6: Financial proxy comparison - non-fragile visitors

The cells highlighted in dark green are the proxies that I determined without the aid of case-studies as they are changes specific to the VARCITIES' intervention goals. All the proxies re-

flect the monetary market values of services that could provide the same outcomes. I moved either by assigning a suitable value, as Human Foundation did, by choosing market proxies, or by giving an estimation based on consolidated studies, such as the one given for "strengthening of active citizenship through participatory decision-making processes" which has been correlated with the "value of being active among tenants" provided by the HACT Social Value Calculator.

Here below an example of how case studies have been used to determine the most suitable type of financial proxy. The table provides multiple information on the measurements of the monetary value of outcomes.

Creation of social connections between citizens

	CASE 2	CASE 6	CASE 4	CASE 5	CASE 3
OUTCOME	Walkers have more social contacts and are now more confident, experience less isolation and take part in new experiences	The project increased candidates' ability and confidence to meet new people	Stress reliefImproved interpersonal relationships	Feeling happier as a result of increased opportunities, meeting new people, establishing new friendships and social connections	Walkers have more social contacts and are now more confident, experience less isolation and take part in new experiences
OUTPUT	18 walking groups - 35 walking sessions a year	min 20 h outside - 4 challenges to accomplish in discovering a natural site	mobile walking applization	30 walking sessions provided each year	30 sessions of walking groups a year
OUTCOME INDICATOR	No of walkers reporting additional social contacts	Number of new opportunities for socialising and meeting people	No of people experiencing more walks with family and friends	No of walkers reporting additional social contacts	No of walkers reporting additional social contacts
QUANTITY	137 persons 90%	56 times (8 days x 7 candidates)	1,455 persons 10%	24 persons 75%	66 persons 26%
FINANCIAL PROXY	average cost of joining a club/ organisation in Glasgow	Average weekly spend on social activities (broken down from annual average spend)	Weighted average of budget and activities for achieving same level of outcomes	Average cost of various different local sports and social clubs	cost of a sports social club in Stirling
VALUE	£ 50.00	£ 10.00	1,873 / 2,119 / 3,992	£5.00	£ 320.00
DEADWEIGHT	7%	10%	62%	0%	7%
DEADWEIGHT DETERMINATION	- research - experience - STK feedback	-experts assumtion	- STK feedback through online questionnaire	-expert assumption based on STK feedback	- research - experience - STK feedback
ATTRIBUTION	5%	25%	51%	0%	10%
ATTRIBUTION DETERMINATION	- research - experience - STK feedback	-expert assumption based on STK feedback	- STK feedback through online questionnaire	-expert assumption based on STK feedback	- STK feedback - consultation

Table 7: Case study analysis for "Creation of social connections between citizens" outcome

"Greater socialization among visitors" is associated in the 5 case studies chosen with the benefit that either a social trip, a holiday abroad, social activities or participating to a club, can give. All these proxies can be assimilated in a category: "spend on social activities". Thus, once defined the type of proxy, a specific financial value has been selected based on the geographical area of interest.
It is interesting to note that the same proxy type, for the "Greater socialization among visitors", has been treated, in the case studies (for more details see appendix VIII), differently for each stakeholder group, meaning that for the fragile STK were associated less expensive social activities, while for the non-fragile STK it was chosen social activity with higher prices, such as the value of a holiday, the same distinction was applied for Castelfranco.
In the table the red row indicates an outcome to which I could not find a proxy that could fully reflect the "Greater sense of belonging of the park to the local community ". In fact in this case the stated prefernce method could be used by directly asking the STK which could be a proper estimation.

Financial Proxies – Fragile visitors group

OUTCOMES	ANCHORING with Human Foundation		STANDARD thesis elaboration	
Reduction of loneliness	anchored	45,5		
Greater psycho-emotional well-being	Monthly yoga course (4 lessons + annual card cost)	45,0	Minimum cost of an individual session of stress management	35,00
Better visiting experience	anchored	43,9	the cost of a sensorial/digital/ guided tour garden	8,00
Greater socialization among visitors	anchored	43,4	Cost of one day of party in the square	26,50
Better accessibility to the facility - enhanced physical activity			Heat assessment tool	2362.38

Table 8: Financial proxy comparison - fragile visitors

Better accessibility of the park translated into enhancemed of physical activity.

For this STK group there are two main changes compared to the application performed with Human Foundation. The first is that I chose not to consider the "reduction of loneliness" as a separate outcome, but either to incorporate it in the "greater psycho-emotional well-being", since the loneliness theme, although a central aspect of fragile persons' life, it does not have in Castelfranco area specific activities to promote the outcome, thus, I decided conservatively to keep only the well-being effect. The second is the consideration of another outcome not treated with HF, which is "**Better accessibility of the park translated into enhancement of physical activity**."

Rationale:
As in all case studies treating the benefits derived from urban spaces by walking, the increase of physical activity was an important outcome. I decided to include it into the analysis only for the fragile visitors of the park. **The main motivations are**:
The fragile category of STK is usually socially more isolated and according to ISTAT data on

	CASE 6	CASE 3	CASE 4	CASE 3*	CASE 1	CASE 5
OUTCOME	Candidates are more physically active due to use of the outdoors for recreation	Walkers with diagnosed physical medical conditions are able to engage in physical activity and as a result feel fitter and become healthier	Better physical health	Walkers are fitter and have improved physical health as a result of becoming more regularly physically active	Health improving	Maintaining or not eroding current physical health and fitness levels
OUTPUT	min 20 h outside - 4 challenges to accomplish in discovering a natural site	30 walking sessions provided each year	mobile walking applization	30 walking sessions provided each year	The construction of a greenway	30 walking sessions provided each year
OUTCOME INDICATOR	"Number of hours candidates report they are more physically active"	No. of walkers reporting clinical improvements in their medical condition	"Helps get into habit of exercise/ walking. Feel more energetic and less fatigued. Better cardiovascular function Lose weight Lowered BMI"	No. of walkers who report improved levels of physical fitness	Percentage of inactive population at baseline that begins making physical activity	Number of participants reporting an Increase in fitness levels
QUANTITY	7 persons 100%	16 persons 6%	5,850 persons 42%	99 persons 40%	hypothesis: 5% - 60 persons	32 persons 100%
FINANCIAL PROXY	Equivalent of paying to attend a gym"	20% reduction on spend on health per year"	Weighted average of budget and activities for achieving same level of outcomes = Riding a bicycle for 3 hours every week	Cost of a swimming session. Each sessions	Multiplying the total number of deaths each year, for each disease by the value of a statistical life	Cost of a swimming session as a form of low impact physical activity
VALUE	£5.73	£67.60 / £13.52	15,462 (in one year)	£120.00	£ 11 562,73	£2.33
DEADWEIGHT	0%	7%	64%	7%	0%	15%
DEADWEIGHT DETERMINATION	-experts assumtion	- research - experience - STK feedback	- STK feedback through online questionnaire	- research - experience - STK feedback	-expert assumption	-expert assumption based on STK feedback
ATTRIBUTION	25%	10%	49%	10%	0%	0%
ATTRIBUTION DETERMINATION	-expert assumption based on STK feedback	- research - experience - STK feedback	- STK feedback through online questionnaire	- research - experience - STK feedback	-expert assumption	-expert assumption based on STK feedback

Table 9: Case study analysis for "Enhanced physical activity" outcome

population they constitute the larger percentage of inactive (according to the WHO definition) persons, also they have limited means to move on the territory, therefore the Bolasco Park can be identified as their main source of urban green. The new paving of the garden trails and the increased parking lots could raise the frequency of their visits and further positively contribute to a change in their habits and so a small percentage could pass from being inactive

to being active.
The method used to assess the monetary value of being active was calculated by using the HEAT (Health Assessment Tool) which has been recognized in case studies here analysed as a suitable way to give a proper picture of the value that walking activities can bring to individuals in terms of health (Case 1 and Case 2). This calculator was developed by the World Health Organization (Health Economic Assessment Tool (HEAT) for Walking and for Cycling Methods and User Guide on Physical Activity, Air Pollution, Injuries and Carbon Impact Assessments, n.d.)which bases its evaluation on years of life gained due to a reduced risk factor of dying because of a series of combined diseases analysed. The tool considers a linear relationship between walking and mortality. [33]

HEAT – Health Assessment Tool
The tool is available online and it requires the following data:
The number of the minutes employed in walking per day
The number of the interested population sample
The percentage of this population on which the value must be determined
The age range of the population
The geographical area
The time frame

The value proposed as a proxy is the result of using the HEAT calculator based on the conservatory assumption the the population experiencing the change of passing from being inactive to being active is the 5% of the inactive fragile visitors of the park.
I started from the target number of fragile visitors: 645, which can be broken down in active and inactive. According to the Istituto Superiore di Sanità (ISS) 2016-2019 in Veneto Region the inactive population is 54.8%, thus 353 visitors, of which I estimated that the 5% will become active, i.e. 18 fragile subjects. The value generated in a year for 18 elderly persons is of 42,523 and 2,362 per individual.

Financial Proxies – Caregivers group

OUTCOMES	ANCHORING with Human Foundation		STANDARD thesis elaboration	
Reduction of stress and anxiety associated with the caregiving experience	Minimum cost of an individual session of stress management, according to the Order of Psychologists' tariff	45,0	Minimum cost of an individual session of stress management	35,00
Better visiting experience	anchored	43,9	the cost of a sensorial/digital/guided tour garden	8,00
Greater socialization among visitors	anchored	43,4	ISTAT data - cost of a day of vacation in 2020	76,00

Table 10: Financial proxy comparison - caregivers

For the caregivers' STK group were applied similar proxies as in the previous categories, in this case the "socialization" was associated with a value similar to the non-fragile visitors, while the "reducction of stress", to the benefit generable by a stress management session.

4.3.4 Stage 4 – Impact

Discount factors determination

An important remark is that discount factors are unique for each outcome and case study, thus they need to be defined by engaging the stakeholders. However, it is interesting that in the case studies analysed, the deadweights and attributions were consistently lower than the discount factors considered for the Castelfranco's application. The reason is that in the latter, the stakeholders were not a defined group of persons to which a special programme is applied, rather they represent park visitors who occasionally benefit from the historic garden; thus a conservative approach has been applied with attribution values raise up to the 80% for the outcomes concerning the socialization sphere. In the case studies instead there were not values exceeding the 25%, except for the walking app proposed by the Case 4, where the stakeholders were non-fragile individuals asked through online questionnaires.

Discussion on the 2 monetizations

The 2 monetization approaches proposed show the possible variables that can be encountered within the application on a same case study. The most obvious differences presented are not only in the way financial proxies were defined, but they are also based on the outcomes that one decides to monetize. In fact, during the engagement with STK and from their written answers, we understood that some of the outcomes were more material than others, as some outcomes were the cause of an outcome rather than an outcome itself. For this reason, the final choice of the outcomes to keep was up to the experts. In the same way I chose the outcomes that I considered more relevant based on the knowledge I gained from research, the Castelfranco's application and the work on case studies.

Other distinctions are the time horizon and the multiplicity of techniques to determine the monetary value created by the project interventions considering, in the specific case, assessment tool used to assess health benefits such as QALY, VOSL, DALY, HEAT. These frameworks, instead of reflecting revealed preferences of market services, they calculate the value based on the years of life duration they save for people, using different methods to determine the latter information.

PART III

FUTURE DEVELOPEMENTS

CHAPTER 5

CONCLUSIONS AND FUTURE DEVELOPEMENTS

5.1 CONCLUSIONS

The development of standardized methodologies capable of monitoring and evaluating the effects urban transformation has on people's health and wellbeing are paramount to guaranteeing a broader implementation of solutions aiming to tackle social and environmental challenges intensifying in our cities. Social Return on Investment was proposed in this thesis to determine the social value brought to key stakeholders as a consequence of the Visionary Nature-Based Solutions intervention.
In the following paragraphs the thesis will discuss how the SROI framework can be better defined after conducting the research on its suitability to urban transformation projects. I will delineate the main findings derived from both the research process and the application, to then consider the challenges that Castelfranco's SROI Analysis brought to the methodology itself. There are, in fact, some SROI steps that would need to be updated in order to fully cover broader employment for public space interventions.

5.1.1 FINDINGS:

RESEARCH:

- There is a lack in case studies which deal with urban interventions, given that SROI was not thought specifically for that kind of application.
- The Social Return on Investment, compared to Cost-Benefit Analysis, transfers the focus on the social impacts, otherwise placed on a secondary level.
- Generally applied to evaluate the impact of a specific project, according to other SROI applications in the built environment, it has potential also in an ex-ante format where multiple alternatives are analysed, but with the advantage of judging from a solid social perspective based on stakeholder engagement.
- Possibility of integrating other evaluation tools within the SROI, especially deriving from the ecosystem services and health assessment fields.

APPLICATION:

- For Castelfranco's case study it was determined that for every euro invested in Visionary Nature-Based Solutions there is social return of 2 euros.
- The employment of SROI in Castelfranco gave multiple suggestions and raised several critical issues from STK, contributing in this way to the co-design purpose embedded into the VARCITIES objectives. This remark would highlight how, despite its resource consuming format, the SROI can be of aid in bottom-up planning processes and support the participation of stakeholders while collecting data for the specific Social Return on Investment Analysis.
- It is proved that SROI could work well in Castelfranco's case, also applications found through literature review demonstrate its suitability for built environment interventions – it has in fact the potential of being up-scaled from a predominantly local dimension to larger scale projects.

5.1.2 How the application within VARCITIES challenges the SROI methodology

The research and application highlighted the need to integrate the quantification of environmental changes such as: the reduction of emissions, the added green or blue areas, within the SROI methodology, for which other assessment tools can be combined. The Castelfranco's case study pushed also towards explorations, as they have already been conducted in SROI Analysis, concerning the use of health economic evaluation tools.

The maximum duration of the effects considered by SROI is incompatible with the life expectancy of the assets proposed. This issue is treated within the guide by considering only one year of costs and benefits, while in other case studies found the time was simply considered to be longer than 5 years, often not applying any drop off.

Some of the outcomes proved to be extremely difficult to monetize, meaning that there are still social aspects that have not been given a value yet. Further investigation on socio-cultural impact of projects on communities by direct engagement is the only way to fill in the present gaps.

Research limitations
The reasearch focuses on a specific Social Return on Investment application, i.e. to urban projects.
There have been analysed articles from the last 10 years .
The SROI is compared mainly with the CBA methodology.
The transfer of this assessment tool to built environment represents an emerging interest not yet fully consolidated.
The research was run in a relatively short period of time to cope with the project timing.

5.2 FUTURE DEVELOPMENTS

5.2.1 Methodology

The research centered multiple points to work on, it shed light on how the introduction of SROI for built environment intervention purposes is still to be refined. While SROI was useful especially to evaluate the social value provided by building performances, little has been done at the urban level which gives the opportunity to investigate the links between human health and wellbeing and the effects generated by the exposure to green and blue areas. This broader dimensions lead to the consideration of consolidated evaluation tools, such as the Ecosystem Services Analysis, HEAT, QALY, discussed also in different stages of the thesis, which could be, and part of which have already been integrated within the SROI, but these represent exceptions rather than the norm.
An interesting development identified by this thesis is the enlargement of the Social Return on Investment to Sustainable Return on Investment, by incorporating within the SROI framework the Ecosystem Services Analysis.

5.2.2 Application – VARCITIES pilots

There is for the future the possibility of the SROI methodology replication in other VARCITIES pilot areas which propose Visionary Solutions to increase health and wellbeing in cities.

Novo Mesto, Slovenia

VS1: Brownfield remediation and greening with plant species indigenous to the nearby Natura 2000 areas
VS2: Creating sustainable forest trails

Leuven, Belgium

VS2: Sensors for health and water measurements
VS3: Health trail with the “moving bench”, therapeutic sensory garden for elderly people
VS4: IoT infrastructure (screens) for smart lighting and noise
VS5: Mobility-sensors to measure the pedestrian and bike flows

Gzira, Malta

VS1: Micro-greening interventions through a participatory design process
VS2: Citizen science on air/noise quality to increase health & well-being awareness
VS3: Urban biodiversity, education and engagement through a co-created community garden project

REFERENCES

[1] UNEP, 'Smart, Sustainable and Resilient cities: the Power of Nature-based Solutions', A working paper for the G20, 2022, https://wedocs.unep.org/20.500.11822/36586

[2] R. F. Hunter et al., 'Environmental, health, wellbeing, social and equity effects of urban green space interventions: A meta-narrative evidence synthesis', Environment International, vol. 130. Elsevier Ltd, Sep. 01, 2019. doi: 10.1016/j.envint.2019.104923.

[3] W. Bank Group, 'NATURE-BASED SOLUTIONS', 2021. [Online]. Available: www.worldbank.org

[4] European Commission, D.-G. for R. and I. (2021). Evaluating the impact of nature-based solutions: A handbook for practitioners. Publications Office of the European Union. https://data.europa.eu/doi/10.2777/244577

[5] R. F. Hunter, M. A. T. Dallat, M. A. Tully, L. Heron, C. O'Neill, and F. Kee, 'Social return on investment analysis of an urban greenway', Cities Health, pp. 1–18, Jun. 2020, doi: 10.1080/23748834.2020.1766783.

[6] M. Dyakova et al., 'Investment for health and well-being: a review of the social return on investment from public health policies to support implementing the Sustainable Development Goals by building on Health 2020'.

[7] C. Nesshöver et al., 'The science, policy and practice of nature-based solutions: An interdisciplinary perspective', Science of the Total Environment, vol. 579. Elsevier B.V., pp. 1215–1227, Feb. 01, 2017. doi: 10.1016/j.scitotenv.2016.11.106.

[8] S. Pauleit, T. Zölch, R. Hansen, T. B. Randrup, and C. Konijnendijk van den Bosch, 'Nature-Based Solutions and Climate Change – Four Shades of Green', 2017, pp. 29–49. doi: 10.1007/978-3-319-56091-5_3.

[9] 'EUROPEAN COMMISSION Directorate-General for Research and Innovation Directorate I-Climate Action and Resource Efficiency Unit I.3-Sustainable Management of Natural Resources', doi: 10.2777/765301.

[10] UNEP. (2022). Resolution on Nature-based Solutions for supporting sustainable development. United Nations Environment Programme UNEP/EA.5/Res.5, United Nations Environment Assembly UNEA 5.2. http://www.unep.org/environmentassembly/unea-5.2/proceedings-report-ministerial-declaration-resolutions-and-decisions-unea-5.2

[11] S. Gantioler and S. Gantioler, 'The Right to Ecological Space | in the City - Operationalising Green Infrastructure as Strategic Urban Planning Concept for a Just Access'.

[12] S. Gantioler (Ed.) (2022 in press). Conceptual and Action Framework on Low carbon | High air quality NbS potentials. Deliverable 2.1 of the Horizon 2020 Project JUSTNature, Grant

Agreement No. 101003757.

[13] S. Zilio, A. Borsari, A. Bisello, A. Segata, V. D. ' Alonzo, and S. Croce, 'VISIONARY NATURE BASED ACTIONS FOR HEALTH, WELL-BEING & RESILIENCE IN CITIES D3.4: Report on multiple benefits expected from Visionary Solutions Dissemination level Public', 2022.

[14] A. Bisello and D. Vettorato, 'Multiple Benefits of Smart Urban Energy Transition', in Urban Energy Transition, Elsevier, 2018, pp. 467–490. doi: 10.1016/b978-0-08-102074-6.00037-1.

[15] Nicholls, J., Lawlor, E., Neitzer, E., Goodspeed, T. (2012) 'A Guide to Social Return on Investment', Office of the Third Sector, Cabinet Office, Tokyo, Japan.

[16] K. J. Watson, 'Establishing psychological wellbeing metrics for the built environment', Building Services Engineering Research and Technology, vol. 39, no. 2, pp. 232–243, Mar. 2018, doi: 10.1177/0143624418754497.

[17] R. Millar and K. Hall, 'Social Return on Investment (SROI) and Performance Measurement: The opportunities and barriers for social enterprises in health and social care', Public Management Review, vol. 15, no. 6, pp. 923–941, 2013, doi: 10.1080/14719037.2012.698857.

[18] A. Nicholls, '"We do good things, don't we?": "Blended Value Accounting" in social entrepreneurship', Accounting, Organizations and Society, vol. 34, no. 6–7, pp. 755–769, Oct. 2009, doi: 10.1016/j.aos.2009.04.008.

[19] Hamelmann C, Turatto F, Then V, Dyakova M. Social return on investment: accounting for value in the context of implementing Health 2020 and the 2030 Agenda for Sustainable Development. Copenhagen: WHO Regional Office for Europe; 2017 (Investment for Health and Development Discussion Paper).Document number: WHO/EURO:2017-2240-41995-57722

[20] J. Gargani, 'The leap from ROI to SROI: Farther than expected?', Eval Program Plann, vol. 64, pp. 116–126, Oct. 2017, doi: 10.1016/j.evalprogplan.2017.01.005.

[21] J. G. Nielsen, R. Lueg, and D. van Liempd, 'Challenges and boundaries in implementing social return on investment: An inquiry into its situational appropriateness', Nonprofit Manag Leadersh, vol. 31, no. 3, pp. 413–435, Mar. 2021, doi: 10.1002/nml.21439.

[22] F. Lyon, 'Social Impact Measurement (SIM) experiencing and future Directions for the third sector organisations in the east of England. The role of social enterprises in providing health and wellbeing services in the UK View project Green business investment in the UK: the case of young early growth business View project', 2010. [Online]. Available: www.squadra.co.uk

[23] Maier F., Schober C., Simsa R., Millner R. (2014) 'SROI as a Method for Evaluation Research: Understanding Merits and Limitations', voluntas, Vol. 26 (5). pp. 1805-1830. Available: https://orcid.org/0000-0002-4687-4905Thisversionisavailableat:https://epub.wu.ac.at/4289/ http://epub.wu.ac.at/

[24] Davide. Sartori, Guide to cost-benefit analysis of investment projects : economic appraisal tool for cohesion policy 2014-2020. European Commission, Directorate-General for Regional and Urban policy, 2015.

[25] Peter. Abelson and Australia. Department of Finance and Administration., Handbook of cost-benefit analysis. Dept. of Finance and Administration, 2006.

[26] J. J. Cordes, 'Using cost-benefit analysis and social return on investment to evaluate the impact of social enterprise: Promises, implementation, and limitations', Eval Program Plann, vol. 64, pp. 98–104, Oct. 2017, doi: 10.1016/j.evalprogplan.2016.11.008.

[27] D. Fujiwara and D. Dass, 'Measuring social value in infrastructure projects: insights from the public', RICS insight paper, 2020. from https://www.rics.org/globalassets/rics-website/media/knowledge/research/insights/measuring-social-value_1st-edition.pdf

[28] R. T. Edwards and C. L. Lawrence, '"What You See is All There is": The Importance of Heuristics in Cost-Benefit Analysis (CBA) and Social Return on Investment (SROI) in the Evaluation of Public Health Interventions', Applied Health Economics and Health Policy, vol. 19, no. 5. Adis, pp. 653–664, Sep. 01, 2021. doi: 10.1007/s40258-021-00653-5.

[29] A. Bichard and E. Bichard, 'Sustainable return on investment : towards a method of valuing social and environmental change in the built environment Title Sustainable return on investment : towards a method of valuing social and environmental change in the built environment Sustainable Return on Investment: Towards a Method of Valuing Social and Environmental Change in the Built Environment', 2016. [Online]. Available: http://usir.salford.ac.uk/id/eprint/39156/

[30] A. Bichard, 'Developing an approach to sustainable return on investment Title Developing an approach to sustainable return on investment', 2015. [Online]. Available: http://usir.salford.ac.uk/id/eprint/36112/

[31] L. Trotter, J. Vine, M. Leach, and D. Fujiwara, Measuring the Social Impact of Community Investment: A Guide to using the Wellbeing Valuation Approach. 2014. [Online]. Available: www.hact.org.uk

[32] 'Guidance: Measuring Social Value using the SFT TOMs Developed in conjunction with the Social Value Portal', 2020. Available: https://www.scottishfuturestrust.org.uk/storage/uploads/guidanceoctober2020.pdf

[33] WHO (2017), 'Health economic assessment tool (HEAT) for walking and for cycling Methods and user guide on physical activity, air pollution, injuries and carbon impact assessments'. Available online: https://apps.who.int/iris/bitstream/handle/10665/344136/9789289052788-eng.pdf?sequence=1&isAllowed=y

[34] Nature-based solutions to address global societal challenges. IUCN International Union for Conservation of Nature, 2016. doi: 10.2305/iucn.ch.2016.13.en.

[35] N. Frantzeskaki, 'Seven lessons for planning nature-based solutions in cities', Environ Sci Policy, vol. 93, pp. 101–111, Mar. 2019, doi: 10.1016/j.envsci.2018.12.033.

[36] D. W. (David W. Pearce, G. Atkinson, Susana. Mourato, and Organisation for Economic Co-operation and Development., Cost-benefit analysis and the environment : recent developments. Organisation for Economic Co-operation and Development, 2006.

[37] M. Challenge Corporation, 'Cost Benefit Analysis Guidelines', 2021.

[38] K. J. Watson and T. Whitley, 'Applying Social Return on Investment (SROI) to the built environment', Building Research and Information, vol. 45, no. 8. Routledge, pp. 875–891, Nov. 17, 2017. doi: 10.1080/09613218.2016.1223486.

[39] K. Maas and K. Liket (2011) 'Social Impact Measurement: classification of methods', http://dx.doi.org/10.1007/978-94-007-1390-1_8

[40] P. Pathak and P. Dattani, 'Social return on investment: three technical challenges', Social Enterprise Journal, vol. 10, no. 2, pp. 91–104, Aug. 2014, doi: 10.1108/sej-06-2012-0019.

[41] J. Gibbon and C. Dey, 'Developments in social impact measurement in the third sector: Scaling up or dumbing down?', Social and Environmental Accountability Journal, vol. 31, no. 1, pp. 63–72, 2011, doi: 10.1080/0969160X.2011.556399.

[42] N. Graveline and J. Calatrava, 'General framework for the economic assessment of Nature Based Solutions and their insurance value-NAIAD project delivrable 4.1 "NAture Insurance value: Assessment and Demonstrati The contribution of water REuse to a resourCe-efficient and sustainabLe wAter manageMent for irrigatiOn (RECLAMO) View project', doi: 10.13140/RG.2.2.11144.78082.

APPENDICES

APPENDIX I: NON - FRAGILE VISITORS FEEDBACK TABLE

OUTCOMES	VSs	SCORE	ASPIRATIONS / *CRITICAL ISSUES*
Better accessibility to the facility	1	3,73	Create connections with Borgo Treviso Street
Better visiting experience	1, 5, 6	3,64	Need of the involvement of the human factor
Creation of social connections between visitors	4	3,55	The Local Landscape Observatory could be a node for socialization
Greater use of the park	1, 5, 6	3,41	Use of the garden for educational and cultural purposes
Greater interest in the park	4	3,27	The Local Landscape Observatory would attract more people from the surrounding territory
Greater socialization among visitors	c	3,09	Organization of specific activities
Greater sense of belonging of the park to the local community	1, 5, 6	3,45	*Past long time of the garden abandonment hindered the sense of belonging*
Strengthening of active citizenship through participatory decision-making processes	4	3,82	Involve stakeholders that to date have never been taken into account
Increase of knowledge and awareness in relation to the benefits of ecosystem services	4	4,45	The awarness and knowledge can lead towards the creation of policies for sustainable city developement

c = consequence

These outcomes are not directly caused by a specific Visionary Solution, but rather their realization is on the condition that other outcomes occur.

APPENDIX II: FRAGILE VISITORS FEEDBACK TABLE

OUTCOMES	VSs	SCORE	ASPIRATIONS / *CRITICAL ISSUES*
Better accessibility to the facility	1	4,30	Having enough parking lots
Greater autonomy when visiting the park	1, 5	3,40	*People with psychic disabilities cannot visit the park without a caregiver*
Greater sense of safety when visiting the park	1, 5	3,60	The interventions purposed by the project are not sufficient
Better visiting experience	1, 5, 6	4,05	Involvement of guides and volunteers that can interact with the visitors
Greater psycho-emotional well-being	1, 5	4,15	Digital tours
Greater use of the park	1, 5, 6	4,10	Extend the opening time of the Villa Bolasco Garden
Creation of social connections between visitors	c	3,70	Having more time access to the park
Greater socialisation among visitors	c	4,00	Create spaces or activities that can facilitate aggregation
Reduction of loneliness	c	4,20	It is considered possible only if the socialization component succeeds
Greater social inclusion	1, 5	3,80	the interaction among people could raise the awareness towards the disabilities
Greater sense of belonging of the park to the local community	1, 5, 6	3,80	Community sense creation thanks to the visit of both fragile and regular people

c = consequence

These outcomes are not directly caused by a specific Visionary Solution, but rather their realization is on the condition that other outcomes occur.

APPENDIX III: CAREGIVERS FEEDBACK TABLE

OUTCOMES	VSs	SCORE	ASPIRATIONS / *CRITICAL ISSUES*
Better accessibility to the facility	1	4,57	Better accessibility would motivate caregivers to come more often.
Reduction of stress and anxiety associated with the caregiver experience	1, 5	4,29	The change is considered possible
Better visiting experience	1, 5, 6	4,14	The change is considered possible
Greater use of the park	1, 5, 6	4,21	Provide information to people about the presence of people with frailty
Creation of social connections between visitors	c	3,86	Training and professionalization activities of the caregiver
Greater sense of belonging of the park to the local community	1, 5, 6	3,95	Have access for the organization of cultural iniziatives
Greater socialisation among visitors	c	4,05	Creation of more knowledge, therefore sensitization towards vulnerable subject

c = consequence

These outcomes are not directly caused by a specific Visionary Solution, but rather their realization is on the condition that other outcomes occur.

APPENDIX IV: TARGET STAKEHOLDERS' NUMBER

Non-fragile visitors

Since 2022 the Villa Bolasco Park has extended its opening time by a day, aside from Saturday and Sunday it added Friday. As data from 2022 were not available yet, it has been hypothesized that the number of visits will increase in a proportional way. To the new total visitors have been subtracted the over 75 population not to double count this category of individuals, as they are considered part of the fragile subjects. Therefore the final data considered was 3.609 and 12.032.
3609 + 528= 4137

Fragile individuals:

To these category belong multiple components which have been estimated based on National population data for each of the vulnerability type.
Over 75 in Castelfranco (ISTAT data): 4229
Alzheimer's patients: 328
Over 17 psychic disabled individuals in charge of families (USLL 2 - they are estimated to be about 243 every 10.000 inhabitants): 804. To this number must be subtracted the number of the under 17, which according to ISTAT Database are 5.000 on the municipal territory, therefore the total number of target population for this category is recalculated to 680 people.
All subjects with disability in Castelfranco (obtained from National percentage, ISTAT database, 5,2% of population is disabled in Italy): 1722
Disabled elderly people (calculated by applying national percentage = 22%): 930
In order not to double count the over 75 population and the over 75 affected by disability, the latter component have been subtracted by the total over 75:
4229 – 930 = 3298
Total number of fragile individuals: 3298 + 1722 = 5020
Total number of the Park visitors in 2022 = 4137 (it is 15,6% of the total population). As not all the Castelfranco's citizens visit the park, but only the 15,6%, this value has to be applied also to the total number of vulnerable categories.
The 15,6% out of the total number of fragile individuals = 645.

Caregivers:

Caregivers, both formal and informal, in Castelfranco (17,4% of population is a caregiver based on the ISTAT study made in 2015): 3761
This number proportionated at the total number of resident visitors = 720

APPENDIX V - DEADWEIGHT DETERMINATION

STK	OUTCOME	DEADWEIGHT	
	DESCRIPTION	VALUE	DESCRIPTION
NON-FRAGILE VISITORS	Increase of knowledge and awareness in relation to the benefits of ecosystem services	30%	Percentage of people in Veneto who read books and newspapers, reduced to account for the specific focus on ecosystemic services (Istat, http://dati.istat.it/Index.aspx?QueryId=22373)
	Strengthening of active citizenship through participatory decision-making processes	20%	Percentage of people aged 14 and over who have developed a greater civil and political awareness, undertaking free activities through groups or organizations (Istat, http://dati.istat.it/Index.aspx?QueryId=26039)
	Better visiting experience	25%	Percentage of requests for guided tours from private visitors, out of the total number of guided tours carried out by Italian tourist guides (ISNART, Confguide, https://www.confcommercio.it/documents/20126/180251/II+testo+dell%27indagine+nazionale+sulle+guide+turistiche.pdf/36124b50-ee12-1fb9-746a-d4f591004d6a?version=1.1&t=1455288240000)
	Creation of social connections between visitors	30%	Percentage of people from North-East Italy who spend time with friends (Istat, http://dati.istat.it/Index.aspx?QueryId=25852)
	Greater sense of belonging of the park to the local community	10%	Estimate of the percentage of residents of Castelfranco Veneto following the facebook page of Castelfranco Veneto Pro Loco (https://www.facebook.com/proloco.castelfrancoveneto/)
FRAGILE VISITORS	Reduction of loneliness	30%	Percentage of people from North-East Italy who spend time in company (Istat, http://dati.istat.it/Index.aspx?QueryId=25852)
	Greater psycho-emotional well-being	35%	Percentage of people in Veneto aged 15 or more attending outdoor places (Istat, http://dati.istat.it/Index.aspx?QueryId=25716)
	Better visiting experience	25%	Percentage of requests for guided tours from private visitors, out of the total number of guided tours carried out by Italian tourist guides (ISNART, Confguide, https://www.confcommercio.it/documents/20126/180251/II+testo+dell%27indagine+nazionale+sulle+guide+turistiche.pdf/36124b50-ee12-1fb9-746a-d4f591004d6a?version=1.1&t=1455288240000)
	Greater socialization among visitors	30%	Percentage of people from North-East Italy who spend time in company (Istat, http://dati.istat.it/Index.aspx?QueryId=25852)
CAREGIVERS	Reduction of stress and anxiety associated with the caregiving experience	20%	Percentage of caregivers who report that their health is not affected by caring tasks (Censis, https://welforum.it/wp-content/uploads/2017/12/Caregiver_Parkinson_Sintesi-rapporto-Censis_2017.pdf)
	Better visiting experience	25%	Percentage of requests for guided tours from private visitors, out of the total number of guided tours carried out by Italian tourist guides (ISNART, Confguide, https://www.confcommercio.it/documents/20126/180251/II+testo+dell%27indagine+nazionale+sulle+guide+turistiche.pdf/36124b50-ee12-1fb9-746a-d4f591004d6a?version=1.1&t=1455288240000)
	Greater socialization among visitors	30%	Percentage of people from North-East Italy who spend time in company (Istat, http://dati.istat.it/Index.aspx?QueryId=25852)

APPENDIX VI - ATTRIBUTION TABLE

ATTRIBUTION	EFFECT
100%	The change will be entirely the result of other organizations, projects, or external factors.
80%	The change will be in great part a result of other organizations, projects, or external factors.
60%	The change will be in small part the result of other organizations, projects, or external factors.
40%	The change will be partly the result of other organizations, projects, or external factors.
20%	The change will be in small part the result of other organizations, projects, or external factors.
0%	Other organizations, projects, or external factors will have no impact on the change detected.

APPENDIX VII - SROI MAP

STAKEHOLDERS		OUTCOME				FINANCIAL PROXIES		DISCOUNT FACTORS				IMPACT
STK GROUPS	TARGET NUMBER	DESCRIPTION	INDICATOR	QUANTITY IN PERCENTAGE	QUANTITY IN NUMBERS	DESCRIPTION	VALUE (€)	DEAD-WEIGHT	DISPLACE-MENT	ATTRIBU-TION	DROP-OFF	VALUE (€)
NON-FRAGILE VISITORS	3,609	Increase of knowledge and awareness in relation to the benefits of ecosystem services	Number of people experiencing described outcome	60%	2165	Annual subscription to National Geographic magazine (average cost between full and discounted costs)	48,9	30%	0%	40%	0%	44,473.0
	3,609	Strengthening of active citizenship through participatory decision-making processes	Number of people experiencing described outcome	60%	2165	anchored	41,9	20%	0%	80%	0%	14,521.79
	12,032	Better visiting experience	Number of people experiencing described outcome	76%	9144	anchored	39,9	25%	0%	20%	0%	219,015.8
	3,609	Creation of social connections between visitors	Number of people experiencing described outcome	58%	2093	anchored	38,9	30%	0%	80%	0%	11,405.7
	3,609	Greater sense of belonging of the park to the local community	Number of people experiencing described outcome	58%	2093	anchored	37,9	10%	0%	60%	0%	28,576.8
FRAGILE VISITORS	645	Reduction of loneliness	Number of people experiencing described outcome	65%	419	anchored	45,5	30%	0%	80%	0%	2,673.1
	645	Greater psycho-emotional well-being	Number of people experiencing described outcome	83%	535	Monthly yoga course (4 lessons + annual card cost)	45,0	35%	0%	80%	0%	3,131.8
	645	Better visiting experience	Number of people experiencing described outcome	68%	439	anchored	43,9	25%	0%	20%	0%	11,556.9
	645	Greater socialization among visitors	Number of people experiencing described outcome	65%	419	anchored	43,4	30%	0%	80%	0%	2,545.8
CAREGIVERS	720	Reduction of stress and anxiety associated with the caregiving experience	Number of people experiencing described outcome	65%	468	Minimum cost of an individual session of stress management, according to the Order of Psychologists' tariff	45,0	20%	0%	80%	0%	3,369.6
	720	Better visiting experience	Number of people experiencing described outcome	75%	540	anchored	43,5	25%	0%	20%	0%	14,094.0
	720	Greater socialization among visitors	Number of people experiencing described outcome	65%	468	anchored	42,5	30%	0%	80%	0%	2,784.6

APPENDIX VIII - CASE STUDIES ANALYSIS TABLES

Non-fragile visitors

Creation of social connections between visitors

	CASE 2	CASE 6	CASE 4	CASE 5	CASE 3
OUTCOME	Walkers have more social contacts and are now more confident, experience less isolation and take part in new experiences	The project increased candidates' ability and confidence to meet new people	Stress reliefImproved interpersonal relationships	Feeling happier as a result of increased opportunities, meeting new people, establishing new friendships and social connections	Walkers have more social contacts and are now more confident, experience less isolation and take part in new experiences
OUTPUT	18 walking groups - 35 walking sessions a year	min 20 h outside - 4 challenges to accomplish in discovering a natural site	mobile walking applization	30 walking sessions provided each year	30 sessions of walking groups a year
OUTCOME INDICATOR	No of walkers reporting additional social contacts	Number of new opportunities for socialising and meeting people	No of people experiencing more walks with family and friends	No of walkers reporting additional social contacts	No of walkers reporting additional social contacts
QUANTITY	137 persons 90%	56 times (8 days x 7 candidates)	1,455 persons 10%	24 persons 75%	66 persons 26%
FINANCIAL PROXY	average cost of joining a club/ organisation in Glasgow	Average weekly spend on social activities (broken down from annual average spend)	Weighted average of budget and activities for achieving same level of outcomes	Average cost of various different local sports and social clubs	cost of a sports social club in Stirling
VALUE	£ 50.00	£ 10.00	1,873 / 2,119 / 3,992	£5.00	£ 320.00
DEADWEIGHT	7%	10%	62%	0%	7%
DEADWEIGHT DETERMINATION	- research - experience - STK feedback	-experts assumtion	- STK feedback through online questionnaire	-expert assumption based on STK feedback	- research - experience - STK feedback
ATTRIBUTION	5%	25%	51%	0%	10%
ATTRIBUTION DETERMINATION	- research - experience - STK feedback	-expert assumption based on STK feedback	- STK feedback through online questionnaire	-expert assumption based on STK feedback	- STK feedback - consultation

Fragile visitors

Greater psycho-emotional well-being

	CASE 9	CASE 2	CASE 4	CASE 3	CASE 7	CASE 8	CASE 10
OUTCOME	Regular attendance brings mental stimulation, a more positive outlook, and reduced levels of anxiety and depression	Walkers and walk leaders who have experienced mental health problems are able to engage in physical activity and feel happier and positive	Stress relief	Walkers who have experienced mental health problems are able to engage in physical activity and feel happier and positive	Loneliness Reduction	Greater propensity in carrying out recreational activities - Isolation Reduction	Emotional wellbeing (LEAF)
OUTPUT	art classes	35 walking sessions provided each year	mobile walking applization	30 walking sessions provided each year	transportation service to hospital patients	caregiving assistence	caregiving assistence
OUTCOME INDICATOR	No. reporting feeling less down, depressed or hopeless; No. reporting improved concentration; No. reporting reduced use of anti-depressants.	"No. of walkers with clinically diagnosed mental health problems who have an increased sense of wellbeing"	No of people stating that walking makes them feel less worried and stressed, while feeling more energetic and that The Cathay Walker campaign relieves work stress	No. of walkers with clinically diagnosed mental health problems who have an increased sense of wellbeing	No. of patients and family members who declare a reduction in the sense of loneliness, thanks to the three services of AIL	No of persons who experience the change	No of persons who experience the change
QUANTITY	68 persons 98%	60 persons 39%	5527 persons 39%	16 persons 6%	87%	1.196 persons 100%	110 persons 56%
FINANCIAL PROXY	Weekly stress counselling sessions	75% increase in average spend on social trips out	Weighted average of budget and activities for achieving same level of outcomes	Increase in spend on social trips and events	Cost of a cycle of group psychotherapy sessions	value of hours spent on recreational activities and / or participation in social life (monthly)	9 Value for relief from depression and anxiety (adult)
VALUE	£ 2,080.00	£ 343.20	£ 4,925.00	£ 655.20	€ 35.00	€ 40.00	£ 353.00
DEADWEIGHT	17%	15%	64%	7%	45%	35%	0%
DEADWEIGHT DETERMINATION	- STK feedback - through interviews	STK feedback	- STK feedback through online questionnaire	- research - experience - STK feedback	- STK feedback through questionnaire	STK feedback	experts assumption based on LEAF questionnaires
ATTRIBUTION	19%	21%	50%	10%	18%	20%	50%
ATTRIBUTION DETERMINATION	- STK feedback - through interviews	STK feedback - consultation	- STK feedback through online questionnaire	- STK feedback - consultation	- STK feedback	- STK feedback	- conservative estimation: experts assumption

Fragile visitors

Greater socialization among visitors

	CASE 2	CASE 6	CASE 4	CASE 5	CASE 3
OUTCOME	Walkers have more social contacts and are now more confident, experience less isolation and take part in new experiences	The project increased candidates' ability and confidence to meet new people	Stress reliefImproved interpersonal relationships	Feeling happier as a result of increased opportunities, meeting new people, establishing new friendships and social connections	Walkers have more social contacts and are now more confident, experience less isolation and take part in new experiences
OUTPUT	18 walking groups - 35 walking sessions a year	min 20 h outside - 4 challenges to accomplish in discovering a natural site	mobile walking applization	30 walking sessions provided each year	30 sessions of walking groups a year
OUTCOME INDICATOR	No of walkers reporting additional social contacts	Number of new opportunities for socialising and meeting people	No of people experiencing more walks with family and friends	No of walkers reporting additional social contacts	No of walkers reporting additional social contacts
QUANTITY	137 persons 90%	56 times (8 days x 7 candidates)	1,455 persons 10%	24 persons 75%	66 persons 26%
FINANCIAL PROXY	average cost of joining a club/ organisation in Glasgow	Average weekly spend on social activities (broken down from annual average spend)	Weighted average of budget and activities for achieving same level of outcomes	Average cost of various different local sports and social clubs	cost of a sports social club in Stirling
VALUE	£ 50.00	£ 10.00	1,873 / 2,119 / 3,992	£5.00	£ 320.00
DEADWEIGHT	7%	10%	62%	0%	7%
DEADWEIGHT DETERMINATION	- research - experience - STK feedback	-experts assumtion	- STK feedback through online questionnaire	-expert assumption based on STK feedback	- research - experience - STK feedback
ATTRIBUTION	5%	25%	51%	0%	10%
ATTRIBUTION DETERMINATION	- research - experience - STK feedback	-expert assumption based on STK feedback	- STK feedback through online questionnaire	-expert assumption based on STK feedback	- STK feedback - consultation

Fragile visitors

Better visiting experience - enhance physical activity

	CASE 6	CASE 3	CASE 4	CASE 3*	CASE 1	CASE 5
OUTCOME	Candidates are more physically active due to use of the outdoors for recreation	Walkers with diagnosed physical medical conditions are able to engage in physical activity and as a result feel fitter and become healthier	Better physical health	Walkers are fitter and have improved physical health as a result of becoming more regularly physically active	Health improving	Maintaining or not eroding current physical health and fitness levels
OUTPUT	min 20 h outside - 4 challenges to accomplish in discovering a natural site	30 walking sessions provided each year	mobile walking applization	30 walking sessions provided each year	The construction of a greenway	30 walking sessions provided each year
OUTCOME INDICATOR	"Number of hours candidates report they are more physically active"	No. of walkers reporting clinical improvements in their medical condition	"Helps get into habit of exercise/ walking. Feel more energetic and less fatigued. Better cardiovascular function Lose weight Lowered BMI"	No. of walkers who report improved levels of physical fitness	Percentage of inactive population at baseline that begins making physical activity	Number of participants reporting an Increase in fitness levels
QUANTITY	7 persons 100%	16 persons 6%	5,850 persons 42%	99 persons 40%	hypothesis: 5% - 60 persons	32 persons 100%
FINANCIAL PROXY	Equivalent of paying to attend a gym"	20% reduction on spend on health per year"	Weighted average of budget and activities for achieving same level of outcomes = Riding a bicycle for 3 hours every week	Cost of a swimming session. Each sessions	Multiplying the total number of deaths each year, for each disease by the value of a statistical life	Cost of a swimming session as a form of low impact physical activity
VALUE	£5.73	£67.60 / £13.52	15,462 (in one year)	£120.00	£ 11 562,73	£2.33
DEADWEIGHT	0%	7%	64%	7%	0%	15%
DEADWEIGHT DETERMINATION	-experts assumtion	- research - experience - STK feedback	- STK feedback through online questionnaire	- research - experience - STK feedback	-expert assumption	-expert assumption based on STK feedback
ATTRIBUTION	25%	10%	49%	10%	0%	0%
ATTRIBUTION DETERMINATION	-expert assumption based on STK feedback	- research - experience - STK feedback	- STK feedback through online questionnaire	- research - experience - STK feedback	-expert assumption	-expert assumption based on STK feedback

Caregivers

reduction of stress associated to the caregiving experience

	CASE 9	CASE 11	CASE 7
OUTCOME	Family members worry less about their loved one	Carers experience a reduction in stress and burden of care	Reduction of tress and anxiety
OUTPUT	art classes	group activities, and games	transportation service to hospital patients
OUTCOME INDICATOR	No. of instances of worry or concern for the older person in an average week; No. reporting a more positive outlook about the older person's prospects.	Proportion of carers reporting decrease in stress over worrying about their relative well-being.	percentage of persons who declared this outcome happened
QUANTITY	64 persons 89%	10 persons 100%	88%
FINANCIAL PROXY	Stress counselling sessions	Average cost of mental health services per individual per year (anxiety and depression).	Cost of a cycle of individual stress management sessions
VALUE	£480.00	£ 1,122.47	£ 735
DEADWEIGHT	5%	66%	45%
DEADWEIGHT DETERMINATION	- STK feedback - through interviews	- external data	-STK feedback through questionnaires
ATTRIBUTION	0%	50%	20%
ATTRIBUTION DETERMINATION	- STK feedback - through interviews	- assumption by experts	-STK feedback through questionnaires