

Deliverable 4.1: Definition of Best Variables and KPIs for assessing the sustainability and effectiveness of Social Economy Organization actions

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1. Executive Summary

This document marks the first of three deliverables for Work Package 4 (WP4) within the Sonya project. In line with the Grant Agreement, WP4 aims to develop a comprehensive sustainability evaluation model to assess the impact of social economy organizations that foster social inclusion for older adults and promote inclusive employment in rural areas.

To achieve this, the initial task focuses on a science-based analysis of existing sustainability assessment models and the identification of relevant KPI variables. The evaluation adopts a holistic approach, encompassing the three pillars of sustainability—environmental, social, and economic. Accordingly, the selected methodology must be capable of assessing all three dimensions across the entire value chain and among all stakeholders.

Our first step involved a thorough review of sustainability assessment models and best practices within social economy and inclusive employment initiatives in rural contexts, to better understand the operating conditions.

The proposed Sustainability Assessment Framework, grounded in prior research, is designed to evaluate two key aspects: the effectiveness of the actions undertaken and the sustainability of those actions as long-term solutions. Effectiveness, measured by improvements in quality of life, will be assessed as an action prerequisite prior to sustainability evaluation. Sustainability will then be evaluated using the developed model.

Deliverable D4.1 is organized as follows:

- A brief literature review of effectiveness and sustainability models related to care services for older adults.
- The structuring of the sustainability assessment framework.
- An exploration of exemplary initiatives addressing sustainability in aging populations.
- The definition of the framework's structure and KPIs

This work will be expanded in subsequent deliverables, which will further develop the framework, provide the necessary evaluation tools, and test the model through pilot program activities.

2. Introduction and scope

SONYA is a project funded by the European Union under the program Horizon Europe in the topic HORIZON-CL2-2024-TRANSFORMATIONS-01-09.

The project starts 01/11/2024 with a project duration of 48 months.

The mission of SONYA is to evaluate the role of social economy organizations in attracting, retaining and supporting care workers. Its expected outcomes are to deliver innovative participatory models of social

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care, assessment methods and policy guidelines adapted to SEs with varying sizes, network development levels and national contexts.

2.1 Specific objectives of the project

(O1) TO EMPOWER THE SOCIAL ECONOMY ORGANIZATIONS IN DEVELOPING MULTI-ACTOR SOCIAL AND ENVIRONMENTAL COMMUNITY INITIATIVES BY INCREASING THEIR ORGANIZATIONAL CAPACITIES.

SONYA will analyze current initiatives and trends across the EU (WP1, RO1.1) to increase the organizational capacities of multi-actor networks. Training and support services (community building activities, adoption of ICT tools and/or financial and funding allocation mentoring services; WP2, KH2.1) will be provided to more than 60 social economy organizations (cooperatives, foundations, and cultural centers) contacted through the partner's network to develop community initiatives (WP3, KH3.1) that integrate the needs of the pool of workers already engaged on a voluntary or contract basis within SEs to support both, the needs of the older population and the needs of informal care workers such as family members.

(O2) TO IDENTIFY, ASSESS AND TRANSFER BEST INNOVATIVE PRACTICES FOSTERING INCLUSIVE EMPLOYMENT AND BETTER WORKING CONDITIONS IN RURAL AREAS TO SOCIAL OLDER PEOPLE CARE SERVICES.

SONYA will analyze SEs organization barriers and best implemented innovative practices (WP1, RO1.2) fostering inclusive employment and better conditions across the European social entrepreneurship ecosystem in terms of participatory community-based models, the use of communication technology, logistics, and organizational and operational efficiency, together with the community's needs. Best innovation practices will be adapted and tested in the 3 SEs models (WP3, DEM3.1; Living-labs in Italy, Bulgaria, and Spain) and transferred to the EU's social older people care sector (France, Germany, Poland, Sweden, Romania, Greece) and Australia.

(O3) TO MEASURE THE IMPACT OF SOCIAL OLDER PEOPLE CARE SERVICES AND SOCIAL ECONOMY ORGANIZATIONS OPERATING IN RURAL AREAS WITH SCIENTIFIC PRECISION USING SOCIAL INCLUSION, SUSTAINABILITY, AND SERVICE QUALITY, EFFECTIVENESS, AND EFFICIENCY INDICATORS.

SONYA seeks to support legal, policy and organizational recommendations with a robust assessment model (WP4, RO4.3), tools (WP3, KH3.1) and set of measurable impact indicators (WP4, RO4.2) tested with data from social innovation ecosystems of up to 320.000 members (WP3, DEM3.1). The assessment model focuses on the contribution of SEs to counteract social exclusion of people at risk, sustainability and quality of the provided services, quality of life for both care givers and older adults and effectiveness and efficiency of care in comparison to other services providers offer. SONYA will provide standards for evaluation of the contribution of local social and environmental community actions to address social older people needs and inclusive employment in the local communities of interest.

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(O4) TO IMPROVE THE LEGAL AND POLICY FRAMEWORKS SUPPORTING SOCIAL ECONOMY ORGANIZATIONS CAPACITY TO ACTIVELY PARTICIPATE IN PUBLIC AND PRIVATE SOCIAL OLDER PEOPLE CARE SERVICES NETWORKS.

SONYA seeks to provide legal and policy recommendations (WP5, SR5.1) for 3 social economy organizational models (Italy, Bulgaria, and Spain) representing different rural community sizes, network development degrees and operational contexts across the EU. Discussion forums will be established (WP5, KH5.1) to foster transferability in other regions. Initial analysis will be triggered with France, Germany, Poland, Sweden, Romania, and Greece, thanks to the collaboration with CARE4CARE (FIR) and SHARE (IPS-BAS) projects and will include Australia's perspective who's rural and policy development context is aligned with the EU trends.

2.2 Scope of the Deliverable

The objective of this deliverable is to identify the relevant principles and methods for evaluating the sustainability of actions undertaken by social economy organizations, particularly those aligned with active aging goals and promoting inclusive employment practices.

In parallel, the deliverable identifies existing, empirically supported measurement tools for assessing effectiveness of actions intended for older people population, based on concepts like social inclusion, connectedness, community belonging, subjective well-being and quality of life (O'Rourke et al., 2018).

This first deliverable details, based on theoretical analysis, the key sustainability issues that a Sustainability Assessment Framework (SAF) should include to develop an appropriate sustainability assessment for Social Economy Organizational Solutions (SE-OS) to contribute to the older people care in rural ecosystems.

The proposed Sustainability Assessment Guidelines (see figure 1) should be consistent with the social-ecological system of the SONYA Project, which is based on strong sustainability, multi-actor approach, welfare of caregivers and older people and UN Sustainable Development Goals. In this regard, the footprint methodologies are a starting point to assess the environmental and social impacts from an ecosystemic and life cycle thinking perspective (Muñoz et al., 2018).

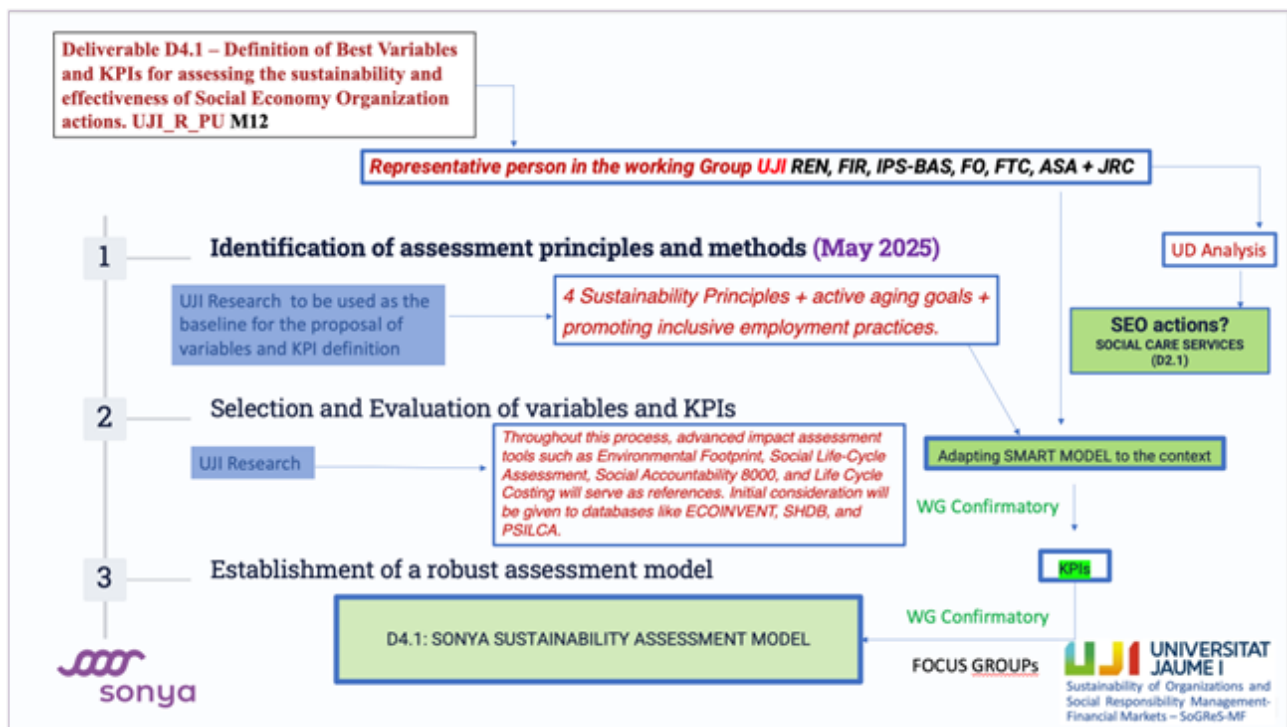


Figure 1. Deliverable Design, source: own elaboration

3. Objective and context of SONYA Sustainability Assessment Framework (SAF)

The primary aim of this deliverable is to critically assess the role and impact of social economy organizations in shaping a more sustainable and resilient care system for older adults across Europe. This includes, not only evaluating their effectiveness in terms of satisfaction of end users and examining how their initiatives promote inclusive employment opportunities within the care sector, but also their contributions to environmental, social, and economic sustainability.

3.1 Objective of SONYA SAF

To achieve this objective, the deliverable proposes the development of a comprehensive and holistic assessment framework. This framework will serve as a practical tool to systematically measure, compare, and analyze the diverse impacts generated by various actions and interventions led by social economy actors. By adopting a sustainability-oriented perspective, the assessment tool (figure 2) will enable stakeholders to identify best practices, highlight areas for improvement, and support evidence-based policymaking aimed at enhancing the quality, accessibility, and inclusivity of care services for older people.

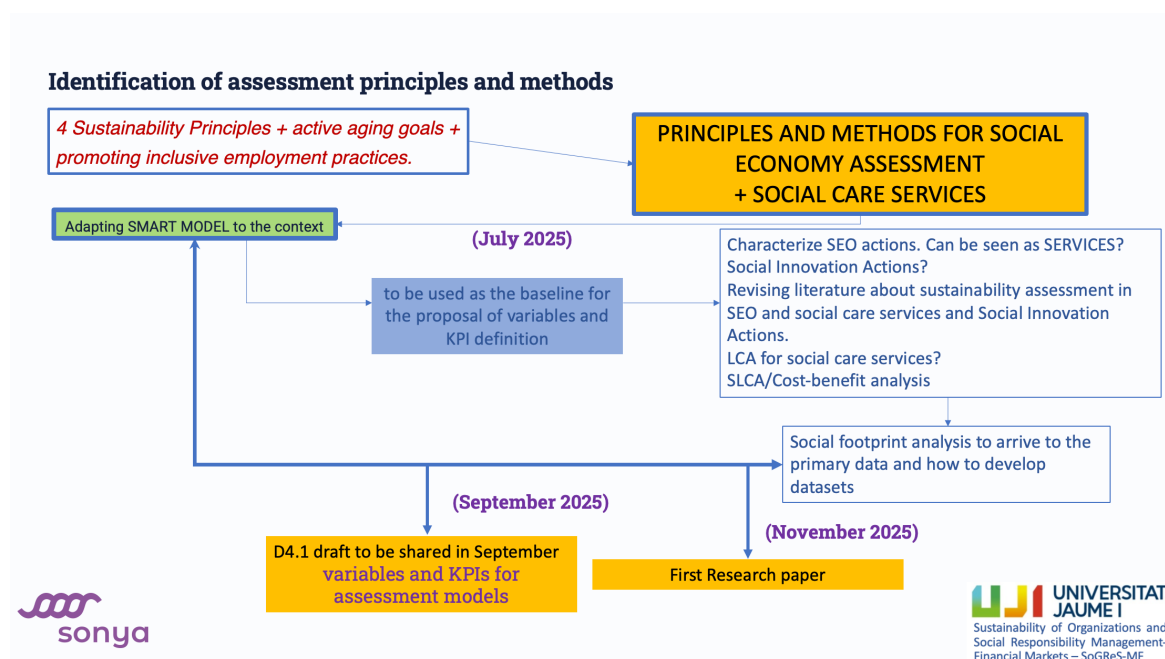


Figure 2. Identification of assessment principles and methods, source: own elaboration

3.2 Context of SONYA SAF

In this deliverable, the object of analysis is caring solutions for older people promoted by social economy organizations. This should guide the selection of the unit of analysis understood as the central element the assessment tool aims to examine in depth. These services represent the core unit through which we can evaluate the contribution of social economy actors to a more sustainable and inclusive care system.

While the primary focus remains on the service itself—its structure, delivery mechanisms, and outcomes—we also recognize the importance of the broader ecosystem in which these services are embedded. This ecosystem includes the various actors, networks, and contextual factors that interact with and influence the functioning of social economy organizations. Although this ecosystem is not the direct object of our evaluation, it plays a critical role in shaping how services are designed, implemented, and sustained over time.

This approach allows us to maintain analytical clarity by focusing on the service as the main unit of analysis, while also acknowledging the relational environment that surrounds it. For example, informal care networks—such as family caregivers, neighborhood support systems, or community volunteers—may not be part of the formal structure of social economy organizations, but they nonetheless contribute to the overall care ecosystem. These elements will be considered external yet influential factors, helping us to better understand the conditions under which social economy services operate.

Rather than centering the analysis solely on the end users of care services (i.e., older people), we propose adopting a Distributed Ecosystem Perspective (Mickelsson et al., 2022). This allows for a more nuanced

and multidimensional understanding of the care system by considering the diverse roles and experiences of all actors involved—particularly caregivers, workers, and the organizations themselves.

By shifting the analytical lens in this way, we can explore how social economy organizations function not only as service providers but also as employers, community builders, and innovation drivers within the care ecosystem. This broader perspective enables us to capture the complexity of interactions, power dynamics, and value creation processes that are often overlooked in user-centered models.

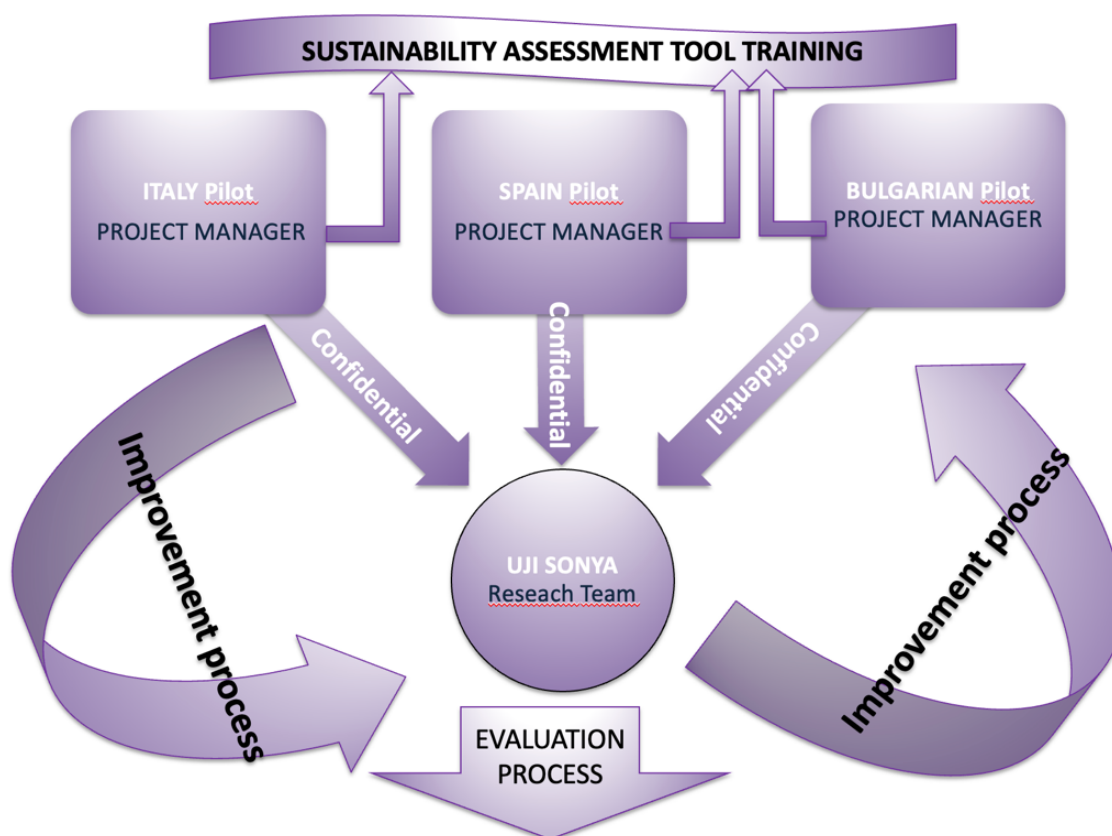


Figure 3. Model implementation, source: own elaboration

During the implementation process (figure 3), the SONYA Pilots will interact with the SONYA research team in a multilevel process, learning about the assessment tool and generating data from the selected care actions, to test the assessment tools and in a continuous improvement process, to develop a comprehensive and holistic assessment framework.

3.3 Life Cycle Thinking

Life cycle thinking is closely intertwined with sustainable production and consumption, by considering all stages in the life of products where a reduction of negative impacts could be achieved.

Most organizations have integrated sustainability in their strategy; however, there are deficiencies to measure sustainability performance in a comprehensive and aggregate way (Wicher et al., 2019). The question of how to manage sustainability has been discussed for years, and scholars have argued about how economic sustainability can be assessed (Kloepffer and Ciroth, 2011).

For the sustainability construction, several aspects are of equal relevance: social, environmental, and economic dimensions of sustainability. The literature on life cycle thinking and life cycle approaches is extremely diverse and constantly growing; it employs a myriad of partially overlapping concepts described in terms of tools, strategies, techniques, and methodologies. Muñoz et al., (2018) proposes a sustainability framework to understand, on the one hand how life cycle thinking is connected to the broader goal of sustainability and on the other hand, how various tools are used to operationalize the principles of life cycle thinking into practice. Fava (2011) graphically presents a good connection between LCT and sustainability

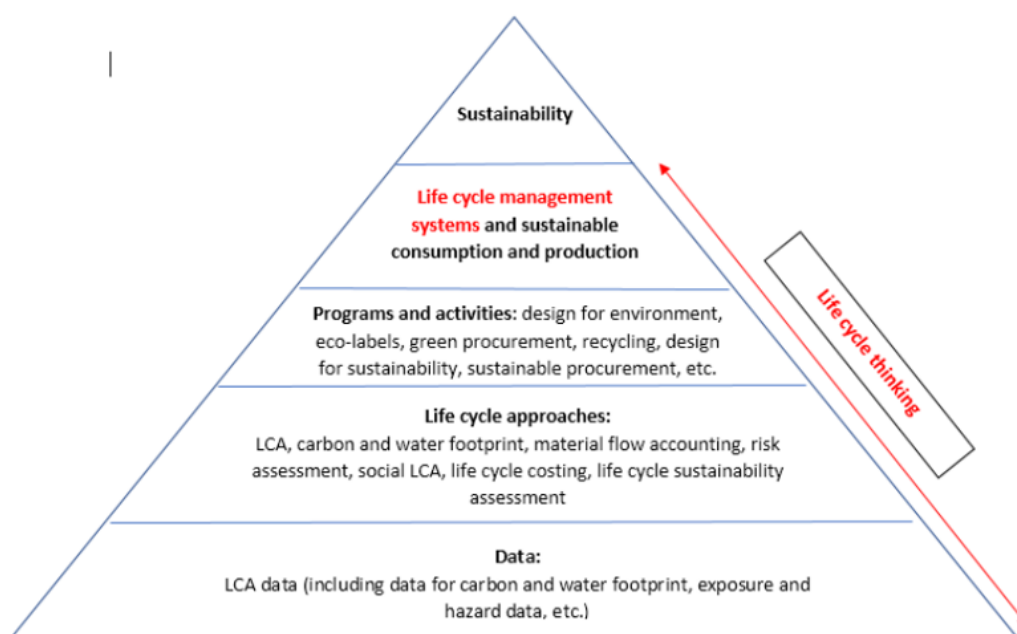


Figure 4. Sustainability framework. Source: UNEP (2012)

At the top of the pyramid, sustainability is the ultimate goal, followed by life cycle management systems and sustainable production and consumption.

Life cycle thinking needs to be viewed as 'a systemic framework that takes a holistic view of the production and consumption of a product or service and assesses its impacts on the environment through the entire life cycle' (Dragos and Neamtu, 2022). LCT can be employed by both private and public sectors, since life-cycle information is nowadays considered crucial to guide policy decisions and business strategies in many contexts.

LCT starts by acknowledging that products or services contribute to various environmental as well as social impacts over their lifetime. Therefore, it seeks to identify environmental and or social improvement opportunities at all stages across the products and services' life cycle, from raw material extraction and conversion, through product manufacture, product distribution, use and fate at the end-of-life stage (Koroneos et al., 2013). By looking at all stages, we make sure that 'improvements made to one part of the system in one country or in one step of the life cycle do not have negative consequences for other parts of the system which may outweigh the advantages' (Kloepffer, 2003). In other words, 'LCT is essential for understanding and preventing unintentional burden shifting, whether between different kinds of impacts, different supply chain stages, or different stakeholders that might occur as a result of our management decisions' (Pelletier, 2015). Focusing on economic sustainability (ES), the decisions of today shall allow the achievement of economic goals, but they also will allow the achievement of economic goals in the future. In the debate about ES, researchers identify a life cycle cost (LCC) perspective as being useful to assess and measure sustainability (Kloepffer, 2008).

Moreover, UNEP (2012) describes this process as balancing trade-offs and identifies five general categories of trade-offs: trade-offs between stages of the product value chain; trade-offs between environmental impact categories; trade-offs between the three sustainability pillars; trade-offs between societies/regions; and generational trade-offs. In section .3 is possible to find the current landscape of the most widely used tools and initiatives for sustainability assessment that are compatible with the Life Cycle Assessment (LCA) approach, that can support informed decision-making in the context of social economy organizations.

4. Literature review on the key aspects on sustainability of Social Economy Organizations (SEOs) connected with care of older people

Assessing sustainability within social economy organizations has become an increasingly complex task, mainly due to the diversity of their missions, type of organizations, activities and stakeholder expectations and EU level acknowledgment of regional and country high level of variation. In response to this challenge, a broad range of methods has been developed. These approaches differ widely in terms of indicators, scope, applicability, and complexity. However, this methodological diversity has also resulted in a fragmented landscape, often creating confusion and making it difficult for organizations to identify the most appropriate method of assessment for their specific needs (Grieco et al., 2015).

In the context of social economy organizations, the social dimension of sustainability assumes a central role, reflecting the intrinsic mission and values that guide these types of organizations. Consequently, the

assessment of social impact is not only crucial for capturing the value they generate for stakeholders and society, but also for informing strategic decision-making, attracting investors, quality and social impact-driven competitiveness in public bids for social service provision and enhancing organizational accountability and performance.

In this regard, Grieco et al. (2015) highlight the existence of 76 models developed for Social Impact Assessment (SIA), and more recently, Perrini et al. (2021) identify more than 100 methods for measure the impact of social enterprises. Despite the vast number of models and methods available, many have been used only anecdotally and have seen very limited practical implementation. Furthermore, the listings also include tools and initiatives, the most applied of which will be presented in section 8.

Table 1 shows a selection of 4 approaches according to the most commonly applied in the literature and in the practice (Mulloth et al, 2022; Muñoz et al., 2018; and Perrini et al, 2021) to assess the social impact of products and services, which are related to Social Life Cycle Assessment (S-LCA), Social Impact Assessment (SIA), Social Return of Investment (SROI) and Cost-Benefit Analysis. The Social Life Cycle Assessment (S-LCA) is a methodology to assess products, services or organizations throughout the entire value chain. On the other hand, a Social Impact Assessment (SIA) is a methodology for analyzing, managing and monitoring the potential social effects of a project or policy. Social return on investment (SROI) is a methodology that allows for a monetary calculation of the social, health, environmental, and economic value generated by a project. It is frequently used by companies and public entities to determine the feasibility of carrying out a project, giving a monetary value that allows comparison with the initial situation. And finally, Cost-benefit analysis (CBA) measures changes in social welfare, typically those brought about by a project or initiative. It is often used in large infrastructure projects and is typically ex ante. It involves listing and monetizing the direct and indirect effects of carrying out the action and calculating the Net Present Value (NPV). These methodologies have been widely applied in the analysis of social impact within social economy organizations. However, they belong to methodological approaches that incorporate the three dimensions of sustainability, giving rise to frameworks such as Life Cycle Sustainability Assessment (LCSA), which integrates Environmental Life Cycle Assessment (LCA), Social Life Cycle Assessment (S-LCA), and Life Cycle Costing (LCC).

Given that SONYA focuses on assessing the sustainability of actions and services carried out by social economy organizations, it is crucial to identify the methodological approach that best aligns with the four principles of sustainability (Muñoz et al., 2018), an approach that goes beyond analyzing the impact across the traditional three dimensions: social, environmental, and economic. In this regard, sustainability should be understood through a temporal and intergenerational perspective, incorporating not only short-term effects but also long-term consequences. It is equally important to consider impacts throughout the full life cycle of products or services, which extend beyond the boundaries of the social economy organization itself. Furthermore, the perception of stakeholders must be integrated into the evaluation framework.

	Objectives	Object	3 dimensions	Inter- generational perspective	Stakeholders approach	Life cycle thinking
LCSA	To assess sustainability throughout the entire value chain of a product or service	Product, services or organizations	X	X	X	X
SIA	To assess the sustainability impact	Policies, projects, programs, or developments	X		X	
SROI, eROI and ROI	To understand and manage the impacts of a project, business, or organization.	Activity or initiatives	X	X	X	
CBA	To measure changes in society's welfare	Projects or initiatives	X			

Table 1. Assessment approaches. Source: own elaboration

In this context, life cycle assessment (LCA) is the methodology that integrates the four principles of sustainability. Therefore, SONYA project adopts this methodology to measure sustainability. In addition, LCA is widely used both in academic research (Rivera et al., 2024) or (Gan Yupanqui et al., 2024) and in different European projects such as SUPERSHINE, SMART, EFFECTIVE, ToNoWaste or XPRESS. This methodology can capture entire impacts because it can cover all phases of the product system. In a service case, the methodology covers the design of the action, testing, recruiting, staff selection, until the assessment and improvement phase. As mentioned above, LCA has been applied to the three sustainability dimensions. It began with the environmental pillar, specifically Environmental Life Cycle Assessment (ELCA), based on ISO 14040 standards. This was later followed by the emergence of Social Life Cycle Assessment (S-LCA), the latter of which is still undergoing development (Choe et al., 2024).

The LCC can be designated as the economic counterpart of the LCA (Kloepffer, 2008). It is a methodology encompassing and assessing all costs related to a product or service arising in all life cycle stages from cradle-to-grave, so, not only purchase prices are considered, but also costs over the entire life cycle. A further objective of the LCC is the identification of cost drivers and trade-offs in the life cycle of a product. In general, the LCC follows the framework of ISO 14040/44. Defining objectives and scope is analogous to the LCA. Both assessments (LCA and LCC) focus on an equivalent definition of the product system. Unlike the LCA, there is no comparable phase of impact assessment in the LCC because all inventory data comprise a single unit of measurement: currency. Consequently, there is no need to characterize inventory data. A challenging aspect of the LCC is the proposed coverage of all costs over the entire life cycle, with costs borne by different actors (UNEP/SETAC, 2011, Bakes and Traverso, 2021)

Life Cycle Costing (LCC) is an economic evaluation technique that considers all costs associated with a product, service, or system throughout its entire life cycle. LCC is applied to evaluate and compare

options that have the same function and are expected to perform similarly. The purpose of LCC is to assist decision-makers in choosing the most cost-effective option over the long term.

LCC is based on economic principles such as discounting future costs to present value and considering the total cost of ownership. It includes acquisition, operation, maintenance, and end-of-life costs. LCC is useful for long-term budgeting, investment analysis, and policy decisions in both public and private sectors.

Recently, significant progress has been made in advancing the integration of E-LCA, LCC and S-LCA. This comprehensive evaluation approach is known as Life Cycle Sustainability Assessment (LCSA). Although still under development, LCSA adopts a holistic approach that simultaneously considers environmental and social impacts and costs. Its versatility allows it to be applied across a wide range of products, organizations and services in diverse sectors.

For a methodological integration of the three LCAs, it is essential to ensure coherence in their underlying assumptions, system boundaries, and data structures and, particularly, using the same Functional Unit. The functional unit defines, in quantitative terms, the service to be provided. It is important to define it and ensure it is consistent when analyzing the three pillars or when conducting comparative studies between various products or services (economic, social, and environmental) in order to conduct a comprehensive study. The function of the service itself, who it is intended for, and where it will be provided must be defined (UNEP, 2020). This Functional Unit enables accurate comparison of results with other products, services, or organizations, and supports efforts to enhance an organization's strategy and performance.

Another reason for choosing LCA is because it is related to global sustainability initiatives such as the Sustainable Development Goals (UNEP, 2020), although some studies suggest that the interconnection between the two should be stronger (Pollock et al., 2021).

Following this initial exploratory analysis and given the importance for SONYA Project of social impact methodologies and the early stage of development of social impact assessment methodologies, this deliverable has primarily delved into the state of the art of the Social Life Cycle Assessment (S-LCA) methodology, with particular emphasis on its application within the service sector. To conduct the analysis of the state of the art, we used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) literature review methodology, which, although designed for health research, is widely used in other disciplines such as sustainability media Padilla-Rivera et al. (2023). We conducted the search in two databases (Web of Science and Scopus) and CORDIS, the European Union's search engine for research results. The keywords used were "Social Life Cycle Assessment," "S-LCA," "s-lca," and "social footprint." We combined these four keywords with "services." Given research in this field is limited, we did not specify services in detail, such as "care services" or "services for the older people," because the results were very limited.

For databases, we used Web of Science and Scopus. We limited the search to results published after 2009, as this was the year of publication of the UNEP/SETAC guide, used as the first reference framework

in this field. We also limited the search to results in English, and we excluded duplicate articles, book chapters, and conference papers, no free access articles and articles where the social component is not the main topic. This search yielded 100 results. Of the 100 articles analyzed, 51 include a case study as the main part of the work.

Analyzing these works, we can confirm the growing interest in the subject since the publication of the UNEP/SETAC guide in 2009 and also how the number of case studies has increased significantly in recent years.

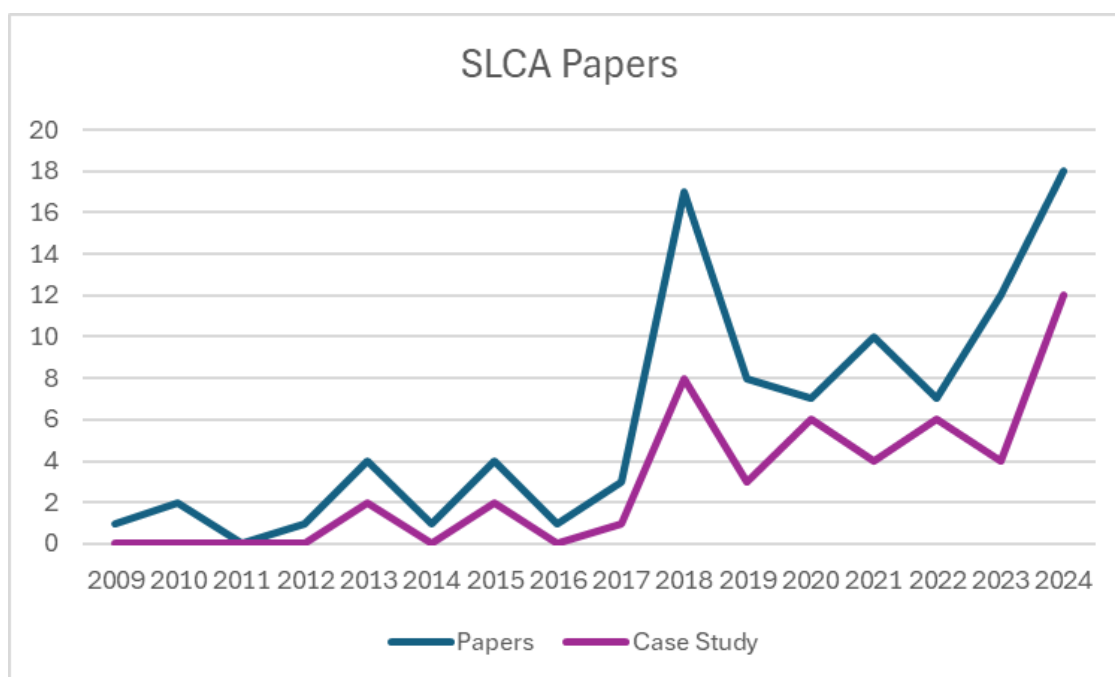


Figure 5.S-LCA publications and case studies for the period from 2019 to 2024., Source: own elaboration

Regarding the analysis of the service sector, service case studies are a minority, comprising 19 of the 51 cases. One of the limitations that may affect the lack of evaluated services is the controversy surrounding the definition of the functional unit. Only 10 studies define a clear functional unit. Some authors claim that social aspects are not easy to define in a functional unit because they are intangible Ruggeri et al. (2024). This lack of functional unity prevents the development of a complete inventory and, therefore, the implementation of a study through databases. In addition, only 3 out of the 19 case studies use a database for the Social Life Cycle Impact Assessment: the rest base the study on public data, surveys, or interviews. Furthermore, they mainly focus on a few sectors such as waste, tourism, and transportation. Only one case related to older people care services has been identified Flor-Montalvo et al. (2020), therefore, we can conclude that our study can contribute to the existing gap in service analysis through the social life cycle methodology.

Regarding European projects, our search in the CORDIS database using the identified keywords yielded 1,031 results. After excluding projects outside the Horizon Europe programme, 232 remained. Significant portion of the projects, although they will include a life-cycle sustainability analysis, are still in the development phase and therefore have no results yet. Focusing on those that have already published some or all their results and that include a social analysis, we finally find 15 projects.

Out of the 15 projects analyzed and given that the selection focused on those adhering to a life-cycle methodology, the majority (10 projects) follow the UNEP/SETAC guidelines. These guidelines are broad and flexible, allowing for different levels of application—from partial studies that may focus on a single stakeholder, to comprehensive assessments that incorporate databases and consider all relevant actors and life-cycle phases outlined in the guide. Among the 10 projects aligned with these guidelines, 5 conduct in-depth studies using tools like PSILCA or SHDB. These tools enable a sector- and country-level analysis or a full inventory to assess social impacts from a life-cycle perspective. Additionally, we identified related or "sister" projects, but they are still in early development stages and do not yet have results available for analysis.

All these studies pertain to analyses of products within industrial sectors, highlighting a notable gap in the application of the S-LCA methodology to service-oriented contexts.

5. Literature review on the key aspects on effectiveness of a social care action for older people

During the design process of the assessment framework, the necessity of assessing effectiveness of social interventions has been detected. Effectiveness in the context of a solution for caring older people refers to the extent to which the intervention achieves its intended outcomes in improving the well-being, health, independence, and quality of life of the carers and the caregivers. It is a multidimensional concept that can be defined from several perspectives.

There is an important body of literature that focuses on interventions to reduce loneliness and isolation among older people (Fakoya et al., 2020). This research highlights, for example, that the individuality of the experience of loneliness and isolation may cause difficulty in the delivery of standardized interventions and consequently their assessment. Loneliness is often used as a proxy for social inclusion, but it is primarily a subjective emotional state rather than a structural or relational indicator of connectedness; as such, it does not fully capture the multidimensional nature of social inclusion, which also involves opportunities for participation, access to resources, and recognition within communities (Walsh et al., 2017). Following this logic, in SONYA we prioritize measures of social inclusion rather than social isolation and loneliness, which are distinct concepts from inclusion.

Measures of effectiveness of social care services

The effectiveness assessment perspectives highlighted by literature focus on different aspects that go from quality of the health system to psychological and sociological quality of life indicators. Owusu-Addo

et al. (2025) performed a systematic literature review about integrated care models (ICMs) for older people and identified the factors that facilitate or impede the successful implementation of care solutions. The paper highlights the most common outcome ways of assessing effectiveness of ICMs, like hospital admission rates, quality of life (QoL) scores, social isolation and loneliness scales, uptake of community services or functional independence.

This suggests that using a multi-dimensional evaluation framework that combines both quantitative and qualitative methods allows us to better understand the effectiveness of an intervention inside the SONYA project.

From the perspective of the indicators that should cover this quantitative and qualitative spectrum, this deliverable makes a strong proposal on assessing impacts from a multistakeholder and sustainability perspective.

It should be noted that the main shortcoming of the extant body of research evidence has predominant focus on health outcomes rather than social care services with social inclusion objectives, which limits its relevance for evaluating these types of services. This gap is highlighted in O'Rourke et al.'s (2018) scoping review, which notes that while loneliness and social isolation are frequently measured, broader dimensions of social connectedness and community participation remain underexamined.

Integrating the rest of the dimensions means considering the above-mentioned psychological and sociological dimensions. The World Health Organization (WHO) defines quality of life (QOL) as an individual's perception of their position in life, within the context of their cultural and value systems, and in relation to their personal goals, expectations, standards, and concerns (Skevington et al., 2004). To develop a quality-of-life assessment, the WHO uses two indicators, the WHOQOL-100 and the WHOQOL-BREF, which measure a person's subjective opinion of their quality of life. The first has 100 items, grouped into six categories (physical health, psychological health, levels of independence, social relationships, environment, and spirituality/religion/personal beliefs). The second of them includes 26 items with five possible answers, grouped into 4 categories: physical health, psychological well-being, social relationships, and environmental factors (WHO, 2004). Skevington et al. (2004) study included data from 23 countries and can be used to compare and evaluate an action by comparing the ex-ante and ex-post results and to compare two alternatives (Torres et al. 2008). The categories of social relations and environmental factors are connected to social care actions and are, therefore, a suitable indicator for evaluating effectiveness.

There are other scales to assess social connection and mental well-being like UCLA Loneliness Scale (3-item or 20-item), again not a direct measure of inclusion, De Jong Gierveld Loneliness Scale or Lubben Social Network Scale (LSNS-6) (Georgia Department of Human Services, Division of Aging Services, 2020). As Fakoya et al. (2020) remark, there is no one-size-fits-all approach to addressing loneliness or social isolation, and hence the need to tailor interventions to suit the social inclusion needs of individuals and specific groups. This is also applicable to the assessment of effectiveness of the actions and interventions

and the SONYA Assessment Framework will introduce the effectiveness evaluation that will better fit the SONYA Pilot Interventions.

We suggest the use of the following priorities in the definition of KPIs for effectiveness in social inclusion services: Measures that directly assess the structure and quality of social ties (Ashida et al., 2019; Pelle et al., 2022; Quan-Haase et al., 2017; Raymond et al., 2014) or community belonging and social connectedness (Kikuchi, 2024; Zheng et al., 2022) as among the most effective and validated ways to evaluate social inclusion using existing structured assessment tools. Additionally, indirect indicators of effectiveness, understood as the impact on inclusion and wellbeing, such as participation rates (Stolee et al., 2012; Kosurko et al., 2020; Southcott & Joseph, 2017), older-adult specific QoL measures including WHOQOL-OLD and CASP-19 (control, autonomy, self-realisation, pleasure) (O'Rourke et al., 2018; Owusu-Addo et al., 2025), functional health (Clément et al., 2018; Svensson & Stjernborg, 2024), and older volunteer engagement and turnover metrics when volunteering itself is designed as a service (Clément et al., 2018; Stolee et al., 2012), how inclusion initiatives operate in practice and how initiatives impact wellbeing.

Table 2 presents measures that could be used to capture the effectiveness of social care solutions to foster social inclusion for older adults. The table presents some care-service specific measures such as home services, which are central to the social care services.

KPI	Operational definition / how to measure	Literature source(s)
Effectiveness of services for social inclusion		
Direct measures of service effectiveness		
Social network analysis	Before/after mapping and quantifying social ties; frequency and quality of contacts; network size and density	Ashida et al. (2019); Pelle et al. (2022); Quan-Haase et al. (2017); Raymond et al. (2014)
Community-based connectedness with people	Survey items capturing whether older adults feel recognized, acknowledged, and accepted in their community	Kikuchi (2024)
Sense of community	Brief Sense of Community Scale (BSCS) to measure psychological sense of community (neighbourhoods, groups, or online)	Zheng et al. (2022)
Indirect measures of service effectiveness		
Participation metrics	Number/frequency of community activities enabled (e.g., per month, for mobility solutions); attendance rates; duration of involvement; volunteer participation in SEOs; attendance of senior center use (before/after); Leisure Activities Blank	Kosurko et al. (2020); Rosso et al. (2013); Southcott & Joseph (2017) (DiSS & social participation); Stolee et al. (2012); Zheng et al. (2022)
Digital inclusion	% of older adults using DiSS alternatives (e-tag, kiosk); training completion rate; tech trust score; number of phone calls, internet use; leisure activity participation	Stjernborg & Lopez Svensson (2024) (digital locks/alternatives); Svensson & Stjernborg, (2024). (trust/accessibility issues)

Mental well-being	Depression Anxiety Stress Scales (DASS)	Van Herpen et al. (2022)
Quality of life	EuroQoL-5 (mobility, self-care, usual activities, pain/discomfort, anxiety/depression); CASP-12 SHARE (Control, Autonomy, Self-Realization, Pleasure); WHOQoL (physical, psychological, social relationships, environment)	Blažun et al. (2012); Fokkema & Knipscheer (2007); Potočnik & Sonnentag (2013); Travers & Bartlett (2011); Woodward et al. (2013)
Home care services specific measures		
Continuity & relationship stability	% of patients meeting a continuity threshold (e.g., ≥70% visits by same caregiver); number of continuity breaches	Gomes & Ramos (2019) (loyalty weekly; rotation across weeks); Maya Duque et al. (2015) (service-level via preferences)
Care service satisfaction / time-window service quality	Composite of on-time rate, penalty-free visits, and preference adherence (proxy for satisfaction)	Zhao et al. (2024) (penalty as service quality proxy); Maya Duque et al. (2015) (time/preferences in service level)
Equity of access / rural accessibility	Median travel time to first visit; rural-urban gap; % of care users served in remote areas	Stjernborg & Lopez Svensson (2024) (accessibility poverty metrics); Mohammadi Bidhandi et al. (2019) (network capacity addressing ALC delays)
Provision of volunteer opportunities as a social inclusion service		
Volunteer engagement metrics	Volunteer turnover, training completion, stipends; Volunteer Satisfaction Index (VSI)	Tang et al. (2010); Galindo-Kuhn & Guzley (2001)

Table 2. Effectiveness indicators in social care for older adults, source: own elaboration

6. Key Issues for the SONYA Sustainability Assessment Framework

6.1 Co-creation of the SONYA SAF

During the design process of the SAF (Sustainability Assessment Framework), various internal presentation structures have been developed for SONYA's project partners, covering the different phases and processes connected to the tool. The SAF is an adaptation of the sustainability assessment framework that has previously been developed in previous European projects, such as the H2020 SMART project and the HE ToNoWaste project.

In the SMART project, the assessment tool was designed and tested to support the evaluation of the sustainability of products manufactured outside the European Union and sold within the EU by European companies. In this context, the integration of sustainability principles led to the creation of a tool that, alongside strategic thinking around why this evaluation was necessary and who was involved (stakeholder analysis), also incorporated technical information across environmental, economic, and social domains. These elements were then integrated into sustainability indicators, which ultimately enabled the development of accountability mechanisms. Simultaneously, processes such as traceability, auditing, and continuous improvement were addressed.

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In the ToNoWaste project, the adaptation of the proposed sustainability evaluation tool is focused on solutions aimed at preventing and reducing food waste.

In the case of the SONYA project, the tool is currently being co-designed in collaboration with both scientific partners and practitioners. The aim is to adapt science-based sustainability evaluation tools to the context of solutions that enhance quality of life and improve the social and work environments of companies and social economy organizations dedicated to the care of older adults.

During the regular internal meetings held within the governance structure of the SONYA project, the research team responsible for this deliverable has presented the structure and content of the SAF tool—both in online sessions and during the in-person meeting held in June 2025.

Subsequently, on September 2025, work was carried out in a co-creation process with the project partners, aimed at clearly define the concepts that affects the design of data capturing for the solutions to be implemented by the three pilot initiatives of the project and introduce sustainability assessment methodology.

A specific taskforce has been designed by the partners to directly collaborate in the cocreation process. The first WP4 technical workshop took place online on 24th of September 2025. It was coordinated by the University Jaume I (UJI) team, and the workshop was programmed, following the GA to transfer knowledge about the content of this deliverable and to co-create on how to measure the effectiveness of a social care action for older people. It was structured around the following content:

Introduction to General Systems Theory (GST) as an interdisciplinary approach focused on uncovering the universal principles that govern the creation, operation, and sustainability of both natural and social systems.

Introductory content on the current processes based on science and aligned with EU regulatory framework of evaluation of results in terms of sustainability.

Open discussion on the problem of how to measure the effectiveness of a care solution for older people.

Identification of current indices to measure effectiveness of care solutions.

All the partners belonging to the Consortium participated in the open discussion, with a brainstorming session, where the different participants talked about the problem of defining an appropriate measure of the effectiveness of a care action considering the complexity of the system and the problems that these actions should solve.

In this working session participated Maria Jesus Muñoz Torres, Idoia Ferrero Ferrero, Elena Escrig Olmedo, Mar García García and Dolors Traver Torres from UJI team and Carla Sala, Maria Petrova, Giulia Fratti, Petya Puncheva, Silvia Magagnoli, Imen Nouira, Teodora Makaveeva, Maria Silvia Cadeddu and Madeg le Gernic as members from the rest of SONYA Consortium.

During the process Menti.com tool was used to support the debate and the main contributions are listed below:

The first question was about key aspects to include in an action effectiveness index and the answers were connected with aspects like mobility, power people satisfaction, responsiveness to challenges or changes during implementation, labor conditions, KPIs for informal workers conditions, older adults social integration, media coverage of the initiatives, quality service, formation, level satisfaction among older people or specific measures for older adults inclusion effects.

Most of the responses focused on the satisfaction of older people with the quality of the services provided (mobility, usability, temporality), and also media coverage of the actions and working conditions.

The next point was about how to evaluate these key aspects through indices or indicators and different alternatives raised to WHOQOL family indices, like number of participants, level of satisfaction, social network of users, testimonials, Community Connectedness Index or number of activities enabled.

After considering the input derived from the workshop and the literature review about effectiveness of social care services, the method suggests introducing flexibility to allow, depending on the casuistic, the introduction of expert knowledge to select the most adequate measure that could capture the effectiveness of social care solutions to foster social inclusion for older adults.

6.2 Social Economy Organizations specificities

The SONYA project aims to promote and analyze care solutions for older adults in rural settings, with a strong foundation in the social economy. The analysis of these care solutions must therefore adopt multiple approaches depending on the focus of the evaluation. Throughout the project, this leads to the exploration of different evaluation models from various perspectives. The project goal is to assess older people social care solutions from multiple angles, such as the effectiveness of active aging opportunities promoted among older individuals (Suzuki et al., 2021) participating in the analyzed solutions or the sustainability organizational perspective (Muñoz et al, 2018).

This document focuses on the sustainability evaluation perspective, specifically in relation to organizational solutions aligned with the objectives of the SONYA project. Given this specificity, the following section dives into the distinctive characteristics of the solutions promoted throughout the project—namely, those aimed at older adults' care in rural environments and implemented within social economy structures.

The social economy refers to a diverse set of private entities that prioritize social and environmental goals over profit, reinvest surpluses in social goals and territorial commitment into their mission, and operate with democratic or participatory governance. SE entities are characterized by different operating and organizational principles and features. These entities play a key role in inclusive growth, job creation, and community resilience across Europe. According to the Study on the Social Economy in the European

Union, the so-called Social Economy Action Plan (2021), five main organizational type groups (table 3) can be distinguished.

Organization Type	Definition	Key Features	Legal Recognition in EU
Cooperatives	Member-owned enterprises operating democratically.	Specific governance structures. One member, one vote. Profit shared equitably. Strong local roots.	Widely recognized; supported by EU programs like COSME and SMP
Mutual Benefit Societies	Non-profit entities offering insurance, welfare, or assistance to members.	Serve members' interests No external profit distribution Promote social protection	Included in EU proposals for a European statute
Associations	Non-profit groups pursuing social, cultural, or environmental goals.	Voluntary membership Mixed funding (public/private) High social innovation capacity	Covered under EU social economy definitions and funding schemes
Foundations	Asset-based entities supporting public interest causes.	No members Funded by endowments or donations Long-term social impact	Eligible for EU support and part of proposed legal harmonization
Social Enterprises	Businesses with a social mission and participatory governance.	Reinvest profits Serve vulnerable groups Often hybrid legal forms	Central to the EU Social Economy Action Plan (2021)

Table 3. Social Economy Organizations typology, source: own work based on *The European Commission launched the Social Economy Action Plan (2021)*

The social economy ecosystem in Europe is diverse, with many organizations working on representing, supporting and promoting the social economy. In this section we aim to map key stakeholders, starting with networks that are active at the European level. In the EU Social Economy Gateway is possible to find a non-exhaustive list of SE organizations active at EU level¹.

The European Commission launched the Social Economy Action Plan (2021)² to strengthen this business model. The European Parliament has approved resolutions to create a European statute for mutuals, associations, and foundations³. Moreover, the social economy is integrated into key EU policies such as the European Social Fund⁴, the green and digital transitions, and the Sustainable Development Goals. In fact, as states the European Commission in its reflection paper "Towards a Sustainable Europe by 2030"⁵, the social economy is an opportunity and a driver for the implementation of the 2030 Agenda and its 17 Sustainable Development Goals (SDGs) at European and at global level, especially for the achievement of

¹ https://social-economy-gateway.ec.europa.eu/about-social-economy/mapping-stakeholders-and-networks_en

² <https://ec.europa.eu/social/BlobServlet?docId=24986&langId=en>

³ [https://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/494461/IPOL-JOIN_ET\(2013\)494461_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/etudes/join/2013/494461/IPOL-JOIN_ET(2013)494461_EN.pdf)

⁴ <https://european-social-fund-plus.ec.europa.eu/en/what-esf>

⁵ https://commission.europa.eu/document/download/3dab8f75-8c9d-4cf2-b215-d9098e69b654_en?filename=rp_sustainable_europe_30-01_en_web.pdf

Objective 8 “promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work”.

When we move to a more granular analysis considering SONYA Pilots (table 4), we can see that there are disparities in the development of the social economy across the three countries.

General Definition (EU)	Spain	Italy	Bulgaria
Cooperatives	Member-owned enterprises with democratic governance and social objectives.	Governed by Law 5/2011. Represent around 10% of GDP. Examples: worker, consumer, producer or multi-stakeholder.	Widespread, especially in the north. Examples: social cooperatives providing services to vulnerable groups.
Mutual Societies	Non-profit entities offering insurance or welfare services.	Included in Law 5/2011. Examples: health and social welfare mutuals.	Historically significant. Examples: mutuals for health and labor assistance.
Associations and Foundations	Non-profit organizations with social, cultural, or environmental aims.	Very active in disability, inclusion, and culture. Examples: third sector associations.	Broad presence in culture, education, and social services.
Social Enterprises	Economic activities with a social goal, profit reinvestment, and participatory governance.	Promoted by CEPES and the European Action Plan. Examples: work integration enterprises.	Legally recognized. Examples: social enterprises for the integration of people with disabilities.
Other Entities	Includes special employment centers, labor societies, guilds, etc.	Diverse legal forms. Examples: labor societies, special employment centers.	Hybrid models under development.

Table 4. Level of development of the social economy across the three SONYA countries, source: own elaboration

The development of the social economy across Spain, Italy, and Bulgaria presents both similarities and disparities that can significantly influence the design and implementation of care solutions for older people.

On the side of similarities, all three countries recognize and support key social economy actors such as cooperatives, mutual societies, associations, and social enterprises. These entities play a vital role in delivering community-based and person-centered care services. Each country also benefits from some form of legal or institutional framework that supports the social economy, providing a foundation for the development and scaling of care-related initiatives. Furthermore, associations and foundations are active in all three contexts, particularly in areas closely linked to older people care, such as social inclusion, disability services, and cultural engagement. Additionally, all three countries are aligned with European Union policies, such as the European Action Plan for the Social Economy, which promotes inclusive and sustainable care models.

However, there are notable disparities that may affect how care services for older people are developed and sustained. One key difference lies in the level of maturity of the social economy sector. Spain and Italy have more established and structured ecosystems, with long-standing traditions of cooperatives and mutual societies. In contrast, Bulgaria is still in a phase of institutional development and territorial

expansion of social economy organizations, which may limit the scalability and consistency of care services in the short term.

Geographic disparities also play a role. In Italy, for example, cooperatives are particularly strong in the northern regions (SONYA pilot), potentially leading to unequal access to services across the country. Bulgaria, still in the process of defining its regulatory framework, experience uneven service provision depending on the region. For example, the first social economy organization is registered in Northwestern Bulgaria in August 2025.

The integration of informal care networks varies as well. Spain has a more established tradition of incorporating family and community-based care into its broader care ecosystem. In Bulgaria, informal care is likely more prevalent, reflecting persistent gaps in the availability and accessibility of formal services. At the same time, the country is undergoing a major reform of its social services system, which aims to expand coverage and improve quality. Yet, informal care remains largely unrecognized and insufficiently integrated within the social economy framework, which limits its potential to complement these reforms.

Legal recognition of social enterprises is another important differentiation. Italy benefits from a well-defined legal framework that facilitates social enterprises' engagement in public procurement and service delivery. Spain operates under a fragmented, sector-specific approach rather than a unified legal status. By contrast, Bulgaria has only recently begun to formalize this model through since 2018.

Finally, the availability of support mechanisms and funding varies. Spain benefits from strong national platforms such as CEPES and targeted funding mechanisms, while Bulgaria relies more on bilateral cooperation and EU-level support, which may be less stable or comprehensive. In Italy, several financial support mechanisms are available, mainly through public tenders, direct contributions, vouchers, and care allowances.

These differences have important implications for assessing older people's care solutions. The uneven development of the social economy across countries means that care models must be evaluated within their specific national contexts, using adaptable and context-sensitive indicators. Assessment methodologies and data necessities that work in Spain or Italy may not be directly transferable to Bulgaria without additional capacity-building or policy support. At the same time, emerging ecosystems like Bulgaria's serve as laboratories for innovative grassroots assessment models that are adaptive and responsive to other environments and needs. Therefore, any assessment framework must consider ecosystem maturity, legal frameworks, and the integration of informal care when proposing improvements or scaling strategies.

6.3 Decision making tools and solutions for the assessment

This section examines the current landscape of the most widely used tools and initiatives for sustainability assessment that are compatible with the Life Cycle Assessment (LCA) approach that can support informed decision-making in the context of social economy organizations and will serve as the

foundation upon which the assessment framework proposed in the SONYA project will be built (see Table 5).

In particular, the assessment framework proposed within the SONYA project builds upon the structure established in the previous H2O2O SMART project, which focused on assessing sustainability at the organizational level. In addition, it incorporates key lessons learned from the ToNoWaste project, contextualized on food waste prevention and reduction actions which advanced the methodological approach by shifting the unit of analysis from the organization to a specific action, intervention, or solution. This shift was contextualized on food waste prevention and reduction actions given the nature of ToNoWaste HE project.

Both frameworks have integrated a set of internationally recognized tools and initiatives which are widely supported by international institutions. In this regard, the environmental impact assessment is grounded in the Environmental Footprint methodology promoted by the European Commission, which itself is based on the ISO 14040 life cycle assessment standards. In parallel, the social impact assessment draws on the international reference framework provided by UNEP's Social Life Cycle Assessment (S-LCA) guidelines, which are aligned with ISO 14075 approach. The implementation of these tools can also benefit from previous experience and established practices in social and environmental assessment and management, such as those developed under the SA8000 Standard, ISO/UNDP PAS 53002, ISO 26000 and the GRI Standards. These frameworks offer valuable insights into stakeholder engagement, performance indicators, and reporting mechanisms, which can complement and strengthen the application of life cycle-based methodologies.

Additionally, the UNEP Hotspots Analysis methodology has contributed to the development of the assessment framework. The Hotspots Analysis allows us to identify critical sustainability issues across the life cycle. This approach facilitates the prioritization of areas for intervention and supports continuous improvement processes.

Moreover, the assessment framework can be further strengthened by integrating sustainability risk management initiatives, such as those proposed by COSO following the structured stages outlined in ISO 31000, and by applying multi-criteria decision-making (MCDM) methodologies, such as those included in the Better Regulation Toolbox – European Commission, allowing for more informative and value-added aggregation of results.

Tools and initiatives	Objective	Focused on	Aspects addressed	Approaches and processes included	Website
Sustainability Assessment Framework – H2020 SMART Project	To present a logical framework to assess a comprehensive assessment of corporate sustainability performance from a life cycle perspective, that integrates different well-known science-based tools and processes	Organizations	Environmental, Social, economic, corporate governance and sustainable management practices	LCA, Hotspots analysis, Traceability in sustainable management, Assurance, and Continuous Improvement	https://ec.europa.eu/research/participants/documents/downloadPublic?documentIds=080166e5c487443e&appId=PPGMS
ToNoWaste Science-based Framework – HE ToNoWaste Project	To assess the sustainability of Food Loss and Waste Prevention and Reduction solutions	Intervention, actions, solutions that prevent or reduce Food Loss or Waste.	Environmental, social and economic impacts, hotspots and risks.	LCA, Hotspots analysis, Traceability in sustainable management, Assurance, and Continuous Improvement	file:///C:/Users/ferrero/Downloads/Attachment_0-1.pdf
Organization/Product Environmental Footprint promoted by European Commission	To promote the use of harmonized methods for measuring and communicating the life cycle environmental performance of products and organizations	Products and organizations	Environmental impacts across the life cycle	LCA, Category and Sector Rules, Normalization and Weighting processes.	https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32021H2279

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Environmental life cycle Assessment Standards – ISO 14040/44	To provide internationally harmonized principles and phases for conducting environmental life cycle assessments	Product and organizations	Environmental impacts across the life cycle	Goal and scope definition, Life Cycle Inventory, Life Cycle Impact Assessment and Interpretation.	https://www.iso.org/obp/ui/#iso:std:iso:14040:ed-2:vl:en https://www.iso.org/obp/ui/#iso:std:iso:14044:ed-1:vl:en
Guidelines for Social Life Cycle Assessment of Products and Organizations ISO 14075:2024 – Environmental management: Principles and framework for Social Life Cycle Assessment	To provide a methodological framework for assessing the social and socio-economic impacts of products and organizations throughout their life cycle	Products and organizations	Social and socio-economic impacts	LCA, stakeholder mapping, comparability	https://www.lifecycleinitiative.org/wp-content/uploads/2021/01/Guidelines-for-Social-Life-Cycle-Assessment-of-Products-and-Organizations-2020-22.1.21sml.pdf
SA8000 Standard – Social Accountability International (SAI)	To provide internationally harmonized principles and phases for conducting social life cycle assessments	Product	Social and socio-economic impacts across the life cycle.	Goal and scope definition, Life Cycle Inventory, Life Cycle Impact Assessment and Interpretation.	https://www.iso.org/standard/61118.html#lifecycle
ISO/UNDP PAS 53002:2024 – Guidelines for contributing to the SDGs	To provide a globally recognized framework for ensuring decent working conditions and protecting workers' rights	Organizations	Social aspects aligned with ILO conventions and Human Rights standards	Social auditing, management systems for continuous improvements and stakeholder engagement	https://sa-intl.org/es/resources/sa8000-standard/
ISO 26000 – Guidance on Social Responsibility	To provide a unified framework for organizations to manage, optimize, and demonstrate their contributions to the UN Sustainable Development Goals (SDGs)	Organizations	Economic, social, environmental, and corporate governance aspects	Impact identification and prioritization, stakeholder mapping, risk management, sustainability reporting and continuous improvement	https://www.iso.org/obp/ui/es/#iso:std:iso-undp:pas:53002:ed-1:vl:en
	To provide guidance on how organizations can operate in a socially responsible manner,	Organizations	Social, economic, environmental and corporate governance	Stakeholder engagement, prioritization, and continuous improvement	https://www.iso.org/iso-26000-social-responsibility.html

	contributing to sustainable development				
Hotspots Analysis – UNEP	To provide a common methodological framework and guidance for sustainability hotspots based on a LCA	Identify priority issues at product and sector level	Environmental, social, economic and governance impacts	LCA, continuous improvement analysis, stakeholder engagement, hotspots analysis	https://www.lifecycleinitiative.org/library/hotspots-analysis-an-overarching-methodological-framework-and-guidance-for-product-and-sector-level-application/
Better Regulation Toolbox – European Commission	To contribute to making European Commission initiatives more effective, coherent, relevant, and efficient, support their implementation, and provide a rigorous evidence base to inform decision-making. It encompasses a broad range of practical tools, best practices, and tips	EU interventions – legislative or non-legislative, policy initiatives or spending programs	Strategic planning, impact assessment, consultation, and related methodologies like multi-criteria decision analysis or cost-benefit analysis, among others. Sustainability as one of the key areas in the EU legislation is a cross-cutting issue	It includes 69 tools with a broad range of approaches and processes. Users of this initiative are expected to apply the toolbox selectively and with common sense when they need additional guidance	https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX%3A32021H2279_ox_en
COSO Enterprise Risk Management-Integrated Framework	to guide risk management and sustainability practitioners to apply enterprise risk management (ERM) concepts and processes to ESG-related risks	Organizations	Governance and culture for environmental, social, and governance (ESG)-related risks, strategy and objective-setting for ESG-related risks, performance for ESG-related risks (including risk identification, risk assessment and prioritization and risk responses), review and	It is based on COSO's ERM Framework Enterprise Risk Management—Integrating with Strategy and Performance (COSO, 2017)	https://www.wbcsd.org/Programs/Redefining-Value/Making-stakeholder-capitalism-actionable/Enterprise-Risk-Management/Resources/Applying-Enterprise-Risk-Management-to-Environmental-Social-and-Governance-related-Risks

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			revision for ESG-related risks and information, communication and reporting for ESG-related risks.		
			Focusing on the process of risk management, it includes: active communication and consultation with all stakeholders; a clear definition of the scope, context, and criteria of the concrete assessment; a systematic assessment including the steps of risk identification, analysis, evaluation; a specific risk treatment, selecting the best option treatment by risk and preparing and implementing the risk treatment plan; a regular monitoring and review of the process; and a document and report the process through appropriate mechanisms		https://www.iso.org/obp/ui#iso:std:iso:31000:ed-2:v1:en
ISO 31000 Risk Management	To provide guidelines on managing risk faced by organizations	Organizations		It is based on a set of principles, consistent with a dynamic and continuous improvement approach.	
GRI Standards – Global Reporting Initiative	To provide a globally recognized framework for sustainability reporting that	Organization	Economic, environmental, social and corporate governance	Stakeholder engagement, materiality assessment,	https://www.globalreporting.org/standards

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	enables organizations to disclose their most significant impacts on the economy, environment, and society.			disclosure according to the following principles: Accuracy, Balance, Clarity, Comparability, Completeness, Sustainability context, Timeliness, Verifiability	
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Table 5. Sustainability tools and initiatives, source: own elaboration

7. Initiatives on sustainability issues connected with Social Economy Organizations (SEOs) and care of older people.

A wide range of initiatives in Spain illustrates how Social Economy Organizations (SEOs) are addressing the evolving needs of older people care while promoting sustainability, inclusion, and territorial cohesion. These initiatives span across several service types, and their diversity reflects the typologies of the European social economy — including cooperatives, associations, foundations, and social enterprises — as defined in the Social Economy Action Plan (2021).

1. Home-based Social Services are among the most common and community-embedded interventions. These initiatives often involve associations, local authorities, and cooperatives, delivering services like personal assistance, hygiene support, and meal delivery. For example, CEOMA's Vivir Mejor en Casa (national association) promotes in-home stability through personalized support, while Rural Domus, backed by hospitals and foundations, enhances rural care professionalism. The WHO Age-Friendly – Radars programme (local government + volunteers) is a strong case of intergenerational, community-based support. In many of these cases, care cooperatives and volunteer networks play a critical role in delivering person-centred care to remote areas, aligning with cooperative and association models within the EU social economy typology.

2. Day and Residential Services demonstrate how cooperatives, foundations, and housing associations contribute to sustainable living arrangements for older adults. This includes day centres (e.g. AERTE), rehabilitation centres (Cuidados Dignos), and innovative cohousing or supervised housing projects (EL CAU, Trabensol, Convivir), typically driven by collaborative cooperatives and consumer cooperatives. These models show how SEOs are applying the principles of mutual support, participatory governance, and reinvestment in social goals — all core characteristics of mutual benefit societies and social enterprises.

3. Active Ageing and Social Inclusion programmes are spearheaded by non-profits, foundations, regional governments, and local councils, with a strong emphasis on intergenerational activities, digital literacy, and cultural engagement. Initiatives like Adopta un Abuelo, Generando Valores, and Fundación Esplai's Conecta Mayores reflect the high innovation capacity of associations and foundations, which use mixed funding and voluntary participation to foster connection and digital autonomy. These efforts promote sustainable, socially integrated ageing, consistent with EU goals on inclusion and digital transition.

4. Support for Informal Caregivers is a critical but often overlooked area where foundations, regional governments, and research institutions play a central role. Projects like Cuidados Dignos and the Scipio Project provide psychological support and formal training to family caregivers, reinforcing dignity in care. These initiatives are examples of asset-based foundations and public-academic partnerships working within the broader EU framework to strengthen caregiver resilience and quality.

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5. Social Enterprises and Employment Integration illustrate how SEOs not only provide care but also create job opportunities, especially for women and rural populations. The Fademur Proximity Cooperatives train rural women for care roles, while Macrosad–UMA Chair and Adinberri Hub focus on innovation in older people care. These are clear cases of social enterprises and cooperatives contributing to job creation and local development, demonstrating strong alignment with the EU Social Economy Action Plan’s focus on the green and care economies.

6. Research and Evaluation activities — led by universities, foundations, and public institutions — underpin the sustainability of SEO-led care models. Projects like MOVICOMA and Como en Casa (Matia Institute) aim to develop evidence-based practices and tools for respectful and innovative older people care. These initiatives reinforce the role of universities and research foundations as part of an integrated innovation ecosystem within the social economy. For the Spanish case, Table 6 presents a selection of initiatives that have been mapped and analyzed to highlight how they respond to key challenges in rural ageing.

Home-based services are central to Bulgaria’s long-term care system and are expanding under recent reforms. The national programmes such as Assistant Support and the Personal Assistance Mechanism provide help with daily living, mobility, household tasks, and communication. These schemes also formalize family involvement by allowing relatives to be contracted as assistants. However, coverage remains limited compared to EU averages, and many older people continue to rely primarily on informal care.

Residential services include homes for older people, specialized facilities for individuals with dementia, hospices, and small family-type accommodation centers. These are gradually replacing the traditional large-scale institutions as part of Bulgaria’s deinstitutionalization reform since 2021. Community-based services such as day centers and centers for rehabilitation and integration offer support for daily activities, social interaction, and therapy. Despite these efforts, access remains uneven across regions, with significant disparities between urban and rural areas.

Bulgaria has introduced a number of initiatives to support active ageing and prevent social isolation. Municipal social patronage schemes deliver meals and household support, while community centers and rehabilitation services aim to maintain independence and promote participation in society. Clubs for retirees and social programmes are available in some areas, though their distribution is uneven. Innovative approaches such as telecare pilots are beginning to appear, offering potential for more flexible and preventive support.

Informal care, provided mainly by family members, continues to play a central role in the Bulgarian social care system. Policies recognize this contribution by enabling relatives to become paid assistants, but overall financial and institutional support for informal carers remains limited. Challenges include low remuneration, lack of respite opportunities, and insufficient legal recognition, which constrains the integration of informal care into broader social policy.

Social economy organizations are still in the early stages of development in Bulgaria. The legal framework created in 2018 provides recognition and criteria for their operation, but their role in long-term care—particularly in older persons social care—remains small. Compared to countries with stronger traditions of cooperative or social enterprise involvement in welfare, Bulgaria is still building capacity and visibility in this field.

Oversight of social services is carried out by the Agency for the Quality of Social Services, which is responsible for inspections, licensing, and quality standards. National mapping tools are being developed to coordinate service provision across municipalities. Nevertheless, systematic evaluation of service outcomes and comprehensive data collection on workforce, users, and informal care remain in developing stage.



Services main type	Service Subtype	Stakeholder	Initiative	Objective	Website	Territory	Year/Period
1. Home-based Social Services	1.1. Social assistant (daily activities)	National association	CEOMA – Vivir Mejor en Casa	Promote stability in the home through personalized support	https://ceoma.org/	Spain	2022–2025
		Hospital + Foundation	Rural Domus	Professionalized rural home-based person-centered care	https://programa-innova.es/proyectos/social/rural-domus/	Navarra	2024
		Local city council	WHO AGE FRIENDLY–Radars	Support isolated seniors to remain home safely	http://www.igualada.cat/	Igualada (Catalonia)	2017
	1.2. Home helper (hygiene household chores)	Regional government	Las Casas del Mayor	Provide basic care in shared rural facilities	https://www.europapress.es/aragon/noticia-casas-mayor...	Aragón	2025
		Research institute	“Como en Casa” Project	Rethink home care based on dignity and wellbeing	https://www.matiafundazioa.eus/	Basque Country and Guadalajara	2024
	1.3. Social patronage (meal delivery admin help)	City council + Volunteers	WHO AGE FRIENDLY–Radars	Community-based help with daily tasks and companionship	http://www.igualada.cat/	Igualada (Catalonia)	2017
		Rural cooperative	Proximity Cooperatives by FADEMUR	Training and home care services in villages	https://fademur.es/...	14 Autonomous Communities	–
2. Day and Residential Services	2.1. Day centres for older adults	Health business association	AERTE – Comunidad Valenciana	Professionalized care in residences and day centers	https://aerte.es/	Comunidad Valenciana	1988–present
	2.2. Centres for rehabilitation	Foundation	Cuidados Dignos	Develop and certify respectful care methodologies and train caregivers	https://cuidadosdignos.org/	Bizkaia	2010–present

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3. Active Ageing and Social Inclusion	n and integration						
	2.3. Protected housing (with support)	Consumer cooperative Collaborative housing association	Residencial Santa Clara EL CAU COHOUSING	Provide adapted housing with care services Promote active aging and autonomy in shared housing	https://residencialsantaclara.es/ https://www.caucohousing.org/	Málaga Spain	2000 —
	2.4. Supervised housing (minimal support)	Housing cooperative Collaborative cooperative	Trabensol Convivir	Enable self-managed community living for older adults Create spaces of active coexistence and mutual support	https://trabensol.org/ https://convivir.coop/	Madrid Málaga	2002 2007
		Non-profit association	Adopta un Abuelo	Encourage intergenerational connection and reduce loneliness	https://adoptaunabuelo.org/	Spain	2014
	3.1. Social engagement programmes	Foundation + Local authority	WHO AGE FRIENDLY – Las Nieves Multiservices Center	Combat isolation and empower older adults in rural settings	https://extranet.who.int/agefriendlyworld/afp/las-nieves-multiservice-community-center-centro-comunitario-multiservicios-las-nieves/	Campoo de Yuso (Cantabria – Spain)	2024
		Neighborhood association	Zaragoza – Brújula de Cuidados	Intergenerational activities between students and older adults	https://fabz.es/event/...	Zaragoza	2025
		Regional government	Generando Valores	Promote active aging and fight loneliness	https://jovesolidos.org/...	Comunidad Valenciana	2025
	3.2. Educational programmes	Foundation	Fundación Esplai – “Conecta Mayores”	Promote safe use of technology among older adults	https://fundacionesplai.org/proyecto/conecta-mayores/	Various regions	2024

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	3.3. Cultural and sports activities	Tech foundation + ministry University + cooperatives Digital volunteer foundation National ministry Local city council	Reconectados Rural Red Innicia Fundación Cibervoluntarios Erasmus Rural WHO AGE FRIENDLY – Intergenerational Workshops	Support digital inclusion and autonomy for older people Foster active ageing using digital tools Reduce digital divide via tailored ICT training Promote social engagement and learning in rural communities Creativity and community bonding across generations	https://fundaciontelefonica.com/... https://innicia.org/... https://www.cibervoluntarios.org/ https://www.miteco.gob.es/... https://ayto.mutxamel.org/...	Several regions Andalusia Rural Spain Spain (<5 000 inhab.) Mutxamel (Alicante)	2025–2026 2024 2001 2020
		Regional government Rural women's association Foundation	Serenity Project Bienenvejeciendo Pilares – Conectando Edades	Promote meaningful aging and intergenerational community services Encourage autonomy, mental health and social participation Shared activities to strengthen intergenerational coexistence	https://gestionydependencia.com/... https://envejeciendobien.org/ https://www.fundacionpilares.org/	Andalusia Madrid (rural) Aragón + Castilla-La Mancha	2025 2025 Active
	4. Support for Informal Caregivers	Regional government	'Scipio' Project	Improve training and counselling for family caregivers	https://www.pamplona.es/...	Navarra	2025
		Foundation National institute + universities	Cuidados Dignos IMSERO Training Actions	Train caregivers and certify respectful care approaches Enhance care quality through specialized seminars	https://cuidadosdignos.org/ https://imsero.es/...	Bizkaia Spain	2010–present 2025
		Foundation	Cuidados Dignos	Offer emotional support and training linked to care roles	https://cuidadosdignos.org/	Bizkaia	2010–present

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	4.3. Respite care services	Regional government	Las Casas del Mayor	Provide short-term care in rural centres for dependent adults	https://europapress.es/...	Aragón	2025
5. Social Enterprises and Employment Integration	5.1. Social cooperative s for employment	Rural cooperative University + cooperative Government of Spain	Fademur Proximity Cooperatives Macrosad-UMA Chair PERTE – Social Economy	Train rural women for care-related jobs Innovate older people care through social economy Promote and transform care-related social economy	https://fademur.es/... https://catedras.ugr.es/macrosad/ https://planderecuperacion.gob.es/...	14 Autonomous Communities	Active
		Neighborhood association	Zaragoza – Brújula de Cuidados	Conduct workshops and engagement between older people and youth	https://fabz.es/event/...	Andalusia	2022
	5.2. Inclusion workshops	Digital NGO	GUÍA DE MAYORES	Empower seniors through digital literacy and social visibility	https://guiademayores.com/	Spain	2022
		Foundation + tech orgs	Mentor Project	Create digital mentoring and gaming tools for older people empowerment	https://mentor.brainstorm3d.com/	Zaragoza	2025
	5.3. Mentorship programmes	University research center	ITEAD Chair	Use smart technologies and research to improve aging experiences	https://uned.es/...	Spain	2016
		Foundation + companies	Adinberri Hub	Support tech solutions for autonomy and healthy ageing	https://adinberri.eus/	Comunidad Valenciana	2023
		Digital volunteer foundation	Fundación Cibervoluntarios	Promote ICT learning and intergenerational tech use	https://www.cibervoluntarios.org/	Comunidad Valenciana	2021
6. Research, Observatories and Public Strategy	6.1. Research and evaluation	University + foundation	MOVICOMA Project	Study collaborative housing for the older people	https://movicoma.blogs.uoc.edu/	Gipuzkoa	2022
		Associated center UNED Alzira-Valencia	ITEAD Chair Project. Research and Technology on Active Aging based on Data	Develop smart aging tools through research and tech	https://uned.es/...	Spain	2001
						Spain	2015–2017
						Valencia	2021

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		Matia Institute + Social Rights Ministry	"Como en Casa" Project	Redesign care based on dignity and personal rights	https://www.comoencasa.eus/es/como-casa/proyecto	País Vasco	2021-2022
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Table 6. Overview of Selected Social Economy Initiatives Addressing Older People Care and Rural Ageing Challenges, source: own elaboration

7.1 Barriers and facilitators in advancing sustainable older people care through SEOs

The initiatives examined reveal both enablers and challenges in scaling sustainable care models through SEOs. In accordance with the line of work established within WPI deliverable 1.2 and its research results, the most significant facilitators and barriers that stakeholders face during the implementation process of social economy initiatives aimed at older people care are summarized. Key facilitators include strong public–private collaboration, the presence of intergenerational and community-based networks, and person-centered innovations such as cohousing and digital inclusion programmes. Territorial sustainability is enhanced through rural care initiatives and employment creation, while visibility and vocational training support a resilient workforce. However, several barriers persist, such as institutional fragmentation, lack of formal recognition of SEOs by public authorities, limited access to innovation funding, and low digital maturity among small organizations. Challenges also stem from rural depopulation, poor generational renewal, and insufficient awareness or training in social entrepreneurship. These findings echo the priorities of EU-level frameworks such as the WHO Decade of Healthy Ageing (2020–2030), the European Green Paper on Ageing, and the Spanish Social Economy Strategy (2023–2027).

7.2 Connection to typologies of organizations in the European social economy

The initiatives identified in table 6 align closely with the five main types of Social Economy Organizations as outlined by the European Commission:

Cooperatives, such as Macrosad or Trabensol, embody democratic participation, reinvest profits in community benefit, and anchor services locally.

Mutual Benefit Societies, though less visible in the dataset, are conceptually present through initiatives that offer member-focused housing and care models.

Associations, like Fademur, Adopta un Abuelo or Zaragoza – Brújula de Cuidados (Federation of Neighbourhood Associations of Zaragoza), bring high social innovation capacity and rely on mixed public–private funding.

Foundations, including Cuidados Dignos and Fundación Esplai, provide long-term programmes grounded in public interest, training, and innovation.

Social Enterprises, such as Reconnectados Rural (Telefónica Foundation + Ministry for Ecological Transition) or Adinberri Hub (foundation of the Provincial Council of Gipuzkoa), demonstrate hybrid models that combine business tools with strong social missions and participatory governance.

These organization types, reinforced by the EU Social Economy Action Plan (2021), are essential actors in reshaping care ecosystems, responding to demographic change, and ensuring sustainable, inclusive, and resilient ageing across Europe.

7.3 The importance of social impact evaluation and the need for integrated assessment

Evaluating the social impact of social economy initiatives targeting older adults is essential to ensure their sustainability, quality, and transformative potential in rural areas. Many of the initiatives analyzed have begun to implement structured evaluation systems that go beyond financial outcomes, adopting a triple bottom line approach (economic, social, environmental) and considering the life course perspective and territorial equity. For instance, long-term care services use indicators such as the Social Return on Investment (SROI), the reduction of avoidable hospitalizations, or user and family satisfaction levels. In health promotion and prevention, metrics include emotional well-being (e.g., using the FUMAT quality of life scale), participation in adapted physical activity programs, and access to healthy food. Social and community participation services are evaluated through measures of unwanted loneliness, involvement in intergenerational programs, and the presence of mutual support networks. For housing and age-friendly environments, indicators include the percentage of adapted homes, urban and rural accessibility indices, and the availability of collaborative housing projects. In the area of digital inclusion and connected health, evaluations consider digital literacy rates among older adults, access to broadband, and satisfaction with digital care services.

However, despite these valuable efforts, evaluations are often fragmented and lack a comprehensive framework to systematically assess the overall sustainability—economic, social, and environmental—of these initiatives. This is the critical gap that the SONYA project aims to address, by developing an integrated evaluation tool to support evidence-based decision-making, continuous improvement, and the effective transfer of best practices across diverse rural European contexts.

To illustrate the process (see figure 6), SONYA assessment framework relies on General systems theory, that emerged in the twentieth century as an interdisciplinary approach focused on uncovering the universal principles that govern the creation, operation, and sustainability of both natural and social systems. Within this framework, a system is understood as a collection of interconnected components that together constitute a unified and complex entity.

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GENERAL SYSTEMS THEORY

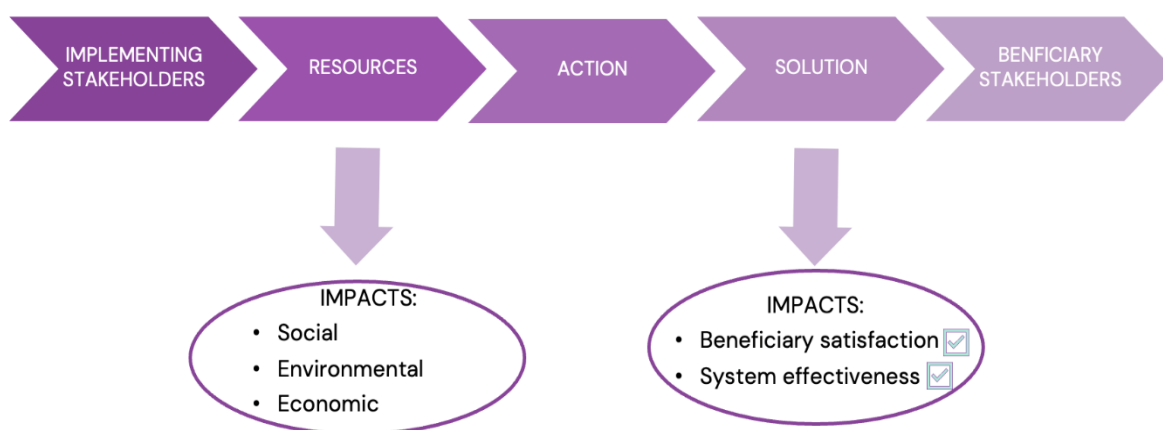


Figure 6. General Systems Theory: analysis of actors and activities. Source: own elaboration

For implementing the analysis (see figure 7), the methodology characterizes the problem and evaluates the ex-ante situation, its use of resources and the level of effectiveness for the end users of the action and compares these results with the results after implementing the action, this is the ex-post Situation.

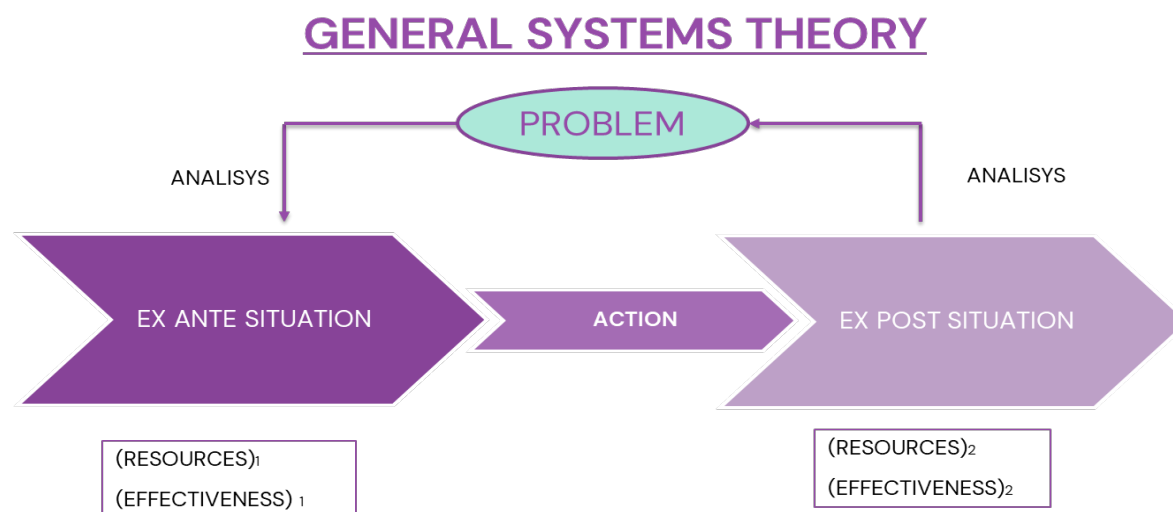


Figure 7. General System Theory: problem solving process, source: own elaboration

In the context of the SONYA Project, Figure 8 presents the flow chart employed to evaluate the sustainability of pilot actions through the SONYA methodology. Beneficiary satisfaction will be measured using the effectiveness Index, which is derived from a preestablished effectiveness metric—such as the WHOQOL-Bref index. Should the implementation of an action lead to improved satisfaction among end users or beneficiaries, its sustainability will subsequently be assessed using the SONYA Sustainability Assessment Framework. If the sustainability level in the postimplementation phase exceeds that of the pre-implementation phase, the action will be deemed a sustainable solution for the care of older adults.

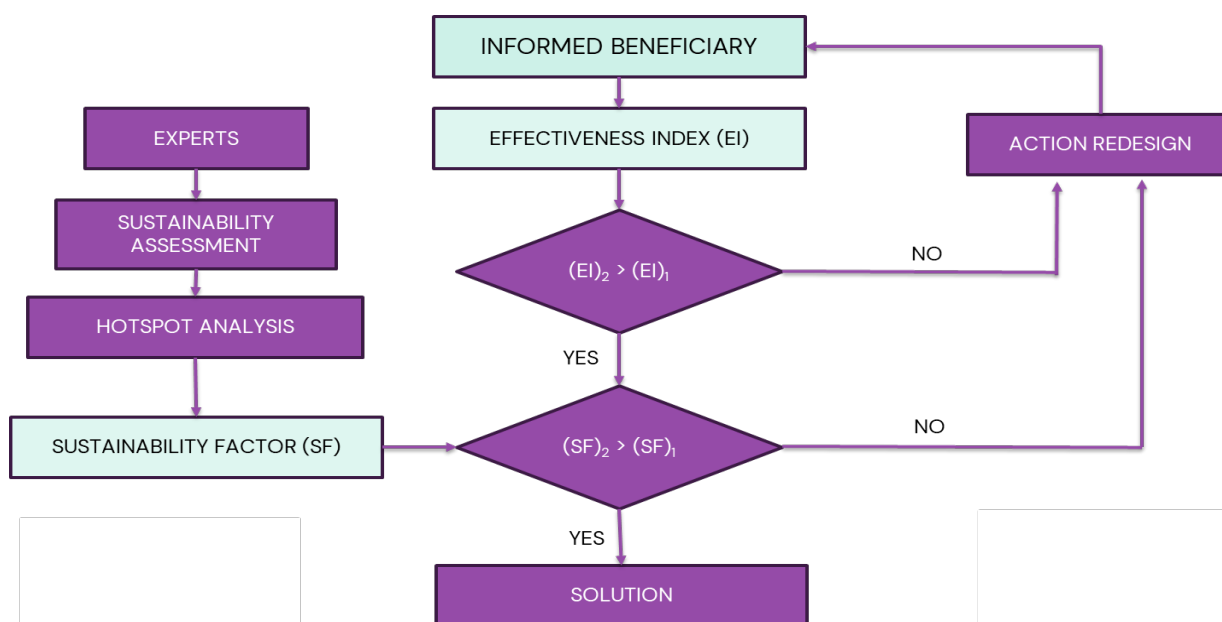


Figure 8. SONYA process flow chart, source: own elaboration

8. Operationalization of SONYA SAF: structure and KPIs/ Core components of the SONYA Sustainability Assessment Framework.

This section builds upon the Sustainability Assessment Framework developed in the SMART project, as illustrated in Figure 9. It highlights the essential components of the SONYA Sustainability Assessment Framework, which is structured around three sequential steps: sustainability framework analysis, which establishes the conceptual and normative foundations; sustainability assessment tool, which operationalizes the evaluation through impact indicators and metrics; and sustainability reporting, which communicates results and supports decision-making. These three steps are supported by three cross-cutting processes: traceability, ensuring transparency and accountability throughout the assessment; assurance, which seeks to reasonably ensure the reliability of the data and methods used; and continuous improvement, which fosters adaptive learning and progressive enhancement of sustainability performance.

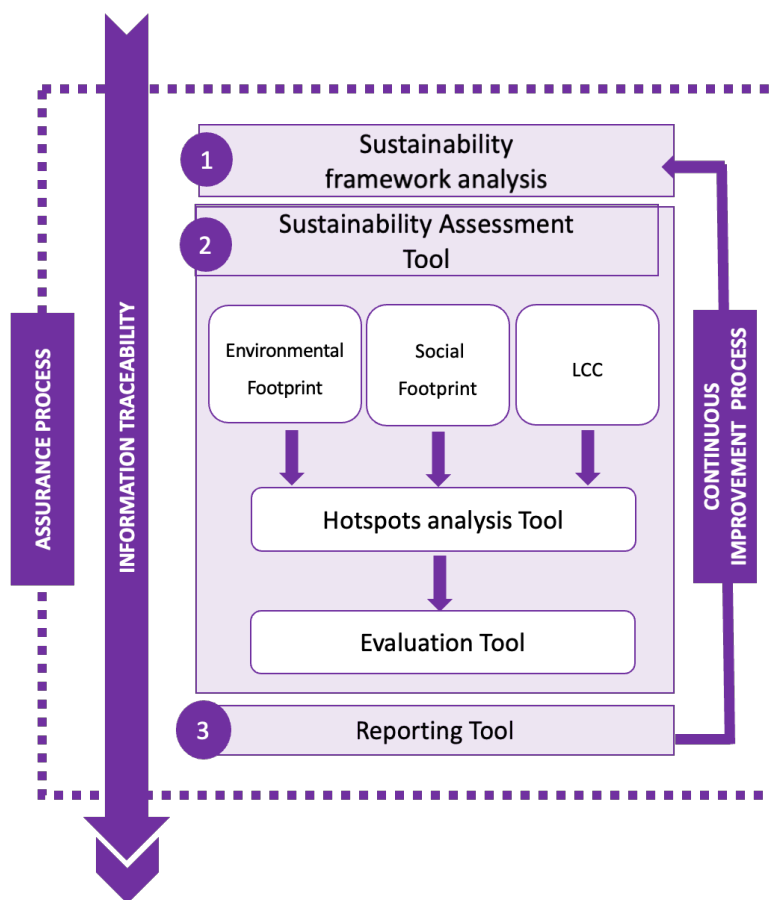


Figure 9.SONYA SBF, source: (Muñoz-Torres et al., 2024) based on SMART H2020 (Muñoz-Torres et al., 2018)

8.1 Step 1. Sustainability Framework Analysis

The Sustainability Framework Analysis aims to provide a comprehensive understanding of the context and a detailed characterization of the action undertaken by social economy organization under assessment. This step also facilitates the necessary data to the subsequent assessment phase.

Following a prior validation process of the action implemented by a social economy organization aligned with the objectives of the SONYA project, this phase focuses on collecting detailed information across the following components:

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8.1.1 Basic Information on the Action and its Context

To ensure a comprehensive characterization of the initiative, the following elements must be provided at a minimum:

1. Title of the action
2. Objective of the action
3. Social economy organization responsible for implementation
4. Geographical area of influence
5. Description of the action
6. Duration of the action
7. Level of development
8. Supply chain stage associated
9. Explanation of how the action contributes to the active aging goal and promotes inclusive employment
10. Classification of the action according to the SONYA typology
11. Definition of units for assessing the success of the action
12. Description of existing training programs and/or skills
13. Description of any existing metrics about social/environmental or economic impacts.
14. Description of monitoring systems implemented to manage the action
15. Description of existing certification schemes linked to the action
16. Stakeholders involved in the action

This information should be accompanied by a brief description of the maturity level of the social economy organization in terms of sustainability management. Additionally, a short description about the identification of the main contextual barriers and enabling factors that may influence the success of the action should be included.

8.1.2 Objective and scope of the assessment

According to the first phase of a LCA, it is necessary to define the goal and scope of the assessment. Goal Definition: The organization should clearly state the purpose of the assessment and the reasons for conducting it, and the target audience.

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Scope Definition: The scope should address three key elements:

System Description: Outline the full system in which the action operates, ideally supported by a flowchart showing key inputs and outputs.

Functional Unit of the LCA: Specify the unit that will serve as the basis for reporting the results of the assessment (For example, one hour of socialization activity in a day center with a capacity of 100 users for non-dependent people over 70 years of age)

System Boundaries: Define which processes are included in the assessment. Any exclusions must be justified and their implications clearly explained, in line with ISO 14044:2006 guidelines.

Define the stakeholders uninvolved and affected

8.1.3 Life cycle inventory

This phase is based on collecting the data necessary to evaluate the process defined within the system boundaries in the first phase (goal and scope). This phase combines both primary data, collected through social economy organizations, and generic data from the database selected for the study. Figure 10 shows the process to achieve the life cycle inventory. Following the characterization of the action undertaken by the social economy organization (see section "a. Basic Information on the Action and its Context"), it is necessary to define the system boundaries of the action subject to evaluation. In line with the established system, all consumed resources—human, economic, material, and energy—required for the execution of the action must be identified and quantified. Additional data may also be required, such as the place of origin of the inputs. All of these data will be processed to serve as inputs for specialized databases such as SHDB, PSILCA ECOINVENT, which will be used to provide the life cycle inventory necessary for the assessment in Step 2 (Sustainability Assessment Tool).

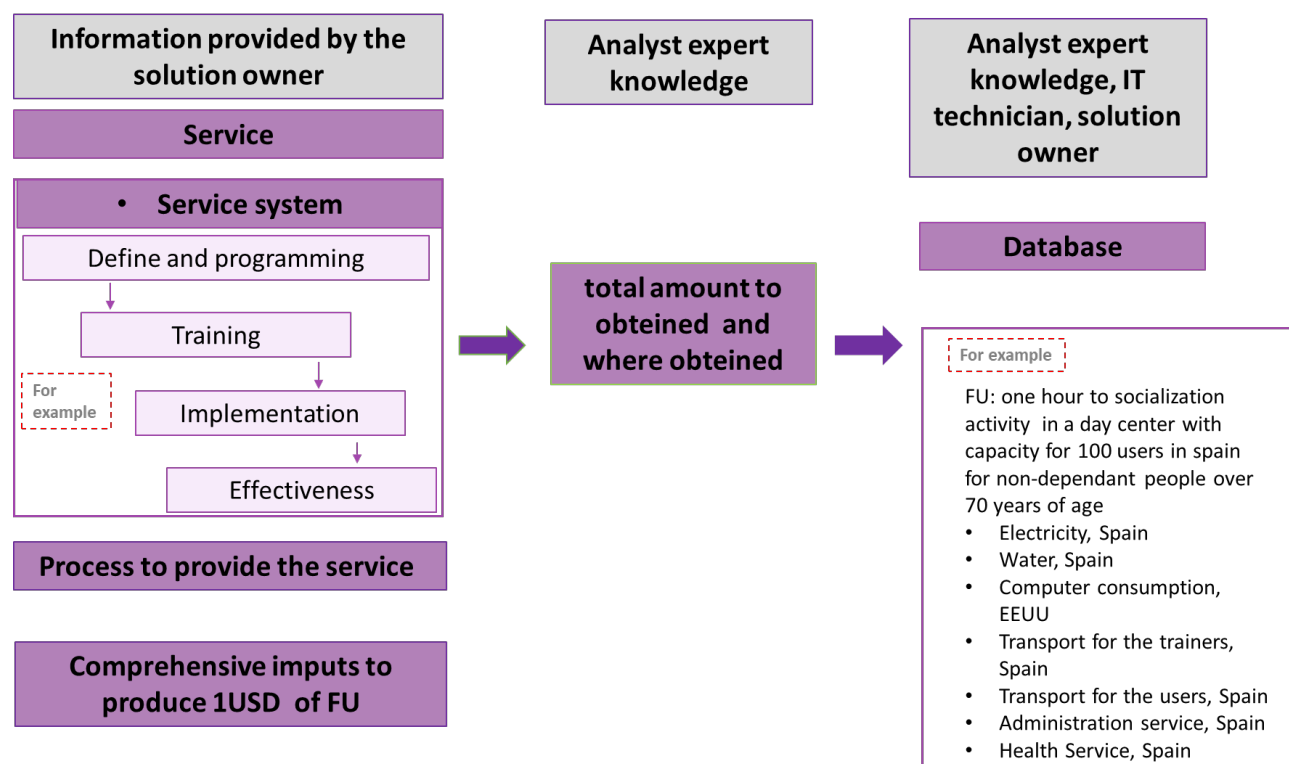


Figure 10. Life cycle Inventory, source: own elaboration based on deliverable 2.1 ToNoWaste project

8.2 Step 2. Sustainability Assessment Tool

The Sustainability Assessment Tool aims to conduct a comprehensive evaluation of the sustainability performance of actions related to care services, using science-based indicators and methodologies—such as environmental, social and economic footprints, hotspot analysis, and multi-criteria decision-making methods—to support evidence-informed decisions regarding the most sustainable action for social economy organizations.

8.2.1 Phase 1: Action undertaken by Social Economy Organization – Footprint Tools

The first phase of this second step aims to estimate a broad set of environmental, social, and economic impact categories through a life cycle approach. Drawing on the Sustainability Assessment Tool of SMART H2O2O project (Muñoz-Torres et al. 2018) and, as applied in ToNoWaste HE Project for food loss and waste prevention and reduction sector (Muñoz-Torres et al. 2024), SONYA will assess the environmental, social and economic impact of the actions based on the Life Cycle Approach. This phase integrates Life Cycle Impact Assessment (LCIA), based on ISO 14044:2006, involving the selection of impact categories and models, classification of inventory data, and characterization of results. To facilitate this process, SONYA recommends the use of specialized software tools such as Ecoinvent, SHBD or PSILCA.

8.2.1.1 ENVIRONMENTAL FOOTPRINT

In SONYA, the environmental impacts are assessed using the Environmental Footprint (EF) 3.1 method, as recommended by the European Commission (Commission Recommendation (EU) 2021/2279). According to Domingo-Morcillo et al. (2024), this method is particularly appropriate, as it enables the aggregation of environmental impacts into a single score and evaluates them across 16 scientifically defined impact categories. Such granularity is suitable for the identification of critical hotspots and the subsequent formulation of targeted corrective measures. Table 7 shows the environmental impact variables proposed by SONYA derived from EF 3.1 method. To support the calculation of these variables, specialized software tools such as SimaPro or OpenLCA are available. These tools integrate databases like Ecoinvent, Agribalyse, EF among others to perform Life Cycle Assessment (LCA), including the inventory data and applying various impact assessment methods, among which the Environmental Footprint (EF) 3.1 is available.

Environmental Impact Variables
Climate change
Ozone depletion
Human toxicity, cancer
Human toxicity, non-cancer
Particular matter
Ionizing radiation, human health
Acidification
Eutrophication, terrestrial
Eutrophication, freshwater
Eutrophication, marine
Ecotoxicity, freshwater
Land use
Water use
Resource use, minerals, and metals
Resource use, fossils

Table 7. Environmental Impact Variables, *Source: Own elaboration based on EF 3.1 (Commission Recommendation (EU) 2021/2279)*

8.2.1.2 SOCIAL FOOTPRINT

From a social perspective, the Social Life Cycle Assessment (S-LCA) methodology, developed by UNEP (2020) and previously by UNEP-SETAC (2009, 2013), represents the most advanced framework for establishing the foundations of the Social Footprint. For the SONYA project, this footprint constitutes a crucial part of the assessment, given the nature of the actions to be assessed. The potential impacts are associated with stakeholder categories and are directly linked to corresponding impact subcategories. Accordingly, Table 8 displays the variables identified in the SONYA project for assessing the Social Footprint.

The application of the UNEP (2020) Social Life Cycle Assessment (S-LCA) framework is complex due to the multifaceted nature of social factors. First, production processes typically involve a wide range of stakeholders (workers, consumers, management, policymakers, and, in some cases, even animals) each with different needs and exposure to several types of impacts. These impacts give rise to numerous subcategories and indicators that must be carefully assessed to ensure relevance and accuracy. Additionally, unlike environmental impacts, the location in which social impacts occur plays a critical role. Legislation, cultural norms, religious beliefs, and customs can significantly shape how production processes are implemented and experienced. Finally, social sciences often rely on rich

qualitative information, making its transformation into quantifiable data for comparison and evaluation a challenging task.

Stakeholder categories	Workers	Local community	Value chain Actors (not including consumers)	Consumer	Society	Children
Subcategories	• Freedom of association and collective bargaining • Child labor • Fair salary • Working hours • Forced labor • Equal opportunities / discrimination • Health and safety • Social benefits / social security • Employment relationship • Sexual harassment • Smallholders including farmers	• Access to material resources • Access to immaterial resources • Delocalization and migration • Cultural heritage • Safe and healthy • Respect of indigenous rights • Community engagement • Local employment • Secure living conditions	• Fair competition • Promoting social responsibility • Supplier relationships • Respect of intellectual property rights • Wealth distribution	• Health and safety • Feedback mechanism • Consumer privacy • Transparency • End-of-life responsibility	• Public commitments to sustainability issues • Contribution to economic development • Prevention and mitigation of armed conflicts • Technology development • Corruption • Ethical treatment of animals • Poverty alleviation	• Education provided in the local community • Health issues for children as consumers • Children concerns regarding marketing practices

Table 8. Variables identified in the SONYA project for assessing the Social Footprint, *source Stakeholders and subcategories (Unep, 2020)*

The UNEP/SETAC guidance presents an iterative framework that allows for flexible decision-making at key stages. It offers two distinct approaches: “Type 1,” which evaluates current impacts using a reference scale, and “Type 2,” which considers long-term effects on all stakeholder groups. The pathway also varies depending on whether the assessment targets an organization or focuses on the production of a specific service or product.

Regarding the software tools used to support the calculation of social impact variables, we highlight SimaPro and OpenLCA. Both software tools allow the use of the two most commonly used databases

in the literature: SHDB and PSILCA. These databases are similar; however, the main differences lie in the stakeholders and indicators they employ (see Table 9). Within the framework of the SONYA project, Work Package 4 (WP4) will conduct an in-depth analysis of both databases to determine which is more suitable for assessing the impact of a care service. This evaluation will take into account both the depth of analysis each database allows and the availability of relevant data.

	PSILCA	SHBD
region	UE, Germany	USA
Organization	greendelta	NewEarth B
software	OPEN LCA, simapro	SIMAPRO, openLCA
Assessment system	Stakeholders, categories	Stakeholders categories, subcategories, inventory indicators inventory data
Product or service?	product focus	product and service
Stakeholders	workers, local community, society, value chains actors, consumers and children	workers, local community, society, consumers and value chains actors
Database	a multi-regional input/output (MRIO) database, called Eora	a multi-regional input/output (MRIO) database, SHDB licence only
version	4, 2025	V4, 2019
inspired	UNEP/SETAC	UNEP/SETAC
Indicators	106 qualitative and quantitative indicators	160
subcategories	233 social and socio-economic	social hotspot index
activity variables	working hours or impact direct method	working hours

Table 9. Comparing PSILCA and SHBD Databases, source: own elaboration

8.2.1.3 ECONOMIC FOOTPRINT

The Economic Footprint methodology presented in H2020 SMART Project emphasizes the societal relevance of economic impacts, incorporating indicators such as business survivorship, fiscal elusion, efficiency, compliance, employment, and inequality. For the shake of this Project and taking into account the specificities of social economy organizations and activities under assessment, this deliverable proposes the use of Life Cycle Costing (LCC), as it offers a comprehensive framework for evaluating the total economic impact of a product, process, or organization across its entire life cycle. Even though it is not an Economic Footprint approach, LCC enables businesses and industries to quantify their direct, indirect, and induced economic contributions throughout the supply chain—both upstream and downstream. This integration facilitates a deeper understanding of financial flows, rent extraction, and fiscal behaviors such as profit shifting and tax avoidance.

LCC complements this by providing a structured method to assess costs associated with the deployment of activities over time, including hidden and externalized costs. For example, LCC can help quantify the long-term financial implications of wage disparities or non-compliance penalties (if exists).

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LCC can enhance transparency and accountability. This approach transcends the shareholder-centric model, recognizing the economic value generated for multiple stakeholders, including employees, suppliers, and communities. Ultimately, integrating LCC into Economic Footprint analysis supports more equitable and sustainable decision-making across organizational boundaries.

Life Cycle Costing (LCC) is a methodological approach used to estimate the total cost of a product, system, or service throughout its entire life cycle, including acquisition, operation, maintenance, and disposal. This will result in a more accurate description of the entire cost for a product or process than just an analysis of the purchase. The primary goal is to support decision-making by identifying cost-effective options among alternatives that offer equivalent functionality. It helps in comparing investments and assessing their long-term economic implications.

Unlike traditional accounting, which focuses on initial costs, LCC provides a more comprehensive perspective by including future costs and operational expenses. It has gained relevance in sectors such as construction, infrastructure, energy systems, and public procurement.

There are two main applications of LCC analysis:

1. As a comparative tool to evaluate different options, design solutions, components, or materials in support of strategic planning and investment decisions.
2. As a management tool following project delivery, facility occupation, or asset acquisition against which actual performance can be monitored and maintained. This also provides a basis for improved budget planning and expenditure forecasts.

LCC analysis is especially useful when project alternatives that fulfill the same performance requirements but differ with respect to initial costs and operating costs, have to be compared in order to select the one that maximizes net savings. For instance, in the selection of building materials or public infrastructure projects, a more expensive upfront option might prove more cost-efficient over time due to lower maintenance or energy costs.

The method is especially valuable in public procurement, where decision-makers must justify long-term expenditures. It also enables life cycle investment analysis, facilitating more sustainable choices.

There are different types of LCC (Hunkeler et al., 2008). Conventional LCC adds up direct costs (and revenues), usually performed from a manufacturer or customer perspective for planning and comparing investment alternatives. E-LCC and S-LCC additionally capture externalities based on different system boundaries. Environmental LCC includes external effects with environmental relevance. These effects are either captured and integrated as external costs or assessed using a parallel LCA. The most complex form (societal LCC) also includes all external social costs, such as

negative user costs or positive consequences for society. As we are performing E-LCA and S-LCA, we select conventional C-LCC instead of E-LCC and S-LCC to avoid double counting effects.

8.2.2 Phase 2: Action undertaken by Social Economy Organization – Hotspots Analysis Tool

The objective of this phase is to identify critical aspects of the assessed actions in terms of sustainability. These "hotspots" identify categories with significant environmental, social, or economic impacts that could be targeted for improvement in the subsequent phase, thereby enhancing the overall sustainability performance of the action.

To identify these hotspots, the SONYA project follows the methodology proposed by UNEP (2017), as integrated into the evaluation tool developed in the SMART H2020 project. In this context, a hotspot is understood as a life cycle stage, process, or elementary flow that contributes significantly to the overall impact of the assessed functional unit.

The process includes the following steps:

Definition of goal and scope. This initial step ensures that the hotspot identification process is aligned with the overarching objective of supporting sustainability-oriented decision-making. In the context of SONYA, the goal is to detect areas within the assessed care service where improvements could lead to significant sustainability gains. The scope includes not only the technical configuration of the service but also the organizational setting and the external socio-economic context in which it operates. This comprehensive framing allows for a more in-depth understanding of the origins of sustainability challenges to be addressed in a continuous improvement approach.

Data collection and expert consultation. This step involves gathering quantitative and qualitative data from multiple sources to support a robust analysis. It includes results from environmental and social footprint assessments and contextual analyses. Expert knowledge will be required to interpret the data and ensure that the analysis reflects both technical accuracy and contextual relevance.

Hotspot identification and validation. This step will be carried out through a multi-stakeholder co-creation process involving experts and key actors, using workshops and collaborative sessions. This co-creation approach ensures that the identified issues are not only analytically sound but also practically meaningful and actionable within the specific context of the SONYA project.

Table 10 shows the variables that summarize the results of this phase that reflect the most significant environmental, social, and economic hotspots of SONYA actions. These variables will serve as the basis for designing and evaluating improvement strategies.

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Hotspots variables
Environmental hotspots
Social hotspots
Economic hotspots

Table 10. Hotspot variables, source: own elaboration

8.2.3 Phase 3: Action undertaken by Social Economy Organization – Evaluation Tool

The objective of the Evaluation Tool is to provide a comprehensive and integrated assessment of the sustainability performance of a selected SONYA action. The objective of the Evaluation Tool is to provide a comprehensive and integrated assessment of the sustainability performance of a set of selected SONYA actions. This tool aggregates environmental, social, and economic information in relative terms, enabling a comparative analysis of a set of comparable actions.

This phase allows the identification of the more sustainable actions, based on a structured and transparent evaluation process. To achieve this, the SONYA project applies Multi-Criteria Decision-Making Methods (MCDM), which facilitates the integration of diverse sustainability indicators and the incorporation of stakeholder preferences. These methods support the construction of a synthetic indicator that summarizes the performance of each action and enables the establishment of a hierarchy of alternatives according to their sustainability results.

Sustainability variable
Sustainability performance

Table 11. Sustainability variables, source: own elaboration

8.3 Step 3: Reporting Tool

The Reporting Tool aims on *what* information will be communicated to end users and *how* the results of the SONYA assessment framework will be presented. The main objective is to ensure that the outcomes of the sustainability assessment are communicated in a clear and accessible manner and oriented toward informed decision-making.

In the SONYA project, the assessment framework is designed to generate a structured set of Key Performance Indicators (KPIs) that reflect the core variables of the sustainability model. These KPIs constitute the primary outputs of the evaluation and are intended to support informed decision-making by end users.

In a first stage, the information communicated will include a comprehensive understanding of the assessed action. This includes the objective of the assessment, the characterization of the action, relevant contextual aspects, and the scope of the evaluation, all of which are addressed in Step 1 of the framework. This foundational information ensures that users can interpret the results within the full context of the action being assessed.

In addition, the KPIs derived from Steps 2 and 3 will be communicated. These include:

Impact results (Step 2), such as environmental, social, and economic footprints, presented both by impact category and in an aggregated format.

Hotspot analyses (Step 2), identifying the categories that represent a significant impact and should be considered for improvement processes.

A synthetic sustainability score (Step 3), which integrates the three dimensions of sustainability and expresses performance in relative terms, based on a portfolio of comparable actions.

Furthermore, two additional indicators will be included, reflecting the assurance and the continuous improvement processes, which are embedded in the sustainability assessment framework. These will be detailed in subsequent sections of the framework.

Note that the selection and use of KPIs will be adapted to the nature of the decision and the specific objectives of the assessment. In some cases, only a targeted subset of KPIs will be relevant; in others, a comprehensive set may be required. This flexibility ensures that the information remains relevant, actionable, and aligned with the needs of diverse users and decision-making contexts.

As the project advances through its fieldwork with pilot cases, SONYA will also explore and define how this information can be presented in a user-friendly and accessible format. This will involve co-designing reporting outputs with stakeholders to ensure that the results are not only technically sound but also intuitive and engaging for final users.

8.4 Assurance process

In the context of the SONYA project, promoting transparency in the communication of sustainability results is fundamental to enhancing the reliability and usefulness of the information for decision-

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makers. To achieve this, the assurance process is introduced as a key component of the sustainability assessment framework. Its purpose is to ensure that the data provided by the social organizations about the action is accurate, complete, and relevant for understanding the sustainability performance of the action from a life cycle perspective. In this respect, the assurance process contributes to strengthening the credibility, integrity, and trustworthiness of sustainability information by verifying its quality and consistency.

Accordingly, in SONYA project a variable is presented regarding the assurance process to report about the quality of the information provided by action owners. A KPI will be developed to ensure that the sustainability assessment results are based on the accuracy of qualitative information and quantitative data provided by the action owner, as well as on the validity of assumptions applied in the assessment process. These elements are critical to ensure methodological consistency and to support the credibility of the sustainability evaluation outcomes.

Assurance variable
Assurance result

Table 12. Assurance variable, source: own elaboration

8.5 Traceability process

The traceability process is considered a crucial process to ensure the integrity of the sustainability assessment framework. This process supports the sustainable management of products and processes within the broader context of organizational sustainability. According to ISO 9000:2015 Quality Management Systems and the United Nations Global Compact's Guide to Traceability (2014), traceability is defined as: "Traceability is the process of identifying and tracking a products or component's path from raw material to finished good. It's a practical approach for organizations to advance sustainability in global supply chains and prove claims and attributes of sustainable products."

Traceability can generally be divided into two main categories:

- Chain traceability, which refers to the tracking of products as they move through multiple processes and organizations. This allows for both forward tracing, knowing where products have been delivered, and backward tracing, understanding the origin of products and their components.
- Internal traceability, which focuses on tracking the movement of products within a single organization or process, such as within a production facility or service provider.

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In a life cycle context, the chain traceability is special relevant, since it allows to connect different organizations through the flow of products, making visible their origins, processing, distribution, and location, and thereby linking them to their sustainability impacts. However, achieving full traceability across complex supply chains remains a significant challenge. Variability in data availability, system interoperability, and the involvement of multiple actors often limit the ability to track products comprehensively. In this regard, the SONYA project overcomes these limitations by integrating specialized databases that provide structured, regionally disaggregated average data. These databases support the traceability process, especially in cases where direct tracking of product components is not feasible. By leveraging these data sources, SONYA enhances the scope and depth of sustainability assessments, ensuring that even with limited primary data, the evaluation remains consistent and aligned with the project's life cycle perspective.

8.6 Continuous improvement process

The continuous improvement process constitutes a strategic and iterative approach, based on the Plan–Do–Check–Act (PDCA) cycle, aimed at optimizing the sustainability performance of the action through incremental advancements. In the SONYA context, this process fosters a culture of proactive engagement in the social economy organization to improve the action in sustainability terms.

Building on the process of continuous improvement, the SONYA framework introduces a variable to measure the quality of outcomes resulting from enhancements made to specific actions undertaken by social economy organizations. This variable enables a comparative evaluation—before and after the implementation of a proposed improvement—focusing on its contribution to sustainability. Crucially, the improvement must maintain the core attributes of the original action; if it alters the defining approaches substantially, it should be categorized as a new initiative rather than an improvement. Therefore, this variable reflects the dynamic nature of successive successful improvements, highlighting the organization's capacity for iterative and sustainable advancement.

Continuous improvement variable

Capacity for Continuous Improvement

Table 13. Continuous improvement variable, source: own elaboration

9. Criteria for the definition of KPIs

Section 8 presents the key variables identified to reflect the main outcomes of the SONYA Sustainability Assessment Framework. These variables are measured through a series of Key Performance Indicators (KPIs), which should comply with the criteria SMART+, applied also in previous

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European projects such as ToNoWaste and FOODRUS. In this regard, the selected KPIs should follow the SMART+ criteria, ensuring they are Specific, Measurable, Achievable, Relevant, Time-bound, and Digitizable. In particular:

Specific. Indicators must be clear and precise regarding what they measure, allowing assessment of specific aspects of sustainability. In SONYA, KPIs are based on recognized scientific methodologies to ensure each indicator reflects relevant dimensions of the sustainability impact associated to a specific action focused on improving the care service provided by a social economy organization.

Measurable. They must provide qualitative or quantitative data that enables comparison of results. SONYA uses standardized reference units to express results in relative terms, facilitating comparison between actions and time frames.

Achievable. The calculation of indicators must be feasible with the resources available to the organizations involved. By utilizing specialized databases and software, SONYA reduces the technical requirements for calculating the KPIs.

Relevant. Indicators must provide valuable information for decision-making. KPIs will be approved and validated through participatory methods such as technical workshops. Moreover, the full sustainability assessment framework, including the KPIs, will be tested using the pilot actions from the three project regions: Italy, Bulgaria and Spain.

Time-bound. Each KPI must be linked to a defined time period in order to assess changes over time. SONYA indicators measure the difference between a baseline scenario (prior to the action) or, even before the improvement, and a subsequent point in time when the effects of the action or the improvement is expected to be observed.

Digitizable. Indicators must be calculable and manageable within digital environments. In fact, many SONYA indicators will rely on methods embedded in specialized software, allowing results to be easily imported to and exported from virtual data-management platforms.

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