SWINS

Sustainable Well-being through INvestment in Social Services

D4.3

Surveying potential macro indicators beyond GDP

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Disclaimer

This deliverable is part of Task 4.3" Estimating the value of services". This task provides an update of previous analysis, using the most recent data and assessing the sensitivity of the results. Earlier, cross-country studies on the distributional effects of the use of social services have been conducted using data from EU-SILC. The assumption most frequently applied in the literature is that a service's value equals the average cost of its provision, although this approach neglects differences – within and between countries – in the quality and efficiency of the provision of these services.

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1. Introduction

The SWINS project (Sustainable Well-being through Investment in Social Services) aims to measure how investments in social services throughout the life-course contribute to wellbeing. Building on the capability approach (Sen, 1999; Nussbaum, 2011) and the social investment life-course multiplier theory (Hemerijck et al., 2023) SWINS treats investments in social services as tools to expand individual and collective capacities over the life course, contributing to sustainable and inclusive wellbeing at the macro level. In order to measure the impact of investments in sustainable social services, such as early childhood education and care (ECEC), active labour market policies (ALMPs), long-term care and primary healthcare, we need to outline a set of outcome indicators that are both theoretically grounded and measurable.

We build on the emerging beyond GDP initiatives in Europe, in particular the European Commission's Sustainable and Inclusive Wellbeing (SIWB) dashboard (Benczúr et al., 2025), which is a multidimensional framework for measuring wellbeing, inclusiveness, and sustainability across EU member states. We aim to select a reduced but representative subset of the 50 headline SIWB indicators that may serve as outcome measures for investments in foundational, enabling, and protective social services throughout the life-course.

First, we introduce simplified theories of change for foundational, enabling and protective social services over the life course that guide our selection of plausible direct and indirect outcome indicators from the pool of 50 SIWB indicators. Second, we apply principal component analysis (PCA) to the imputed SIWB panel dataset (EU-27, 2011–2023) to further streamline these selected indicators into a subset of indicators that explain the greatest share of variance within each group of outcome measures, categorized by life-course stages. The final shortlist of beyond-GDP outcome indicators aims to support future empirical and agent-based modelling work within the SWINS project.

The paper is structured as follows. First, we review the European Beyond GDP landscape and introduce the SIWB framework. Second, we describe the SWINS categorization of social services into foundational, enabling, and protective social services that broadly fit the life-course stages. Third, using the life course-based categories of social services, we select plausible outcome indicators from SIWB for each category based on simplified theories of change. Fourth, we report the PCA results for each category. Finally, we conclude with a shortlist of outcome indicators, limitations and next steps.

2. European Beyond-GDP initiatives

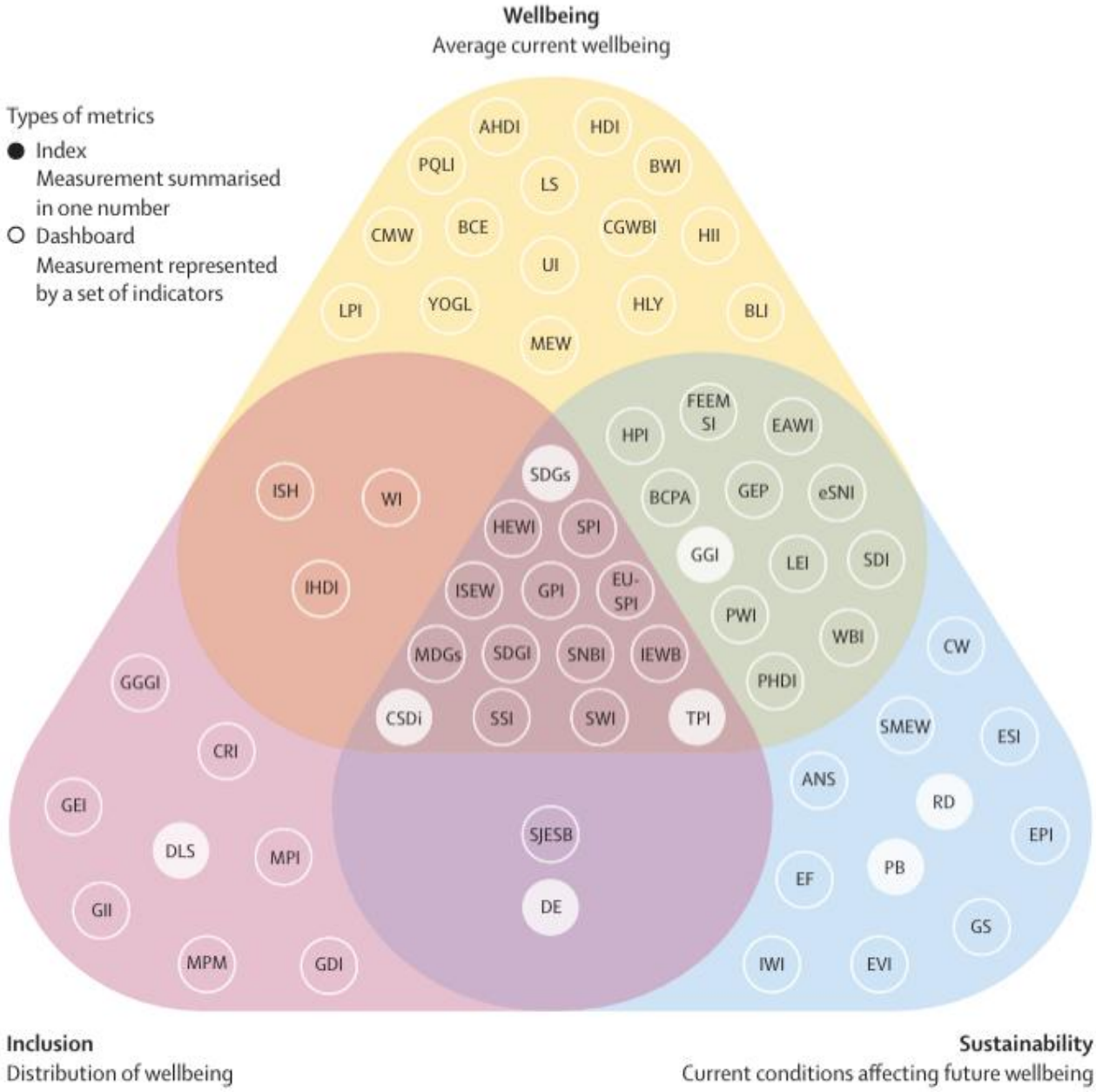
There are several international initiatives to advance the 'beyond GDP' approach, which stresses the importance of adopting more comprehensive indicators for assessing societal progress and sustainable prosperity. (For a recent analysis of beyond-GDP metrics see Rum et al., 2024.) A pivotal milestone was the so-called Stiglitz-Sen-Fitoussi report (Stiglitz et al., 2009), which highlighted that commonly used, mostly macroeconomic statistics may not capture some phenomena, which have an increasing impact on the well-being of citizens. As a response, they recommended a multidimensional approach for current well-being that includes measures of capability and subjective well-being as well. Overall, they suggested three conceptual dimensions that should be measured and evaluated separately: current wellbeing, future wellbeing (sustainability) and the distribution of wellbeing (inclusion) (Stiglitz et al., 2009).

The proposed framework for sustainable and inclusive wellbeing has been influential. A cluster of Horizon Europe-funded research projects with similar keywords have been building the scientific infrastructure for beyond-GDP initiatives in Europe. The SPES (Sustainability Performances, Evidence and Scenarios: https://www.sustainabilityperformances.eu/) project analysed interconnections between economic growth, human flourishing, and sustainability to support the transition towards achieving sustainable human development (see e.g. Biggeri et al., 2025). Part of the project was a summary of mapping indicators and composite indices relevant to measure transition performances (Gábos et al., 2023) and analyses about composite indices to assess trade-off and synergies present within their input indicators (Combarnous et al., 2025).

The WISE Horizons project (Wellbeing, Inclusion, Sustainability, Economy: https://wisehorizons.world/) produced a theoretical framework based on the current post-growth narratives and a comprehensive Beyond-GDP database. Similarly, the ToBe (Towards an Economy for Sustainable Wellbeing: https://toberesearch.eu/) project constructed a conceptual framework built on green growth and post-growth initiatives and a group of meaningful indicators to assess welfare policies multidimensionally. REAL (A Post-Growth Deal: https://www.realpostgrowth.eu/) is a European Research Council (ERC) Synergy project, which investigates the policies, politics and provisioning systems that are necessary for a just post-growth transition that enables well-being for all within planetary boundaries, building on both quantitative and qualitative methods.

Given the potential synergies between the above-mentioned sister research projects, MERGE (https://mergeproject.eu/), a Horizon Europe funded Coordination and Support Action (CSA) project, harmonizes the scientific work of WISE Horizons, SPES, ToBe, and REAL to reach a consensus on frameworks and indicators to measure multidimensional wellbeing beyond GDP, establishing multi-stakeholder networks, promoting science-policy dialogue, and developing training tools for policy implementation. The work on consolidating Beyond-GDP metrics (Costanza et al., 2024; Jansen et al., 2023; Rum et al., 2024) contributed to a conceptual framework for measuring sustainable and inclusive wellbeing that once again arrived at the three dimensions of wellbeing, inclusion and sustainability of Beyond GDP metrics, summarized in Figure 1 (Jansen et al., 2024). Furthermore, the joint report by Barth et al. (2024) supports the European Commission in developing a policy model that prioritizes people's wellbeing instead of focusing solely on economic growth.

Figure 1 Wellbeing, inclusion, and sustainability triangle of Beyond GDP metrics



Source: Jansen et al. (2024), p. e700.

Figure 1 maps both dashboards and composite indices of beyond-GDP metrics that are worth considering. (For a recent shortlist of indicators measuring transition performances of countries see Gábos et al., 2023.) A composite index compresses multiple dimensions into a single composite number to have an overall assessment that enables country rankings. The most influential beyond-GDP composite indices include the HDI (Human Development Index of the UN), the SPI (Social Progress Index) and GPI (Genuine Progress Indicator). On the other hand, a dashboard displays indicators separately without forcing aggregation that enables a more thorough understanding of development, highlighting areas of strengths and weaknesses and potential trade-offs between the indicators of the dashboard. Among the beyond-GDP dashboards the UN Sustainable Development Goals (SDG) indicator framework and the OECD Better Life Index stand out.

2.1 SIWB

To further advance the EU's Beyond GDP agenda, the European Commission has also created an Internal Working Group on Sustainable and Inclusive Wellbeing, who compiled a dashboard of indicators for Sustainable and Inclusive Wellbeing (Benczúr et al., 2025).

The SIWB framework provides a comprehensive approach to capturing the metrics of wellbeing, including social, economic, and environmental factors, as well as the importance of resilience, nature, and governance. By combining elements of wellbeing and sustainability, the SIWB framework offers a perspective on building equitable and enduring prosperity. The six main components of the framework all comprise various indicators that measure these objectives.

The **wellbeing today** component refers to a range of aspects relevant to quality of life, including how different population groups and territories experience and perceive it (Benczúr et al., 2025, Annex 1, p. 44). It includes measures beyond the material aspects of wellbeing, such as frequency of contacts with family and friends. It also takes into account how different population groups and territories experience and perceive quality of life, through indicators such as at risk of poverty or social exclusion rate (AROPE) and average rating of life satisfaction overall (Benczúr et al., 2025, Annex 5, pp. 65–67).

The second component, **social and economic resources for future wellbeing**, includes the social and economic resources that ensure future wellbeing. The categories include economic capital, with indicators such as net fixed capital formation (NFCF), human capital, such as tertiary education attainment, and social capital, measured by participation in voluntary activities (Benczúr et al., 2025, Annex 5, pp. 67–68).

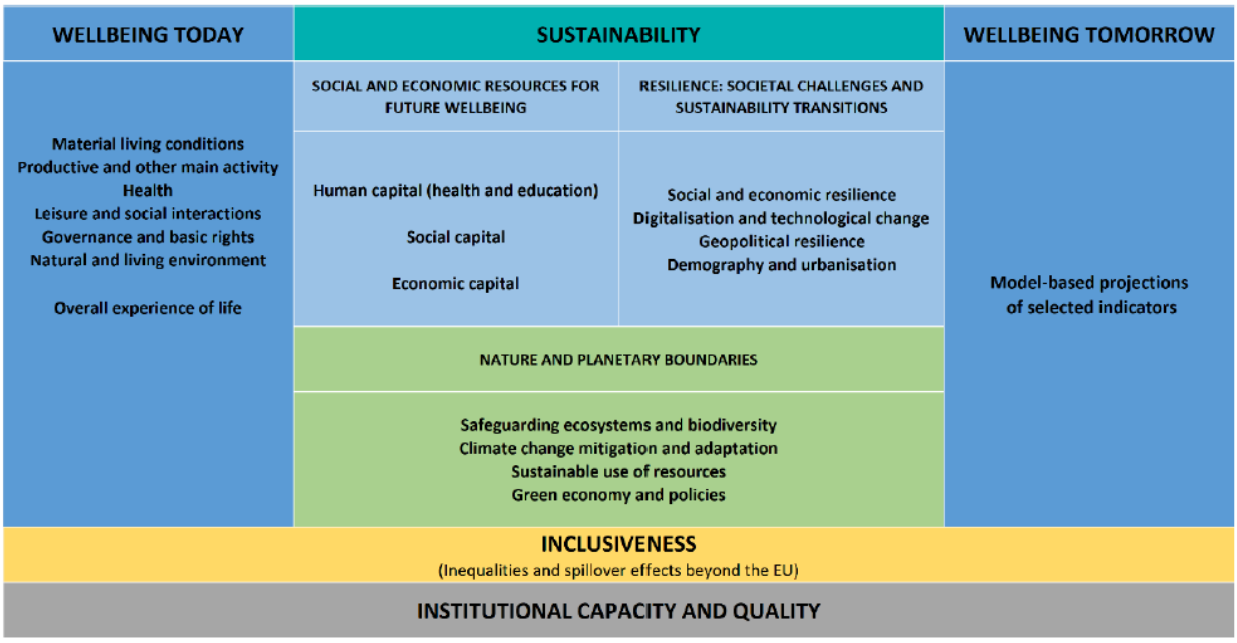
The third component, **resilience: societal challenges and sustainability transitions**, includes variables that measure resilience to societal challenges and sustainability transitions, such as digitalisation, technological change, and demographic indicators, with indicators such as adult participation in learning, material import dependency, and net migration rate (Benczúr et al., 2025, Annex 5, pp. 68–71).

The fourth component, **nature and planetary boundaries**, includes all aspects of environmental sustainability, including the condition of nature both as a contribution to people, with indicators such as Natura 2000 protected areas and as a future resource and a source of resilience in the face of climate change, with indicators such as share of renewable energy in gross final energy consumption and net greenhouse gas emissions (Benczúr et al., 2025, Annex 5, pp. 71–73).

The fifth component, **inclusiveness**, collects the key fairness and distributional aspects of wellbeing across all the other components and subcomponents (Benczúr et al., Annex 1, p. 46). It measures the ability of society to achieve distributional fairness through indicators such as income quintile share ratio and feeling discriminated. It also encompasses an indicator on international spillover effects through the Spillover Index Score (Benczúr et al., 2025, Annex 5, p. 64), which considers the environmental and social impacts of the EU on other countries, as wellbeing in the EU should not come at the expense of other regions.

The final component, **institutional capacity and quality**, relies on the Worldwide Governance Index that measures essential characteristics that institutions and governance need to ensure the current and future wellbeing of citizens and institutional capacity to face challenges and transitions (Benczúr et al., 2025, Annex 1, p. 46). Aspects include voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption.

Figure 2 Main components and their dimensions of the SIWB framework



Source: Benczúr et al. (2025), p.9.

The SIWB dashboard consists of a set of 140 indicators from over 1000 candidates. There is a subset of 50 indicators that still capture the above-mentioned dimensions. The streamlined set of 50 indicators will serve as our pool to choose relevant outcome indicators of social services beyond GDP. The SIWB dashboard has several advantages for our analysis: it covers the EU and it is among the most up-to-date collection of metrics (it covers years 2011-2023), with imputed values for missing observations. And most importantly, the wellbeing, inclusiveness and sustainability dimensions of SIWB fit the consolidated conceptual framework of Jansen et al. (2024) (see Figures 1 and 2).

3. Foundational, enabling and protective social services

SWINS approaches social services as components of a capability-enhancing and sustainability-oriented institutional ecosystem. The capability approach originates from Amartya Sen (1999), who describes wellbeing as people's capability to function, their ability and freedom to lead the kind of life they value (see a recent review in Jansen et al., 2024), which resonates with the social investment perspective, which emphasizes risk prevention and capacitation instead of the dominance of ex-post income compensation. Insights from the capability and enabling approach are supplemented by a life-course perspective within the SWINS project, building on the 'social investment life-course multiplier' theory, which predicts that social investment policies (i.e. childcare, education, ALMPs) yield compounding well-being returns over people's life courses, while at the same time fostering employment levels, which grants macroeconomic sustainability of welfare systems (Hemerijck et al., 2023). Overall, social services have the potential to expand people's opportunities across the life course apart from their redistributive and social protective impact, in a sustainable way respecting planetary boundaries.

Ciani & Fattacciu (2025) adopts a threefold categorization of social services for SWINS: foundational, enabling, and protective (summarized in Table 1). Foundational services provide preconditions for human development and full participation in society, typically accessed early in life with lifelong and intergenerational ramifications. Foundational services include maternal and child health services, ECEC (Early Childhood Education and Care) and primary and secondary education.

Enabling services facilitate transitions across major turning points in life during adulthood, which are crucial to adaptive and transformative resilience both at the individual and at the societal level. Enabling services include, for example, vocational training, ALMPs, work-life balance policies and affordable housing policies.

Protective services provide a safety net to cope with shocks (e.g. job loss), dependency (e.g. due to old age or ill health) or structural exclusion. Protective services are not only passive spending, but they also build resilience and they act as automatic stabilizers of macroeconomic cycles (e.g. boosting demand during an economic downturn).

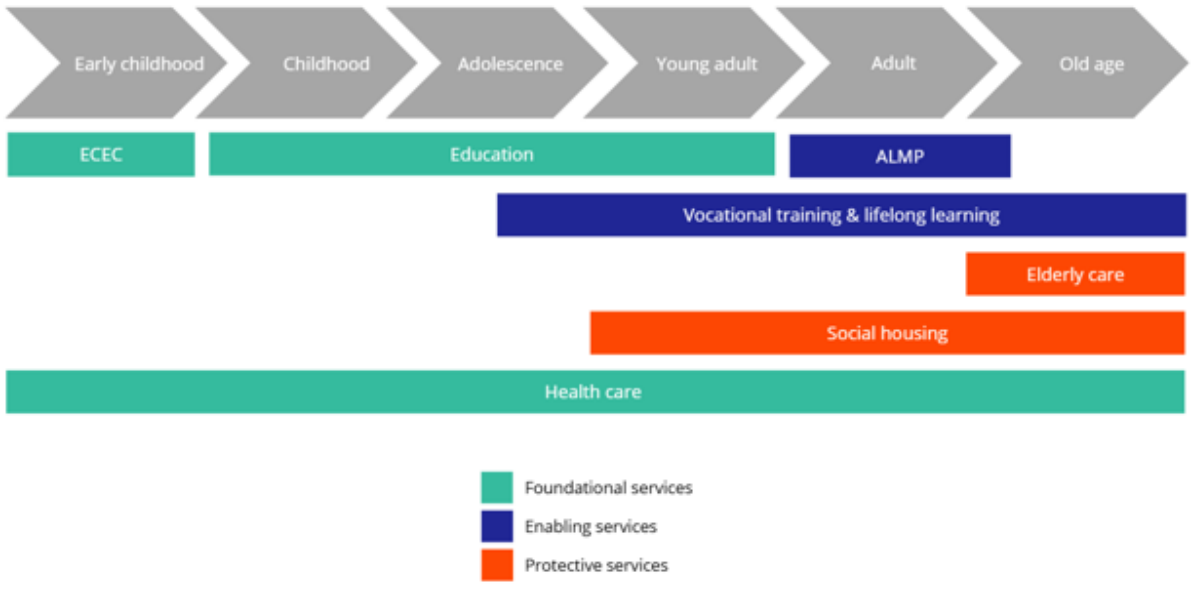
Table 1 Categorization of social services

Social service category	Examples	Key Functions
Foundational	Maternal & child health; Early Childhood Education & Care (ECEC); Primary and secondary education	Provide basic preconditions for human development and participation in society. Typically accessed early in life with lifelong and intergenerational consequences.
Enabling	Vocational training; ALMPs; Work-life balance policies; Affordable housing	Facilitate transitions across turning points during adulthood. Crucial for adaptive and transformative resilience.
Protective	Unemployment benefits; Minimum income schemes; Long-term care services	Provide a safety net to cope with shocks, dependency or structural exclusion. Important to support resilience and as stabilizers of macroeconomic cycles.

Source: own table based on Ciani & Fattacciu (2025).

Foundational, enabling and protective services broadly align with different stages of the life course. Foundational services are mostly targeting children, enabling services adults and protective services the elderly. Nevertheless, social services categories do not fit strictly the life course stages, some of them, i.e. health care services cover the whole life-cycle, while some, i.e. lifelong learning programs target adults and elderly as well, as shown on Figure 3 by Bursens et al. (2026).

Figure 3 Foundational, enabling and protective in-kind social services throughout the life course



Source: Bursens et al., 2026, p.14.

In our analysis, we organize social services by the stages of the life course, and we also add the category of the service (foundational, enabling or protective). We mostly focus on the subset of core services selected by Ciani & Fattacciu (2025) that are crucial for enhancing capabilities and resilience in a transition towards a sustainable welfare system: early childhood education and care (ECEC), active labour market policies (ALMPs), long-term- and elderly care and some dimensions of healthcare.

4. Selecting potential outcome indicators from SIWB

Our process of selecting relevant outcome indicators for social service investments starts with a simplified theory of change or logic model of the outcomes of social service investments. In a second step we identify which indicators correspond to our expected outcomes. We aim for a tractable set of outcome indicators that are the most relevant outcomes beyond GDP of foundational, enabling and protective social service investments.

Our analysis has a few caveats. As we look at social service investments in general instead of a particular social service in a particular institutional context, our logic models or descriptions of mechanisms remain overly simplified and broad. When measuring the outcomes of a social service, it is important to consider the level of aggregation at which impact is assessed: a policy that generates a positive outcome locally may not be detectable at the national level, and this discrepancy should not be mistaken for a lack of effectiveness. Outcome measurement for social services should therefore account for such scale effects. For an extensive review of the mechanisms and the empirical evidence on the impact of social service investments (including ECEC, education, ALMPs, health care) see Bursens et al. (2026).

A further limitation of our analysis is that it misses outcomes capturing potential environmental impacts of social service investments. While environmental sustainability is crucial, linking social service investments with macro level indicators of planetary health outcomes is beyond the capacity of our simplified theories of change, given the discrepancy between the complexities of environmental effects and that available environmental outcome measures, which are quite limited and fragmented.

4.1 Outcome indicators for foundational services

Investing in early childhood education and care (ECEC) has two main channels for impacting sustainable and inclusive wellbeing. On the one hand, investment in ECEC affects the parents of children, particularly the labour force participation of women, who are usually the primary care givers. On the other hand, it affects children receiving ECEC as they build cognitive and social skills which in a ‘social investment life-course multiplier’ framework yield compounding returns over the life course, such as educational achievement and employment prospects. A prominent concern in the literature assessing the impact of investments in early childhood education and care is about the distribution and take-up of such services. While low socio-economic status children could benefit more from investments in ECEC, they are less likely to be enrolled in childcare compared to children from high-income households, resulting in a Matthew effect, where despite the intentions better-off families benefit more from a service, undermining ambitions to reduce inequality (Van Lancker, 2023). For a more detailed review of empirical evidence on the impact of ECEC investments see Bursens et al. (2026).

Looking at the 50 SIWB indicators, gender employment gap is the most straightforward measure for assessing ECEC's impact on female labour force participation.

- 'Gender employment gap': Difference between the employment rates of men and women aged 20 to 64; published by Eurostat.

SIWB indicators that may capture the skill building effects of ECEC are all indicators of potential long-term effects such as:

- 'Underachievement in reading, math, science': share of 15-year-old students failing to reach level 2 (basic skills level') on the PISA scale for the three core school subjects of reading, mathematics and science, published by Eurostat.
- 'Tertiary education attainment: Share of the population aged 25-34 who have successfully completed tertiary studies (e.g. at university or a higher technical institution); published by Eurostat.
- 'At least basic digital skills': Share of people aged 16 to 74 who have at least basic digital skills. It is a composite indicator based on selected activities performed on the internet in specific areas: information and data literacy, communication and collaboration, digital content creation, safety and problem solving; published by Eurostat.
- 'NEET rate': share of young people neither in employment nor in education and training, defined as the share of people aged 15-29 meeting the following two conditions: (a) are unemployed or outside the labour force according to the ILO definition and (b) have not received any education or training (i.e. neither formal nor non-formal) in the four weeks preceding the LFS; published by Eurostat.

Table 2 Potential outcome indicators from SIWB for foundational services targeted at early childhood

Early Childhood				
		Well-Being	**Inclusion**	**Sustainability**
Social Service Investment	**Service Category**	**Outcome Indicators**	**Outcome Indicators**	**Outcome Indicators**
ECEC	*Foundational*	Young people neither in employment nor in education and training (NEETs)	• Gender employment gap	• Tertiary education attainment (25–34) • Underachievement in reading, math, science • At least basic digital skills
Maternal & Child Health Services	*Foundational*	• Deaths from suicide • Average rating of life satisfaction overall • Employment rate	• Regional dispersion of life expectancy at birth	• Life expectancy • Standardised preventable and treatable mortality (low rate)

Source: authors' compilation based on SIWB (Benczúr et al., 2025).

Maternal and child health services investments directly impact health outcomes, both physical and mental, and indirectly economic and social outcomes. Most of the health outcome indicators of SIWB could capture long-run impacts of maternal and child health services, which are harder to capture. Nevertheless, physical health indicators include:

- Life expectancy: Life expectancy at certain ages represents the mean number of years still to be lived by a person who has reached a certain exact age, if subjected throughout the rest of his or her life to the current mortality conditions (age-specific probabilities of dying); published by Eurostat.
- Regional dispersion of life expectancy at birth may decrease if health services target citizens living in more vulnerable regions. The indicator is defined as the gap between minimum and maximum life expectancy at the NUTS2 level in a country; published by Eurostat.
- Standardised preventable and treatable mortality: Preventable mortality refers to mortality that can mainly be avoided through effective public health and primary prevention interventions (i.e. before the onset of diseases/injuries, to reduce incidence). Treatable mortality can mainly be avoided through timely and effective health care interventions, including secondary prevention and treatment (after the onset of diseases to reduce case-fatality); published by Eurostat.

Relevant mental health indicators include:

- Average rating of life satisfaction overall: Average score reported by people when asked to rate their satisfaction with life from 0 (very dissatisfied) to 10 (very satisfied); published by Eurostat.
- Deaths from suicide: Death rate of the population due to suicide and intentional self-harm adjusted to a standard age distribution; published by Eurostat.

Finally, an indirect economic outcome may be the higher employment rate due to the expanded participation of women benefiting from higher quality maternal health services.

- Employment rate: share of the population aged 20 to 64 that is employed; published by Eurostat.

Table 2 summarizes the above-mentioned SIWB indicators that could capture some of the outcomes of foundational services, grouped by the well-being – inclusion – sustainability dimensions of the SIWB dashboard.

Table 3 Potential outcome indicators from SIWB for foundational services targeted at the youth

Youth				
		Well-Being	**Inclusion**	**Sustainability**
Social Service Investment	**Service Category**	**Outcome Indicators**	**Outcome Indicators**	**Outcome Indicators**
Primary / Secondary Education Investments	*Foundational*	• Young people neither in employment nor in education and training (NEETs) • Real gross disposable income of households per capita • At risk of poverty or social exclusion (AROPE)	Gender employment gap	• Tertiary education attainment (25–34) • Underachievement in reading, math, science • At least basic digital skills • Adult participation in learning

Source: authors' compilation based on SIWB (Benczúr et al., 2025).

When it comes to primary and secondary educational investments targeted at the youth, the most straightforward outcomes are the indicators of skills and of participating in education as an adult. In turn, a

higher skilled workforce is more likely to be employed and to be employed in better-paid jobs. SIWB indicators that correspond to direct outcomes of primary and secondary education investments include:

- NEET rate
- Tertiary education attainment (age group 25–34)
- Underachievement in reading, math, science (share of 15-year-old students with low PISA scores)
- At least basic digital skills (the share of people aged 16 to 74 who have at least basic digital skills)
- Adult participation in learning: Share of people aged 25 to 64 who stated that they received formal or non-formal education and training in the last 4 weeks preceding the survey. Adult learning covers both general and vocational formal and non-formal learning activities. Adult learning usually refers to learning activities after the end of initial education. Published by Eurostat.

Indirect outcomes that investments in education may impact are:

- Real gross disposable income of households per capita: Gross disposable income of households and Non-Profit Institutions Serving Households (NPISH) adjusted by Harmonized Index of Consumer Prices (HICP), by the total resident population. Published by Eurostat.
- At risk of poverty or social exclusion (AROPE): Share of people who are at risk of poverty, and/or severely materially and socially deprived and/or lives in a household with very low work intensity. Published by Eurostat.
- Gender employment gap

Education's impact on AROPE is not straightforward. While labour market attachment is positively associated with education, decreasing the probability of living in a household with low work intensity, its impact on poverty and income inequality (measured by the AROP rate) depends on the distribution of job-related benefits from education.

Similarly, the education's impact on the gender employment gap is uncertain. While more educated women tend to have a higher probability of being employed, differences in education level are not among the main reasons of current gender employment gaps.

Table 3 summarizes the above-mentioned SIWB outcome indicators, most of them fall under the well-being and sustainability dimensions.

4.2 Outcome indicators for social services targeting adults

The **working age population** receives mostly enabling services: active labour market policies (ALMPs), work-life balance policies, policies supporting affordable housing and healthcare, supplemented by protective ones (social protection and income support) (see Table 4).

Direct outcomes of **ALMPs** are related to employment rates: lower NEET rate, higher employment rate and lower gender employment gap. Indirect outcomes may be higher income, lower in-work poverty rate (if ALMPs are supporting acquiring better quality, higher paid jobs), lower AROPE, and higher life satisfaction (based on the assumption that working on the labour market elevates satisfaction). A further indirect effect may be a lower dependency ratio if counted as the share of pensioners and working population.

While the main aim of ALMPs is to get the unemployed back to the labour market and to employment, we may not see the employment effect on the short run, due to the so-called lock-in effect, describing the period when participants in ALMPs are less active in the job search process during trainings and programs (Vooren et al., 2019). However, training participants are more likely to find a higher quality job that is a better match on the job market.

We list the definition and source of those SIWB indicators that have not been reported yet:

- In-work at-risk-of-poverty rate: Share of persons who are employed and have an equivalised disposable income below the risk-of-poverty threshold, which is set at 60 % of the national median equivalised disposable income (after social transfers). Published by Eurostat.
- Projected old-age dependency ratio: Estimated ratio of persons aged 65 and over to persons aged 15-64 in 2050, considering future fertility rates, probabilities of dying, and net migration. Projections based on data up to 2023. Published by Eurostat.

Work-life balance policies may increase the time spent with family and friends, contributing to a higher satisfaction with life and a lower number of deaths from suicide. Better work-life balance may decrease stress, indirectly increasing life expectancy. An indirect effect may be that the excess time thanks to work-life balance policies will be used on voluntary activities and participation in learning activities. Definitions of the yet unlisted SIWB indicators:

- Frequency of contacts with family and friends: Percentage of people meeting socially with friends, relatives or work colleagues once a week. Published by the European Social Survey (ESS).
- Participation in voluntary activities: Percentage of people who claimed they participated in voluntary activities (formal or informal) in the last twelve months. Formal volunteering relates to any unpaid non-compulsory work for or through an organisation, a formal group or a club. Informal voluntary activities can include helping other people, animals, cleaning a beach or a forest for example. Published by Eurostat.

Table 4 Potential outcome indicators from SIWB for enabling services targeted at the working-age population

Working Age				
		Well-Being	**Inclusion**	**Sustainability**
Social Service / Investment	**Service Category**	**Outcome Indicators**	**Outcome Indicators**	**Outcome Indicators**
ALMPs	*Enabling*	• At risk of poverty or social exclusion (AROPE) • Average rating of life satisfaction overall • Employment rate • Real gross disposable income of households per capita • NEETs • In-work at-risk-of-poverty rate	—	• Adult participation in learning • Projected old-age dependency ratio
Work-Life Balance Policies	*Enabling*	• Average rating of life satisfaction overall • Deaths from suicide • Employment rate • Frequency of contacts with family and friends	Gender employment gap	• Life expectancy • Participation in voluntary activities • Adult participation in learning
Social Protection & Income Support	*Protective*	• At risk of poverty or social exclusion (AROPE) • Average rating of life satisfaction overall • Deaths from suicide • In-work at-risk-of-poverty rate • Inability to keep home adequately warm	Income quintile share ratio (S80/S20)	Household debt

		• Real gross disposable income of households per capita		
Affordable Housing	*Enabling*	• Average rating of life satisfaction overall • Housing cost overburden rate	—	Household debt
Healthcare (Primary & Preventive)	*Enabling*	• Average rating of life satisfaction overall • Deaths from suicide • Employment rate	Regional dispersion of life expectancy at birth	• Life expectancy • Standardised preventable and treatable mortality (low rate)

Source: authors' compilation based on SIWB (Benczúr et al., 2025).

Social protection and income support should increase the material wellbeing of vulnerable households, lowering income inequality. Indicators of material wellbeing are:

- Real gross disposable income of households per capita
- Inability to keep home adequately warm: Share of the population that cannot afford to keep the home adequately warm. Published by Eurostat.
- Household debt: Total outstanding debt of households (including non-profit institutions serving households), which includes loans (primarily mortgage loans and consumer credit) and other accounts payable as a share of net disposable income. Published by Eurostat.

SIWB indicators of income inequality are:

- Income quintile share ratio (S80/S20): Ratio of total income received by the 20 % of the population with the highest income (the top quintile) to that received by the 20 % of the population with the lowest income (the bottom quintile). Published by Eurostat.
- At risk of poverty or social exclusion (AROPE)
- In-work at-risk-of-poverty rate

Social protection and income support may also support mental health, captured by:

- Higher average rating of life satisfaction overall, and
- Fewer deaths from suicide

Affordable housing policies should have a direct impact on the housing cost overburden rate and on household debt related to housing (i.e. mortgage).

- Housing cost overburden rate: Share of population living in households that spend 40 % or more of the household disposable income on housing ('net' of housing allowances). Housing costs include rental or mortgage interest payments and cost of utilities (water, electricity, gas or heating). Published by Eurostat.

Affordable housing policies may indirectly benefit life satisfaction.

Investments in **primary and preventive health care** should affect population health indicators directly, such as life expectancy, preventable and treatable mortality and mental health related outcomes like life satisfaction and suicide rates. Ideally such investments decrease health inequalities as well, captured in SIWB by the regional dispersion of life expectancy. A rather straightforward indirect effect of spending more on health care

is better employability of the population. All SIWB indicators related to social services targeting the working-age population are summarized in Table 4.

4.3 Outcome indicators for social services targeting older people

Finally, the most prominent social services targeting the older population **are long-term care services and elderly care services** in general. Both services are expected to improve physical and mental health of the elderly, captured by life expectancy, mortality, life satisfaction and social contacts. Again, ideally health inequalities decrease as well. An important indirect effect may be a reduction in the gender employment gap, given that women are more likely to provide informal and unpaid long-term care for elderly relatives. In-kind services create employment in the care economy and ensure the quality of service, nevertheless they are less flexible compared to cash-based measures (Ciani & Fattacciu, 2025). Outcome indicators are listed and categorized in Table 5.

Table 5 Potential outcome indicators from SIWB for protective services targeted at the old-age population

Old Age				
		Well-Being	**Inclusion**	**Sustainability**
Social Service / Investment	**Service Category**	**Outcome Indicators**	**Outcome Indicators**	**Outcome Indicators**
Long-Term Care	*Protective*	• Average rating of life satisfaction overall • Frequency of contacts with family and friends	• Gender employment gap • Regional dispersion of life expectancy at birth	• Life expectancy • Standardised preventable and treatable mortality (low rate)
Elderly Care Services	*Protective*	• Average rating of life satisfaction overall • Deaths from suicide	• Gender employment gap • Regional dispersion of life expectancy at birth	• Life expectancy • Standardised preventable and treatable mortality (low rate)

Source: authors' compilation based on SIWB (Benczúr et al., 2025).

5. Principal component analysis

In addition to the simplified logic models describing several social service types' most plausible direct and indirect outcomes, we conducted a principal component analysis (PCA) to further streamline these outcome lists. PCA is a statistical tool, which reduces the dimensions of a dataset with the least information loss within the process. It groups correlated indicators into a smaller set of uncorrelated variables that capture the most variability in the data. Indicators with the highest PCA correlation are the strongest predictors of the variance in the data. As a consequence, we select these indicators that explain the most variability in the dataset as the final reduced list of relevant SIWB outcome indicators. The absolute value of the factor loadings drives the selection, though the number of top loaders selected may be between 1 and 4, depending on the differences among the loadings. One indicator may stand out or there may be a few top loaders close to each other in magnitude. In the latter case a maximum of four indicators are highlighted.

We used the imputed SIWB dataset of the 50 indicators, using their standardized percentile values provided by SIWB, covering EU-27 and years 2011-2023 (SIWB Dataset, 2026). We conducted three separate PCAs:

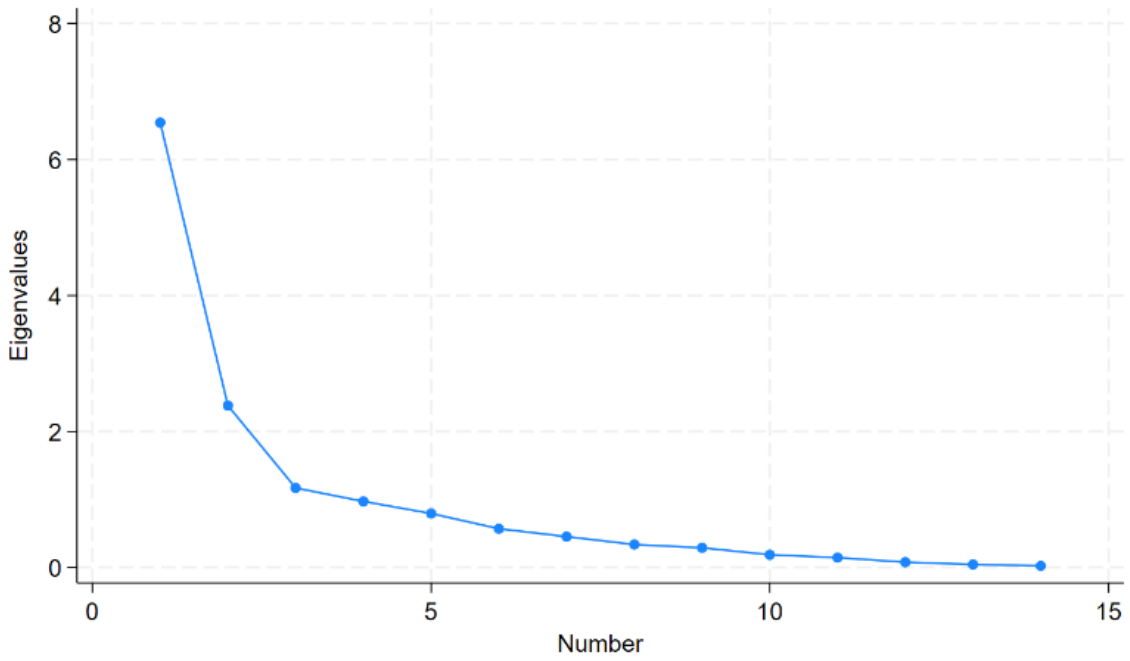
1. PCA of the potential outcomes of social services targeted at children and youth
2. PCA of the potential outcomes of social services targeted at the working aged population
3. PCA of the potential outcomes of social services targeted at the elderly

To assess whether the results of the PCAs reflect common variation among indicators across time rather than reflecting only cross-country level differences (e.g., wealthier countries scoring systematically better across most indicators simultaneously), we re-estimate each PCA on country-demeaned data. As observations are pooled across country-years, the repeated observations from the same country are unlikely to be independent draws, which violates the independent and identically distributed (i.i.d.) assumption underlying standard PCA and means the original eigenvalues and loadings may partly reflect persistent, country-specific structure rather than independent covariation across observations. We arrive at a list of relevant SIWB indicators taking into account all six PCAs, thus the final selection criterion is to have indicators that are among the top loaders in the PCAs run on both the pooled and the country-demeaned datasets.

5.1 Potential outcome indicators for foundational services

We have 14 SIWB indicators in total as potential outcomes of social services targeting children and young people. Our aim is to reduce this list to a few indicators and to test them against the dimensions pre-set by SIWB. Figure 4 shows a scree plot of Eigenvalues from the PCA, suggesting that there is a dominant general factor, a strong secondary dimension (with a clear elbow after the second component) and a weaker third one with an Eigenvalue above 1 (fulfilling the Kaiser criterion). The two components explain almost 64%, the three explain 72% of the variance. Eigenvalues are reported in Table A1 in the Appendix.

Figure 4 Scree plot of Eigenvalues after PCA of potential outcome indicators for foundational services targeting children and youth



Source: authors' calculations based on the SIWB imputed dataset covering EU27, 2011-2023 (SIWB, 2026).

We report the factor loadings from the PCA in Table 6. Component 1 seems a general factor capturing shared variance among the indicators – it explains close to 47% of the variance. It mostly captures the well-being dimension of SIWB, with disposable income, and life satisfaction standing out with a high loading (0.34). Adult learning from the sustainability dimension is also among the most influential indicators with a loading of 0.36. On the other hand, the very low loading of suicide deaths indicates that they may not correlate with socio-economic status.

Component 2 is mostly dominated by health indicators under the sustainability dimension, such as preventable mortality (0.45) and life expectancy (0.43). Suicide deaths indicator has a high loading as well (0.45). In contrast, labour market indicators, such as gender employment gap, employment rate and the NEETs rate load negatively, suggesting that health and labour market indicators of inclusive and sustainable wellbeing may not be aligned, although negative association may reflect compositional effects.

Component 3 captures health inequalities within the population, where life expectancy dispersion is the dominant indicator with a loading of 0.67. Accordingly, we may label this component as the inclusion one.

The three components with dominant indicators of well-being, sustainability and inclusion confirm the original dimensions of the SIWB dashboard, reinforcing that these dimensions are separate. Selecting one or two indicators from each dimension ensures that the reduced indicator list spans the variance structure without over-representing one of the dimensions. Overall, the strongest representatives of the major components (that are the highest absolute loaders) are disposable income, life satisfaction, adult learning participation, suicide deaths, life expectancy, preventable mortality, gender employment gap, life expectancy dispersion and tertiary education.

Table 6 Factor loadings from the PCA of potential outcome indicators for foundational services targeting children and youth

		Comp1	Comp2	Comp3
Wellbeing	AROPE	0.2886	-0.1872	-0.3714
	Employment rate	0.2657	-0.3118	-0.161
	Household disposable income	**0.3402**	0.1783	-0.03868
	Life satisfaction	**0.3426**	0.01796	-0.156
	NEETs	0.3195	-0.2754	-0.1448
	Suicide deaths	-0.04355	**0.4536**	0.1196
Inclusion	Gender employment gap	0.1816	-0.3473	**0.3802**
	Life expectancy dispersion	0.107	-0.1908	**0.6681**
Sustainability	Adult learning participation	**0.3589**	0.02333	-0.001533
	Basic digital skills	0.2948	0.1032	0.1454
	Life expectancy	0.2614	**0.4317**	0.04512
	Preventable mortality	0.2588	**0.4451**	0.07809
	Tertiary education (25-34)	0.2362	-0.03366	**0.3677**
	Underachievement in STEM/reading	0.2402	0.01033	-0.14

Source: authors' calculations based on the SIWB imputed dataset covering EU27, 2011-2023 (SIWB, 2026).

To see whether similar indicators describe the within-country fluctuations, we repeat the PCA on a country-demeaned dataset (see Table 7). Again, we arrive at a broad economic well-being factor (Component 1, capturing 40% of the variance), with employment rate, household disposable income and NEET rate as the highest loaders. Within Component 2 (explaining 12% of the variation) we see that preventable mortality and life expectancy are among the dominant indicators again. However, instead of suicide deaths, life satisfaction comes up with a high negative loading. Component 3 (capturing 8.4% of the variation) is again dominated by indicators of inclusion: the gender employment gap and the life expectancy dispersion. Overall, the dimensions of socio-economic wellbeing, sustainability and inclusion come across on the demeaned dataset as well, and we see a considerable overlap among the top loading indicators as well, suggesting that household disposable income, life satisfaction, life expectancy, preventable mortality, gender employment gap and life expectancy dispersion capture a large share of both within-country and across-country fluctuations.

Table 7 Factor loadings from the PCA of potential outcome indicators for foundational services targeting children and youth on a country-demeaned dataset

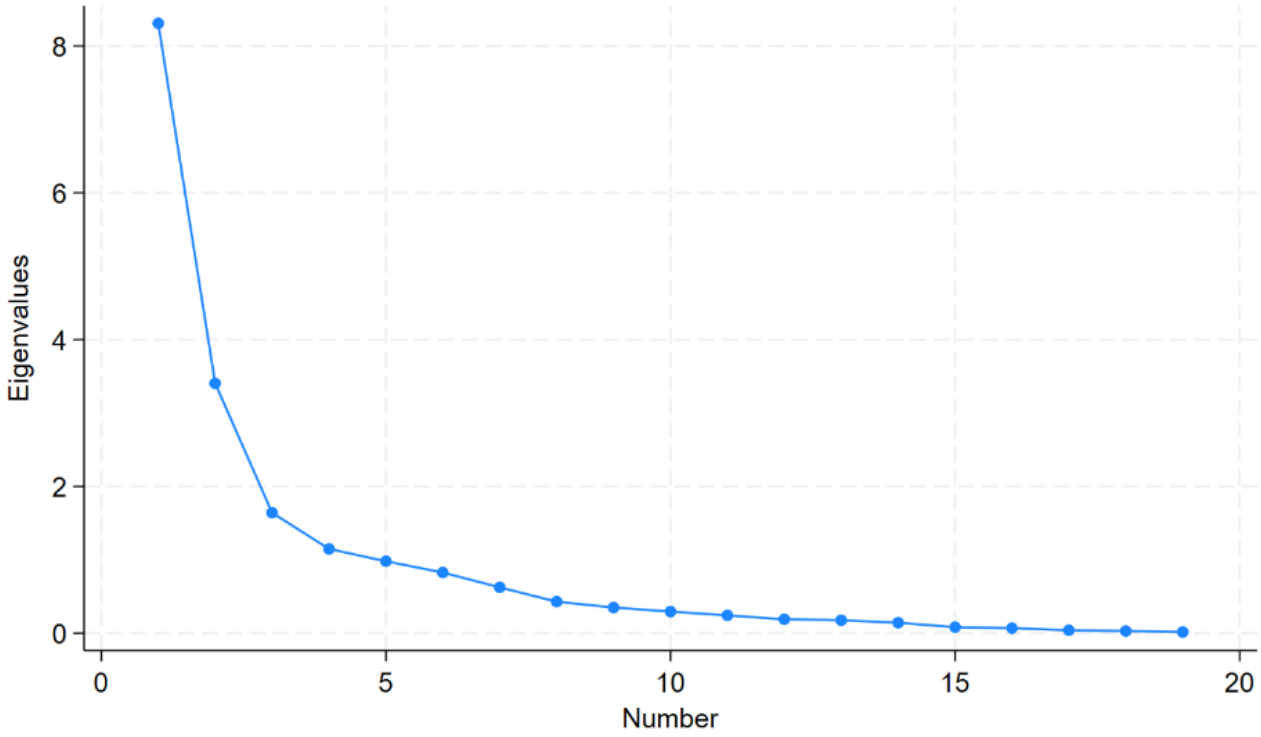
		Comp1	Comp2	Comp3
Wellbeing	AROPE	0.3282	-0.2121	0.1906
	Employment rate	**0.3894**	-0.1845	0.0261
	Household disposable income	**0.3456**	-0.0764	0.034
	Life satisfaction	0.246	**-0.4251**	-0.0814
	NEETs	**0.3464**	-0.1273	0.0484
	Suicide deaths	0.3134	-0.1329	0.1649
Inclusion	Gender employment gap	0.0996	0.3941	**-0.5316**
	Life expectancy dispersion	-0.0485	0.1571	**0.4631**
Sustainability	Adult learning participation	0.2366	0.0389	-0.0514
	Basic digital skills	0.0334	0.0077	-0.1362
	Life expectancy	0.2656	**0.4434**	0.283
	Preventable mortality	0.2249	**0.5289**	0.2796
	Tertiary education (25-34)	0.3016	0.1665	-0.2295
	Underachievement in STEM/reading	-0.2472	-0.1219	**0.4433**

Source: authors' calculations based on the SIWB imputed dataset covering EU27, 2011-2023 (SIWB, 2026).

5.2 Potential outcome indicators for social services targeting adults

When it comes to potential SIWB outcome indicators of enabling and protective social services targeting the working-age population, we have a list of 19 indicators. Looking at the scree plot of Eigenvalues we reached from the PCA, we have four components that fulfil the Kaiser criterion of being above 1. Component 1 is again a dominant general factor (explaining 44% of the variance), Component 2 is still strong (explaining around 18%), while Component 3 and 4 are weaker, explaining around 9% and 6% of the variance, respectively. In total, the four components explain 76% of the variance. Eigenvalues are reported in Table A2 in the Appendix.

Figure 5 Scree plot of Eigenvalues after PCA of potential outcome indicators for enabling services targeting working-age adults



Source: authors' calculations based on the SIWB imputed dataset covering EU27, 2011-2023 (SIWB, 2026).

Looking at the factor loading from the PCA of this broader 19-element list (considerably overlapping with the former 14-element list), we see that Component 1 is again dominated by indicators of wellbeing, life satisfaction (0.31), household disposable income (0.29), the NEETs rate (0.29) and adult learning participation (0.31) from the sustainability dimension (see Table 8).

Similarly to the previous analysis, Component 2 is dominated by health indicators from the sustainability dimension: preventable mortality (-0.42) and life expectancy (-0.39). A mental health indicator of suicide deaths from the wellbeing dimension also scores high in absolute terms (-0.38). Interestingly, the indicator of contacts with friends and family has a negative loading as well, suggesting that health outcomes and social connectedness co-vary.

Component 3 more or less replicates the inclusion dimension from the previous analysis, with the health inequality indicator of life expectancy dispersion (0.52) as the top loader, gender employment gap being the second (0.50), and income inequality (-0.30) being the third largest loader in absolute terms within inclusion-indicators. The negative sign of income inequality suggests that countries with lower income inequality tend to have a larger gender employment gap and higher health inequalities. Central and Eastern European countries with relatively low income inequality coupled by deep health inequalities and a considerable gender employment gap fit this pattern. From the sustainability dimension the old-age dependency ratio stands out (0.35).

Component 4 is clearly dominated by a single factor: housing cost overburden (0.74), indicating that housing stress is a structurally independent dimension of wellbeing and should not be reduced to disposable income and other measures of material well-being.

Overall, the strongest representatives of the four major components are disposable income, life satisfaction, adult learning participation, preventable mortality, life expectancy, life expectancy dispersion, gender employment gap, and housing cost overburden.

Table 8 Factor loadings from the PCA of potential outcome indicators for enabling services targeting working-age adults

		Comp1	Comp2	Comp3	Comp4
Wellbeing	AROPE	0.2834	0.1597	-0.2498	-0.02888
	Contacts	0.2044	-0.2411	0.2593	0.07682
	Employment rate	0.2399	0.1827	0.04106	-0.1986
	Household disposable income	**0.293**	-0.1971	-0.02022	-0.03396
	Housing cost overburden	0.1031	0.1726	-0.07594	**0.7401**
	IWP	0.2278	0.264	-0.04788	0.005199
	Life satisfaction	**0.3074**	-0.03635	-0.05072	-0.1991
	NEETs	**0.287**	0.1402	0.03555	-0.09356
	No warm home	0.2845	0.1244	-0.2374	-0.1396
	Suicide deaths	-0.06556	**-0.3794**	-0.0677	-0.2454
Inclusion	Gender employment gap	0.1646	0.1489	**0.4976**	0.2114
	Income inequality	0.2481	0.2368	**-0.3031**	-0.05187
	Life expectancy dispersion	0.08722	0.07215	**0.5192**	0.08503
Sustainability	Adult learning participation	**0.3064**	-0.1028	0.06737	0.06123
	Household debt	-0.214	0.3131	-0.1866	0.1353
	Life expectancy	0.2015	**-0.3888**	-0.1023	0.2094
	Old-age dependency	0.1402	0.2186	**0.349**	-0.3361
	Preventable mortality	0.1981	**-0.4145**	-0.04537	0.1105
	Voluntary activities	0.2728	-0.03892	-0.113	0.1763

Source: authors' calculations based on the SIWB imputed dataset covering EU27, 2011-2023 (SIWB, 2026).

Running the same PCA on the country-demeaned dataset, we see that Component 1 (explaining 34% of the variation, with an Eigenvalue of 6.37) is again capturing the socio-economic wellbeing dimension, though apart from the common household disposable income indicator as a high loader, instead of life satisfaction and adult learning participation, we have employment rate and AROPE in the top three, suggesting that life satisfaction and adult learning participation rates may capture rather the cross-country differences (see Table 9). Within Component 2 preventable mortality and life expectancy remains dominant but suicide deaths indicator

collapses to -0.02. Gender employment gap remains dominant in Component 3 but instead of life expectancy dispersion (dropping to 0.20), IWP (in-work poverty) rises as a strong indicator with a loading of 0.58. Component 4 is different from the housing-costs dominated version of the pooled dataset; household debt is the strongest indicator on the demeaned dataset.

Common dominant indicators of the PCA components based on the pooled and country-demeaned datasets are household disposable income, preventable mortality and gender employment gap.

Table 9 Factor loadings from the PCA of potential outcome indicators for enabling services targeting working-age adults on a country-demeaned dataset

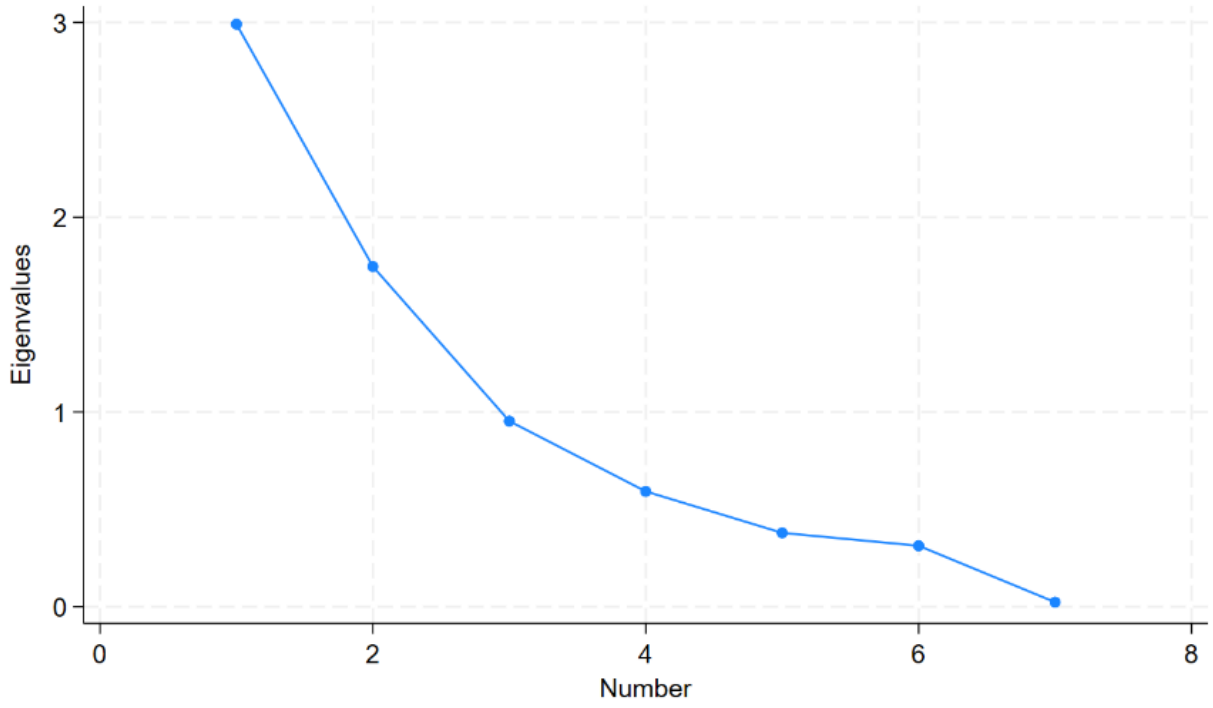
		Comp1	Comp2	Comp3	Comp4
Wellbeing	AROPE	**0.344**	-0.1327	0.0359	0.1102
	Contacts	-0.0935	0.0181	-0.3149	0.2043
	Employment rate	**0.3583**	-0.0036	-0.1297	-0.1163
	Household disposable income	**0.3276**	0.0434	0.0089	-0.0445
	Housing cost overburden	0.2981	-0.1866	0.0432	-0.1796
	IWP	0.0632	-0.1845	**0.577**	0.0689
	Life satisfaction	0.2485	-0.2838	-0.0902	-0.3002
	NEETs	**0.3269**	0.0567	-0.0881	0.0247
	No warm home	0.2143	-0.3145	-0.136	0.1247
	Suicide deaths	0.293	-0.0202	-0.116	-0.1817
Inclusion	Gender employment gap	0.0458	0.2312	**0.5504**	-0.3316
	Income inequality	0.2209	-0.1769	0.3609	0.3324
	Life expectancy dispersion	-0.0236	0.0269	0.2048	**0.4501**
Sustainability	Adult learning participation	0.2162	0.1538	0.0463	0.059
	Household debt	0.2088	0.0912	-0.0933	**0.5498**
	Life expectancy	0.2102	**0.5078**	-0.0164	0.073
	Old-age dependency	-0.1772	-0.0329	0.1168	0.0531
	Preventable mortality	0.163	**0.5602**	0.0017	-0.009
	Voluntary activities	0.0001	-0.1948	-0.0106	0.1314

Source: authors' calculations based on the SIWB imputed dataset covering EU27, 2011-2023 (SIWB, 2026).

5.3 Potential outcome indicators for protective services

The final PCA of potential outcome indicators for protective services targeting the elderly analysed a much smaller subset of SIWB indicators: 7 indicators in total that still covers the well-being, inclusion and sustainability dimensions as well. The scree plot of Eigenvalues indicate that two components are above the Kaiser threshold of 1. Component 1 explains 43% of the variance, while Component 2 explains 25%. Overall, the two dominant components explain around 68% of the variance. Eigenvalues are reported in Table A3 in the Appendix.

Figure 6 Scree plot of Eigenvalues after PCA of potential outcome indicators for protective services targeting old-age adults



Source: authors' calculations based on the SIWB imputed dataset covering EU27, 2011-2023 (SIWB, 2026).

On the reduced list of seven indicators our PCA resulted in two dimensions (see Table 10). Component 1 covers both the well-being and the sustainability dimension of SIWB. The top loaders are sustainability indicators of preventable mortality (0.54) and life expectancy (0.52), followed by the well-being indicators of social contacts (0.47) and life satisfaction (0.41). Positive loadings suggest that social connectedness, life satisfaction and health indicators move together.

Component 2 covers the inclusion dimension of SIWB: gender employment gap (0.63) and life expectancy dispersion (0.43) are dominant indicators. Deaths from suicide rate is also strong (-0.52) and its negative sign indicates that higher gender employment gap and wider health inequality are associated with lower suicide rates. The negative association may reflect compositional differences: Southern European countries with substantive informal care responsibilities of women (reflected in a wider gender employment gap) have a lower suicide rate.

Table 10 Factor loadings from the PCA of potential outcome indicators for protective services targeting old-age population

		Comp1	Comp2
Wellbeing	Contacts	**0.466**	0.163
	Life satisfaction	**0.4047**	0.1846
	Suicide deaths	0.1549	**-0.5209**
Inclusion	Gender employment gap	0.1529	**0.6342**
	Life expectancy dispersion	0.1026	**0.4316**
Sustainability	Life expectancy	**0.5214**	-0.195
	Preventable mortality	**0.5379**	-0.2037

Source: authors' calculations based on the SIWB imputed dataset covering EU27, 2011-2023 (SIWB, 2026).

Overall, the strongest representatives (that are the highest absolute loaders) of the major components are preventable mortality and life expectancy, which cover the sustainability part of Component 1, and gender employment gap from Component 2, covering the inclusion dimension.

The PCA on the country-demeaned dataset yields somewhat different results (see Table 11). From Component 1 (explaining 32% of the variation) the previously strong indicators of social contact and life satisfaction vanish, while the health indicators of life expectancy and preventable mortality remain dominant. This pattern suggests that countries with stronger social contacts tend to have better health outcomes, nevertheless, contacts and health outcomes may not co-move within a country over time. Component 2 looks different: the previously weak life satisfaction dominates while the importance of gender employment gap vanishes. Overall, the common indicators from the two PCAs are life expectancy and preventable mortality.

Table 11 Factor loadings from the PCA of potential outcome indicators for protective services targeting old-age population on a country-demeaned dataset

		Comp1	Comp2
Wellbeing	Contacts	-0.1256	0.2185
	Life satisfaction	0.2046	**-0.6682**
	Suicide deaths	0.4421	-0.423
Inclusion	Gender employment gap	0.2416	0.1916
	Life expectancy dispersion	-0.0228	0.3784
Sustainability	Life expectancy	**0.591**	0.2246
	Preventable mortality	**0.582**	0.3106

Source: authors' calculations based on the SIWB imputed dataset covering EU27, 2011-2023 (SIWB, 2026).

6. Conclusions

In our paper we used the SIWB dashboard (Benczúr et al., 2025) to identify a selection of outcome indicators beyond GDP suitable for measuring the impact of investments in social services over the life course on sustainable and inclusive well-being. Based on simple logic models we identified plausible direct and indirect outcome indicators for foundational, enabling, and protective services. Then, in a second step we applied a principal component analysis (PCA) to further streamline the list of indicators to those that capture the most variance within the selected indicators in EU-27 throughout 2011-2023.

The PCA yielded a shortlist of 6 core indicators when measuring the outcomes of foundational, enabling and protective social services over the life-course that mirror the original conceptual framework of SIWB and cover indicators of well-being, inclusion and sustainability: household disposable income, life satisfaction, life expectancy, preventable mortality, life expectancy dispersion and gender employment gap, summarized in Table 12. From the well-being indicators, household disposable income and life satisfaction cover both the material and subjective or mental aspects of wellbeing. Life expectancy and its dispersion are both among the selected core indicators, underlining the importance of both the level and the distribution of health outcomes when it comes to inclusive well-being.

Table 12 Shortlist of SIWB indicators yielded by the PCA

SIWB dimension	SIWB indicators - outcomes	Social services - inputs
Wellbeing	Household disposable income	ALMPs, Social protection and income support
	Life satisfaction	Healthcare services
Inclusion	Gender employment gap	ECEC, educational investments, work-life balance policies
	Life expectancy dispersion	Healthcare services throughout the life-course
Sustainability	Life expectancy	Healthcare services
	Preventable mortality	Healthcare services

There are several limitations of our study. First, the theory-of-change models are broad and simplified as we assess social service categories without institutional context, in later empirical studies of actual social service investments a careful analysis of the mechanisms and causal pathways should precede the selection of outcome indicators. Second, the PCA analysis captures variation across EU-27 countries between 2011-2023, thus some of the variation is due to differences across welfare regimes and socio-economic contexts and not due to within-country changes. Accordingly, a plausible theory of change model should be the principal guide when selecting outcome measures. Third, long-term and intergenerational impacts of social service investments remain hard to measure based on the SIWB dataset, nevertheless the indicators may be included in modelling exercises, which leads us to possible next steps. Finally, measures of environmental sustainability are missing from the analysis due to the complexities and uncertainties of linkages between social services investments and measures of planetary boundaries. Nevertheless, environmental sustainability remains crucial and a cornerstone of sustainable and inclusive wellbeing. Net greenhouse gas emissions and circular material use rate are among the SIWB indicators that agent-based models may be able to capture.

The aim of the report was to support the macro agent-based modelling exercises that follow in subsequent SWINS tasks. Household disposable income and gender employment gap may serve as genuinely endogenous macro-outcomes in the MABM. Social service investments (e.g. in childcare services) feed into labour supply decisions that directly impact household income. Gender employment gap may also be an endogenous macro-outcome, in case the model is able to differentiate labour supply behaviour across genders (e.g. via explicit modelling of childcare-service availability affecting mothers' participation). Otherwise, life

expectancy, preventable mortality, life expectancy dispersion and life satisfaction could serve as contextual (exogenous or ‘satellite’) outcomes that rely on applying external trends (e.g. epidemiological trends). The socio-economic gradient needed to assess life expectancy dispersion is often imposed based on existing external parameters in the literature. Life satisfaction is not endogenous either as it is not an output of standard economic behaviour modelled by MABMs.

These potentially endogenous and contextual outcome indicators aim to serve as inspiration – and certainly not a prescription – to represent the well-being, inclusion and sustainability dimensions in the MABMs, in order to assess both potential reinforcements and trade-offs between these dimensions when assessing the impact of social service investments on the selected outcome measures.

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Appendix

Table A1 Eigenvalues for the PCA of potential outcome indicators of foundational services targeting children and youth

Component	Eigenvalue	Proportion	Cumulative
Comp1	6.54211	0.4673	0.4673
Comp2	2.38086	0.1701	0.6374
Comp3	1.17071	0.0836	0.721
Comp4	0.972624	0.0695	0.7905
Comp5	0.794777	0.0568	0.8472
Comp6	0.571111	0.0408	0.888
Comp7	0.45489	0.0325	0.9205
Comp8	0.338892	0.0242	0.9447
Comp9	0.290954	0.0208	0.9655
Comp10	0.187997	0.0134	0.9789
Comp11	0.146163	0.0104	0.9894
Comp12	0.0789054	0.0056	0.995
Comp13	0.0455993	0.0033	0.9983
Comp14	0.024401	0.0017	1

Source: authors' calculations based on the SIWB imputed dataset covering EU27, 2011-2023.

Table A2 Eigenvalues for the PCA of potential outcome indicators of enabling services targeting working-age adults

	Eigenvalue	Proportion	Cumulative
Comp1	8.30748	0.4372	0.4372
Comp2	3.40403	0.1792	0.6164
Comp3	1.64121	0.0864	0.7028
Comp4	1.14839	0.0604	0.7632
Comp5	0.980575	0.0516	0.8148
Comp6	0.826556	0.0435	0.8583
Comp7	0.624838	0.0329	0.8912
Comp8	0.429629	0.0226	0.9138
Comp9	0.349484	0.0184	0.9322
Comp10	0.295524	0.0156	0.9478
Comp11	0.243072	0.0128	0.9606
Comp12	0.18952	0.01	0.9705
Comp13	0.177424	0.0093	0.9799
Comp14	0.143419	0.0075	0.9874
Comp15	0.082237	0.0043	0.9918
Comp16	0.069169	0.0036	0.9954
Comp17	0.040409	0.0021	0.9975
Comp18	0.030063	0.0016	0.9991
Comp19	0.016973	0.0009	1

Source: authors' calculations based on the SIWB imputed dataset covering EU27, 2011-2023.

Table A3 Eigenvalues for the PCA of potential outcome indicators of protective services targeting the elderly

Component	Eigenvalue	Proportion	Cumulative
Comp1	2.99093	0.4273	0.4273
Comp2	1.74671	0.2495	0.6768
Comp3	0.953415	0.1362	0.813
Comp4	0.592294	0.0846	0.8976
Comp5	0.379432	0.0542	0.9518
Comp6	0.31341	0.0448	0.9966
Comp7	0.0238063	0.0034	1

Source: authors' calculations based on the SIWB imputed dataset covering EU27, 2011-2023.

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