

D3.1 Report on mapping indicators and composite indices relevant to measure transition performances

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Disclaimer

This Report 3.1 for the project SPES has been prepared by the TÁRKI and University of Florence as part of Task 3.1 “Mapping individual indicators and composite indices that might be relevant for measuring transition performances” / Work Package 3. This task has allowed SPES research partners to provide an overview of (i) indicator selection practices of existing measurement frameworks and of (ii) indicators that might be relevant to be included in a new dashboard structured according the four pillars of sustainable human development and are suitable to serve as individual items for a composite index.

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Abstract

This report aims to provide an updated mapping and assessment of available indicator sets and composite indices that are relevant to measure transition performances in Europe and across the world. This is meant to inform in-depth analytical and conceptual work on the dimensions of sustainable human development (i.e., productivity, equity, environmental sustainability, participation & empowerment, human security) and their interrelations within the [SPES project](#) and similar research projects.

First, the overarching conceptual framework of sustainable human development is explained. Then we present the outcome of the mapping and assessment exercise of 44 available indicator sets and composite indices that are widely used to measure transition performances in Europe and across the world (with full details in [Annex I](#)). On the basis of this mapping exercise, we present how we made a selection of 15 indicator frameworks using our assessment criteria. A more in-depth analytical assessment of the specific indicators and data infrastructure of these 15 short-listed indicator frameworks follows, with an overview provided in this report (with full details in [Annex II](#)). This in-depth assessment provides an overview of (i) indicator selection practices of existing measurement frameworks and of (ii) indicators that might be relevant to be included in a new dashboard structured according to the concept of sustainable human development and are suitable to serve as individual items for a composite index. In methodological terms, the analysis builds on desk research using secondary data sources.

1. Introduction

In social sciences, the accurate measurement of observations is one of the most intricate problems to be addressed. Indeed, establishing quantitative methods and units of measurement of social phenomena is often a difficult challenge for researchers and policymakers (Stockemer et al., 2019). Sustainable development issues are no exception. In light of their complex and interrelated structure, both the socio-economic and environmental dimensions of sustainability are difficult to capture in universally recognised metric (Popovic et al., 2018; Camana et al., 2021, Rieger et al. 2023). Nevertheless, the relevance of the topic of sustainability in recent decades has led to an increasing focus by academics and experts in the field on finding the most appropriate indicators and composite indices.

One of the main driving forces behind this search for new sustainable development indicators has been the need to develop novel global measurement systems alternate to GDP, which is no longer able to accurately capture the state of social, economic and environmental development of specific geographical areas (Fleurbaey & Blanchet, 2013; Costanza et al., 2014; Hoekstra, 2019; European Commission, 2023). For example, the Stiglitz-Sen-Fitoussi Commission report, released in 2009, aimed to redefine how we measure economic and social progress beyond traditional metrics like GDP. Its main message revolves around the need to adopt a more holistic and comprehensive approach to assessing well-being and societal development. Instead of solely relying on economic indicators, the report emphasized the importance of incorporating a broader set of factors such as health, education, environmental sustainability, and social inclusion into our measurement framework (Stiglitz et al., 2009). A similar perspective is offered by "*Valuing What Counts: United Nations System-wide Contribution on Beyond Gross Domestic Product (GDP)*", the new High-Level Committee on Programmes (HLCP) Core Group on Beyond GDP of the United Nations, that is an initiative that extends beyond the traditional measurement of economic growth, emphasizing the importance of considering a broader set of factors when assessing societal progress and well-being (United Nations, 2023). The report calls for a paradigm shift towards a more holistic and people-centered approach, urging governments to consider alternative indicators.

It is within this framework, for example, that the UN General Assembly has proposed the UN Sustainable Development Goals (SDGs) framework, the well-known set of 17 interrelated global goals with the associated 169 targets and 232 indicators, in its Agenda 2030. As suggested by Costanza et al. (2016), the SDGs framework includes some relevant aspects that have emerged in the debate on alternative measurements to GDP and, contextually, on the inclusion of proxies for community well-being and ecosystem protection within sustainable development indicators. At the same time, key elements such as individual freedom or the systemic integration of social and environmental aspects have sometimes appeared neglected by the large number of Agenda 2030 targets and indicators (Biggeri & Mauro, 2018).

The explosion in recent years in the number of indicators and composite indices on one or more dimensions of sustainable development testifies to the widespread need to include further elements in the pre-existing indicators. Examples can be numerous: the Human Development Index (HDI) and

its successive adjustments for the effective measurement of human advancements; the SDG Index and Dashboard, namely the global assessment of countries' progress towards the SDGs; the Social Progress Index (SPI) that assesses social and environmental outcomes to gauge overall well-being and sustainability; OECD Green Growth Indicators to evaluate the countries' performance in terms of ecological commitment; the Environmental Performance Index (EPI) that measures a country's environmental performance based on indicators related to environmental health, ecosystem vitality, and environmental policy; the Ecological Footprint that measures a country's impact on the environment by quantifying its resource consumption and waste generation in comparison to available resources; Global Sustainable Competitiveness Index (GSCI) that evaluates the competitiveness of nations while accounting for their sustainability performance (Saisana et al., 2022); the Environmental Democracy Index (EDI) that assesses the state of environmental democracy and governance in a country; the Transition Performance Index (TPI) that quantifies the effectiveness and efficiency of a country in managing significant changes, assessing its ability to adapt, plan, and execute strategic shifts to fair sustainability.

In line with this trend, the Directorate-General for Research and Innovation (DG RTD) of the European Commission also published a report on "Beyond GDP" metrics in January 2023 entitled *"Developing alternative visions for assessing progress to sustainable development 'Beyond GDP' – Constructing new measurement indicator sets"* (European Commission, 2023). In the report, the authors propose two alternative versions of a new 'Beyond GDP-Sustainable Development Index' that, in addition to GDP as metric of economic development, comprise indicators of climate neutrality, health, human capital, quality of life. There is also a proposal for a third alternative, a sensitivity test of one of these indices, where GDP is completely omitted.

Several of these initiatives mentioned above will be analysed in this report. The aim of this work is to provide an overview of existing measurement frameworks for sustainable development, in order to guide both policymakers and scholars in the selection and use of the most appropriate framework according to policy scope and research needs. Moreover, such mapping would serve the implementation of the SPES project to understand what indicator frameworks should be used for different phenomena and what individual indicators are relevant to be included in a new dashboard structured according to the pillars of Sustainable Human Development (see [D2.1 SPES Framework](#)) and are suitable to serve as individual items for a new composite index, if necessary.

2. Conceptual Framework

The main theoretical framework underlying this indicator mapping refers to the Sustainable Human Development (SHD) paradigm, as elaborated in the SPES project Working Paper entitled “The *winds of change*: the SPES framework on sustainable human development”.

Sustainable Development (SD) and Human Development (HD) are two prominent paradigms that have shaped the discourse on inclusive and sustainable development over the last decades, steering them away from exclusive emphasis on economic growth towards comprehensive well-being for both humanity and the environment. SD, originating from the 1987 Brundtland Report, advocates for development that satisfies current needs without compromising the ability of future generations to meet their own needs. It emphasizes the interplay between environmental, economic, and social facets, challenging conventional growth theories. In this regard, Ecological Economics (EE) introduced concepts like irreversibility, non-commensurability, qualitative change, and the scarcity of low entropy, broadening the SD paradigm (Daly, Cobb and Cobb, 1994). This led to its widespread adoption by global institutions and the establishment of Sustainable Development Goals (SDGs) within the 2030 Agenda, with its 5Ps, namely People, Prosperity, Planet, Partnership, and Peace (Figure 1), as pivotal action areas (UN, 2015).

2030 Agenda and its 5Ps as critical areas of action

People: ensuring social inclusion, equity, and well-being for all individuals.

Prosperity: guiding economic growth, job creation, and sustainable livelihoods that promotes social and environmental sustainability.

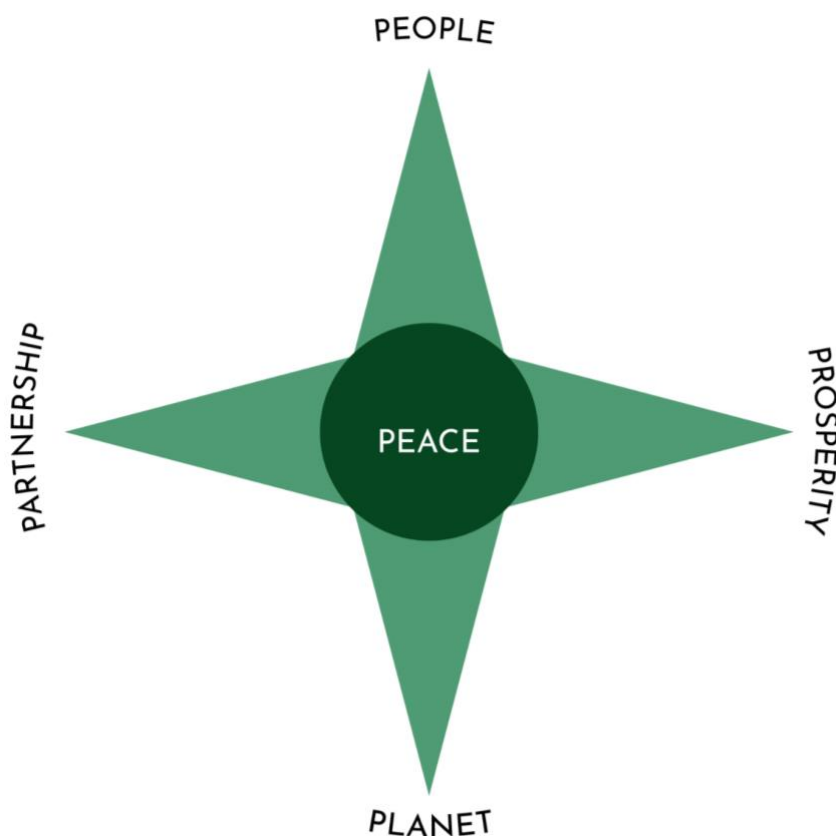
Planet: protecting the environment for current and future generations.

Partnership: promoting collaboration among the various actors in governments, the private sector, civil society, and international organizations.

Peace: supporting peace, justice, and strong institutions as a prerequisite for enabling SD.

The HD paradigm, pioneered by Mahbub ul Haq and the UNDP (1990), places people at the core of development. It draws inspiration from Amartya Sen's Capability Approach (CA) and basic needs theory. Unlike traditional models fixated on economic growth, HD shifts the focus to enhancing individuals' capabilities and well-being, focusing on four pillars at an equal basis - i.e., productivity, equity, sustainability, and participation & empowerment - thus providing a multi-dimensional framework for development.

Figure 1. Graphical representation of 5Ps as critical areas of action



Source: Biggeri et al. (2023)

In our SPES framework, we slightly reinterpret the original four pillars of the human development paradigm, to better dialogue with 5 Ps of sustainable development, and we add a new pillar to take into account for the role of social relations, stability, and peace: the notion of human security. Taken together, the 5 pillars of SHD represent a novel contribution of our SPES framework in the academic and policy debate (Figure 2).

SHD five pillars brief definition

Productivity: the efficient use of economic, human and natural resources for the provision of goods and services, expanding human capabilities and increasing the standards of living for all.

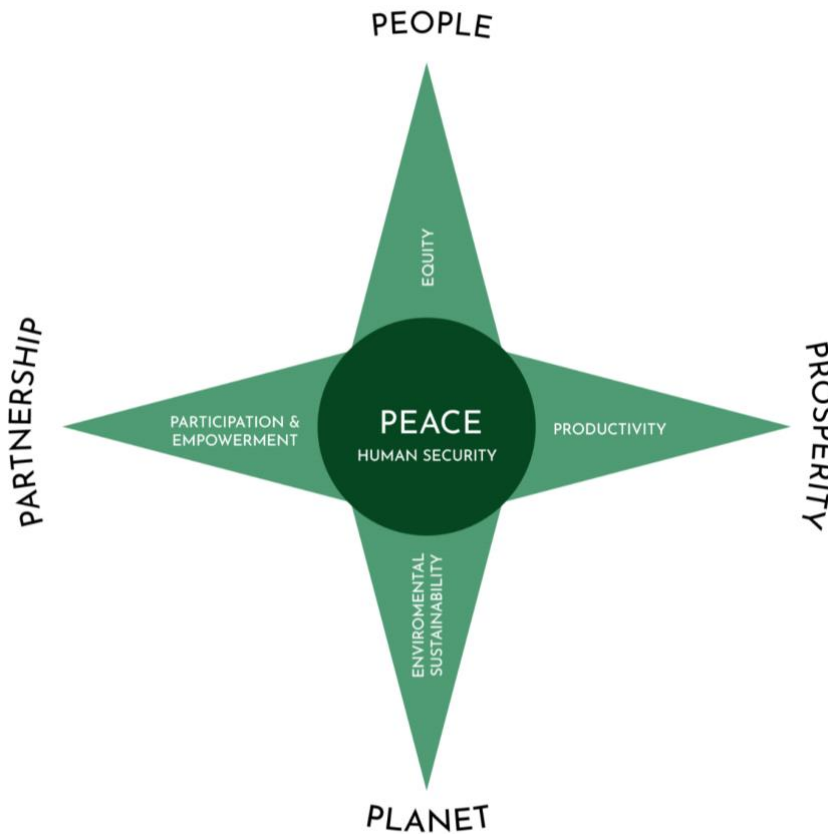
Equity: ensuring equitable access to economic, political, social and cultural opportunities for all.

Environmental sustainability: the practice of responsibly managing and preserving natural resources and ecosystems, ensuring a balance between current and future people's well-being.

Participation and empowerment: enabling individuals and communities to be active agents of their own future, by ensuring a level playing field for the societal engagement of citizens and stakeholders.

Human security: the sum of capabilities "freedom from want, freedom from fear, and freedom to live with dignity".

Figure 2. Graphical representation of the dialogue between 5 Ps and the 5 pillars of SGD



Source: Biggeri et al. (2023)

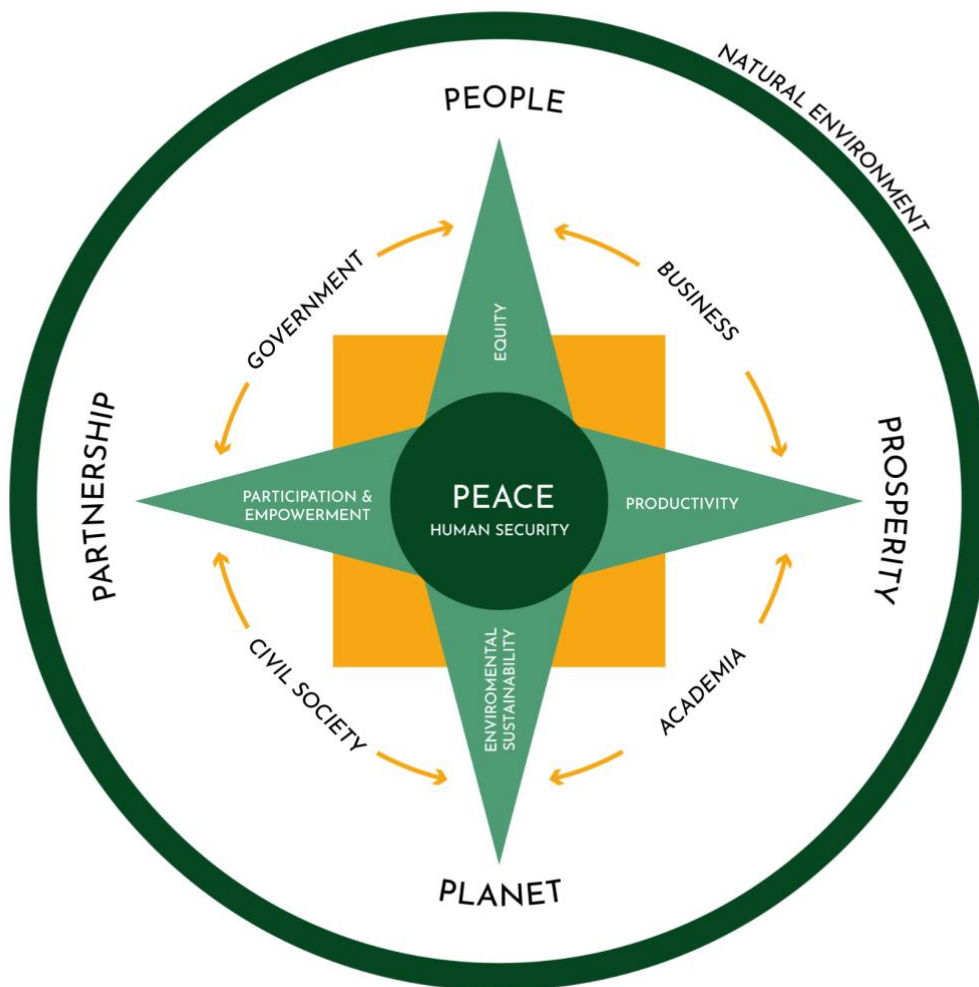
All in all, the SPES framework seeks to reconcile these paradigms and their associated theoretical approaches. We propose that government interventions, at all levels, should prioritize human lives and societal sustainability across the five areas of the 2030 Agenda: Planet, People, Prosperity, Peace, and Partnership. It acknowledges that economic growth does not inherently benefit everyone, as evidenced by the climate crisis and global inequality. Consequently, policy interventions should follow a SHD perspective, promoting its five pillars at the same time.

In this regard, the SPES framework underscores the importance of the several stakeholders that are active participants of SHD. Through the lens of the Quintuple Helix model (Carayannis & Campbell, 2010), we identified five different actors: government, business, academia, civil society, and the natural environment. Government corresponds to regional, national, and international institutions, while business is the firms and industries subsystem; the academia represents universities and research centers, whereas civil society incorporates people's organization and communities; natural environment is also seen as an actor with voice, rights and interests, standing for the ecosystem (e.g., plants, animals, other natural resources). According to this model, these five subsystems

represent the foundations of global society, and they experience complex and dynamic interactions that could influence the transition process towards SHD.

Therefore, the five helixes – namely, government, business, academia, civil society, natural environment – entail the dynamic role of human actors for all pillars and in all areas of action, along with the overarching role of the natural environment (Figure 3).

Figure 3. The SPES framework on Sustainable Human Development



Source: Biggeri et al. (2023)

3. Overview of relevant existing measurement frameworks

As the first step, we selected a list of indicator systems measuring progress and sustainable development. We gathered a list of metrics from Biggeri & Mauro (2018), Biggeri et al. (2019), Gábos et al. (2021), European Commission (2023), and selecting them based on their relevance in policy-making and scientific research, building also on the JRC Composite Indicators and Scoreboards in the dedicated section of the European Commission website, as well as the expertise of the consortium.

The 44 selected composite indexes and indicators were then examined in detail, reporting for each of them the following information: Title, Organisation, Journal/report/handbook, Year of publication, Link, Objective, Practical use, Academic use, Theoretical framework, Unit of analysis, SDGs link, Dimensions, Indicators, Criteria for selection of dimensions, Source(s) of Data, Data year or years, Countries selected, Measurable at sub-national level, Time comparability, Country comparability. We will present these indicators in Section 3.1 below.

As the second step, we selected a list of 15 indicator systems (short list), based on a set of criteria, using the information we collected. We explain the selection criteria and present them in detail in Section 3.2. All the indicator framework on the short list are composite indices.

3.1. The long list of indicator systems

3.1.1 Overview

Our long list includes the following indices or dashboards:

1. ASviS Composite Index
2. Bertelsmann Stiftung's Transformation Index
3. "Beyond GDP" Sustainable Development Index
4. Competitive Sustainability Index
5. Digital Economy and Society Index
6. Ecological footprint
7. Environmental Performance Index
8. Equitable and sustainable well-being
9. EU Regional Human Development Index
10. EU Social Progress Index
11. EU SDG indicator set
12. European Quality of Government Index

13. European Social Rights Indicator
14. Gender Equality Index
15. Genuine Progress Indicator
16. Global Competitiveness Index
17. Global Innovation Index
18. Global Multidimensional Poverty Index
19. Global Sustainable Competitiveness Index
20. Green Growth Index
21. Gross National Happiness Index
22. Happy Planet Index
23. Human Development Index
24. Human Freedom Index
25. Inequality-adjusted Human Development Index
26. Just Transition Score
27. Legatum Prosperity Index
28. Macroeconomic Imbalance Procedure Scoreboard
29. Notre Dame-Global Adaptation Country Index
30. OECD Better Life Index
31. OECD Green Growth Indicators
32. OECD Regional Well-being
33. Planetary Pressure-adjusted Human Development Index
34. Resilience Dashboards - Synthetic Indices
35. Social Progress Index
36. Social Scoreboard
37. Statistics for the European Green Deal
38. Subnational Human Development Index
39. Sustainable Development Goals Index and Dashboards
40. Sustainable Development Index
41. Sustainable Human Development Index
42. Sustainable Society Index
43. The Green Future Index
44. Transition Performance Index

We collected information on the geographical coverage, time coverage, data sources, and also assessed individually whether the specific indicator system addresses the four key dimensions of Sustainable Human Development (productivity, equity, environmental sustainability, participation & empowerment) (see Table 1 for an overview). The new fifth pillar - i.e., human security - was not yet taken into consideration here, as its definition and measurement is new in the debate.¹ In our assessment of the indicator systems, we used a broad approach, and classified indicators that measure a particular dimension both directly and indirectly. Furthermore, we did not assess the quality or depth of how a particular pillar of SHD is covered by the indicator system (incl. whether there were several indicators or just one). In the case of the equity pillar, we acknowledged the presence of social outcome indicators, such as life expectancy, education enrolment, poverty incidence, including cases when the particular indicator measured national average only, rather than social disparities. In the case of the participation pillar, we marked good governance or the share

¹ In this regard, UNDP (2022a) introduces the *Index of Perceived Human Insecurity* based on waves 6 (2010-2016) and waves 7 (2017-2020) of the World Values Survey, and computed for 74 countries and territories. It combines 17 variables covering insecurities from violent conflict, socioeconomic insecurities and insecurities at the personal and community levels. See also: <https://hs.hdr.undp.org/pdf/srhs2022.pdf>

seats in Parliament by women as proxies for participation, which may be regarded as incomplete measures of participation as understood in the conceptual framework. In addition, we found that there are few individual indicators addressing participation directly. We noted the specific cases in Table 1, when the coverage of a particular pillar appears to be partial only. Overall, we found that only 11 out of 44 indicators cover all four pillars of Sustainable Human Development.

Furthermore, we also collected information on the objective of each indicator system, their practical use, academic use, theoretical framework, unit of analysis (e.g., country, region), SDGs link, dimensions, selection criteria of these dimensions, the specific individual indicators included in the index or the scoreboard, source(s) of data, data year(s), countries selected, as well as the time comparability and the country comparability. We also refer to the organization that created the specific indicator system, and link to the reports that present the most recent figures.

The detailed results are available in [Annex I. 'Description of relevant existing indicator frameworks](#) in Excel file format.

Table 1. Overview of main indicator frameworks and links with SHD

N°	Name (Alphabetical order)	Short name	Geographical coverage	Time coverage	Source(s) of Data	SHD Pillars				Index or dashboard
						Productivity	Equity	Environmental Sustainability	Participation & empowerment	
1	ASviS Composite Index	ASviS CI	EU MS	2010-2021	Eurostat Database, Council of Europe European Commission for the efficiency of justice (CEPEJ)	x	x	x	x (institutions)	index
2	Bertelsmann Stiftung's Transformation Index	BTI	137 countries (excludes all OECD countries)	2006-2022	qualitative expert survey	x	x	x	x	index
3	"Beyond GDP" Sustainable Development Index (ongoing)	"Beyond GDP"	EU-27 (+ Iceland, Norway, UK, Switzerland and others)	2011-2020	Eurostat, Gallup World Poll, EEA, UNEP	x	x	x		index
4	Competitive Sustainability Index	CSI	27 EU MS	2022 (based on most recent data within the period 2015–2021 for each MS)	Eurostat, ECB	x	x	x		index
5	Digital Economy and Society Index	DESI	EU MS	2014-2022	Eurostat Database, other survey, admin and business data	x (integration of DT dimension)	x (HC dimension)			index
6	Ecological footprint	EF	more than 200 UN MS	1961-2022	UN National Footprint accounts			x		index and dashboard
7	Environmental Performance Index	EPI	180 countries	1995-2019	various			x		index
8	Equitable and sustainable well-being	BES - Istat	1 country (Italy, regions)	2005-2021	various	x	x	x	x	dashboard only

N°	Name (Alphabetical order)	Short name	Geographical coverage	Time coverage	Source(s) of Data	SHD Pillars				Index or dashboard
						Productivity	Equity	Environmental Sustainability	Participation & empowerment	
9	EU Regional Human Development Index	EU-RHDI	EU MS	2006-2012	Eurostat database	x	x			index
10	EU Social Progress Index	EU SPI	EU MS, NUTS2 level	2016, 2020	mainly Eurostat database		x	x	x	index
11	EU SDG indicator set	EU SDG	EU MS	2017-2022/2023	various, Eurostat SDG indicators set	x	x	x	x (institutions)	dashboard only
12	European Quality of Government Index	EQGI	all 27 EU MS, the UK before Brexit and two accession countries	latest release: 2021, earlier rounds: 2010, 2013, 2017	population survey (total of 129,000 respondents in 208 NUTS 1 and NUTS 2 regions and all EU 27 MS)		x (equal treatment)			index
13	European Social Rights Indicator (EUROSHIP)	ESRI	EU MS	2004-2022	Eurostat database		x			dashboard only
14	Gender Inequality Index	GII	191 UN countries and territories	2010-2022	various (WHO, UNICEF, OECD, ILO, etc.)		x		x (seats in Parliament)	index
15	Genuine Progress Indicator	GPI	various countries and regions (by different authors)	1950-2022 (varies depending on country and authors) For EU15: 1995-2018	various	x	x	x	x	index
16	Global Competitiveness Index	GCI	141 countries (2019)	1979-2019	national authorities, international agencies (World Bank, IMF, Economic Forum, UNESCO, WTO, etc.), and private sources	x	x (skills, health)			index

N°	Name (Alphabetical order)	Short name	Geographical coverage	Time coverage	Source(s) of Data	SHD Pillars				Index or dashboard
						Productivity	Equity	Environmental Sustainability	Participation & empowerment	
17	Global Innovation Index	GII	132 countries	2007-2022	subjective and objective data derived from several sources, including the International Telecommunication Union, the World Bank and the World Economic Forum	x	x	x	x (political environment)	index
18	Global Multidimensional Poverty Index	MPI	111 developing countries	2011-2022	various		x			index
19	Global Sustainable Competitiveness Index	GSCI	180 countries (2022)	2012-2021 (Latest release)	World Bank, the IMF, and various UN agencies	x	x	x	x (governance performance)	index
20	Green Growth Index	GGI	186 countries	2010-2021	various	x	x	x		index
21	Gross National Happiness Index	GNHI	Bhutan, US (various states), Canada (Victoria, British Columbia), Thailand, the Philippines	2008, 2010, 2015 (in Bhutan)	national population survey	x	x	x	x	index
22	Happy Planet Index	HPI	153 countries	2006-2020	Gallup World Poll, UNDP, Global Footprint Network			x		index

N°	Name (Alphabetical order)	Short name	Geographical coverage	Time coverage	Source(s) of Data	SHD Pillars				Index or dashboard
						Productivity	Equity	Environmental Sustainability	Participation & empowerment	
23	Human Development Index	HDI	191 United Nations MS	latest data (2022) => Historical HDI measure of human development from 1870 onwards	UNDP global databases	x	x			index
24	Human Freedom Index	HFI	165 countries	2000-2020	various (World Justice Project, V-Dem Institute, Freedom House, University of Mariland, OECD, UNICEF, IMF, World Bank, World Economic Forum, etc.)		x		x	index
25	Inequality-adjusted Human Development Index	IA-HDI	191 countries	2010-2021	various	x	x			index
26	Just Transition Score	JTS	158 countries	2011-2022	Our World in Data, Climate Watch, Eora Global Supply Chain Database		x	x	x	index
27	Legatum Prosperity Index		167 countries (99.4% of world population)	2007-2022	various (BTI, Gallup, OECD, UN, WVS and many others)	x	x	x	x	index
28	Macroeconomic Imbalance Procedure Scoreboard	MIP	27 EU MS	1995 - 2021	Eurostat (NA; BoP; IIP; FA; EDP / GFS; LFS)	x	x			dashboard only

N°	Name (Alphabetical order)	Short name	Geographical coverage	Time coverage	Source(s) of Data	SHD Pillars				Index or dashboard
						Productivity	Equity	Environmental Sustainability	Participation & empowerment	
29	Notre Dame-Global Adaptation Country Index	ND-GAIN	192 countries	2001-2020	various (Earth System Grid Federation, World Bank, FAOSTAT, WDI, World Resource Institute, AQASTAT, etc.)		x	x	x (governance)	index
30	OECD Better Life Index	OECD BLI	38 OECD countries, plus Brazil, Russia and South Africa	latest data (2020)	various	x	x	x	x	index
31	OECD Green Growth Indicators	OECD GGI	mainly OECD countries, 46 countries in total	latest data (2017, 2014, 2011)	various	x	x	x		dashboard only
32	OECD Regional Well-being	OECD RWB	38 OECD countries, 447(395) OECD regions	last available year: 2016-2021, first year: 2006-2010	various	x	x	x	x	dashboard only
33	Planetary Pressure-adjusted Human Development Index	PPA-HDI	156 countries	2019-2021	Global Carbon Project, UNEP, plus same as for HDI	x	x	x		index
34	Resilience Dashboards - Synthetic Indices	RD-SI	42 countries (EU27, plus selected countries outside the EU)	2007-2020	Primarily Eurostat, and also: European Environmental Agency, other European institutes, ECB, OECD, World Bank, UN, etc.	x	x	x	x	dashboard and indices
35	Social Progress Index	SPI	169 countries	2011,207, 2022	various		x	x	x	index

N°	Name (Alphabetical order)	Short name	Geographical coverage	Time coverage	Source(s) of Data	SHD Pillars				Index or dashboard
						Productivity	Equity	Environmental Sustainability	Participation & empowerment	
36	Social Scoreboard	EU SSC	EU MS	2004-2022	Eurostat database		x			dashboard only
37	Statistics for the European Green Deal	EU GD	30 countries (EU MS and EFTA countries)	1985 - 2021	Eurostat	x	x	x	x	dashboard only
38	Subnational Human Development Index	SN HDI	187 countries, 1787 sub-national regions		statistical offices and from the Area Database of the Global Data Lab, which contains indicators aggregated from household surveys and census datasets	x	x	x	x	index
39	Sustainable Development Goals Index and Dashboards	SDG	166 countries	2000-2023	various	x	x	x	x	index and dashboard
40	Sustainable Development Index	SDI	165 countries	1990-2019	UNDP, UN International Resource Panel Global Material Flows database, Eora MRIO database	x	x	x		index
41	Sustainable Human Development Index	SHDI	sample of 50 countries	2013	World Bank, Freedom House, UNDP	x	x	x	x	index
42	Sustainable Society Index	SSI	213 countries	2000-2020	various	x	x	x		index

N°	Name (Alphabetical order)	Short name	Geographical coverage	Time coverage	Source(s) of Data	SHD Pillars				Index or dashboard
						Productivity	Equity	Environmental Sustainability	Participation & empowerment	
43	The Green Future Index	GFI	76 nations and territories (representing about 95% of global GDP)	2021-2022 (overall index), longer time series for specific indicators	International Energy Agency (IEA), the International Renewable Energy Agency, the World Bank, the United Nations Food and Agriculture Association (FAO), the World Intellectual Property Organization, and the Climate Action Tracker (CAT), etc.	x		x		index
44	Transitions Performance Index	EU TPI	72 countries, incl. EU MS	2011-2021	various	x	x	x	x (governance)	index

Notes: MS=Member States. * the UK before Brexit and 2 accession countries (Serbia and Turkey are also included in the 2013 round).

Source: Authors' elaboration

3.1.2 Relevance to the SDGs

There is a significant diversity with respect to how the specific indicator systems are related to the Sustainable Development Goals (see Table 2). The EU SDG indicator set aims to monitor progress with respect to SDGs. Some other indices, such as the ASviS Composite Index (ASviS, 2022), Sustainable Human Development Index, the EU "Beyond GDP" Sustainable Development Index, have direct links to numerous SDGs. In contrast, many indices have no direct link to SDGs in the sense that they do not monitor them or apply specific SDG target indicators, but at the same time these indices can be linked to the aims of certain SDGs. We explored and noted these indirect links where we could establish their existence. Many indicator systems, especially those that are related to all the four pillars of the SHD, cover several sustainable development goals. Among these, we can list the Competitive Sustainability Index, the Equitable and sustainable well-being, the Legatum Prosperity Index, the Notre Dame-Global Adaptation Country Index, the OECD Better Life Index, the Resilience Dashboard, or the Transition Performance Index (e.g., Legatum Institute, 2023, Schmidt-Traub et al., 2017).

From the point of view of our conceptual framework of sustainable human development, we noted that indicator systems that are exclusively linked to Goal 8 (Decent Work and Economic Growth) do not manage to move "beyond GDP". In other words, they focus on the "productivity" pillar only, and fail to address key further pillars of equity, sustainability and participation that we regard essential from our conceptual point of view. We thus did not include any such indicator system in our short-list.

Table 2. Indicator frameworks and their link to the SDGs

	Name	Link to SDGs
1	ASviS Composite Index	Direct link, covers all 17 SDG goals
2	Bertelsmann Stiftung's Transformation Index	Strong link to goal 16, but also with goals 8 and 10
3	"Beyond GDP" Sustainable Development Index (not final, currently 2+1 alternatives)	Links to goals 3, 5, 7, 8, 10, 11, 12, including target 3.9 (substantial reduction of health impacts from hazardous substances), SDG 11.6 (reduction of adverse impacts of cities on people).
4	Competitive Sustainability Index	Strong links to goals 1, 3, 4, 5, 7, 8, 9, 10, 13, 16
5	Digital Economy and Society Index	Links to goals 4, 5, 8, 9
6	Ecological footprint	Strong links to goals 6, 12, 13, 14, 15, and links to goals 7, 11
7	Environmental Performance Index	The EPI offers a policy tool in support of efforts to meet the targets of the SDGs.
8	Equitable and sustainable well-being	Links to several goals: 3, 4, 5, 6, 7, 8, 9, 11, 13, 16, 17
9	EU Regional Human Development Index	Links to goals 3, 4, 8, 10
10	EU Social Progress Index	Links to goals: 2, 3, 4, 6, 11, 14, 15
11	EU SDG indicator set	Direct link, aims to cover all 17 goals. The main objective is to monitor the EU's delivery on the 2030 Agenda, and its effort to meet the SDGs
12	European Quality of Government Index	Link to goal 16
13	European Social Rights Indicator (EUROSHIP)	The index is based on the Social Scoreboard. The update of the Social Scoreboard should be linked to the SDGs
14	Gender Equality Index	Links to goals 3, 4, 5, in particular to targets 3.1, 3.7, 5.5, 4.4
15	Genuine Progress Indicator	Link to goals 3, 8, 10, 13
16	Global Competitiveness Index	Link to goal 8
17	Global Innovation Index	Link to goal 8
18	Global Multidimensional Poverty Index	Links to goals: 1, 2, 3, 4, 6, 7
19	Global Sustainable Competitiveness Index	All goals are addressed
20	Green Growth Index	SDGs used as benchmarks, the index includes many SDG indicators
21	Gross National Happiness Index	Link to goal 8
22	Happy Planet Index	Links to goals 3, 13
23	Human Development Index	Strong links to goals 1, 2, 3, 4, 8, 10
24	Human Freedom Index	Strong links to goals 1, 5, 8

	Name	Link to SDGs
25	Inequality-adjusted Human Development Index	Links to goals 1, 2, 3, 4, 5, 8, 10, especially to target 10.1
26	Just Transition Score	Strong links to goals 1, 2, 3, 4, 5, 10
27	Legatum Prosperity Index	Links to goals 1, 2, 3, 4, 5, 6, 7, 8, 10, 13, 14, 15
28	Macroeconomic Imbalance Procedure Scoreboard	Links to target 8.1. Economic growth, 10.2: Social, economic and political inclusion, 17.13: Global macroeconomic stability, 17.18. Capacity-building for reliable data availability, 17.19. Measure progress
29	Notre Dame-Global Adaptation Country Index	Links to goals 1, 2, 3, 4, 5, 6, 7, 10, 13, 14, 15
30	OECD Better Life Index	All goals are covered in a way if the 4 capitals for future well-being are also considered
31	OECD Green Growth Indicators	Link to goals: 3, 9, 13, 14, 15
32	OECD Regional Well-being	Links to goals: 1, 3, 4, 8, 9, 10, 11, 17
33	Planetary Pressure-adjusted Human Development Index	Strong links to targets 8.4, 9.4, 12.2
34	Resilience Dashboards - Synthetic Indices	Strongest links with targets 4.4 and 9.1. Also strong links with 8.4, 8.5, 12.2, 17.13, less strong links with 2.4, 7.1, 8.2, 8.3, 9.4, 9.5, 11.6, 12.5, 15.3
35	Social Progress Index	Related to all 17 goals and reflects 131 out of 169 targets
36	Social Scoreboard	The update of the Social Scoreboard should be linked to the SDGs
37	Statistics for the European Green Deal	Links to goals 7, 8, 9, 11, 12, 13, 15, 16, 17
38	Subnational Human Development Index	Links to goals 1, 2, 3, 4, 5, 8, 10, especially target 10.1
39	Sustainable Development Goals Index and Dashboards	Direct link, covers all 17 SDG targets
40	Sustainable Development Index	Links to goals: 3, 4, 8, 11, 12, 13, 14, 15
41	Sustainable Human Development Index	At least 10 out of the 17 goals feature a precise reference to sustainability and environmental goals (items 2, 6, 7, 8, 9, 11, 12, 13, 14, and 15)
42	Sustainable Society Index	All goals are covered
43	The Green Future Index	Strong links to goals 7, 13
44	Transitions Performance Index	Links to goals: 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17

Note: UN SDGs short description. 1: No Poverty, 2: Zero Hunger, 3: Good Health and Well-being, 4: Quality Education, 5: Gender Equality, 6: Clean Water and Sanitation, 7: Affordable and Clean Energy, 8: Decent Work and Economic Growth, 9: Industry, Innovation and Infrastructure, 10: Reduced Inequality, 11: Sustainable Cities and Communities, 12: Responsible Consumption and Production, 13: Climate Action, 14: Life Below Water, 15: Life on Land, 16: Peace and Justice Strong Institutions, 17: Partnerships to achieve the goals.

Source: Authors' elaboration.

3.2. The short list of indicator systems

3.2.1 Selection procedure

The selection procedure for the short-listed indicator system was based on 9 criteria, and included the ranking of the indicators by summing up the scores for each criterion.

The selection criteria included objective elements as well as subjective assessment by our SPES team. Below is a summary description of each criterion:

- Coherence with SHD framework: how many and to what extent the indicator system includes the pillars of the SHD theoretical framework (0=No; 0,5=partially; 1=Yes)
- Convincing framework: degree of complexity and completeness of the theoretical framework (0=Low; 0,5=Medium; 1=High)
- Policy use: inclusion of the indicator system in European and international policies (0=No; 0,5=partially; 1=Yes)
- Organization reliability: assessment based on institutional relevance, presence of the institution within the EU, interactions with global partners, as well as academic rankings of research institutions (0=Low; 0,5=Medium; 1=High)
- Clarity of data sources: degree of transparency on the data underlying the indicator system (0=Low; 0,5=Medium; 1=High)
- Timespan (since 2010 or not): time coverage from 2010 onwards (0=Low coverage; 0,5=Medium coverage; 1=High coverage)
- Country coverage: the number of countries covered by the indicator system, considering the Member States, but also at extra-European level (0=few; 0,5=several; 1=all (or almost all))
- Availability of regional data: availability of regional data, extracted from previously collected data (0=No; 0,5=partially; 1=Yes)
- JRC audit: [EU Joint Research Center audit](#) availability (0=No; 0,5=indicator mentioned on their website but still not audited; 1=Yes).

The ranking resulted in a short-list of 15 composite indices which will represent the main metrics for the SPES project as well as the object of future analysis.

3.2.2 Selected composite indices

Based on these 9 criteria, we short-listed 15 indicator systems/composite indices, as presented in Table 3.

Table 3. Short-listed composite indices and their objective

	Name	Short name	Objective
1	ASviS Composite Index	ASviS CI	Evaluation of EU member states' performance to reach the EU SDGs and the objectives of the Europe 2030 agenda, using composite indicators
2	"Beyond GDP" Sustainable Development Index	"Beyond GDP"	Bridging the policy ambition gap between the development and the implementation of EU-wide sustainable transition strategy by the introduction of new evidence-based policy instruments to monitor member-states' progress, options and possible actions. Alternatives: (1) 'ambitious scenario' with 5 statistically tested indicators (including GDP), (2) 'transition scenario' with 12 indicators of sustainable development. (3) A third, sensitive version of the 'ambitious scenario', where GDP was dropped completely.
3	Competitive Sustainability Index	CSI	To measure competitiveness in the context of the transition to a smart, green, climate neutral economy, addressing immediate needs for resource resilience and energy security as well as social equity, stability, public legitimacy and material prosperity.
4	Genuine Progress Indicator	GPI	To replace or supplement GDP. The GPI is designed to take fuller account of the well-being of a nation, quantifying costs and benefits of environmental and social externalities.
5	Green Growth Index	GGI	To assess impacts of green growth policy implementation and investments
6	Just Transition Score	JTS	JTI combines the comprehensive, human-centered measurement of the Social Progress Index with data on countries' consumption-based per capita CO ₂ emissions.
7	Legatum Prosperity Index	LPI	A tool for transformation, offering insight into how prosperity is forming and evolving across the world.
8	OECD Better Life Index	OECD BLI	To assess whether life is getting better for people in 37 OECD countries and 4 partner countries
9	Planetary Pressure-adjusted Human Development Index	PHDI	An experimental index that adjusts the HDI for planetary pressures in the Anthropocene. PHDI is the level of human development adjusted by carbon dioxide emissions per person (production-based) and material footprint per capita to account for the excessive human pressure on the planet.
10	Social Progress Index	SPI	To measure social progress directly, rather than utilize economic proxies; to measure the outcomes that matter to the lives of real people, not the inputs; to create a holistic measure of social progress that encompasses the many aspects of the health of societies and is relevant to all countries.
11	Sustainable Development Goals Index and Dashboards	SDG	Not an official SDG monitoring tool, but instead complements efforts of national statistical offices and international organizations to collect data on and standardize SDG indicators.

12	Sustainable Development Index	SDI	The SDI retains the base formula of the HDI but places a sufficiency threshold on per capita income, and divides by two key indicators of ecological impact: CO2 emissions and material footprint, both calculated in per capita consumption-based terms and rendered vis-à-vis planetary boundaries. The SDI is an indicator of strong sustainability that measures nations' ecological efficiency in delivering human development.
13	Sustainable Human Development Index	SHDI	To monitor Sustainable Human Development (SHD). It integrates two important sustainability-related dimensions that are missing in the HDI; the environment and freedom, as well as uses a novel method of aggregation.
14	Sustainable Society Index	SSI	To be a comprehensive and quantitative method to measure and monitor the health of coupled human-environmental systems at national level worldwide
15	Transitions Performance Index	EU TPI	The tool is at the basis for a new model of prosperity for Europe and the world, focusing on resilience, inclusiveness and sustainability which supports the EU's 2022 Annual Sustainable Growth Strategy

Source: Authors' elaboration.

Then we aspired to describe these short-listed indicator systems in greater depth, including:

- 1) A list of specific individual indicators included in each the 15 composite indicators, as well as information on these individual indicators:
 - a) the data source and its type (i.e. statistical or administrative + in case of statistical source, whether it concerns the total population or a sample);
 - b) time frequency and how often it is updated;
 - c) level of analysis (national, sub-national, individual etc.).

- 2) Methodological assessment of the composite indicators:
 - a) management of missing data;
 - b) treatment of outliers;
 - c) normalization (standardization) method;
 - d) weighting of pillars and dimensions;
 - e) aggregation method.

The aim was to collect information that enables us to find potential shortfalls in the raw data and to determine how they affect the composite indicator. In addition, the information was expected to help us to assess whether the geographical coverage could be enlarged, in other words, the index could be measured for other countries or regions as well, and whether it was possible to increase the frequency of the observations and the updates of the new release (feasibility of nowcasting).

Our ambitions could be met only partially, as we had to rely on existing resources primarily, and they were at times not fully comprehensive with respect to our issues of interest. For example, in the case

of the Genuine Progress Indicator (Kubiszewski et al., 2013), there is a large diversity of existing calculations, including methodology and geographical coverage, often with scarce information on methodology and/or data.

The detailed overview of the 15 composite indices (see Annex II) provides some general findings on their commonalities and differences, which we summarize below.

Three of the short-listed composite indices aim to further develop and adjust the Human Development Index (HDI). These indices complement the initial three components of the HDI (standard of living, health and education), with additional one (ecological/environment dimension, in case of the Planetary Pressure-adjusted HDI, Sustainable Development Index) or two (environment and freedom in case of the Sustainable Human Development Index) dimensions. Thus, each of these rely on a relatively small number of specific indicators (UNDP, 2022b; Hickel, 2020).

Interestingly, the underlying concepts and the applied methodologies may lead to rather diverse outcomes. For example, while the Planetary Pressure-adjusted HDI and the Sustainable Human Development Index strongly correlate positively with national income, the Sustainable Development Index correlates negatively with it: low-income countries are ranking among the “best performers”, while affluent countries (among others Singapore, Australia, the US, Iceland, Canada, Norway, Finland or Switzerland) are ranking among the “worst performers”.

The 12 other composite indices can be characterized as multidimensional composite indices that rely on much larger dashboards, including between 21 and 300 indicators, depending on the tool. They also strongly differ according to the underlying theoretical framework, to their coverage of the four pillars of human development, to the applied methodology (weighting and aggregation procedure they follow), as well as to their time and country coverage (see, for instance, Acosta et al., 2019; Saisana and Filippas, 2012; European Commission, 2022).

Economic growth, which is a highly contested issue in our conceptual framework, seems to be treated in rather different ways. In most of the cases productivity (measured for example by GDP or GNI) is part of the index, among other dimensions and indicators (e.g., all indices that are based on HDI, the two main scenarios of the “Beyond GDP” Sustainable Development Index, Competitive Sustainability Index, the OECD Better Life Index, the Social Progress Index) (Stern et al., 2022; OECD, 2022; Social Progress Imperative, 2022).

The Just Transition Score does not include GDP or similar indicators at all, as it aims to measure the carbon efficiency of social progress of each country. Some indicators, such as the Genuine Progress Indicator, opt for adjusting the GDP metric by quantifying costs and benefits of environmental and social externalities.

For an in-depth description of these indices, including the specific indicator list as well as methodological issues of the indices, see Annex II. ‘Methodological information on short-listed indicator systems.

4. Conclusions and further steps

The aim of this report was to provide an overview of existing measurement frameworks to monitor the sustainability transition process. We started from the idea that GDP, while a valuable economic indicator, fails to capture the full spectrum of human well-being, environmental sustainability, and social progress (United Nations, 2022). To do that, governments and policymakers should consider a broader set of metrics that account for factors like income inequality, environmental degradation, and the quality of life.

We searched for initiatives that are relevant to be included in a new dashboard structured according to the pillars of Sustainable Human Development and are suitable to serve as individual items for a new composite index, if necessary. Two main selection steps have been performed: (1) a long list of 44 initiatives, based on their relevance in policy-making and scientific research, building on the JRC Composite Indicators and Scoreboards, as well as the expertise of the consortium; (2) a short list of 15 initiatives based on a 9-element list of criteria. For the latter, a more detailed description of individual indicators and on the applied methodology was provided.

Two main approaches emerge when the short list of indicator systems is examined. First, the initiatives that aim to further develop and adjust the Human Development Index rely on a restricted number of indicators, and they complement the initial three components of the development index (standard of living, health, and education), with additional one (ecological/environment dimension, Planetary Pressure-adjusted HDI, Sustainable Development Index) or two (environment and freedom, Sustainable Human Development Index) dimensions. While they are narrow in their indicator coverage, the underlying concepts and the applied methodologies lead to strongly diverging outcomes (e.g., country ranking) among these initiatives. Second, the multidimensional composite indices rely on much larger dashboards that include 21-160 indicators, depending on the tool. They also strongly differ according to the underlying theoretical framework, to their coverage of the four pillars of human development, to the applied methodology (weighting and aggregation procedure they follow), as well as to their time and country coverage. Finally, most composite indices show drawbacks in terms of data timeliness, as data is not timely available (e.g., every 3 month) for continuous monitoring of sustainability performances paths, as well as in terms of territorial coverage (e.g., going well beyond national and sub-national aggregates).

Our study shows that the “Beyond growth” debate is in full swing and has produced several alternative measurements to GDP. Moreover, our analysis confirms the increasing number and complexity of metrics used to measure one or more dimensions of sustainable human development. These elements lead to implications that are threefold.

At the SPES project level, the completed analysis is the prerequisite for proceeding with an even more in-depth investigation, thanks to which 3-4 of the most relevant composite indices among the 15 short-listed items will emerge. The selected indices will be the subject of a statistical robustness study, which is one of the project activities following this report.

Secondly, the work may influence future research in the study of composite indicators of sustainable development by providing an up-to-date overview of the structure and methods of some of the most globally relevant metrics.

In addition to these insights, we propose to provide for academic debate, another relevant aspect is the policy implications for decision makers at national and international level. The state of the art of current mechanisms for measuring sustainable development and the transition towards sustainability illustrates, in addition to the complex dynamics of measuring these systemic processes, that the decision on which metrics we should use for measurement can influence the perspective through which current issues (e.g., social-economic inequalities, climate change, lack of participation) are addressed. At the same time, the choice of indicator not only involves aspects of a methodological nature but can also influence the space available for each dimension at stake, fostering desirable synergies and/or potential trade-offs between the pillars of sustainable human development. Stakeholder engagement and international collaboration are enabling researchers to develop new metrics that better reflect the diverse goals and values of societies worldwide. They call for the integration of these alternative measures into policymaking to ensure a more balanced and sustainable approach to development.

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Annex I: Description of relevant existing indicator frameworks

You can view and download the Excel table [here](#).

Annex II: Methodological information on short-listed indicator framework

You can view and download the detailed document [here](#).



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