Sustainability Indicators and Performance Metrics

Smart-Edu4.0

Erasmus+ project

Co-funded by the Erasmus+ Programme of the European Union

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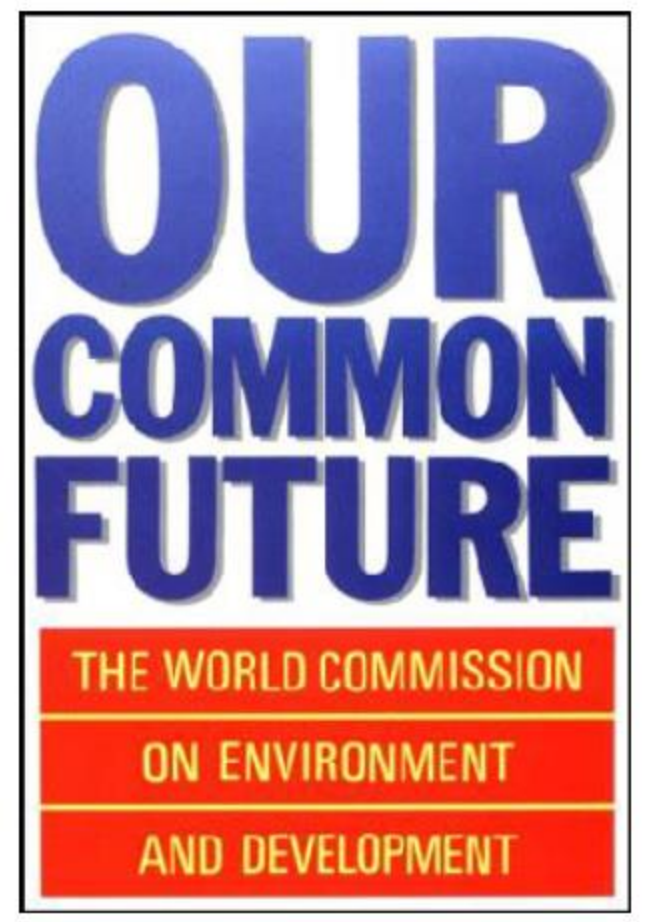
How do we define “sustainability”?



https://en.wikipedia.org/wiki/Our_Common_Future

Brundtland Report definition:

“Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

World Commission on Environment and Development, 1987, The United Nations

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Sustainability Performance Metrics: Towards a Measurable Future

The Need for Indicators

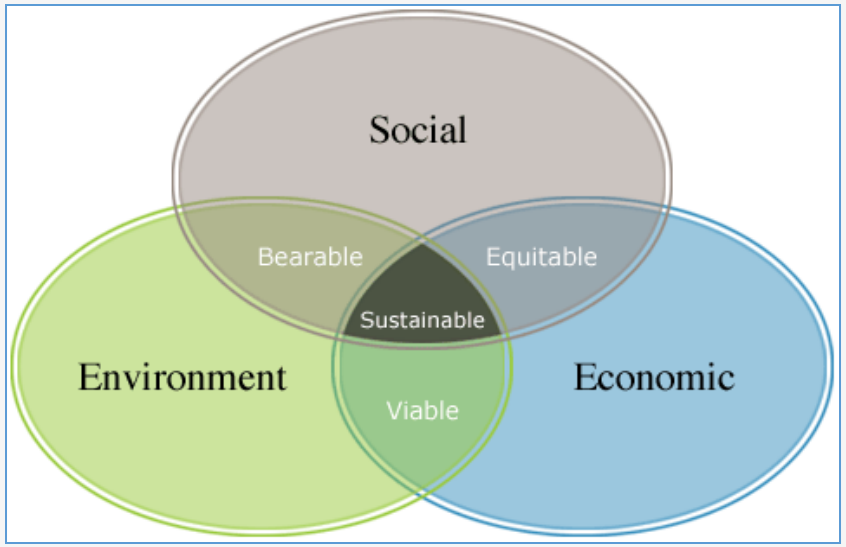
Sustainability is too macro-level and multi-faceted to be measured by any one metric.

Analogous to indicator species used by ecologists to track ecosystem trends

Additional Questions: Scale

What is the physical or social system you are interested in measuring? City, Region, National, International, …

What is the time period you are interested in? Past ten years, Next year, Next 40 years, …



https://en.wikipedia.org/wiki/File:Sustainable_development.svg

Source: The United Nations

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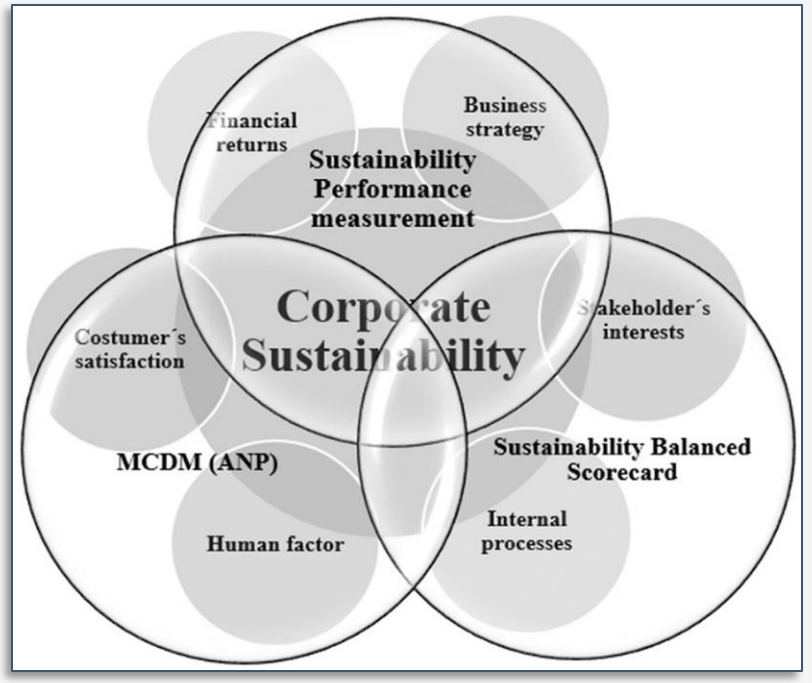
Sustainability Performance Measurement

- Focused on methods and instruments of sustainability performance measurement

- Analyze main sustainability accounting and accountability instruments and their importance for decision making at company level.



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From the MDGs to SDGs and the importance to measure and monitor them

8 Goals

21 targets

60 indicators for monitoring the progress.

Social priorities

to meet within the 2015 and designed mainly for developing countries.

"development " and sustainability " are still considered as separated topics

https://www.weforum.org/agenda/2016/02/3-ways-businesses-can-help-achieve-the-sdgs/

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From the MDGs to SDGs: 8 Goals 21 targets 60 indicators

Eradicate **extreme poverty** and **hunger**	Target 1A: Halve, between 1990 and 2015, the proportion of people living on **less than $1.25 a day** Target 1B: Achieve Decent Employment for Women, Men, and Young People Target 1C: Halve, between 1990 and 2015, the proportion of people who suffer from hunger
Achieve universal **primary education**	Target 2A: By 2015, all children can complete a full course of **primary education/schooling, girls and boys**
Promote **gender equality** and empower women	Target 3A: Eliminate **gender disparity** in primary and secondary education preferably by 2005, and at all levels by 2015
Reduce **child mortality** rates	Target 4A: **Reduce by two-thirds**, between 1990 and 2015, the **under-five mortality rate**
Improve **maternal health**	Target 5A: **Reduce by three-quarters**, between 1990 and 2015, the **maternal mortality ratio** Target 5B: Achieve, by 2015, universal **access** to **reproductive health**
Combat **HIV/AIDS**, **malaria**, and other diseases	Target 6A: Have halted by 2015 and begun to **reverse the spread of HIV/AIDS** Target 6B: Achieve, by 2010, universal access to **treatment for HIV/AIDS** for all those who need it Target 6C: Have halted by 2015 and begun to **reverse the incidence of malaria and other major diseases**
Ensure **environmental sustainability**	Target 7A: Integrate the principles of **sustainable development** into **country policies and programs**; reverse loss of environmental resources Target 7B: **Reduce biodiversity loss**, achieving, by 2010 a significant reduction in the rate of loss Target 7C: Halve, by 2015, the proportion of the population without sustainable **access to safe drinking water** and **basic sanitation** Target 7D: By 2020, to have achieved a **significant improvement in the lives** of at least 100 million slum-dwellers
Develop a **global partnership** for development	Target 8A: Develop further an open, rule-based, predictable, non-discriminatory trading and financial system Target 8B: Address the **Special Needs** of the Least Developed Countries Target 8C: Address the **special needs** of landlocked developing countries and small island developing States Target 8D: Deal comprehensively with the **debt problems** of developing countries through national and international measures in order to make debt sustainable in the long term Target 8E: In co-operation with **pharmaceutical companies**, provide access to affordable, **essential drugs in developing countries** Target 8F: In co-operation with the **private sector**, make available the benefits of **new technologies**, especially **information and communications**

Source: The United Nations

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Introduction to the 17 Sustainable Development Goals

"We [...] in New York from 25 to 27 September 2015 [...] have decided today on ***new*** *global* ***Sustainable Development Goals****. On behalf of the peoples we serve, we have adopted a historic decision on a comprehensive, far-reaching and* ***people-centred*** *set of universal and transformative Goals and targets. We* ***commit ourselves*** *to working tirelessly for the full implementation of this* ***Agenda by 2030****"*

Agenda 2030:
5 P
17 Sustainable Development Goals (SDGs)

https://www.iynf.org/2018/08/a-guide-to-sustainable-development-and-its-challenges-in-developing-countries/

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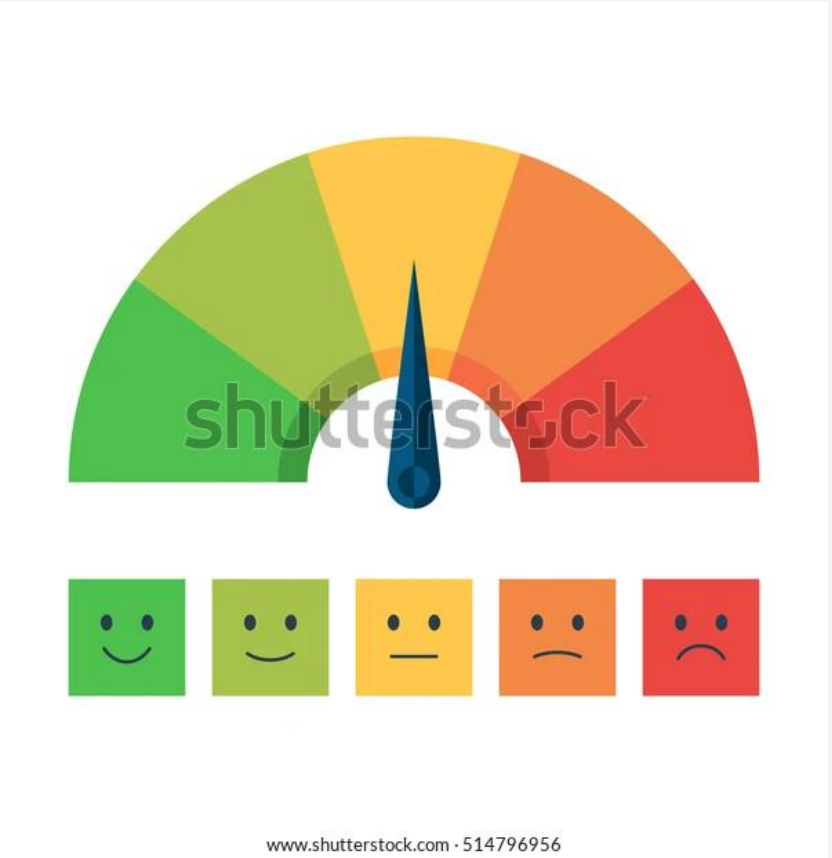
Indicators as tool of measurement

Indicators are tools that measure, simplify and communicate important issues and trends.

An indicator is a variable that describes the state of a system

"An indicator may be defined as a characteristic which, when measured repeatedly, demonstrates ecological trends, and a measure of current state or quality of an area" (Ferris and Humphrey, 1999, p. 313f).



https://www.shutterstock.com/el/image-vector/color-scale-arrow-red-green-emotions-514796956

Ferris, R., & Humphrey, J. (1999). A review of potential biodiversity indicators for application in British forests. Forestry, 72, 313-328.

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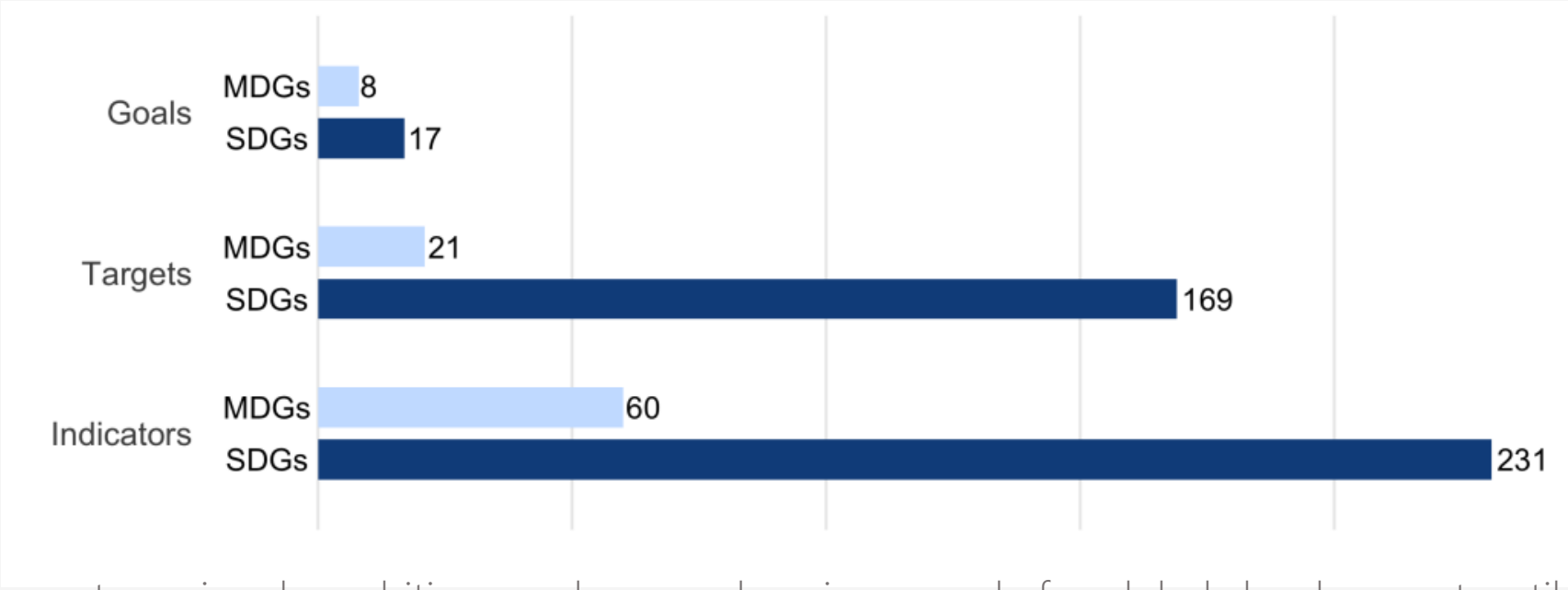
Increased Data Requirements by SDGs



The 17 SDGs lay out a uniquely ambitious and comprehensive agenda for global development until 2030.

Achieving these goals is not the only challenge. Monitoring progress towards these goals represents an enormous task for countries' statistical systems.

The SDGs include 231 indicators for 169 targets.

Yet in 2015, the target year of the MDGs, countries reported on average data on only 68% of the MDG indicators.

https://blogs.worldbank.org/opendata/are-we-there-yet-many-countries-dont-report-progress-all-sdgs-according-world-banks-new

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Indicators in SDG

As part of the *2021 World Development Report: Data for Better Lives*, the World Bank recently launched the Statistical Performance Indicators (SPI).

The SPI assess the performance of countries statistical system across five pillars:

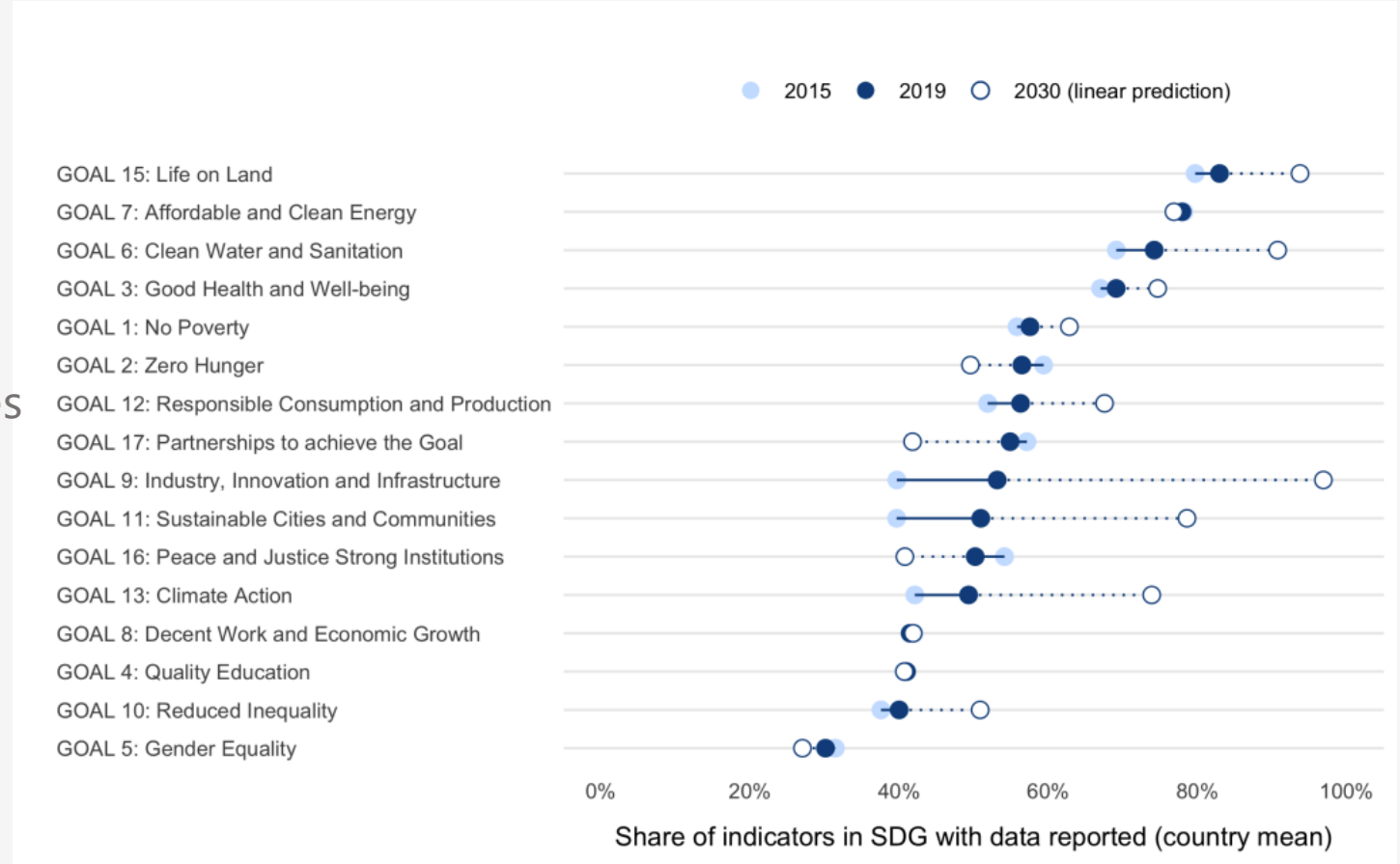
(i) data use,

(ii) data services,

(iii) data products,

(iv) data sources, and

(v) data infrastructure.



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Indicators in SDG - commend

The excluded values were produced by an international organization through modeling and are either country reported, country adjusted, estimated, or are included as global monitoring data.

Goal 14 is not included as land-locked countries don't report on it.

The predictions are based on linear models estimated by OLS on all data points from 2015 to 2019.

https://sdg-tracker.org/oceans

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SDG indicators

Not every indicator may be relevant for all countries, but the SDGs are global goals for global challenges, with many topics of direct relevance for wealthy countries.

For example, high-income countries reported a mere 25% of the indicators on gender equality (goal 5). Ending discrimination and violence against women (targets 5.1 and 5.2), ensuring women's equal opportunities for leadership (5.5), and universal access to sexual and reproductive health (5.6) can hardly be considered priorities for low-income countries alone.

https://blogs.worldbank.org/opendata/are-we-there-yet-many-countries-dont-report-progress-all-sdgs-according-world-banks-new

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SDG data reporting

Another indication that SDG data reporting may not only be a function of statistical capacity but perhaps also of political will is that the correlation between pillar 3 of the SPI, which measures data reporting on SDGs, and the other pillars of the SPI is lower than the correlation between the other pillars.

It is possible that some countries collect data on more indicators than they submit to the UN SDG database.

The value of reporting SDG data goes beyond monitoring progress. Previous research suggests that countries' performance on measuring progress towards the MDGs was positively correlated, if not causally associated, with actually making progress on the goals.

By keeping track of what gets measured, the SPI can help countries shed light on where they fall short on SDG reporting, and, ultimately, where they still have work to get done.

https://blogs.worldbank.org/opendata/are-we-there-yet-many-countries-dont-report-progress-all-sdgs-according-world-banks-new

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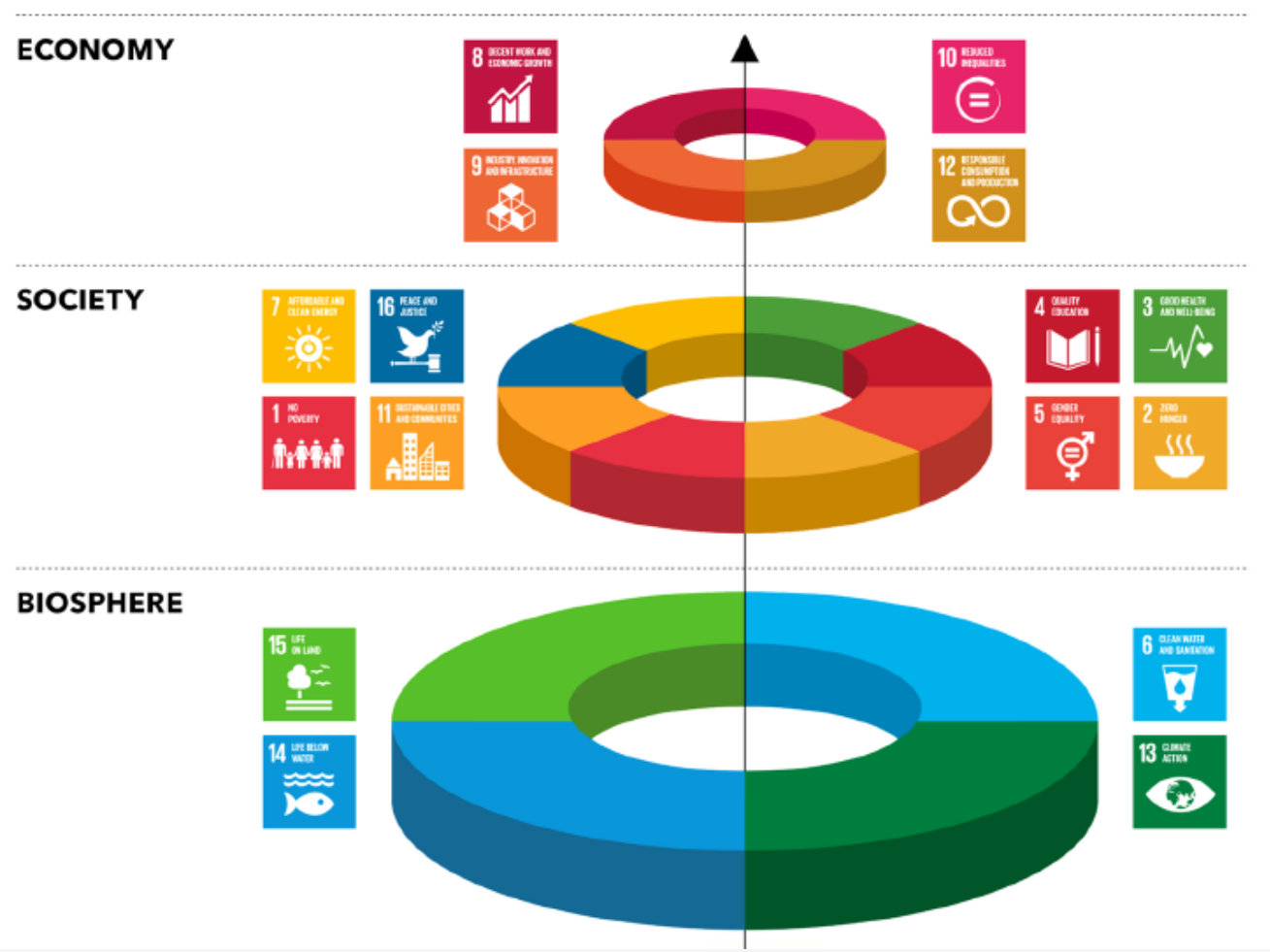
From the MDGs to SDGs: 8 Goals 21 targets 60 indicators



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Characteristics of a good indicator

- Validity: the indicator ensures an accurate measure of a behavior, practice, task that is the expected output or outcome of the intervention
- Reliable: the indicator is measurable over time, in the same way by different observers
- Precise: the indicator is operationally defined in clear terms
- Measurable: the indicator quantifiable using available tools and methods
- Timely: provides a measurement at time intervals relevant and appropriate in terms of program goals and activities

https://talonconsulting.com/characteristics-of-effective-performance-indicators/

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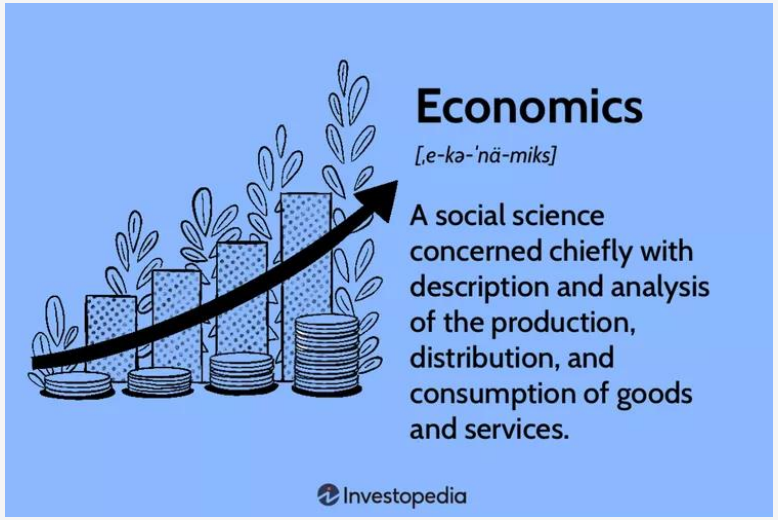
Characteristics of indicators

Indicators need to be able to communicate information related to a specific phenomenon

The simplification should ensure also a proper interpretation of the phenomenon

- Physical context specific physical or morphological characteristics can influence the result or the interpretation of it.
- Cultural and social context by knowing the cultural context it is possible to add or remove significant or insignificant indicators from a standardized dataset.
- Economic context with an in-depth knowledge of the economic context it is possible to identify valid and credible target.



https://www.investopedia.com/terms/e/economics.asp

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Quantitative indicators - Example

Quantitative indicators: mathematical fraction in which the numerator represents one of the variables that characterize a specific phenomenon, and the denominator is a value able to make the measure comparable in times and/or in space.

GOAL	**Goal 7. Ensure access to affordable, reliable, sustainable and modern energy for all**
TARGET	7.1 By 2030, ensure universal access to affordable, reliable and modern energy services
INDICATOR	7.1.1 Proportion of population with access to electricity
PHENOMENON	Level of electricity access
FORMULA	$\frac{\text{No. Of person with access to electricity}}{\text{Tot. Population}} * 100$

Source: https://www.isglobal.org/en/-/sdg-7-ensure-access-to-affordable-reliable-sustainable-and-modern-energy-for-all

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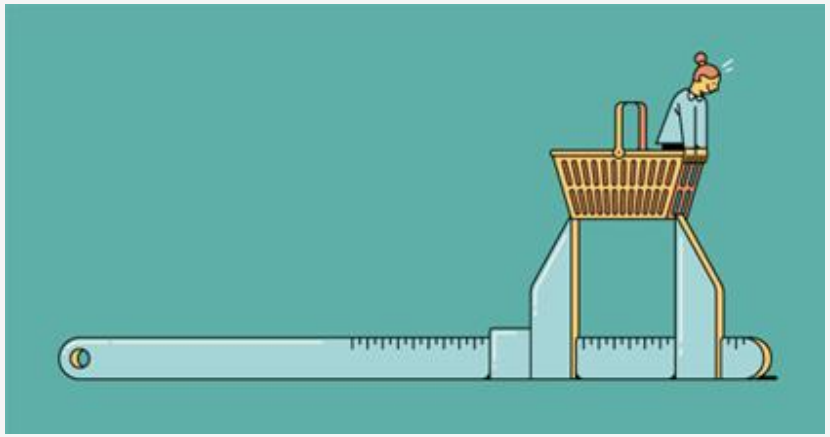
Four steps to build an indicator

1. Select the unit of analysis → what are you observing?
2. Understand the context → what are the variables able to impact and to modify the observed phenomena?
3. Data selection → according to the identified variables, select the necessary data. In this phase it is fundamental to check if the data are valid, credible, reliable and precise
4. Normalization → according to scope of the indicator (comparable in years and/or in the space). It is necessary to provide a denominator that is able the results comparable



https://www.shopify.com/blog/7365564-32-key-performance-indicators-kpis-for-ecommerce

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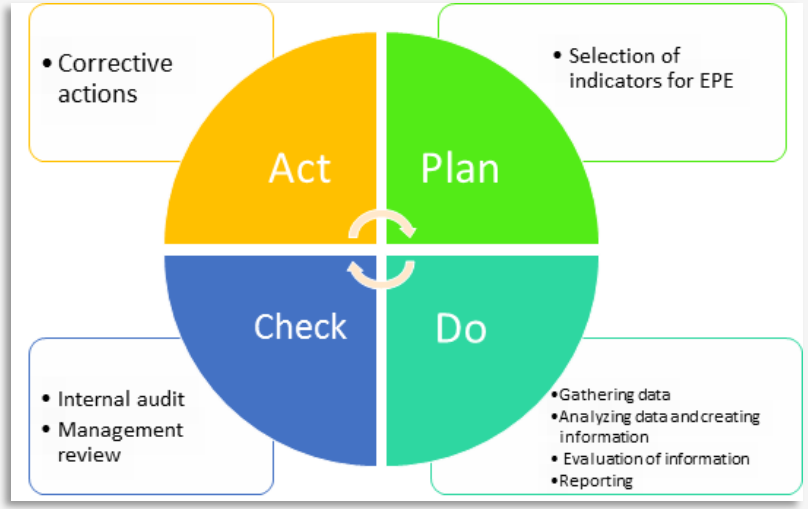
Indicators' standardization

Standardized indicators are useful to:

- compare similar products made by different companies;
- compare different processes producing the same product;
- benchmark of units within corporations;
- rate company against other companies in the(sub -sector)
- assess progress towards sustainable development of a sector



At company scale in term of measurement and evaluation, the ISO Standard 14031 gives a definition of Environmental Performance Evaluation (that is an internal process and management tool to provide the management with information about the organization's environmental performance. This information should be reliable and verifiable.

C. M. Jasch, Environmental performance evaluation and indicators. February 2000, Journal of Cleaner Production 8(1):79–88London: Elsevier, DOI:10.1016/S0959-6526(99)00235-8

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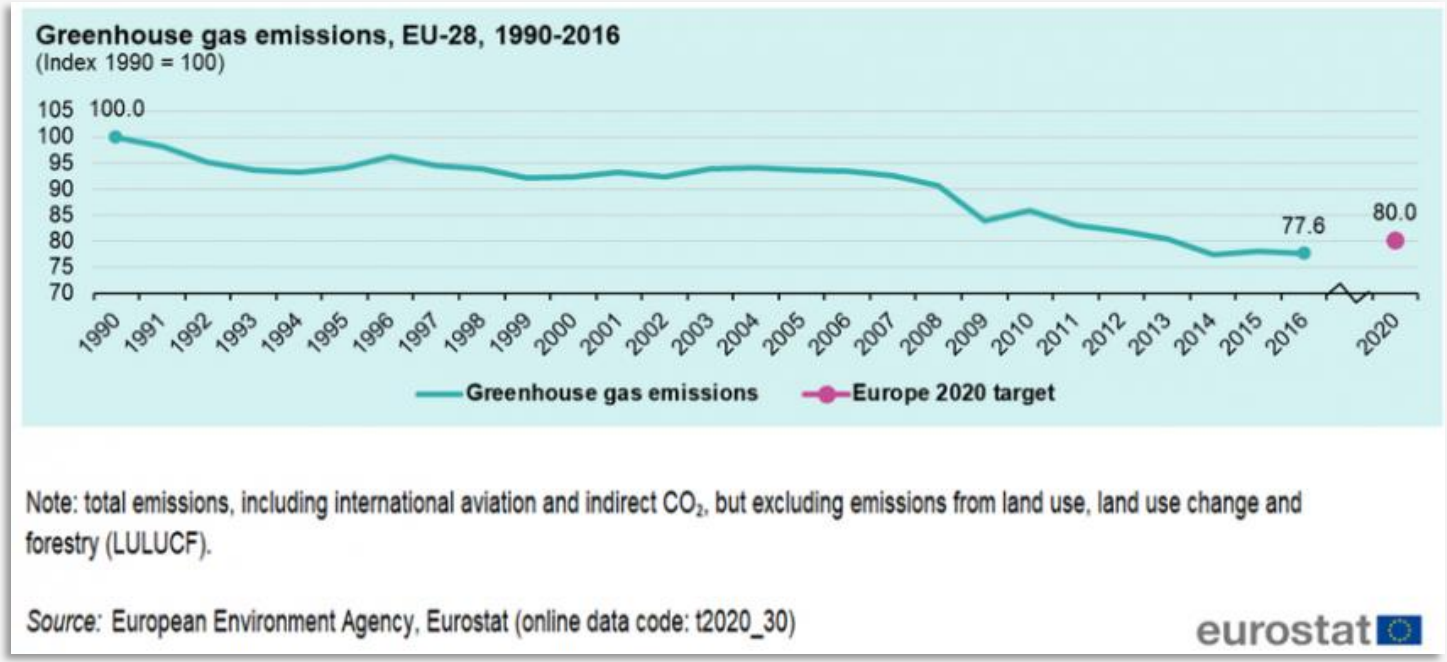
The use of sustainability indicators



Sustainability indicators are those indicators aimed at measure the sustainability level of a country.

Environmental or sustainability indicators can be used to guide the design of national policies and the definition of national targets

Source: Eurostat

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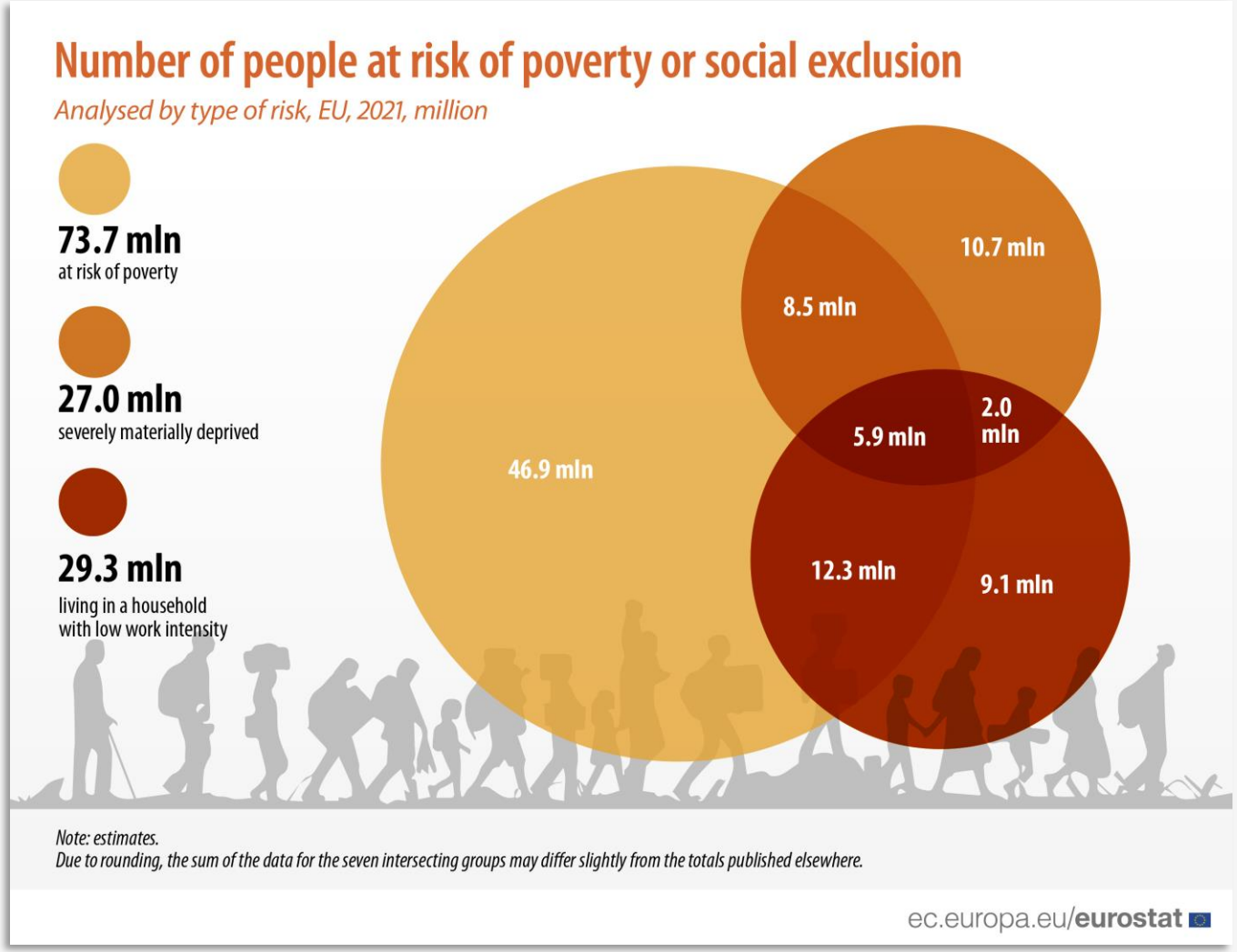
The use of sustainability indicators



In 2021,

- 95.4 million people in the EU, representing 21.7% of the population, were at risk of poverty or social exclusion.
- 5.9 million (1.3% of the total population) lived in households experiencing all three poverty and social exclusion risks simultaneously.

https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220915-1

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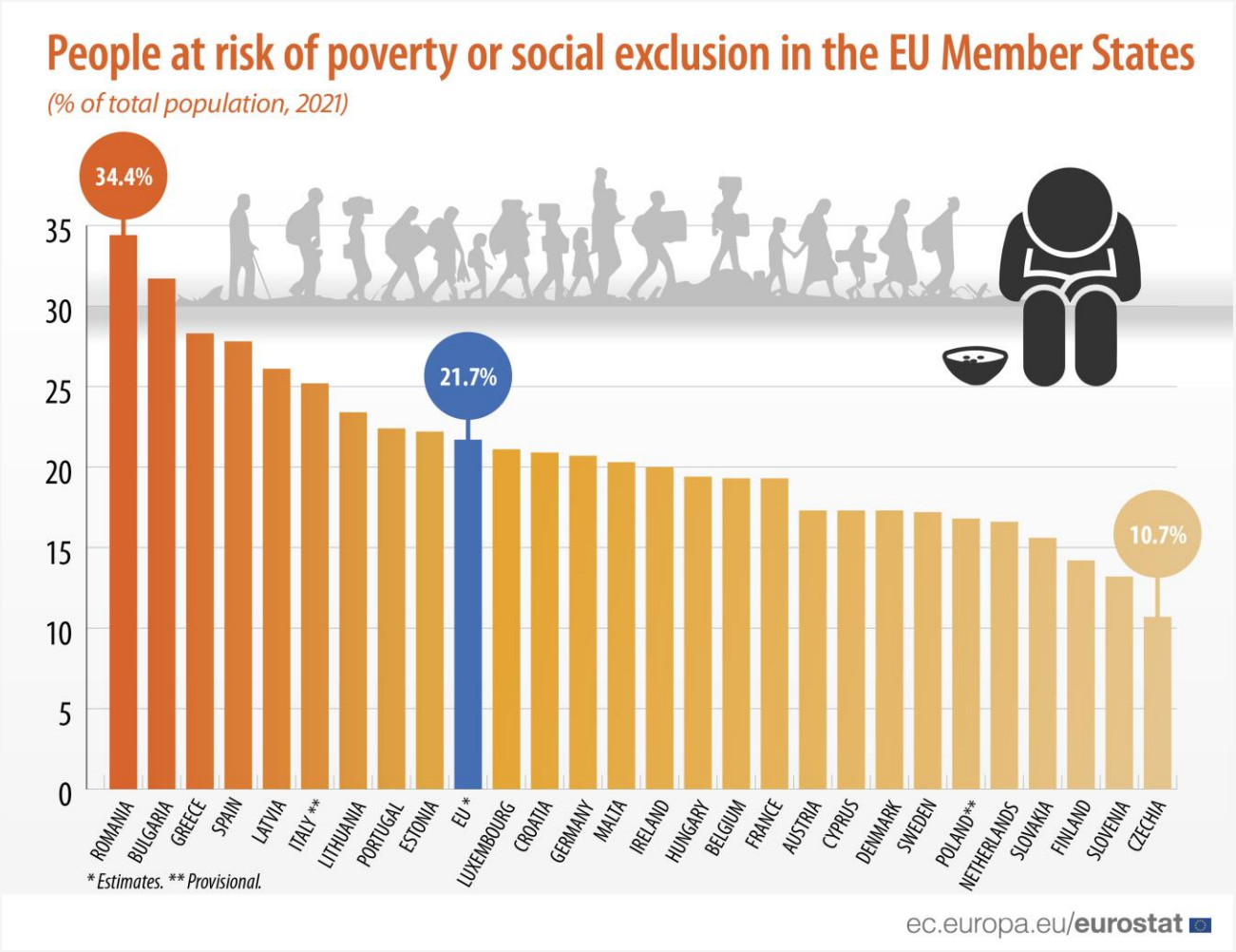
The use of sustainability indicators



The risk of poverty or social exclusion varied across the EU Member States.

The highest shares of people at risk of poverty or social exclusion were recorded in Romania (34%), Bulgaria (32%), Greece and Spain (both 28%).

In contrast, the lowest shares of people at risk of poverty or social exclusion were recorded in Czechia (11%), Slovenia (13%) and Finland (14%).

https://ec.europa.eu/eurostat/web/products-eurostat-news/-/ddn-20220915-1

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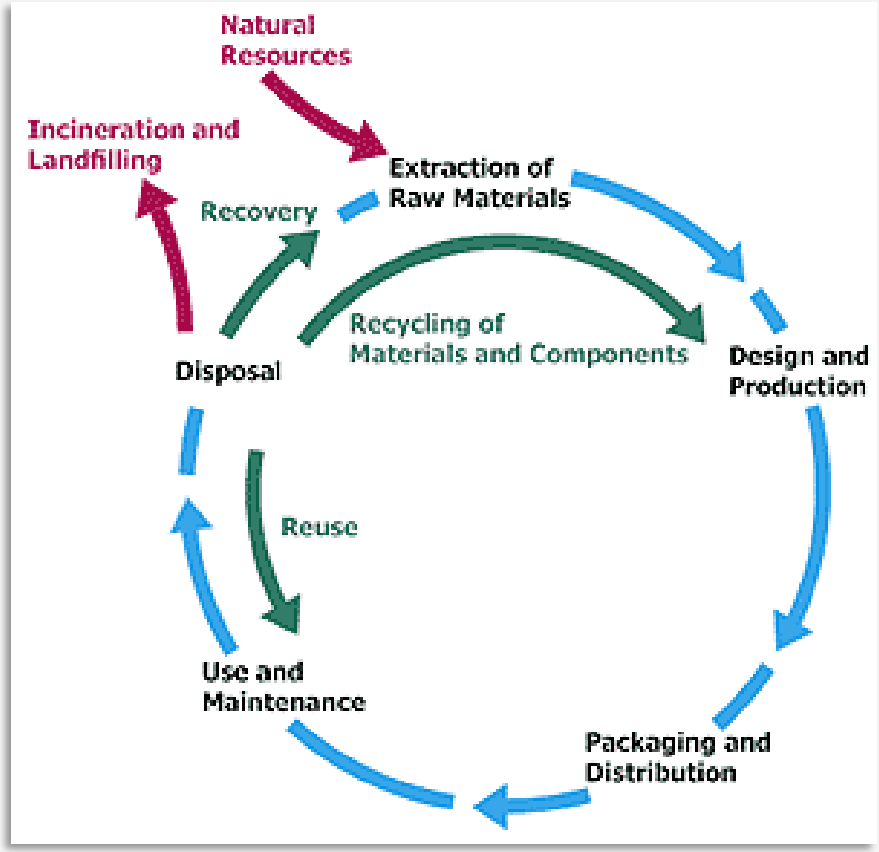
Sustainability Indicators OPI, MPI, ECI

Operational Performance Indicators (OPI): related to operations of an organization and can cover topics such as emissions, product and recycling of raw materials, energy consumption.

Management Performance Indicators (MPI): related to management activities to provide the necessary support necessary for the success of environmental management.

Environmental Condition Indicators (ECI): provide information on the quality of the environment surrounding the organization or on the local, regional or global environmental status



https://www.lifecycleinitiative.org/activities/what-is-life-cycle-thinking/

Source: C. M. Jasch, Environmental performance evaluation and indicators. February 2000, Journal of Cleaner Production 8(1):79–88London: Elsevier, DOI:10.1016/S0959-6526(99)00235-8

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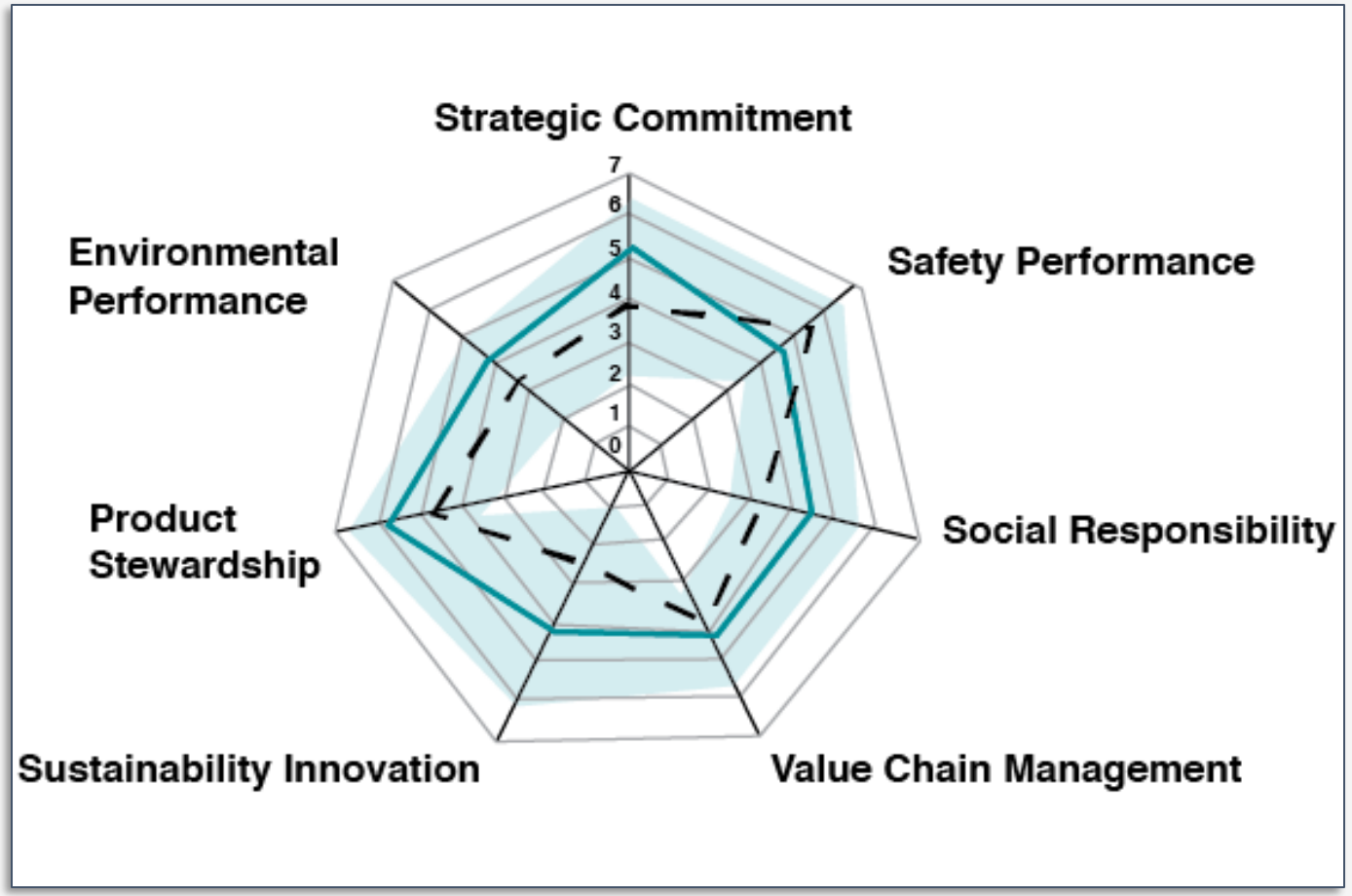
The AIChE Sustainability Index

The AIChE (American Institute of Chemical Engineers) Sustainability Index was developed by engineering and scientific experts.

Unlike other indices, the AIChE Sustainability Index benchmarks well-defined performance metrics and indicators, including EHS performance (Environment, Health, and Safety), innovation, and societal measures.

The metrics are based on over 30 sources of public data and allow companies to measure their efforts at the company and sector level.



https://www.aiche.org/ifs/resources/sustainability-index

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Dow Jones Sustainability Indices

The Dow Jones Sustainability Indices (DJSI) launched in 1999, are a family of indices evaluating the sustainability performance of thousands of companies trading publicly, operated under a strategic partnership between S&P Dow Jones Indices and RobecoSAM (Sustainable Asset Management) of the S&P Dow Jones Indices.

They are the longest-running global sustainability benchmarks worldwide and have become the key reference point in sustainability investing for investors and companies alike.

The DJSI is based on an analysis of corporate economic, environmental and social performance, assessing issues such as corporate governance, risk management, branding, climate change mitigation, supply chain standards and labor practices. The trend is to reject companies that do not operate in a sustainable and ethical manner. It includes general as well as industry-specific sustainability criteria for each of the 60 industries defined according to the Industry Classification Benchmark (ICB).

Source: https://en.wikipedia.org/wiki/Dow_Jones_Sustainability_Indices

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NASDAQ OMX Sustainability Finland Index

Fortum is included in the NASDAQ OMX Sustainability Finland Index 2022.

The index consists of the 40 shares with the highest Sustainability ranking of the 80 most traded shares on NASDAQ Helsinki.

Read more on NASDAQ OMX Sustainability Finland index.

Fortum has been certified as a Nasdaq's ESG Transparency Partner (reporting year 2021).

https://www.fortum.com/sustainability/approach/assessments-indices

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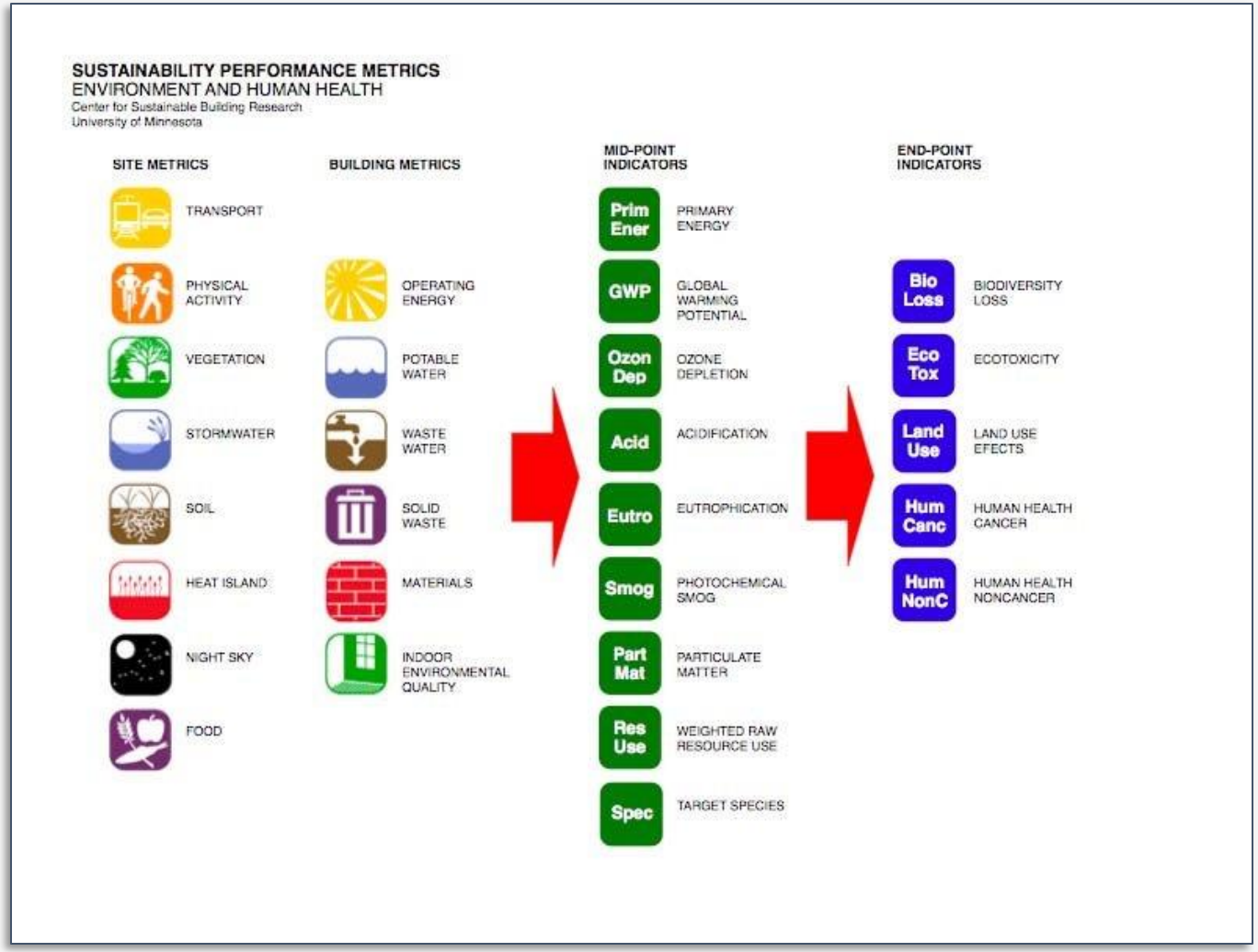
CSBR Sustainability Performance Metrics: Environment and Human Health



Center for Sustainable Building Research, University of Minnesota

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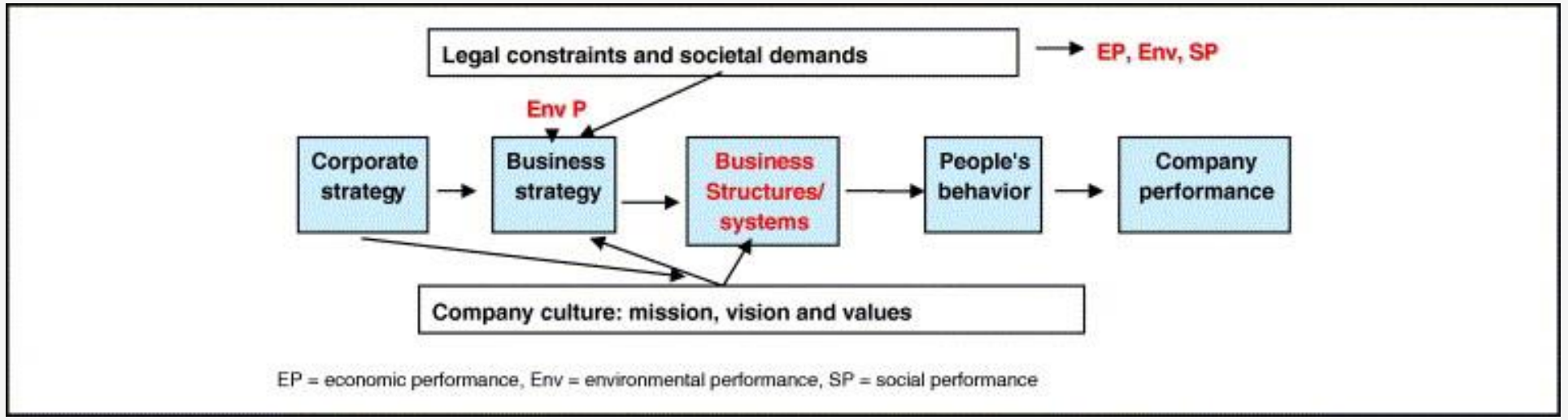
Metrics for Sustainable Performance

A company that embarks on the path of sustainability needs to carefully examine its mission, vision and values. It must be informed about legal constraints and assess all its management structures.



Székely F., Knirsch M. Responsible leadership and corporate social responsibility: Metrics for sustainable performanceEur. Manag. J., 23 (2005), pp. 628-647, 10.1016/j.emj.2005.10.009

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Sustainability reporting

Sustainability reporting is the practice of measuring, disclosing, and being accountable to internal and external stakeholders for organizational performance against specific environmental, social and economic/governance ("ESG") goals and metrics.

Reporting to whom? to all its stakeholders (customers, suppliers, etc after mapping them

Object: Social and environmental practices (economic results are in the ordinary balance sheet, the Consolidated Report and Account)

What? Enterprise outputs, but also its direct and indirect outcomes (by means of performance indicators). It is both a management tool for the company (programming, control and internal information) and a communication and dialogue tool towards the external world

Source: Eurostat

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Reporting tools

- Environmental balance sheet
- Social balance sheet
- Environmental report
- Sustainability report

https://vidooly.com/blog/best-custom-reporting-tools-software/

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Any questions?

Thank you ☺

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