SDG Composite indicators for EU countries

This paper presents a unique set of composite indicators synthesizing the elementary indicators of each EU28 Member State on the Sustainable Development Goals (SDGs), the first experiment of this kind in the international panorama. This metodology is proposed as quick-to-read tool for monitoring the Agenda 2030

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Complexity is the biggest challenge when monitoring the Agenda 2030. Composite indicators do not represent a simplification of the problem, but an instrument that allows for a quick and concise view of performances related to each Goal.

The results of this project provide stakeholders and the media with synthetic, clear and easy-to-read evaluations of both the EU's and countries' progress vis-à-vis each Goal. Moreover, they prove the usefulness of a tool that allows to monitor the overall situation of EU28 countries, offering an insight on their progress in relation to the achievement of the SDGs. Starting from this work, each Member State will be able to further develop its own composite indicator suing additional elementary indicators. Finally, this research could be an important step for data monitoring and reporting on the SDGs in the international context, encouraging more in-depth analyses of indicators.

The elementary indicators provided by Eurostat's database have been summarized using the AMPI methodology [Mazziotta, Pareto, 2016], the same methodology utilized to create the Italian composite indicators released in the 2017 ASviS Report [ASviS, 2017] and used to produce the composite indicators of the equitable and sustainable well-being in Italy [Istat, 2015]. AMPI possesses all the desired properties of a composite index[1],while remaining sufficiently simple to be understood by the general public. Starting with Eurostat's database on SDGs, an overall analysis of the countries' and of the EU28 average trends of composite indicators has been produced for each Goal from 2010 to, at least, 2015, according to the available data.

Indicator selection: the criteria

The selection of the elementary indicators to be used in a composite indicator (henceforth, "composite") necessarily reflects the values and priorities of the institutions that select them. For this reason, in order to obtain a legitimacy at different levels (political, civil society, etc.), the selection of the elementary indicators (especially at the national level) should follow a process that aims to promote a debate and a dialogue between different stakeholders, in order to achieve a broad consensus, as was done in Italy with the project "Equitable and Sustainable Wellbeing"[2].

In our analysis, the selection of the indicators for each Goal took into account the following methodological and technical aspects:

– *number of indicators*: the number of indicators was limited, giving priority to those that contribute the most to each Goal;
– *conceptual orientation of indicators*: indicators were positively or negatively "linked" to the Goal and indicators liable of ambiguous interpretations were avoided.

Moreover, the selection gave preference to indicators which:

• are *made available on a regular basis*, with reference to the past
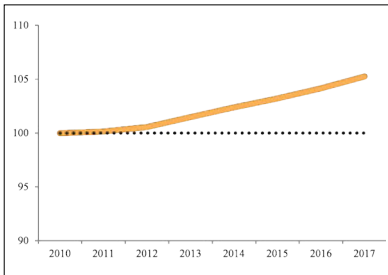
(time series) and to the future (planned surveys);
• can be *broken down at territorial* (e.g., national comparison) *and social level* (e.g., comparison by age groups, gender, etc.);
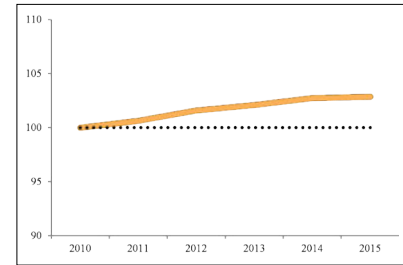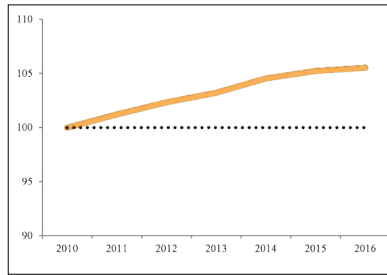

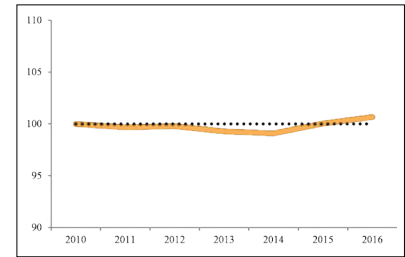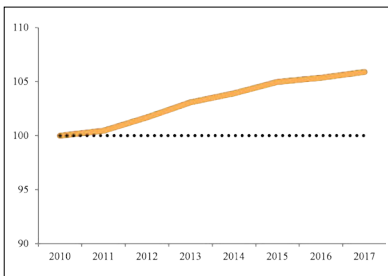Goal 3 – Ensure healthy lives and promote well-being for all at all ages

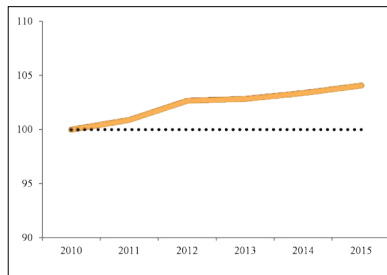**Goal 4** – Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all

Goal 9 – Build resilient infrastructure, promote sustainable industrialization and foster innovation
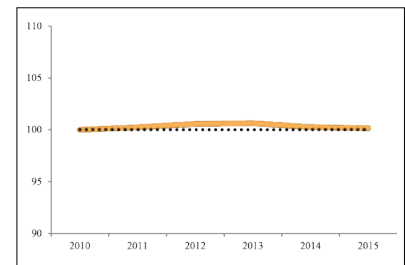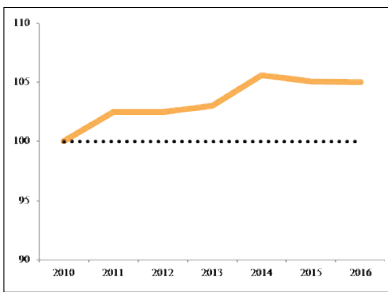

Goal 1 – End poverty in all its forms everywhere

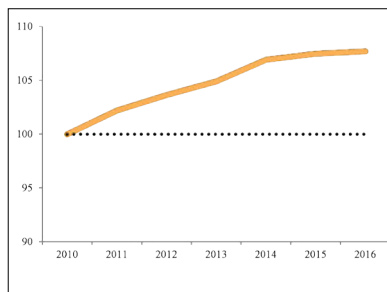**Goal 5** – Achieve gender equality and empower all women and girls

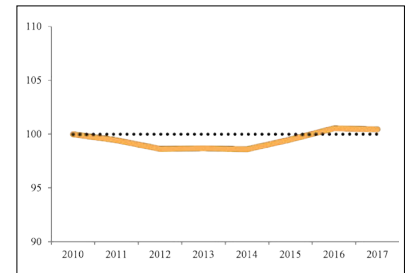**Goal 11** – Make cities and human settlements inclusive, safe, resilient and sustainable

Goal 2 – End hunger, achieve food security and improved nutrition and promote sustainable agriculture
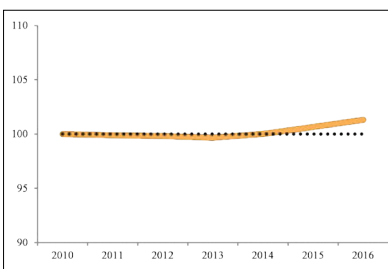

Goal 7 – Ensure access to affordable, reliable, sustainable and modern energy for all

Goal 12 – Ensure sustainable consumption and production patterns

Goal 17 – Strengthen the means of implementation and revitalize the global partnership for sustainable development

- have a *high-quality*, being produced by official sources or by unofficial sources that adopt the same quality criteria of the former (relevance, accuracy, accessibility, comparability, consistency and timeliness).

Indicators were selected in light of what has been established at the international level on the monitoring of the SDGs, taking into account the relevance and adequacy of the indi-

Goal 8 – Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all
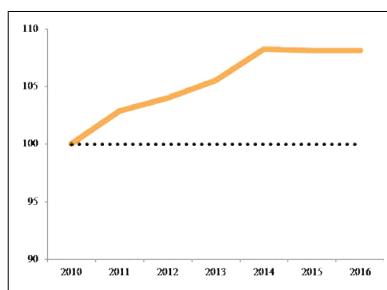
Goal 13 – Take urgent action to combat climate change and its impacts

cators. Therefore, the analysis was carried out using exclusively indicators available in Eurostat's dataset "Sustainable Development indicators"[3].

## How to interpret composite indicators for SDGs

This analysis aims to monitor the trends of each Goal from 2010 to the most recent year (2015-2016 or 2017). The AMPI methodology allows to measure the progress in all Goals against a base year (in our case, 2010), even though different indicators may have time series of different length. Therefore, it is important to underline that the composite indicators do not measure the distance from the UN's 2030 targets but in the last paragraph of this pa-
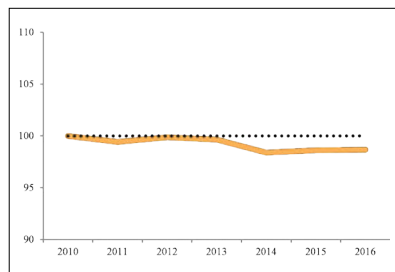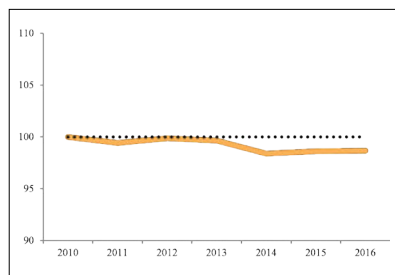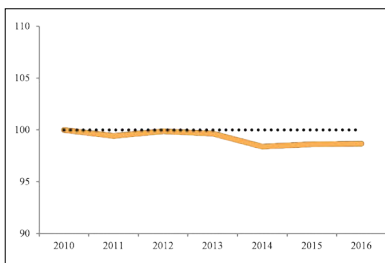
Goal 16 – Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels

per a new experimental composite indicator is presented using the EU 2020 targets as a reference.

The research resulted in an analysis at both national and EU28 levels for all 17 Goals except for Goal 6 and Goal 14. For Goal 14, due to the absence of indicators with national detail, it was only possible to create a composite indicator at the European level. Regarding Goal 6, it is important to underline the absence, within the Eurostat database, of reliable indicators, of time series and country disaggregation. This analysis is an opportunity to raise awareness on the necessity to produce better data regarding one of the most important themes for the well-being of European citizens.

Trends of composite indicators for the EU-28

This chapter presents an overview of the trends for each Goal for the EU28 average according to their direction. In the first section, the Goals with an increasing trend are described, followed by the Goals with a stable trend and finally those with a decreasing trend. Both Goals with stable and decreasing trends are matter of concern because they highlight situations where Europe is not heading

in the right direction for the achievement of the 2030 Agenda.

For nine Goals, the EU28 composite indicators show a positive trend. While the composite for Goal 3 (health) shows a slight increase between 2010 and 2015, the indicators for Goal 4 (education), Goal 5 (gender equality), Goal 7 (energy), Goal 9 (infrastructures and innovation), Goal 12 (responsible production and consumption) and Goal 13 (climate change) show a remarkable positive development, exceeding in all cases the 105 point mark in the last observed year. The composite indicator for Goal 8 (growth and employment) is stable until 2014, while in the last two years the situation improves thanks to the slight improvement of the employment indicators.

At the same time, it is important to underline the stability over the last few years of the composite indicators for Goal 7, Goal 12 and Goal 13, due to the raise of the indicators related to energy consumption and GreenHouse Gases (GHG) emissions during the economic recovery. These trends prove that a lot more progress is needed for the implementation of the Paris Agreement and the achievement of the related SDGs.

Goal 1 (poverty), Goal 2 (food) and Goal 17 (partnerships) do not show any remarkable trend. For Goal 1 and Goal 17 the stability is mainly explained by an overall compensation of the small variations of the elementary indicators included in the composite indicators, while for Goal 2, it is caused by the compensation between the positive increase of the "Area under organic farming" indicator and the negative trend of the "Ammonia emissions from agriculture".

Finally, Goal 10 (inequalities), Goal 15 (life on land) and Goal 16 (institutions) show a negative trend. For

Goal 10 – Reduce inequality within and among countries

Goal 15 – Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss

Goal 10, the deterioration happens in 2013 and 2014, notwithstanding the economic recovery, due to the worsening of the indicators related to poverty and inequalities. After 2014, the stability is the result of the raise of disposable income and the decline of the other indicators, especially the increase of the distance from the poverty threshold. The negative trend of Goal 15 is attributable to a significant increase of the "Change in artificial land cover" indicator, which is by far the worst among all the analyzed trends. Finally, the decreasing evolution of Goal 16 is mainly due to the strong worsening of the indicator on the level of confidence in the EU Parliament.

Modified AMPI: An example of AMPI composite indicator based on the distance from the EU 2020 targets

One of the main problems of the AMPI methodology is that the baseline is set to an arbitrary point in space and time. In our report, the baseline is set to equal the situation of the EU28 average in 2010. This solution allows to evaluate the improvements of the EU and of member states relative to 2010, but does not allow to evaluate the entity of the improvement relative to a specific target.

For example, the composite indicator for SDG 4 shows significant improvement, whereas the composite indicator for SDG 8 shows a less steep rise. By setting 2010 as the baseline, it is not possible to discern which Goal is closer to reach the targets set by the 2030 Agenda.

Nevertheless, the AMPI methodology can be adapted to measure the distance from a vector of targets. It is possible to set the value of the AMPI

composite indicator=100 if all the elementary indicators meet the EU28 target, or if the majority of indicators exceed the target and the rest are relatively close to their target. In this way both the value of individual countries and of the EU28 average for every year can be considered as a composite evaluation of the distance from the target of each elementary indicator.

An assessment of this methodology has been produced on SDG 13 as a

Fig. 1 SDG 13 Composite indicator scores for EU28. Years 2010–2015. Target=100

test, using only the EU28 average data for each available year.

This test is carried out only on the EU28 average because countries have different policy targets. The difference from the methodology adopted in the report lies on the use of two different baselines. In this example, the baseline is a fictional vector of targets created using the EU 2020 targets. In all the other graphs of the paper, the baseline is the vector of EU28 in 2010.

Therefore, the results of the modified AMPI can be used to build a different narrative with respect to that of the

classical AMPI. The results of the test in table 2 show that the EU28 starts from a value of 50.2 in 2010 and in the observed period the composite indicator shows a remarkable rising trend until 2014, when it almost reaches the targets baseline.

Analyzing the elementary indicators and their targets, it is worth noticing that in 2014, all indicators have exceeded their 2020 targets except for "Primary energy consumption" (sdg_07_10) and "Share of renew-
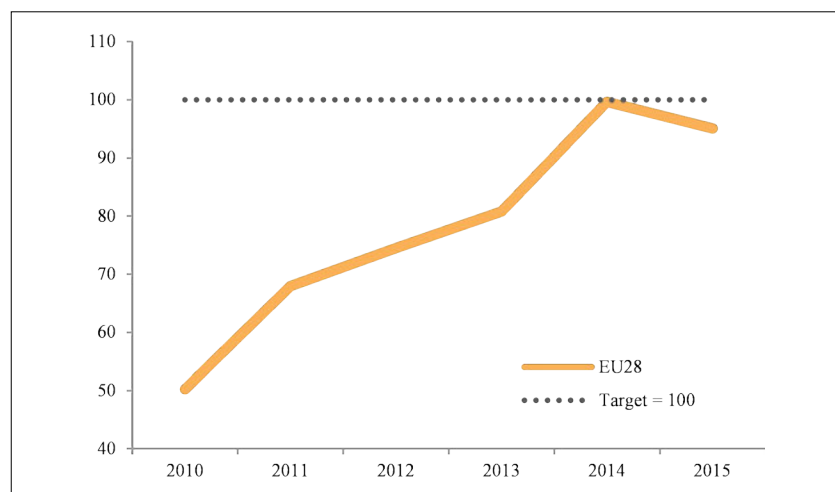
able energy in gross final energy consumption" that reached 16.1% in 2014, still far from the 20% required to meet the 2020 target. However, the EU 28 composite indicator shows a decreasing trend in the last observed year, reaching the 95 point mark in 2015.

This decreasing trend is explained by the worsening of all the elementary indicators regarding both GHG emissions and energy consumption, while the only indicator that continues its linear increase is the "Share of renewable energy in gross final energy consumption".

This methodology offers a clear advantage since it allows to measure the performances of a country in relation to a specific set of policy targets.

Nevertheless, there is an important trade-off to consider. In order to use this methodology in a proper way it would be necessary to set policy targets for all the elementary indicators used to monitor the SDGs.

From the methodological point of view, it is important to point out that it is impossible to compare the results of a classic AMPI with this modified version of the AMPI. Indeed, the value used for the baseline has a different meaning.

Every country can apply this "modified AMPI" methodology in order to assess the distance of a composite indicator from a vector of targets at the EU level.

Moreover, if a country has its own specific targets to achieve within, for example, the year 2030, this methodology can be applied.

However, it would not be possible to compare the EU composite indicator with EU2020 targets and a country's composite indicator with its own targets. In conclusion, AMPI can be re-adapted to create a composite indicator that measures the distance from a vector of targets. Therefore, it is extremely important to set specific targets both at the EU and at country level.

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[1] Composite indicators and composite index are used as synonymous

[2] https://www.istat.it/it/benessere-e-sostenibilit%C3%A0/misure-del-benessere

[3] http://ec.europa.eu/eurostat/web/sdi/indicators

REFERENCE

1 Mazziotta M. &A. Pareto. 2016, "On a Generalized Non-Compensatory Composite Index for Measuring Socio-economic Phenomena". *Social Indicators Research* 127 (3): 983-1003

2 Asvis, 2017, "La posizione dell'Italia nei confronti dell'agenda 2030 e degli obiettivi di sviluppo sostenibili", *L'Italia e gli Obiettivi di Sviluppo Sostenibile, Rapporto ASviS 2017*

3 Istat, 2015, *Rapporto Bes 2015, il benessere equo e sostenibile in Italia*