

Monitoring SDGs at territorial level: the case of Lombardy

Il monitoraggio degli SDGs a livello territoriale: il caso della Lombardia

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Abstract: In this paper we want to measure the trend of Lombardy compared to the Italian average in each goal of sustainable development. By doing this, we propose to synthesize a large set of sustainable development indicators at Italian regional level. Complexity represents the biggest challenge in monitoring the 2030 Agenda. In this perspective, composite indicators represent a useful tool that allows a quick and concise view of performances related to each goal. The intention is to provide stakeholders and media with synthetic, clear and easy-to-read evaluations of performances of each region to provide an insight on the direction the regions are heading to and if they are going in the right direction towards the achievement of the SDGs.

Abstract: *In questo lavoro proponiamo la sintesi di un vasto set di indicatori di sviluppo sostenibile a livello regionale al fine di misurare per ogni obiettivo il trend della Lombardia rispetto alla media Italiana. La complessità rappresenta la più grande sfida nel monitoraggio dell'agenda 2030. In questa prospettiva, gli indici composti rappresentano un utile strumento in grado di mostrare in maniera concisa le performances di ogni goal. L'idea è quella fornire agli stakeholders una valutazione sintetica e chiara delle prestazioni di ogni regione, in termini di raggiungimento degli obiettivi (SDGs).*

Key words: Sustainable development; SDGs; Lombardy; Composite Indicators; AMPI

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1 Introduction

In September 2015, 193 countries adopted the 2030 Agenda for Sustainable Development and its 17 Sustainable Development Goals (hereinafter: SDGs). The SDGs are the blueprint to achieve a better and more sustainable future for all. They address the global challenges we face, including those related to poverty, inequality, climate, environmental degradation, prosperity, peace and justice.

The Agenda recognizes the importance of territories in the implementation of policies required to reach the SDGs. In Italy the national strategy for sustainable development underline the key role of regions in the implementation of the Agenda 2030³. Many studies analysed and monitored the differences among Italian Regions in achieving SDGs (Maggino et al. 2018, Alaimo and Maggino 2018, Alaimo 2019).

In order to support this process, the Italian Alliance for the Sustainable Development (ASviS) is committed to monitor the achievement of the SDGs at regional level. Starting from the UN indicators statistical framework, ASviS selected through a structured dialogue with 217 partners from the civil society a set of statistical indicators to measure the SDGs at regional level. The result of this work is the 2018 ASviS report, in which the monitoring of SDGs at regional level was addressed for the first time.

In this paper, we analyse the positioning of Lombardy related to the SDGs, using as frame of reference the Italian trend. We use composite indicators as method to represent the level of sustainable development in the Region.

2 Data and methods

We used 77 basic indicators, divided among the different goals, all in time series from 2010 to 2016. The source of the data is the ASviS dataset⁴, which includes only indicators from official statistical sources (Istat, Ispra, etc.). This dataset is the result of an intense dialogue with stakeholders and it is a tool for monitoring the positioning of regions compared to Italian average. Nevertheless, in order to calculate composite indicators, we had to perform a selection of the basic indicators that was influenced by the need to have data in time series and available at regional territorial disaggregation level.

As previously written, the main purpose of this article is analysing the situation of Lombardy with respect to each goal using one single composite measure and compare it with the Italian situation⁵. To do this, we summarized each set of basic indicators in composite indicators (hereinafter: composites) through a method that

³ <https://www.minambiente.it/pagina/la-snsvs>

⁴ <http://asvis.it/il-monitoraggio-degli-sdgs-a-livello-regionale/>

⁵ For the calculation of composite indices, we have taken into account all Italian regions, not only Italy and Lombardy.

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will be illustrated below. From the operational point of view, after the definition of the phenomenon and the selection of basic indicators, the following phases are the normalization of the individual indicators and the aggregation of the normalized indicators (Mazziotta and Pareto, 2016).

For the aggregation, we chose the Adjusted Mazziotta-Pareto Index (AMPI), a partially non-compensatory composite indicator also used by Istat for the construction of equitable and sustainable well-being (BES) indicators and previously used by ASviS for measuring the trends of each goal at Italian and European level (ASviS, 2018). It is a variant of Mazziotta Pareto Index (MPI), based on a Min-Max normalisation and a re-scaling of the basic indicators in a range [70; 130], according to two goalposts, representing a minimum and a maximum value of each variable for all units and time periods (Mazziotta and Pareto, 2016). Using this normalisation procedure of the individual indicators allows assessing absolute changes over time. AMPI allows computing the score of each unit independently of the others, in contrast to the MPI where the mean and standard deviation of the individual indicators are required (Mazziotta and Pareto, 2017, 179). Given the original matrix (1):

$$X = \{x_{ij}\} = \begin{pmatrix} x_{11} & \cdots & x_{1m} \\ \vdots & \ddots & \vdots \\ x_{n1} & \cdots & x_{nm} \end{pmatrix} \quad (1)$$

where $i=1,\dots,n$ are the units of analysis and $j=1,\dots,m$ are the variables, we calculate the normalized matrix as follows (2):

$$r_{ij} = \frac{(x_{ij} - \text{Min}_{x_j})}{(\text{Max}_{x_j} - \text{Min}_{x_j})} * 60 + 70 \quad (2)$$

where x_{ij} is the value of the indicator j in the unit i and Min_{x_j} and Max_{x_j} are the goalposts for the indicator j ⁶. In the normalization, it is necessary to define the polarity of the basic indicators, i.e. the sign of the relation between the indicator itself and the phenomenon to be measured. Therefore, the type of composite we want to construct defines polarity. If the basic indicator has positive polarity, the formula (2) is used; if it has negative polarity, we calculate the complement to 200 of the (2). The polarity of basic indicators used in this paper is reported in the ASviS Report (ASviS, 2018).

In this article, the goalposts have been constructed using as reference the value assumed by Italy in the year 2010 for each basic indicator considered. Thus, using this normalization procedure, each indicator will assume the value 100 for Italy in

⁶Let Inf_{x_j} and Sup_{x_j} be the minimum and the maximum of indicator j across all time periods considered, and Ref_{x_j} be the reference value for indicator j . Then the “goalposts” are defined as: $\text{Ref}_{x_j} \pm \Delta$, where $\Delta = (\text{Sup}_{x_j} - \text{Inf}_{x_j})/2$ (Mazziotta and Pareto, 2017:178).

2010 and all the other values, of each unit for all the years, will be expressed in reference to this value, allowing a comparison in time and space. The AMPI is given by (3):

$$AMPI^{\pm} = \mu_{r_i} \pm \sigma_{r_i} * cv_i \quad (3)$$

where μ_{r_i} , σ_{r_i} and $cv_i = \sigma_{r_i} / \mu_{r_i}$ are the mean, the standard deviation and the coefficient of variation of the unit i and the sign \pm depends on the kind of phenomenon measured. In this paper, all the composites are positive, i.e., increasing values of each index correspond to positive variations of the phenomenon considered in each goal; then we used AMPI with negative penalty (AMPI-). All values will be approximately within the range [70,130], and 100 will represent the reference value (in our case, that of Italy in 2010). Therefore, AMPI indicates how each unit is placed with respect to the goalposts.

3 Results

Figure 1 reports the charts with the time series of the composites for each goal considered; the value of Lombardy is compared to the national data.

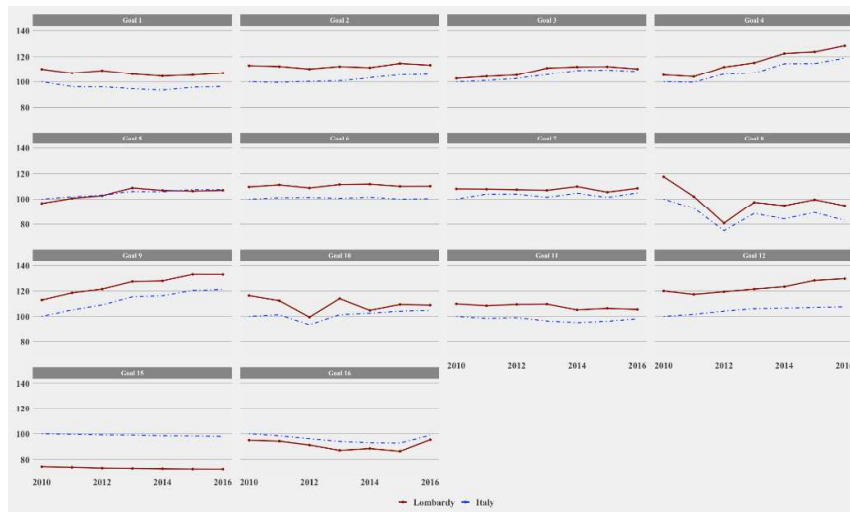


Figure 1: SDGs composite indicators: data of Lombardy and Italy. time series 2010–2016; AMPI: Italy 2010 = 100.

The composites for goals 1 (Poverty), 2 (Hunger), 4 (Education), 6 (Clean water and sanitation), 7 (Affordable and clean energy), 8 (Decent work and economic

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growth), 9 (Industry, innovation and infrastructure), 10 (Reduce inequalities), 11 (Sustainable cities and communities), 12 (Responsible production and consumption) reveal for Lombardy a better situation than the Italian average. The positive performance in goal 1 is attributable to the superior situation of its basic indicators: for instance, severely materially deprived people, in 2016 reaches 6% compared to 12% of the country, poor households is equal to 5% in comparison to 11% of Italian average. The increasing trend of education (SDG 4) can be explained by the broad rise of the tertiary educational attainment that increases from 23% in 2010 to 34% in 2016 (Italy reaches 27% in 2016). The higher level of SDG 6 is explained by the degree of the efficiency of urban water supply network, 73% compared to the 59% of national average. The composite for SDG 12 performs better than the Italian average due to the higher level of separate collection of municipal waste (68% in Lombardy compared to the 52,5% of the national level). The composite indicator of SDG 15 (Life on land) shows a worse situation compared to the Italian average. This is explained by the levels of the land fragmentation, 52,4%, in comparison to the 38% of Italy, and by those of soil cover, 13% compared to the 8% of national average. The lower level of SDG 16 is mainly due to the higher number of thefts, in Lombardy 258 in comparison to the 222 of Italy. The composites for gender equality (SDG 5) and good health and well-being (SDG 3) are in line with the national data. It wasn't possible to elaborate a composite indicator for SGDS 13 (climate action), 14 (life below water) and 17 (partner for the Goals), due to the lack of data at regional level.

4 Conclusions

Sustainable development, apart from being a central theme in the international debate, is today an essential necessity that must guide the definition of policies and the choices of allocation and use of resources. From this point of view, a central role is played by the territorial realities, in order to be able to define and calibrate policies and actions in the best possible way. Italy has always been characterized by deep differences between the various areas of the country, which should lead to specific interventions for specific problems. In this paper, we have taken into consideration the case of Lombardy. The analysis identified the differences existing between the Region and the national data, making explicit some goals with better and other with worse values than Italian ones.

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