A Systematic Study of Sustainable Development Goal (SDG) Interactions in the Main Spanish Cities

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Abstract In October 2018, the Spanish SDSN Network, REDS, launched the SDG Spanish Cities Index report summarizing the progress of 100 Spanish cities toward the Sustainable Development Goals (SDG). This study, developed in collaboration with the Technical University of Madrid, follows the methodology used by the Global SDG Index and Dashboards and the US Cities Index, which SDSN co-produces annually to assess SDG performance at both the national and international levels. This study, previously developed by the same researchers, identifies the most suitable indicators, metrics and urban data to measure the commitment and degree of compliance with SDG 17 for a selection of Spanish cities. It provides, through a set of 85 indicators, a unique vision of their sustainable development and allows monitoring the implementation of the SDGs at the local level in the Spanish context. In this paper, the analysis of their interactions using this dataset has been systematized. This is an innovative first step in defining the path toward urban sustainable development to make policies happen: dependencies among the goals in terms of potential interactions need to be evaluated in the Spanish context. Those results, improvements and applicability are presented and discussed in the following to identify action priorities and raise awareness of local governments and policymakers. It concludes that major efforts are required to increase sustainability and suggests an open framework that can be gradually improved as more data become available.

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1 Introduction

Sustainability has become a global concern (Keivani 2010) for urban development. Indeed, more people live in urban areas than in rural areas; with 55% of the world population residing in urban areas in 2018, by 2050, 68% of the world population is projected to be urban (UN-DESA 2018). While historically this was the desired goal of development (Brown et al. 1987), it evolved to maintain economic advancement and progress while protecting the long-term value of the environment (Emas 2015). Nowadays, it is understood as one of the major implementation science challenges (Moore et al. 2017).

Cities are at the forefront of sustainable development. The increase of urbanized areas poses some of the world's greatest development challenges, but it also creates huge opportunities to promote sustainable development. For example, cities nowadays generate 80% of global GDP (Moir et al. 2014), while consuming 70% of global energy and producing 70% of CO_2 emissions (IEA 2019). They are primarily responsible for the environmental degradation and highly contribute to climate change beyond city boundaries. But they are also centers of innovation and opportunity and support high-density habitation and efficient land-use.

Whereas SDGs have a global dimension, their action implementation depends on the level of priority assigned to them by the various countries and on how sustainability issues compete with the main problems faced by a country. It aims to force us to look not only at the overall progress of the country but also at the progress of its main cities.

SDSN has developed a series of global sustainability studies, the Global SDG Index, based on indicators from 2015 to 2019, which underlines the specific role of cities (Sachs 2016, 2017; SDSN 2018). In addition, to better inform regional and national analysis for the implementation of the SDGs, it has supported SDG Dashboards in African countries (SDGCA and SDSN 2018), metropolitan areas in the US (Espey 2018), major European cities (Lafortune et al. 2019) and Italian cities (Cavalli 2018). This research aligns with these studies to promote evidence-based policy making, mobilize regional and local communities and identify persisting data gaps for monitoring the SDGs.

As the Spanish Urban Agenda has recognized (Hurtado and González 2018), Spanish cities also face important urban challenges: pressure on natural resources, the threat of climate change, growing social inequality and, in particular, the depopulation of rural areas (MPTFP 2017), which constitute 80% of the territory, with half of the country's municipalities at risk of extinction (Collantes et al. 2014). Eight percent of the Spanish population lives in big cities and their metropolitan areas, whereas 4955 of the 8125 villages have less than 1000 inhabitants, according to the latest data published in the INE (INE 2018).

In a previous research, the most suitable indicators, metrics and urban data able to measure the commitment and degree of compliance with the 17 Sustainable Development Goals for the main Spanish cities and their metropolitan areas (Sánchez et al. 2018) have been identified by the authors. This urban diagnosis based on the SDGs is especially useful because it provides an objective and holistic analysis of the monitoring of the reality, and the main issues, challenges and opportunities for the sustainability of a city (Childers et al. 2014); it is a multidisciplinary assessment based on engineering, economic, social and environmental sciences (Ferrer, Thomé and Scavarda 2018), ranging from demographic changes and depopulation of rural areas to mobility, through urban metabolism and governance issues, among others.

The holistic nature of the SDG framework implies that a large number of potential interactions across the 169 targets have to be considered. A systematic data-driven analysis of all SDG interactions in the Spanish context is currently needed.

The main idea is to analyze the starting point and relevant variables of the Spanish cities for the advancement of SDGs through a set of indicators. To bridge the existing gap, a methodological framework that analyses the main interactions among this set of indicators is proposed. Thus, it is intended to recognize the main components among all the indicators of the cities to identify priorities for action in their policies for the achievement of the 2030 Agenda.

2 Method

This study has been carried out in collaboration with the Technical University of Madrid and with multiple group-support systems (Kolfschoten and de Vreede 2009), using the alliance approach proposed by the 2030 Agenda. This assessment has been inspired by the methodology used by the Global SDG Index and Dashboards and the US Cities Index, which SDSN co-produces annually to assess SDG performance at both national and international levels.

It has been articulated under various forms of collaboration that perform multiple tasks: facilitators from the local and national administration, civil society organizations, foundations, universities, researchers and other entities. The analysis has been carried out in three parts: (i) factor analysis, to determine a small number of factors that could represent the original variables, and (ii) principal component analysis and (iii) a correlation matrix, to identify correlation between two variables. All of them have participated in the discussions on the initial approach and in the interpretation of the results. In addition, each step and finding has been subjected to continuous validation by the focus group (Harrington 2016) formed by expert members of REDS working in sustainable development. The calculation of interactions and testing of the results have been developed on the basis of this dataset and the basic model established by REDS.

2.1 Factorial Analysis

First of all, to avoid redundancies in the study, the chosen variables needed to be independent of each other. By avoiding dependencies within the set of variables, we prevent them from affecting the validity of the final results. For this purpose, the factorial analysis technique is used as a statistical method that solves this problem while providing the basis for calculating the index that ranks Spanish municipalities according to the multiple values of the index. Thus, the main objective of the factor analysis is to determine a small number of factors that could represent the original variables.

The analysis is based on 17 variables available for the Spanish municipalities. Based on these values, the technique of factor analysis is applied and confirms these variables as relevant.

The rotating component factor matrix identifies the following relationships between the original variables and the extracted factors (Table 1).

The first factor mainly collects information from SDG 12 concerning responsible production and consumption. Also, this factor achieves high scores for SDG 8, Decent Work and Economic Growth, and SDG 4 and SDG 17, Quality Education and Partnerships for the Advancement of the Goals.

The second factor is mainly and negatively related to SDG 3, linked to Health and Welfare. In addition, it is negatively related to SDG 13, Climate Action.

The third factor firmly connects with SDG 9, Industry, Innovation and Infrastructure. It also correlates negatively with SDG 15, Life of Terrestrial Ecosystems.

The fourth factor is essentially linked with SDG 6, which is related to Clean Water and Sanitation.

The fifth factor basically collects information from SDG 1, End of Poverty. It also correlates positively with SDG 10, Reduction of Inequalities.

The sixth factor is negatively linked to SDG 2, Zero Hunger. It also scores significantly for SDG 5, related to Gender Equality, and SDG 14, Underwater Life.

Table 1 Rotated component matrix of factorial analysis

	FACTOR 1	FACTOR 2	FACTOR 3	FACTOR 4	FACTOR 5	FACTOR 6
SDG 1 - No Poverty					0,8244	
SDG 2 - Zero Hunger						-0,7573
SDG 3 - Good Health and Well-Being		-0,8821				
SDG 4 - Quality Education	0,6157		0,3195		-0,362	
SDG 5 - Gender Equality		0,3608				0,659
SDG 6 - Clean Water and Sanitation				0,7092		
SDG 7 - Affordable and Clean Energy	0,3985			-0,5852		
SDG 8 - Decent Work and Economic Growth	0,7462			-0,3285		
SDG 9 - Industry, Innovation and Infrastructure			0,8327			
SDG 10 - Reduced Inequalities	-0,3867	0,3202			0,7101	
SDG 11 - Sustainable Cities and Communities		0,5466	-0,5712			
SDG 12 - Responsible Consumption and Production	0,8168					
SDG 13 - Climate Action		-0,7499				
SDG 14 - Life Below Water						0,6039
SDG 15 - Life on Land			-0,7048	0,3894		
SDG 16 - Peace, Justice and Strong Institutions	0,3571	0,5154		-0,5446		
SDG 17 - Partnerships for the Goals	0,6714	0,3411				

It should be emphasized that the six factors highlight remarkable information related to the 17 SDGs, with three of the SDGs not named in the above list: with regard to SDG 7, Affordable Energy and Non-Polluting Energy, information is collected from two different factors; with regard to SDG 11, Sustainable Cities and Communities, information is similarly collected from two factors; and three different factors include information with regard to SDG 16, Peace, Justice and Strong Institutions.

2.2 Principal Component Analysis and Correlation Matrix

A Pearson correlation analysis and a PCA analysis have been developed to capture the nonlinear correlation between the variables and its main factors and to identify the general relation beyond the linear correlation between two variables (Tables 2 and 3).

Table 2 shows the relationships among the 17 SDGs, which are very different. Since these variables are uncorrelated with each other, it is convenient to reduce those variables to a few components.

Table 2 Correlation matrix of main SDG

Correlaciones

		ods1	ods2	ods3	ods4	ods5	ods6	ods7	ods8	ods9	ods10	ods11	ods12	ods13	ods14	ods15	ods16	ods17
ods1	Correlación de Pearson	1	-,063	,116	,019	-,130	,028	,256*	,303**	,205*	,353**	-,304**	,172	,028	,026	-,146	,054	-,029
	Sig. (bilateral)		,536	,252	,854	,198	,786	,011	,002	,042	,000	,002	,088	,780	,796	,150	,593	,777
	N	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99	99
ods2	Correlación de Pearson	-,063	1	-,053	-,002	-,321**	,011	,009	-,200*	-,004	-,010	,213*	-,011	-,057	-,190	,029	,032	,053
	Sig. (bilateral)	,536		,603	,986	,001	,917	,932	,046	,965	,922	,033	,911	,576	,058	,771	,749	,602
	N	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
ods3	Correlación de Pearson	,116	-,053	1	-,097	-,318**	-,125	-,064	,060	,012	-,269**	-,440**	-,017	,516**	-,051	,064	-,390**	-,217*
	Sig. (bilateral)	,252	,603		,339	,001	,215	,529	,552	,909	,007	,000	,866	,000	,614	,530	,000	,030
	N	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
ods4	Correlación de Pearson	,019	-,002	-,097	1	,333**	-,023	,348**	,336**	,258**	-,394**	,092	,389**	-,219*	-,086	-,095	,354**	,407**
	Sig. (bilateral)	,854	,986	,339		,001	,819	,000	,001	,010	,000	,364	,000	,028	,397	,349	,000	,000
	N	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
ods5	Correlación de Pearson	-,130	-,321**	-,318**	,333**	1	,088	,222*	,252*	-,060	-,164	,229*	,305**	-,131	,115	-,112	,330**	,164
	Sig. (bilateral)	,198	,001	,001	,001		,386	,026	,012	,552	,102	,022	,002	,194	,253	,266	,001	,102
	N	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
ods6	Correlación de Pearson	,028	,011	-,125	-,023	,088	1	-,184	-,020	,059	,197*	,096	,139	-,201*	,110	,124	-,110	,172
	Sig. (bilateral)	,786	,917	,215	,819	,386		,067	,842	,562	,050	,343	,167	,045	,274	,220	,277	,088
	N	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
ods7	Correlación de Pearson	,256*	,009	-,064	,348**	,222*	-,184	1	,341**	,063	-,297**	-,008	,178	-,002	-,064	-,226*	,358**	,251*
	Sig. (bilateral)	,011	,932	,529	,000	,026	,067		,001	,534	,003	,938	,077	,984	,524	,024	,000	,012
	N	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
ods8	Correlación de Pearson	,303**	-,200*	,060	,336**	,252*	-,020	,341**	1	,092	-,265**	,021	,572**	,029	-,153	-,110	,430**	,305**
	Sig. (bilateral)	,002	,046	,552	,001	,012	,842	,001		,363	,008	,836	,000	,771	,129	,278	,000	,002
	N	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
ods9	Correlación de Pearson	,205*	-,004	,012	,258**	-,060	,059	,063	,092	1	,030	-,316**	-,011	,030	-,004	-,358**	-,070	,122
	Sig. (bilateral)	,042	,965	,909	,010	,552	,562	,534	,363		,769	,001	,912	,768	,968	,000	,488	,227
	N	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
ods10	Correlación de Pearson	,353**	-,010	-,269**	-,394**	-,164	,197*	-,297**	-,265**	,030	1	-,039	-,207*	-,168	,161	-,091	-,101	-,189
	Sig. (bilateral)	,000	,922	,007	,000	,102	,050	,003	,008	,769		,700	,038	,095	,110	,368	,317	,060
	N	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
ods11	Correlación de Pearson	-,304**	,213*	-,440**	,092	,229*	,096	-,008	,021	-,316**	-,039	1	,097	-,269**	-,072	,354**	,296**	,266**
	Sig. (bilateral)	,002	,033	,000	,364	,022	,343	,938	,836	,001	,700		,339	,007	,477	,000	,003	,007
	N	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
ods12	Correlación de Pearson	,172	-,011	-,017	,389**	,305**	,139	,178	,572**	-,011	-,207*	,097	1	-,088	,000	,052	,262**	,474**
	Sig. (bilateral)	,088	,911	,866	,000	,002	,167	,077	,000	,912	,038	,339		,381	,998	,609	,008	,000
	N	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
ods13	Correlación de Pearson	,028	-,057	,516**	-,219*	-,131	-,201*	-,002	,029	,030	-,168	-,269**	-,088	1	,171	,006	-,304**	-,367**
	Sig. (bilateral)	,780	,576	,000	,028	,194	,045	,984	,771	,768	,095	,007	,381		,089	,949	,002	,000
	N	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
ods14	Correlación de Pearson	,026	-,190	-,051	-,086	,115	,110	-,064	-,153	-,004	,161	-,072	,000	,171	1	,083	-,141	-,113
	Sig. (bilateral)	,796	,058	,614	,397	,253	,274	,524	,129	,968	,110	,477	,998	,089		,412	,160	,262
	N	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
ods15	Correlación de Pearson	-,146	,029	,064	-,095	-,112	,124	-,226*	-,110	-,358**	-,091	,354**	,052	,006	,083	1	-,145	,105
	Sig. (bilateral)	,150	,771	,530	,349	,266	,220	,024	,278	,000	,368	,000	,609	,949	,412		,149	,296
	N	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
ods16	Correlación de Pearson	,054	,032	-,390**	,354**	,330**	-,110	,358**	,430**	-,070	-,101	,296**	,262**	-,304**	-,141	-,145	1	,308**
	Sig. (bilateral)	,593	,749	,000	,000	,001	,277	,000	,000	,488	,317	,003	,008	,002	,160	,149		,002
	N	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100
ods17	Correlación de Pearson	-,029	,053	-,217*	,407**	,164	,172	,251*	,305**	,122	-,189	,266**	,474**	-,367**	-,113	,105	,308**	1
	Sig. (bilateral)	,777	,602	,030	,000	,102	,088	,012	,002	,227	,060	,007	,000	,000	,262	,296	,002	
	N	99	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100	100

*. La correlación es significativa en el nivel 0,05 (bilateral).

**. La correlación es significativa en el nivel 0,01 (bilateral).

Table 3 PCA matrix of the main SDGs

Matriz de componente [a]

	Componente					
	1	2	3	4	5	6
ods1	,056	,473	,523	,052	,294	,485
ods2	-,042	-,237	-,097	-,634	,357	,036
ods3	-,384	,594	-,442	,076	,293	,010
ods4	,693	,193	-,081	-,080	,029	-,360
ods5	,556	-,086	,017	,429	-,462	-,141
ods6	,049	-,295	,312	,372	,476	-,267
ods7	,526	,373	-,023	-,196	-,210	,194
ods8	,638	,428	-,054	,176	,149	,295
ods9	,070	,434	,426	-,189	,136	-,560
ods10	-,349	-,255	,744	,081	,070	,294
ods11	,359	-,705	-,224	-,030	-,013	,159
ods12	,639	,161	-,085	,313	,396	,097
ods13	-,407	,505	-,391	,201	-,073	,093
ods14	-,175	-,026	,159	,615	-,166	-,104
ods15	-,092	-,439	-,462	,306	,387	,180
ods16	,701	-,092	,099	-,181	-,255	,305
ods17	,671	-,138	-,006	-,021	,391	-,186

Método de extracción: análisis de componentes principales.

a. 6 componentes extraídos.

3 Analysis and Discussion of the Results

An analysis of all the municipalities included in the sample has been carried out to address the characteristics or explanatory factors for the dynamics shown in the field of Sustainable Development.

By analyzing the geographical location of the municipalities with the best and worst rating, it is possible to point out characteristics and elements of territorial concentration that serve for further cluster analysis. On the one hand, the areas which perform best in Sustainable Development are clearly located in the northwestern quadrant of the Spanish Peninsula. On the other hand, the southeastern coastal axis of the Mediterranean and the coastal area of the south of the Iberian Peninsula show a concentration of areas with the worst values of Sustainable Development.

The first observations obtained from the analysis are:

- The communities in the area with the best results contain 15.06% of the total population as opposed to the worst-rated communities, which accumulate 31.73% of the Spanish population.
- The concentration of cities with the worst results coincides with the areas with the highest tourist concentration on the Iberian Peninsula.
- The territories with the best Sustainable Development results are among the most affected regions by the abandonment of the population of their municipalities.

Finally, to determine which factors contribute to the Sustainable Development situation of the Spanish municipalities included in the sample, a series of correlations that justify the data obtained in the study has been calculated. Specifically, these are the variables that correlate significantly:

- Average population density measured in inhabitant per km^2.
- Median age of the population measured in years.
- Population measured in number of inhabitants.
- Total number of households measured in absolute values.
- Rate of employment in industry measured as a percentage of total employees.
- Rate of employment in services measured as a percentage of total employees.
- Rate of foreign-born individuals as a percentage of the total population.
- Employment rate of people between the ages of 20 and 64 measured as a percentage of the working population.
- Rate of population over 65 years measured as a percentage of the total population.
- Rate of population between the ages of 0 and 14 measured as a percentage of the total population.
- Average annual net income per capita measured in euros per capita.
- Surface measured in km^2.
- Average household size of the municipality measured in number of inhabitants per household.
- Gross mortality rate.
- Unemployment rate.

Regarding the PCA analysis, the following interpretation of the results is inferred:

The variance shown by the components is low: 20%, 13% and 10% in all three components. This means that there is a large dispersion of the data and that the indicators for each SDG measure different aspects. This also means that it is more difficult to identify common trends. In principle, this could be seen as positive because each SDG measures different aspects (Table 4).

This is reflected through the correlation matrix since correlations are generally low (Table 2). The highest correlations are observed between SDG 12 and SDG 8 (0.57) and between SDG 13 and SDG 3 (0.52). These results differ from the most significant relationships in terms of synergies found in the UN meta-study (Singha

Table 4 Total variance explained

Component	Squared charge extraction sums		
	Total	% Variance	% Accumulated
1	3439	20,232	20,232
2	2339	13,759	33,991
3	1778	10,461	44,452
4	1495	8797	53,248
5	1388	8165	61,414
6	1196	7034	68,448

Extraction method: Principal component analysis et al. 2018). The interpretation of the second correlation is interesting and can be useful because better results in climate change management are associated with better health indicators. This conclusion is consistent with numerous international reports (Patz et al. 2005; UNFCCC 2017). Another powerful correlation associates the indicator of responsible consumption, SDG 12, with wealth sharing, SDG 10, and less unemployment, SDG 8. Other interesting correlations occur between SDG 17 and SDG 4 (0.41) and SDG 17 and SDG 12 (0.47). This new relationship complements those found in the UN meta-study (UN 2019).

The SDGs with the lower correlations, and therefore more independent of the rest, are SDG 6 and SDG 14; even among them, the correlation is very low. Their relationship with the rest of the SDGs is almost non-existent. This conclusion has similarities with the relationship's framework based on compatibility context dependent (Shinga et al. 2018).

The SDGs with more correlations with other SDGs are SDG 4 and SDG 16. They are the most transversal (Blind 2016; Boeren 2019). Education correlates positively with SDG 5, SDG 7, SDG 8, SDG 12, SDG 16 and SDG 17 and negatively with SDG 10. SDG 16 is positively correlated with SDG 4, SDG 5, SDG 7, SDG 8 and SDG 16 and negatively with SDG 3 and SDG 13. In other words, better data from justice and peace indicators show worse indicators of health and climate change.

4 Conclusion

This case study for Spanish cities takes the municipality as its reference unit, being the municipality the administrative and political entity mainly responsible for a large number of public policies that affect the territory under its jurisdiction. There is no single variable, composite indicator or set of indicators that measures sustainability universally (Wilson and Wu 2017). Therefore, the results presented should be interpreted as methodological assumptions and adopted conventions suitable in the Spanish context.

Data are indicators that point to a situation and do not reflect the urban complexity by themselves. They are limited and can mask part of the everyday reality of cities. Indicators are a tool that provides information showing reality through evidence. Thus, an interpretation exercise is needed. There are as many systems of indicators as realities to be built.

In view of all these factors, interesting results have been found in the comparison between territories. A large concentration of the tourism sector and a poorer development of education have been identified in the worst-rated areas of the index. In contrast, the municipalities with the highest values of Sustainable Development suffer from population exodus. It is important to note that correlation does not imply causation, and future lines of research should focus on locating the cause-and-effect relationship of the phenomena found.

On the other hand, the analysis shows that several factors have been identified that relate to the Sustainable Development situation of the various Spanish municipalities included in the sample. In particular, the results show how the municipalities with the best situation show significant positive correlations with the median age of the population, the average annual income per capita and the employment rate of working population between the ages of 20 and 64. By contrast, municipalities with the lowest unemployment rate are the ones with the best results.
This should ultimately lead us to consider the necessary complicity between active employment policies and sustainability and compliance with the 2030 Agenda, which is a major challenge for public administrations. SDG 8, Decent Work and Economic Growth, shows very low values in several of the Spanish municipalities; however, those with a higher economic activity are the ones that have shown the greatest progress in sustainable development. It is important that Spain is implementing policies aimed at ending job precariousness and promoting the growth and economic development of the regions. Understanding this necessary diligence means promoting educational development, which generates direct social benefits in the productivity of regions and creates decent jobs.

The following are some recommended actions which could contribute to the advancement of the 2030 Agenda at the municipal level:

- Using an open data-based approach for planning and implementation will enable a systematic assessment of the annual progress in sustainable development, improving the quality of comparable data on an urban scale and collecting it.
- Focusing on inequalities within certain groups to facilitate their approach. This study has shown acute inequalities in virtually every major city that makes up the sample analyzed. Implementing long-term policies and programs aimed at addressing inequalities between social groups in cities are critical for leveling the playing field and ensuring that all citizens, regardless of where they live, have equal opportunities in life.
- Promoting the exchange of knowledge and mutual learning between cities will be a crucial catalyst for change. Cities can use existing forums to share their experiences and forge new alliances based on shared challenges.
- Collaborations should be encouraged since the scale of the sustainable development challenges is enormous and the resources at the local level are limited. Local governments could rely on non-governmental actors such as universities, civil society and organizations to obtain technical support, collect data, design programs and strategies and support their implementation. As new strategies are defined, other actors, such as the private sector, can also be incorporated to help in supporting the implementation.
- Supporting the central government in its commitment to implement the 2030 Agenda, the Paris Declaration and Accra Agenda for Action and the Spanish Urban Agenda. This can be done by demonstrating local support for sustainable development through campaigns and public funding of the SDGs and, also, by

Table 5 Acronyms

Acronym	Full name
SDG	Sustainable Development Goals
UN	United Nations
UNDP	United Nations Development Programs
EU	European Union
EC	European Commission
SDSN	Sustainable Development Solutions Network
REDS	Spanish Network for Sustainable Development—SDSN Spain
UPM	Technical University of Madrid
ITD	Innovation and Technology for Development Center
OECD	Organization for Economic Co-operation and Development
INE	Spanish National Institute of Statistics
FEMP	Spanish Federation of Municipalities and Provinces
PCA	Principal Component Analysis

laying the foundations for practical and replicable strategies aimed at achieving the SDG in the cities and the rest of the country.

Appendix

See Table 5.

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