



**Creating an Inclusive Prosperity Cities Index
Background and Methodology**

D&L Partners, SA

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This study is part of a project commissioned in 2017 by the Bask Government, with the aims of providing the basis for the creation of an Inclusive Prosperity Corporate Seal, and its corresponding Award and Event. The underlying methodology is based on the experience gathered by D&L Partners SA through previous projects around the world, including with Bizkaia Talent.



D&L Partners is a global strategy consulting firm that specializes in providing innovation, skills and technology advice to governments and multinational organizations.

Special Note

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Initially described in the present report in February 2019, 'Inclusive Prosperity Cities Index' - or ICI for short - has now become the 'Prosperity and Inclusion in Cities Seal and Awards Index', or PICSA Index. However, we decided to leave this initial report unchanged, in order to allow readers and PICSA followers to get an accurate vision of the process that led to its creation.



The D&L and PICSA team

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Creating an inclusive prosperity cities index (ICI)

Cities, not nations, are becoming the big attractors of talent and the main engines of economic activity and prosperity.ⁱ Interest in measuring cities' economic performance is thus growing. At the same time, there is growing awareness of the importance of inclusive growth to sustain the viability and competitiveness of an economy.

The question that follows is: how inclusive are cities around the world? Approaching Inclusive Prosperity in Cities is a fertile area in need of metrics for policy design. Having good measurements will facilitate taking actions in priority areas and also identifying best practices of cities that are performing well.

This section of the report identifies the relevant work that has been done around cities measurements; based on this and on the relevant literature on inclusive growth, it then conceptualizes inclusive prosperity at the level of cities and proposes an empirical methodology (the ICI model) to measure it and benchmark cities in different geographies. Preliminary computations are shown.

I.1) Background

When talented people think about relocating, they do not think of the United States versus the United Kingdom or Australia versus Sweden. They think of Silicon Valley versus Cambridge, New York City versus London, or Sydney versus Stockholm. The Global Talent Competitiveness Index (GTCI) has been emphasizing the growing role of cities in empowering the greatest global asset: human capital. In a world of talent circulation, cities and regions are competing for becoming global talent hubs.

Talent continues to be attracted by the usual enablers: high-quality infrastructure; competitive market conditions and business environment, including clusters; an existing critical mass of talents, with excellent networking and cooperation possibilities; and superior living conditions. Because they are smaller than most national entities, cities are not only more manageable but also more agile—able to produce innovative 'talent propositions' more rapidly than their respective countries might be. Also, many elements of 'quality of life' are locally anchored such as climatic conditions or social life. Some of the sub-national entities involved have proved remarkably active – and imaginative – on this front, as demonstrated by the example of the Basque Country in Spain featured in GTCI 2015-16.

Although the success of cities will indeed be largely driven by attracting the people with the best skills, this can only be sustained by an environment that allows all residents to flourish. Inclusive institutions that respond to citizens' expectations, nurture people's skills and create a favorable business environment can expand

opportunities for all urban residents.ⁱⁱ And expanding opportunities pays off. GTCI 2018 shows how diversity and inclusion bring value to people, organizations cities and nations. Linguistic, ethnic and identity diversity can increase our prosperity, via more diverse ideas for innovating or through a richer social and cultural life.ⁱⁱⁱ Also, more equal societies develop more skills that are needed for the knowledge economy.

The objective of the ICI model is to generate metrics for comparison. The usefulness of this tool is twofold: measuring progress and identifying best practices. By measuring performance of cities across different pillars of inclusive prosperity, policy makers and regional entities can identify high performers in specific domains and establish roadmaps of best practices.

Modelling inclusive prosperity requires clear conceptualization since it is a multi-dimensional concept concerned with various aspects of quality of life including economic inclusion (e.g. access to employment) and social inclusion (e.g. tolerance of minorities). An assessment model must have a good definition of these dimensions and a clear conceptualization of their inter-relations. Qualitative information about the trade-offs and synergies that exist between pro-inclusiveness and growth-friendly policies can complement the quantitative analysis to take better decisions.

Given current access to data, the current methodology has larger coverage of cities in developed nations. et, the ICI model is bound to be refined in future versions and certainly expand its coverage as cities in emerging markets achieve more prominence. Half of global GDP in 2007 came from 380 cities in developed regions, with more than 20 percent of global GDP coming from 190 North American cities alone. The 220 largest cities in developing regions contributed another 10 percent. But by 2025, one-third of these developed-market cities will no longer make the top 600. By 2025, 136 new cities are expected to enter the top 600, all of them from the developing world and overwhelmingly—100 new cities—from China.^{iv}

I.1.1) Learning from existing Approaches to Regional and Local Prosperity

A benchmarking model to evaluate cities does not seek to re-invent the wheel.

- On the one hand, there is certainly a lot of work already done around inclusive growth - becoming one of the core values of the OECD and driving the work of development institutions around the world, including the World Bank.^v The WEF Inclusive Development Index is already developed at the level of nations.
- On the other hand, the interest in developing metrics for cities is expanding fast in academia (e.g. IESE Cities in Motion Index), business (e.g. Mercer Quality of Living Ranking), national institutions (e.g. the EU working towards a Smart City Index) and multi-lateral organizations (e.g. UN City Prosperity

Index). Some of these initiatives date back to 10 years ago, some of them being more authoritative than the others.^{vi}

The goal of the ICI model is to offer a new angle that allows taking more focused actions, precisely by linking these two areas of work: (i) inclusive growth/development and (ii) cities performance measurements.

In the work related to cities, the concept of 'Smart City' is gaining track. The main focus has been on:

- Digital transformation (e.g. European Digital City Index by NESTA)^{vii} and
- Environment (including actions in urban planning for sustainability). The environment is one of the key pillars of the Smart City approach within EU 2020 – which builds upon several analyses already existing such as EIU/Siemens Green City index or the European Green Capital Award.^{viii}

The ICI model will focus on one dimension that also makes cities smart: inclusiveness. Being smart is about optimizing resources: technology, natural resources and people. The objective of becoming a smart city is to become more sustainable in a broad way:^{ix} regarding the environment and also regarding economic and social aspects.^x The sustainability of a city's success will only endure if it benefits all in society.

It has been asserted that “the most successful cities are often the most unequal”.^{xi} Can this really be the right definition of success? There is increasing recognition in governments and also the private sector that success needs to be judged in new ways: factors like health, housing affordability and quality of life need to be put alongside jobs, skills and incomes when measuring prosperity. One example of this is the Demos-PwC Good Growth for Cities Index that is computed for U.K. cities.

The ICI model will allow comparisons of large cities across countries. Opportunity is the key word for an inclusive prosperity measurement. Although the Social Progress Index (SPI) is calculated at the level of nations, its focus on opportunity gives an insight about how to think about 'Prosperity' in cities.^{xii}

- In any advanced society, human basic needs such as safety, sanitation and medical care should be widely available.
- What will make a society more inclusive is the wide access to education and jobs, independently of initial socioeconomic status, and having equal social acceptance in society no matter gender, race or other personal characteristics.

In short, benefitting from prosperity has a material dimension (income and wealth) but also a social dimension. The work that comes closer to what ICI seeks to achieve is the work on Cities by the OECD.

I.1.2) OECD Work

The OECD has a large agenda of work around regional and local development. The mission of the Centre for Entrepreneurship, SMEs, Regions and Cities (CFE) is to help local and national governments unleash the potential of entrepreneurs and small and medium-sized enterprises and to promote inclusive and sustainable regions and cities.

A wide set of indicators have been developed in the context of this initiative (and also by previous work from the Directorate for Public Governance). These regional and city-level indicators will help improve measurements of inclusive prosperity – and for that reason such data are described in detail here and in the Annexes. The ICI model proposed below leaves room for introducing these indicators in future refinements of the methodology while relying on other sources of data with greater geographical coverage - the limitations of the OECD data are also explained below

The greatest contribution of the OECD work is a clear definition of Metropolitan Areas that has also allowed to collect data at the level of cities. Cities are defined as “*functional urban areas*” (*FUAs*), *urban centres connected by high travel-to-work flows*.^{xiii}

The latest work around ‘Cities’ by the OECD has actually been around inclusion and inequalities. Analytical and policy work have been reinforced. Moreover, to support local leaders, the OECD and the Ford Foundation launched a global coalition of Champion Mayors for Inclusive Growth in March 2016. Around 50 Champion Mayors have signed on to the New York Proposal for Inclusive Growth in Cities, a roadmap for change and a shared commitment to ensure that cities work for all.

The flagship report resulting from this work, OECD (2016) Making Cities Work for All,^{xiv} identifies five key policy areas:

- jobs; education and skills;
- housing;
- transport;
- quality services
- environment

While conceptual definitions may vary across countries, the OECD approach to urban policy for inclusive growth promotes multi-stakeholder governance that builds on the following features:

- *Functionality*: think beyond administrative boundaries;^{xv} metropolitan areas make more sense.
- *Multi-dimensionality*: target both people’s income and well-being in a city.

- *Distribution*: customize policies across population segments (heterogenous impacts within a city)

The question of distribution also points towards the issue of *spatial segregation*, which has also been tackled in further OECD work:^{xvi}

- Segregation affects quality of life: the extent to which the metropolitan population is concentrated spatially in different local jurisdictions is connected to the quality of the public services provided by local governments.
- Spatial segregation is an issue of metropolitan governance: co-ordination among different local administrations can ensure that public services are provided effectively in all parts of metropolitan areas.^{xvii}

Based on the above, OECD Data is generated at the level of both regions and cities:

A) Data at the level of Cities (see Annex 2 for full list of indicators^{xviii}):

- Developed according to two domains: (i) expanding opportunities and (ii) inclusive urban environment (see Figure 1). They represent areas where policies can have a strong impact in terms of inclusiveness.
- Data are collected following the FUA definition above: e.g. FR001: Paris
- Coverage of cities varies: e.g. Income data available for cities in more than 20 countries; inequality data available in less than 12 countries.

Figure 1. OECD Data at the sub-national level: Regions and Metro Areas

	Dimensions	City-level indicators	City definition	Number of countries
Expanding opportunities	Income	– Household disposable income	City (functional urban area)	18
	Income inequality	– Gini Index for household disposable income	City (functional urban area)	11
		– Quintile ratio for household disposable income		
		– Spatial segregation for household disposable income		
	Jobs	– Employment rate	City (functional urban area)	29
		– Unemployment rate		
– Women's participation rate				
Education	– Educational attainment (%)	City (functional urban area)	16	
Environmental quality	– Air quality (PM _{2.5})	City (functional urban area)	29	
Inclusive urban environment	Housing	– Percent of people that are satisfied with the affordability of housing in their city	Municipality (administrative unit from Gallup)	32
	Personal safety	– Percent of people that feel safe walking alone at night in their city	Municipality (administrative unit from Gallup)	32
	Social connections	– Percent of people that have someone to rely on in case of need	Municipality (administrative unit from Gallup)	31
	Subjective well-being	– Percent of people that are satisfied with the city they live in	Municipality (administrative unit from Gallup)	32

Main source of data: <http://dx.doi.org/10.1787/data-00531-en> Note: Building on the How's Life in Your Region framework, Chapter 2 of the report OECD (2016) reports some of the data on selected well-being outcomes at the metropolitan spatial scale

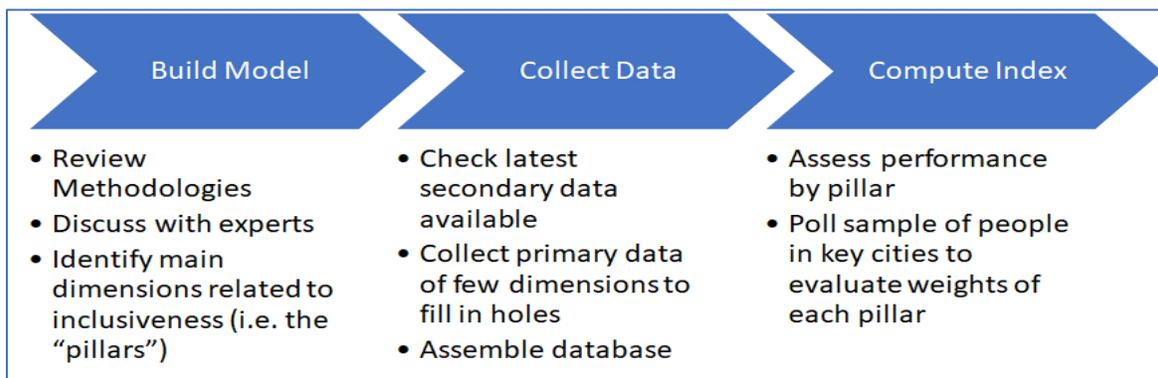
B) Data at the level of Regions (see Annex 3 for full description^{xix}):

- Regions can be defined at the T1 or T2 level (see EUROSTAT classification): e.g. FR10: Ile de France
- The OECD Better Life Index (based on “How’s Life” Initiative)^{xx} uses the Regional Well-being indicators to create a normalized composite indicator for 11 dimensions:^{xxi} (1) Education; (2) Jobs; (3) Income; (4) Safety; (5) Health; (6) Environment; (7) Civic engagement; (8) Accessibility to services; (9) Housing; (10) Community; (11) Life satisfaction.
- The Regional Well-being section also includes data on regional inequality: Gini (at disposable income, after taxes and transfers); Gini before taxes and transfers; S80/S20 disposable income quintile ratio.

I.2) ICI Model and Sources of Data

Building a good index or assessment tool requires a clear conceptual framework that is also statistically coherent (and compatible with available data). The ICI model identifies the key dimensions of such framework through a research process (see Figure 2). The model considers: (i) the best practices in composite work; (ii) the high-level dimensions that build inclusive prosperity (theoretical conceptualization); (iii) the specific variables to be included in each component of the high-level structure (empirical applicability) and; (iv) the relevant sources of data. Future refinements to the model can be done depending on the availability of additional data.

Figure 2 – The ICI Research Process



1.2.1) Criteria for a good Index

An “index” is a quantitative aggregation of many indicators and aims to provide a simplified, coherent, multidimensional view of a system.

- Indices usually give a static overview of a system

- When calculated periodically, they can indicate whether the system is becoming more or less [inclusive], and can highlight which factors are most responsible for driving the system.^{xxii}
- The aim is to be able to assess cities in different stages of ‘inclusiveness’ using common axes of evaluation.

For a composite indicator to be useful:^{xxiii}

1. Find rigorous connection to the used definitions of inclusiveness
2. Select meaningful indicators representing holistic fields (based on data availability)
3. Use data for quantification over longer time horizons
4. Identify process-oriented indicator selection
5. Enable the possibility of deriving political objectives

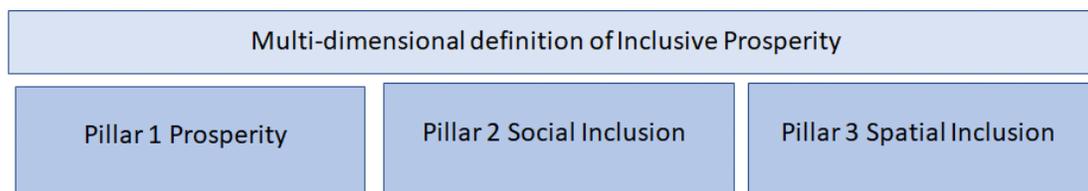
To make an optimal use of a composite indicators as a tool, it is important to complement it with qualitative information about what cities are doing to improve inclusiveness.

I.2.2) The Theoretical Basis: Inclusive Prosperity as multi-dimensional construct

The ICI model will initially focus on current performance: i.e. the current ‘state of inclusiveness’ in cities via the measure of current outcome variables such as income per capita and access to education. Policy measures and regional initiatives that are underway (that are likely to only have impacts in the future) are more difficult to quantify.^{xxiv}

The ICI Framework for inclusive prosperity is multi-dimensional and its structure was defined following the theoretical developments in this area – including the work by the OECD reviewed above. The construct of ‘inclusive prosperity’ was conceptualized using three pillars (or underlying dimensions) as depicted in Figure 3.

Figure 3. The Theoretical Components of Inclusive Prosperity



The current model was designed to be conceptually neat, empirically flexible and with the capability to be improved with relevant variables as data become available. The detailed OECD data described above will without a doubt give access to relevant information for Metro areas across the 3 pillars (nevertheless, such data is still limited to OECD countries).

The empirical model proposed in this report is an initial attempt at measuring inclusive prosperity and it takes a pragmatic stance in trying to cover cities from different geographies – particularly given the importance of inclusiveness for cities in emerging markets. Not all dimensions identified as important for inclusiveness in theory are currently being measured. Yet, all such theoretical factors must be understood – so that the model can be improved when suitable data is available (the three pillars in Figure 3 will surely show more dimensions in further refinements of the model).

Measuring inclusive prosperity in cities requires taking into account several aspects that are especially relevant to cities rather than other scales: skills, the spatial concentration of poverty, and upward economic and social mobility. In future versions, the ICI model could move beyond current *performance* variables in order to measure the *capacity* of local institutions to drive inclusive performance.^{xxv}

Before describing the indicators currently used for the computation of the empirical model, it is worth describing what each pillar is supposed to measure - and this will guide further developments and data collection regarding the model. Each pillar aims at measuring different objectives:

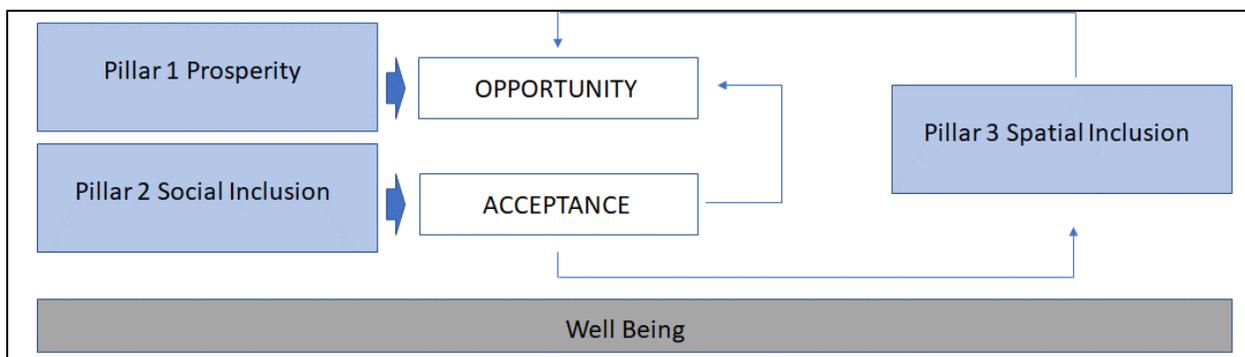
- *Pillar 1* has mainly to do with questions around income, including its distribution, and questions related to access to opportunities such as educational opportunities (which themselves affect current and future income).
- *Pillar 2* has mainly to do with non-income well-being of different social groups (related to diversity) and with people's engagement in society.^{xxvi}
- *Pillar 3* has mainly to do with the infrastructure and services of cities.^{xxvii} This is not only about quality of life; access to housing and transport facilitate access to jobs, etc.

Modelling inclusive prosperity (including the current empirical methodology and future refinements) need to consider the multi-dimensional nature and the inter-dependencies across the three pillars:

- A) Each of the three pillars is self-contained but there are inter-relationships across them (see Figure 4). For instance:

- *The issue of spatial segregation cuts across the three pillars:* could be part of Pillar 1 or Pillar 3, depending on what variables on spatial inequality are measuring.
 - *One Pillar can lead to better performance in another:* e.g. better access to housing (which enhances well-being directly via spatial inclusion) can lead to better economic inclusion (by living near employment opportunities). E.g.2 gender equality (a social inclusion goal in itself) can lead to better economic inclusion (by reducing gender employment differentials).
- B) The analysis can become more detailed by grouping variables in each pillar in more specialized sub-pillars. For instance, for Pillar 1 Prosperity, there are sub-groups of variables that can be created as data becomes richer:
- Shared Income sub-pillar (Metro area GDP/capita; Metro area Gini coefficient)
 - Shared Opportunity sub-pillar (Educational attainment tertiary; Early leavers; LM participation; LT unemployment; Social mobility).

Figure 4. Inter-dependencies in Inclusive Prosperity of Cities



The ICI Model will not re-invent the wheel. Its value will reside on becoming a more focused tool – one that allows better identifying best practices in specific areas and to better inform policy.

- One differentiating characteristic is its *anchoring to the human dimension* of local development: a special angle on talent competitiveness and talent strategies allows saying more not only about socioeconomic mobility but also about people empowerment. For instance, in addition to civic engagement, measures of collaboration and delegation of authority can be used as indicators of workplace inclusion (this could well become a sub-pillar of Pillar 2).
- The ICI framework avoids becoming a general assessment of Quality of Life by having clear delimitations. For instance, air pollution or safety are clearly important for quality of life but they would not inform the inclusiveness

framework if there is not a measure of unequal access (e.g. spatial differences in crime rates, etc.).^{xxviii}

The structure of the ICI model is relevant for policy-making because the nature of its pillars can be linked to policies in different domains.

- For improving pillar 1, policies can aim at reducing wealth inequalities (e.g. via tax system)
- For improving pillar 3, policies can aim at improving social mixing in cities (e.g. via social housing, etc.)
- Policies for Pillar 1 and 2 have mainly to do with people (e.g. policies for better education); policies for Pillar 3 have more to do with Urban Development.

I.2.3) Measurement: the challenge of city-level data

Measurement challenges at the level of cities are well known:

- How to define what a city comprises continues to be a challenge: administrative limits of municipalities vs. metropolitan areas, etc.
- Many relevant variables coming from secondary, publicly-available, sources might only be available at the level of nations, not at the level of cities.

This means that the ICI model empirical approach will favor data at the level of cities when available (the OECD has produced an important set of basic variables for FUAs; yet, issues that have to do with inclusion require more specialized data). For key issues that seem important for inclusion, regional or even national data shall be used (Figure 5).

Figure 5. Prototype of Dataset with different Levels of Data

			City-level			Region-level	Country-level
Country 1	Region 1	City 1					
Country 1	Region 1	City 2					
Country 1	Region 2	City 3					
Country 1	Region 2	City 4					
Country 2	Region 1	City 1					
Country 2	Region 1	City 2					
Country 2	Region 2	City 3					
Country 2	Region 2	City 4					

OECD data access is available to the Metropolitan Area data listed in [Annex 2](#) (although coverage of cities varies a substantially from one indicator to the other). Some variables at the regional level in [Annex 3](#) can complement the dataset where

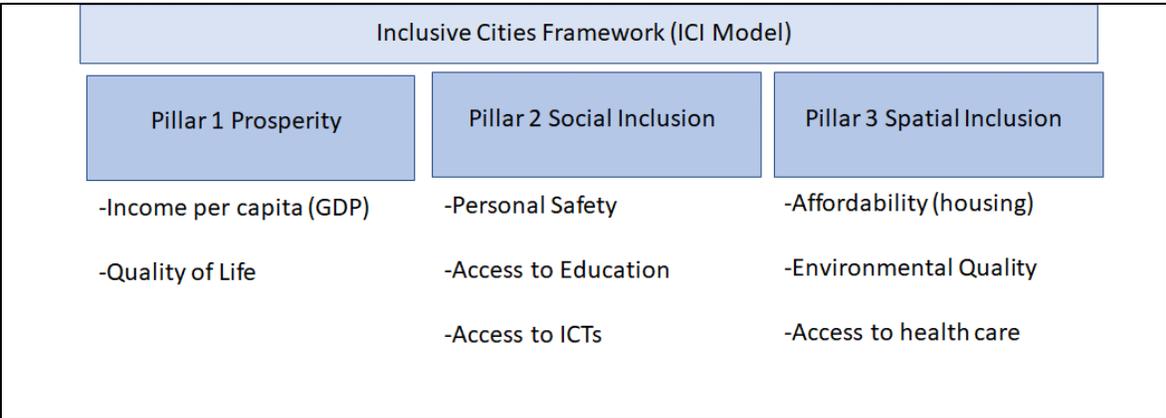
appropriate – a process of matching will have to be done between cities identifiers and their corresponding regions. National-level data will also be used in few dimensions.^{xxix}

I.2.4) The Empirical Specification: ICI Model and Variable definitions

The ICI theoretical structure defined in the last section provides a neat way to think about inclusive prosperity. Relevant variables can feed each of the pillars. Pillar 1 on Prosperity is compatible with the OECD definition of ‘material prosperity’. The other two pillars break down the OECD definition of ‘Quality of Life’ (see Annex 3) in order to become more focused: Pillar 2 focuses on social relations and the enjoyment of acceptance, whereas Pillar 3 focuses on basic services and the environment.

The current empirical model is defined as in Figure 6.

Figure 6. The ICI Framework



The ICI framework can be built into an overall composite indicator that summarizes performance across all the relevant inclusion dimensions. Nevertheless, the most useful feature of the framework is to identify high performers in specific domains. Complementing ICI results by pillar with qualitative information of initiatives and practices in leading cities will allow establishing roadmaps for action.

The most important element for comparison is to present data in a harmonized and standardized way. Following best practices in the area of composite indicators, as elucidated in the JRC-OECD Manual, the measurement process covers different stages (Table 1):

Table 1. The Data Stages

STAGE	PURPOSE	DETAILS
1 <i>Data collection</i>	Create a data table for each variable collected and identify cities using a unique ID	Identify types of data, including hard measurements, survey data (e.g. based on opinions as in the data from the WEF Executive Opinion survey) and index data (e.g. human development index). Few key variables will rely on data from primary sources. Guidelines for designing questionnaires and implementing the relevant surveys in cities will be delineated in further documentation.
2 <i>Data completion</i>	Since there normally are missing data for several variables, some data points must be imputed in order to ensure the maximum data coverage of cities. ^{xxx}	Indicate in each data table (i.e. for each variable collected) the latest year of data available for each city. If data comes at the regional or national level, ensure that there is a correspondence between the city ID and its relevant region ID and country ID.
3 <i>Data cleaning and normalization</i>	All the raw data put together in 1 and 2 above has to be normalized - so that it is comparable and they fall within a common range such as [0,100].	ICI can start with a min-max normalization method and then try other methodologies such as distance to frontier (i.e. how cities compare to leading cities irrespective of their ranking in a composite indicator). Such process of normalization takes into account outliers (extreme values that distort the comparisons) and the nature of data (categorical data can be transformed differently than numerical data).
4 <i>Creating a full ICI Dataset</i>	Produce a single data table that contains all the relevant variables for the ICI framework	The dataset will be produced by linking all the individual variable data tables using the cities IDs.

Once the full ICI dataset is created (with indicators mostly at the level of cities and regions but also at the level of nations), performance at the level of pillars (or sub-pillars if these are defined in future refinements) can be evaluated via:

- **Maturity heatmaps:** Categorical evaluations that classify cities according to level of maturity in across the different dimensions or variables included in the ICI framework
- **Scores that can give a ranking of cities (relative to the other cities in the sample) for each dimension or variable included in the ICI framework.**
- **Scores that measure the distance to frontier (i.e. distance to the leading city, or group of top cities) for each dimension.**
- **The creation of an Index for each pillar or an overall ICI Index will require thinking about the weights (i.e. the importance) of each dimension. A recent practice has been to run polls in different geographies to see what people think are the most important elements to achieve inclusion (and then weights for a composite indicator are based on responses).**

The current model is computed using the following 9 variables listed in Table 2 (measuring the indicators described in Figure 6):

Table 2. The Data Stages

Variable	Source
PILLAR 3	
GDP per capita	Global Metro Monitor, OECD, national statistics, World Bank
Quality of life	UN Habitat, Numbeo
PIILLAR 2	
Personal safety score	Numbeo
Population with tertiary education (%)	Eurostat, OECD, national statistics, UNESCO UIS with GTCI values used as a proxy
ICT access (% households with internet access at home)	Eurostat, OECD, national statistics
PILLAR 3	
Affordability: Ratio of average monthly net salary (after tax) over Rent Per Month: Apartment (1 bedroom) in City Centre	Numbeo
Environmental quality	WHO Air Pollution database June 2018
Physician density (physicians per 1000 people)	Eurostat, OECD, national statistics

I.2.5) Future Improvement to the ICI Model

Improvements to the model will depend on the amount of primary data that can be collected with partners to fill in the gaps that are not being covered by the secondary data sources available.

Data that would be ideal – but most likely not available:

- Segregation: Entropy indicators of spatial segregation.^{xxxii} The recent OECD work on segregation can be a good source of data for future improvements.
- Networks: Measure social networks in cities (e.g. Record of a National Communication Network)
- Transport: Data about commuting times >> might hamper job opportunities (the way cities are physically organized); perhaps use data on population density as an indicator of access to job opportunities.
- Housing: Data on % of home ownership

Expand focus from Performance to Capacity:

- Initially the Index will focus on current *performance*; in future version it can try to measure the *capacity* of local institutions to drive inclusive performance.
- Local government's ability to shape growth: local governments' powers and responsibilities to drive economic growth (e.g. city deals were agreed as part of a 'devolution revolution').

Other issues to take into account:

- Use indicators of individual welfare.
- See also the Multi-dimensional Living Standards (MDLS) initiative (country level) to look at approaches for welfare measures.^{xxxii}

I.2.6) Gearing ICI to an Inclusive Prosperity Seal & Award

The objective of the ICI model is to generate metrics for comparison. Such metrics allow measuring progress - with respect to reference points and with respect to other cities. They also allow identifying best practices. Based on these assessments, an Inclusive Prosperity Seal & Award will help attract worldwide attention to inclusive-related policies designed and implemented in successful cities.

I.3) ICI 2019 Results

Once normalized, ICI indicators can be aggregated into scores per theme, that eventually might be added to one score.^{xxxiii}

In order to obtain scores, the data has to be transformed into a common scale that takes into the dispersion of the data points for the variables in question

Table 3 presents ranking for the overall score. Table 4 presents the overall ranking and then the ranking for each of the three pillars for the Top-40 countries.

Table 3. ICI RANKING

RANK	City	Region	Development level	OVERALL Score
1	Zurich	Europe	Developed	78.2
2	Vienna	Europe	Developed	72.0
3	Copenhagen	Europe	Developed	70.5
4	Luxembourg	Europe	Developed	70.3
5	Helsinki	Europe	Developed	70.1
6	Taipei	Asia	Developed	69.9
7	Oslo	Europe	Developed	69.8
8	Ottawa	North America	Developed	69.8
9	Kiel	Europe	Developed	69.5
10	Geneva	Europe	Developed	68.3
11	Washington, DC	North America	Developed	68.2
12	Munich	Europe	Developed	66.9
13	Prague	Europe	Developed	66.8
14	Seattle	North America	Developed	66.6
15	Stockholm	Europe	Developed	66.0
16	Boston	North America	Developed	65.8
17	Amsterdam	Europe	Developed	65.2
18	Berlin	Europe	Developed	65.0
19	Eindhoven	Europe	Developed	64.2
20	Bilbao	Europe	Developed	64.0
21	Bratislava	Europe	Developed	63.9
22	Tallinn	Europe	Developed	63.4
23	Gothenburg	Europe	Developed	62.6
24	Rotterdam-The Hague	Europe	Developed	62.4
25	Frankfurt	Europe	Developed	62.2
26	Montreal	North America	Developed	62.1
27	Cardiff	Europe	Developed	62.1
28	Madrid	Europe	Developed	61.3
29	Nantes	Europe	Developed	60.7
30	Hanover	Europe	Developed	60.4
31	Dallas	North America	Developed	60.0
32	Paris	Europe	Developed	60.0
33	London	Europe	Developed	59.1
34	Melbourne	Oceania	Developed	59.1
35	Toronto	North America	Developed	59.0
36	Sydney	Oceania	Developed	58.7
37	Brussels	Europe	Developed	58.4
38	New York	North America	Developed	58.4
39	Tokyo	Asia	Developed	57.9
40	Dublin	Europe	Developed	57.3

41	Athens	Europe	Developed	57.0
42	San Francisco	North America	Developed	56.9
43	Ljubljana	Europe	Developed	56.9
44	Osaka	Asia	Developed	56.7
45	Abu Dhabi	MENA	Developed	56.1
46	Singapore	Asia	Developed	56.0
47	Doha	MENA	Developed	55.8
48	Lisbon	Europe	Developed	55.5
49	Seoul	Asia	Developed	55.4
50	St. Petersburg	Europe	Emerging	55.2
51	Houston	North America	Developed	54.1
52	Vilnius	Europe	Developed	53.8
53	Bucharest	Europe	Emerging	53.4
54	Riga	Europe	Developed	52.7
55	Budapest	Europe	Developed	52.6
56	Warsaw	Europe	Developed	52.1
57	Tel Aviv	MENA	Developed	52.0
58	Brno	Europe	Developed	51.6
59	Moscow	Europe	Emerging	51.4
60	Auckland	Oceania	Developed	51.3
61	Barcelona	Europe	Developed	51.2
62	Bologna	Europe	Developed	51.0
63	Dubai	MENA	Developed	51.0
64	Chicago	North America	Developed	50.6
65	Los Angeles	North America	Developed	50.3
66	Birmingham	Europe	Developed	49.1
67	Valletta	Europe	Developed	47.3
68	Milan	Europe	Developed	47.3
69	Zagreb	Europe	Emerging	47.0
70	Hong Kong	Asia	Developed	46.4
71	Nagoya	Asia	Developed	45.2
72	Sofia	Europe	Emerging	44.7
73	Turin	Europe	Developed	43.4
74	Rome	Europe	Developed	42.0
75	Krakow	Europe	Developed	41.9
76	Montevideo	LATAM	Emerging	39.4
77	Kuwait City	MENA	Developed	39.3
78	Buenos Aires	LATAM	Emerging	39.2
79	Istanbul	MENA	Emerging	36.5
80	Belgrade	Europe	Emerging	36.0
81	Bangkok	Asia	Emerging	35.8
82	Zhengzhou	Asia	Emerging	35.3
83	Bangalore	Asia	Emerging	34.7
84	Chengdu	Asia	Emerging	33.8

85	Xi'an	Asia	Emerging	32.8
86	Bogota	LATAM	Emerging	31.9
87	Hangzhou	Asia	Emerging	28.5
88	Lima	LATAM	Emerging	28.2
89	Hanoi	Asia	Emerging	27.9
90	Beijing	Asia	Emerging	27.6
91	Brasilia	LATAM	Emerging	27.3
92	Kuala Lumpur	Asia	Emerging	27.2
93	Santiago	LATAM	Emerging	27.0
94	Sao Paulo	LATAM	Emerging	26.3
95	Quito	LATAM	Emerging	25.8
96	Guangzhou	Asia	Emerging	25.7
97	Shenzhen	Asia	Emerging	25.6
98	Mexico City	LATAM	Emerging	25.6
99	Shanghai	Asia	Emerging	25.2
100	Jakarta	Asia	Emerging	22.7
101	Delhi	Asia	Emerging	22.5
102	Johannesburg	SSA	Emerging	22.3
103	Tunis	MENA	Emerging	21.9
104	Casablanca	MENA	Emerging	21.4
105	Wuhan	Asia	Emerging	19.6
106	Rio de Janeiro	LATAM	Emerging	18.6
107	Mumbai	Asia	Emerging	18.6
108	Manila	Asia	Emerging	18.2
109	Cape Town	SSA	Emerging	17.5
110	Nairobi	SSA	Emerging	17.4
111	Tianjin	Asia	Emerging	16.3
112	Chongqing	Asia	Emerging	15.7
113	Cairo	MENA	Emerging	11.4

- The sample has 112 cities distributed across the five continents: 50 cities in Europe, 25 in Asia, 12 in North America, 10 in Latin America, 9 in MENA, 3 in Oceania and 3 in Sub-Saharan Africa
- Of the Top-20 cities, 15 are in Europe, 4 in North America and 1 in Asia (Figure 2)
- The Top 10 cities in emerging markets are: St. Petersburg (50), Bucharest (53), Moscow (59), Zagreb (69), Sofia (72), Montevideo (76), Buenos Aires (78), Istanbul (79), Belgrade (80), Bangkok (81).

Table 4. ICI Ranking by Pillar (Top-40)

	OVERALL Rank	Pillar 1 Rank	Pillar 2 Rank	Pillar 3 Rank
City	Rank	Rank	Rank	Rank
Zurich	1	9	4	2
Vienna	2	13	16	4
Copenhagen	3	6	5	32
Luxembourg	4	1	10	45
Helsinki	5	35	3	20
Taipei	6	54	6	1
Oslo	7	23	7	12
Ottawa	8	31	11	7
Kiel	9	7	39	3
Geneva	10	15	36	6
Washington, DC	11	17	37	5
Munich	12	20	12	22
Prague	13	32	15	16
Seattle	14	4	35	17
Stockholm	15	12	21	23
Boston	16	3	18	38
Amsterdam	17	14	9	41
Berlin	18	43	27	10
Eindhoven	19	8	13	50
Bilbao	20	51	22	13
Bratislava	21	29	29	19
Tallinn	22	60	20	14
Gothenburg	23	46	31	18
Rotterdam-The Hague	24	36	19	40
Frankfurt	25	40	52	9
Montreal	26	47	28	21
Cardiff	27	57	26	15
Madrid	28	44	30	25
Nantes	29	49	58	8
Hanover	30	21	51	28
Dallas	31	18	56	33
Paris	32	19	40	47
London	33	16	14	71
Melbourne	34	38	50	26
Toronto	35	33	23	60
Sydney	36	24	44	42

Brussels	37	41	53	30
New York	38	10	46	54
Tokyo	39	30	42	51
Dublin	40	27	41	57

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- OECD Income and Inequality in Metros: https://www.oecd-ilibrary.org/urban-rural-and-regional-development/income-levels-and-inequality-in-metropolitan-areas_5j1wj02zz4mr-en
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ANNEXES

ANNEX 1 – SOURCES AND DEFINITIONS

This Annex list all the indicators used in the ICI model and includes their definition, level of the data (city, region or nation) and the source.

Variable	Source
PILLAR 3	
GDP per capita	Global Metro Monitor, OECD, national statistics, World Bank
Quality of life	UN Habitat, Numbeo
PIILLAR 2	
Personal safety score	Numbeo
Population with tertiary education (%)	Eurostat, OECD, national statistics, UNESCO UIS with GTCI values used as a proxy
ICT access (% households with internet access at home)	Eurostat, OECD, national statistics
PILLAR 3	
Affordability: Ratio of average monthly net salary (after tax) over Rent Per Month: Apartment (1 bedroom) in City Centre	Numbeo
Environmental quality	WHO Air Pollution database June 2018
Physician density (physicians per 1000 people)	Eurostat, OECD, national statistics

ANNEX 2 - LIST OF OECD INDICATORS AT THE LEVEL OF METRO AREAS

Demographic indicators

Total population of the metropolitan area (persons)
Population of the city area (persons)
Population, City, Youth (0-14)
Population, City, Working age (15-64)
Population, City, Old (65more)
Population of the commuting zone area (persons)
Population, Commuting Zone, Youth (0-14)
Population, Commuting Zone, Working age (15-64)
Population, Commuting Zone, Elder (65more)
Population, Total, Youth (0-14)
Population, Total, Working age (15-64)
Population, Total, Old (65more)
Youth-dependency ratio
Old-age-dependency ratio
Population of the metropolitan area as a share of national value (%)
Youth population of the metropolitan area as a share of national value (%)
Working age population of the metropolitan area as a share of national value (%)
Elderly population of the metropolitan area as a share of national value (%)
Youth population of the core area as a share of the total metropolitan area youth population (%)
Working age population of the core area as a share of the total metropolitan area working age population (%)
Elderly population of the core area as a share of the total metropolitan area elderly population (%)
Population density (persons per km²)
Population density of the city area (persons per km²)
Population density of the commuting zone (persons per km²)

Land cover indicators

Total land area (km²)
Total land area of the city (km²)
Total land area of the commuting zone (km²)
Metropolitan land share of national value (%)
City land share over Metropolitan land area (%)
Commuting zone land share over Metropolitan land area (%)
Urbanised area (km²)
Urbanised area growth
Urbanised area share (%)
Green area per million people (square meters per million person)

Urban form

Polycentricity
Concentration of population in the core (%)
Sprawl index

Territorial organization

Local governments (count)
Local governments in the core (count)
Territorial fragmentation
Average population size of local government

Economic indicators

GDP (millions US\$)
GDP of the metropolitan area as a share of national value (%)
GDP per capita (US\$)
Labour productivity

Income and inequality

Equivalised household disposable income
Gini index
Spatial ordinal entropy index at a 1,000 meters scale

Environmental indicators

CO2 emissions per capita (tonnes per inhabitant)
CO2 emissions per capita from energy industry (tonnes per inhabitant)
CO2 emissions per capita from transport (tonnes per inhabitant)
CO2 emissions of the metropolitan area as a share of national value (%)
CO2 energy emissions of the metropolitan area as a share of the national energy industry emissions (%)
CO2 transport emissions of the metropolitan area as a share of the national transport emissions from transport (%)
Estimated average exposure to air pollution (PM2.5) based on imagery data

Labour indicators

Labour force (persons)
Labour force of the metropolitan area as a share of national value (%)
Employment (persons)
Employment of the metropolitan area as a share of national value (%)
Employment as a share of the working age population (%)

Unemployment (persons)

Unemployment of the metropolitan area as a share of national value (%)

Unemployment as a share of the labour force (%)

Participation rate (%)

Innovation indicators

PCT patent applications (count)

PCT patent applications of the metropolitan area as % of national value

PCT patents applications per 10,000 inhabitants

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ANNEX 3 – DESCRIPTION OF OECD REGIONAL DATA

Regional demography

One of five datasets that make up the OECD Regional database, regional demography includes regional data on population and number of deaths by age and gender, population density, life expectancy, infant mortality, inter-regional migration and demographics indicators.

The territorial grids (TL2 and TL3) used in this database are officially established and relatively stable in all OECD member countries, and are used by many as a framework for implementing regional policies.

Regional economy

One of five datasets that make up the OECD Regional database, regional economy includes regional data on regional GDP, GVA by industry, employment by industry, labour productivity, labour utilisation, primary and disposable income and a growth index.

The territorial grids (TL2 and TL3) used in this database are officially established and relatively stable in all OECD member countries, and are used by many as a framework for implementing regional policies.

Regional labour markets

One of five datasets that make up the OECD Regional database, regional labour markets includes regional data on labour force at place of residence, employment and unemployment by gender, part-time employment, and long term and youth unemployment.

The territorial grids (TL2 and TL3) used in this database are officially established and relatively stable in all OECD member countries, and are used by many as a framework for implementing regional policies.

Regional social and environmental indicators

One of five datasets that make up the OECD Regional database, regional social and environmental indicators includes regional data on the environment, including air pollution and municipality waste; health, including physician and hospital beds density; safety, including homicides, car theft and mortality due to transport; social inclusion, including the rate of young people neither in employment nor in education and training (NEET) and, the rate of early leavers from education and training; and housing, including the number of rooms per capita and housing cost as a share of household income.

The territorial grids (TL2 and TL3) used in this database are officially established and relatively stable in all OECD member countries, and are used by many as a framework for implementing regional policies.

Regional innovation

One of five datasets that make up the OECD Regional database, regional innovation includes regional data on patent and co-patent by technology (fractional count, by inventor and priority year); R&D expenses and R&D employees; labour force and student enrolment by ISCED level.

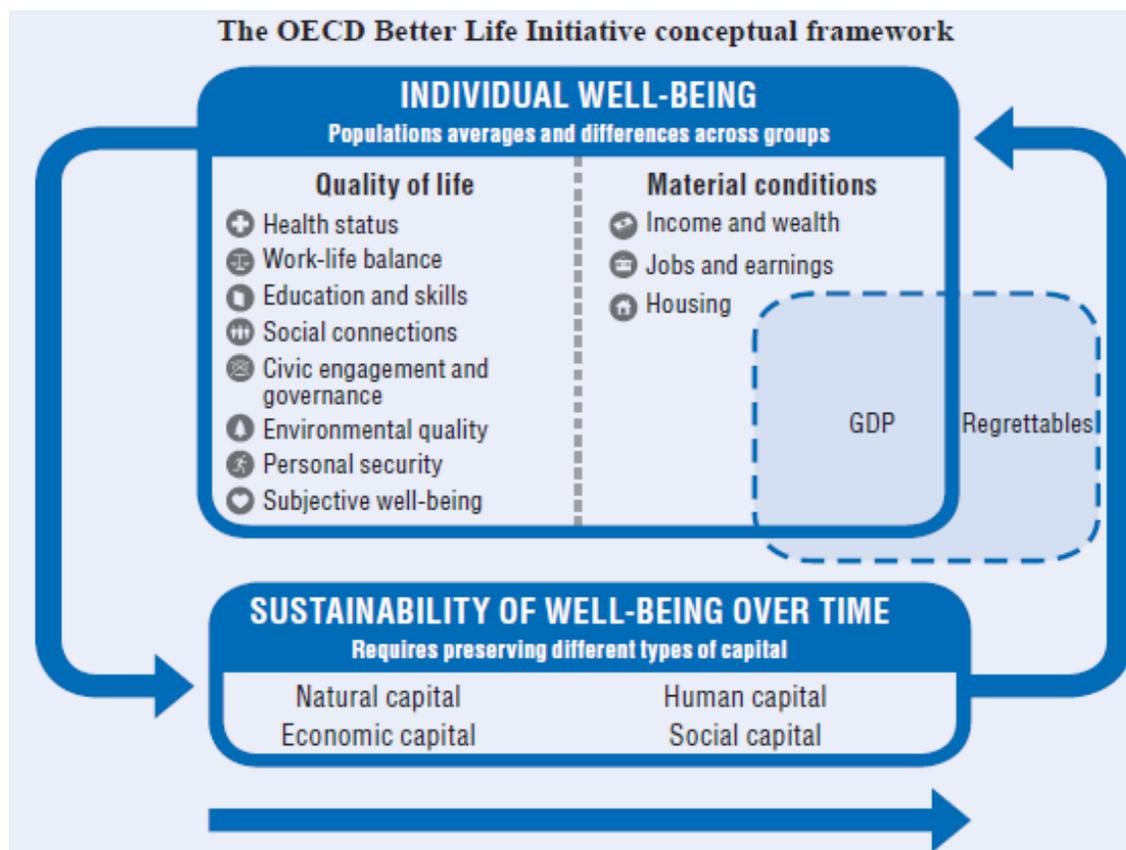
The territorial grids (TL2 and TL3) used in this database are officially established and relatively stable in all OECD member countries, and are used by many as a framework for implementing regional policies.

Regional well-being (indicators that complement the main 5 datasets above)

The Regional well-being dataset (subjective): presents nine dimensions central for well-being at local level and for OECD regions, covering material conditions (jobs and housing) and quality of life (education, health, environment, safety and access to services). The set of indicators selected to measure these dimensions is a combination of people's individual attributes and their local conditions. This dataset, the website and the publication "How's life in your region?" are outputs designed from the framework for regional and local well-being, which starts with the consideration that making better policies for better lives means understanding what matters to people.

The Regional income distribution dataset presents comparable data on sub-national differences in income inequality and poverty for OECD countries. The data by region provide information on income distribution within regions (Gini coefficients and income quintiles), and relative income poverty (with poverty thresholds set in respect of the national population), for OECD countries. These new data complement international assessments of differences across regions in living conditions by documenting how household income is distributed within regions and how many people are poor relatively to the typical citizen of their country.

Category	Well-being dimension	Place-based factors +	Individual characteristics =	People's well-being
Material living conditions	Income and jobs	- Dynamism of regional economic context	- Family	- Employment
		- Regional labour pool	- Education	- Income
		- Access to training	- Skills	- Earnings
		- Transport	- Motivation	- Poverty rates
		- Information networks		
		- Education opportunities		
Quality of life (objective factors)	Health	- Social conditions (housing, heating, relative and absolute inequality, etc.)	- Biological and genetic factors	- Life expectancy at birth
		- Environmental conditions (pollution, amenities, etc.)	- Lifestyle	- Infant mortality
			- Risky behaviour	
			- Income	
Quality of life (subjective factors)	Subjective well-being	- Access to amenities	- Mental health/ psychological resilience	- Life satisfaction
		- Noise	- Family and personal life	- Happiness
		- Pollution	- Character	
		- Community life and support		
		- Economic conditions		
		- Safety/security		



ENDNOTES

- ⁱ Cities are increasingly seen as significant economic and political actors (Harrison, 2012; Ianchovichina, Lundstrom, & Garrido, 2009; Storper, 2013). See the work cited in Lee, N. (2018). *Inclusive Growth in cities: a sympathetic critique*, Regional Studies 2018.
- ⁱⁱ OECD (2016). *Making Cities Work for All*.
- ⁱⁱⁱ For example, Ottaviano and Peri (2006), considering evidence from a sample of 226 US cities from 1980 to 2010, showed that linguistic, racial, and composite diversity increased the average income of working-age population in American cities. They also showed that such positive effects are generally higher at city level than at that of the nation.
- ^{iv} Source: Dobbs, R., Smit, S., Remes, J., Manyika, J., Roxburgh, C., & Restrepo, A. (2011). *Urban world: Mapping the economic power of cities*. McKinsey Global Institute, available at <http://www.mckinsey.com/global-themes/urbanization/urban-world-mapping-the-economic-power-of-cities>
- ^v See, for instance, Report No: AUS8539 , *World Inclusive Cities Approach Paper*, May 2015
- ^{vi} The Global Power City Index already celebrated 10 years of existence.
- ^{vii} Another example is Ericissons’s Networked society city index.
- ^{viii} Organizations supplying green certification schemes for buildings have moved into green certification of neighborhoods, districts and in an extreme case even cities.
- ^{ix} The Brundtland Report (WCED, 1987) states that sustainable development is, “... development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” Later the International Institute for Environment and Development and the World Business Council for Sustainable Development (IIED and WBCSD, 2002) repeated this same concept of sustainable development and explained it even more stating, “One of the greatest challenges facing the world today is integrating economic activity with environmental integrity, social concerns and effective governance systems. The goal of that integration can be seen as ‘sustainable development’ and should be to maximize the contribution to the well-being of the current generation in a way that ensures an equitable distribution of its costs and benefits, without reducing the potential for future generations to meet their own needs.” (see Kaklauskas et al. 2018, *Cities* 72, pp. 82–93)
- ^x The Cities in Motion Index (CIMI) has been designed with the aim of constructing a “breakthrough” indicator in terms of its completeness, characteristics, comparability and the quality and objectivity of its information. Its goal is to enable measurement of the future sustainability of the world’s main cities as well as the quality of life of their inhabitants.
- ^{xi} To see the numbers behind this assertion, see the research done by Glaeser, Resseger, & Tobio (2009) and Lee, Sissons, & Jones (2016). See the work cited in Lee, N. (2018). *Inclusive Growth in cities: a sympathetic critique*, Regional Studies 2018.
- ^{xii} SPI is built upon 3 pillars: (i) Basic Human Needs; (ii) Foundations of Wellbeing and (iii) Opportunity.
- ^{xiii} The OECD-EU definition of functional urban areas consists of highly densely populated urban centres and adjacent municipalities with high levels of commuting (travel-to-work flows) towards the densely populated municipalities. A minimum threshold for the population size of the functional urban areas is set at 50 000 inhabitants. The definition is applied to 30 OECD countries (with the exception of Iceland, Israel, New Zealand and Turkey), and it identifies 1 197 urban areas of different sizes. SOURCE: Sources: OECD

(2016), OECD Regions at a Glance, http://dx.doi.org/10.1787/reg_glance-2016-en; OECD (2012), Redefining “Urban”: A New Way to Measure Metropolitan Areas, <http://dx.doi.org/10.1787/9789264174108-en>.

- ^{xiv} Source: OECD (2016). Making Cities Work for All
- ^{xv} Local administrative units are larger than neighborhoods, but they are more strongly connected with the provision of public goods and services.
- ^{xvi} New research on ‘Divided Cities’ attempts to measure spatial inequality.
- ^{xvii} See OECD (2016) Chapter 4.
- ^{xviii} The development of indicators in these areas is based mainly on administrative records, mainly tax records, etc. (with the exception of cities in countries such as Chile, Mexico and USA where survey data is used). Recent literature analyzing issues of income inequality, spatial segregation and income dynamics in cities are also making use of administrative data (Chetty et al., 2014; Tammaru et al., 2016). Data coming from Gallup will need to be requested; it is not available on OECD.Stat.
- ^{xix} Some Regional Statistics are presented in the form of indices (of wellbeing) whereas others are presented in raw form across different domains. Access the Data on: <https://www.oecd-ilibrary.org/urban-rural-and-regional-development/data/oecd-regional-statistics-region-data-en> . Like the Metro Area data, these indicators are also available via OECD.Stat
- ^{xx} For further details see OECD (2011; 2014b). The OECD Better Life Initiative combines OECD work on well-being, including the publications *How’s Life?*
- ^{xxi} These data are provided in 395 subnational OECD regions
- ^{xxii} See the definitions in Mayer (2008).
- ^{xxiii} These are the recommendations delineated by Bohringer (2007)
- ^{xxiv} Driving factors for smart cities, for instance, may include smart city policies, city budget for smart city development projects, a smart city-minded leadership, desire for an innovative environment etc.
- ^{xxv} Local governments do not always have the ability to shape growth: local governments’ powers and responsibilities to drive economic growth could be limited (e.g. the lack of city deals as part of a ‘devolution revolution’).
- ^{xxvi} On non-monetary wellbeing.....Once shadow prices are estimated for non-monetary variables of quality of life, it is possible to compute the “equivalent income” (or “monetised well-being”) of different groups of people within each region (see OECD 2016 Ch3)
- ^{xxvii} The Economist Intelligence Unit (EIU) publishes an annual Global Liveability Ranking, which ranks 140 cities for their urban quality of life based on assessments of stability, healthcare, culture and environment, education and infrastructure.
- ^{xxviii} The environment is good for Quality of Life but it is not a direct driver of inclusiveness. Good transportation is also good for Quality of Life (and for the environment for that matter); moreover, it is good for inclusiveness as it facilitates access to work locations and the different amenities of the city.
- ^{xxix} Other useful variables at national level:
- Ease of Doing Business (national level, i) for Pillar 1 Economic Inclusion (shared opportunity)
 - Social protection (national level, s) for Pillar 1 Economic Inclusion (shared opportunity)
 - Rule of law (national level, i) for Pillar 2 Social Inclusion
 - Lack of corruption (national level, i) for Pillar 2 Social Inclusion
 - Personal rights (national level, i) for Pillar 2 Social Inclusion
 - Delegation of authority (national level, s) for Pillar 2 Social Inclusion (‘workplace inclusion’ sub-pillar?)

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- Collaboration within firms (national level, s) for Pillar 2 Social Inclusion (or 'workplace inclusion' sub-pillar?)

^{xxx} For instance, by using regression imputation or expectation-maximisation imputation.

^{xxxi} See Source: Veneri, P. (2015), "Urban spatial structure: Is urban population decentralising or clustering?", OECD Regional Development Working Papers, No. 2015/1, OECD Publishing, Paris, <http://dx.doi.org/10.1787/5js3d834r3q7-en>

^{xxxii} See in particular https://www.oecd-ilibrary.org/economics/multi-dimensional-living-standards_5jlpq7qvxc6f-en . Additional details on and about the report can be found at: http://www.oecd.org/inclusive-growth/Bridging_the_Gap.pdf . It computes a distribution-adjusted welfare measure that aggregates outcomes in three dimensions of well-being, namely income, employment and longevity. Aggregation weights reflect preferences of people on these dimensions. The welfare measure is calculated for 26 OECD countries and selected emerging economies, and covers about three decades.

^{xxxiii} One caveat: Relative positions among the spatial entities do not tell us whether they are sustainable or not. Even though a country is considered sustainable in a relative evaluation, it may be non-sustainable in absolute terms. Measuring relative performance is meaningless if all countries are on unsustainable trajectories (Mori, 2012).