

**Center for
Globalization
and Strategy**



IESE Cities in Motion Index

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CONTENTS

Preface	05
Working Team	07
Academic Team	07
Sponsors	07
Introduction: The Need for a Global Vision	08
Our Model: Cities in Motion. Conceptual Framework, Definitions and Indicators	09
Limitations of the Indicators	20
Geographical Coverage	20
Cities in Motion. Ranking	22
Cities in Motion. Ranking by Dimension	24
Cities in Motion. Regional Ranking	33
Some Noteworthy Cases	35
Evolution of the Cities in Motion Index	38
Cities in Motion vs. Other Indexes	41
Cities in Motion: A Dynamic Analysis	43
Conclusions	45
Appendix 1. Indicators	47
Appendix 2. 181 City Profiles	52

PREFACE

For the third consecutive year, we are pleased to present a new edition of the Cities in Motion Index (**CIMI**), which aims to evaluate different cities in relation to 10 dimensions that we consider key: the economy, human capital, technology, the environment, international outreach, social cohesion, mobility and transportation, governance, urban planning and public management.

In recent years, we have observed an intensification of the urbanization process; it has become a trend that will mark the way we view our lives. According to the most reliable estimates, in 2050, 70% of the world's population will live in cities (currently, this percentage is 56%). And although they generate 80% of global economic growth and wealth, cities around the world face major global challenges, including economic crises (the polarization of income, unemployment and inflation), demographic trends (the aging of the population, segregation and immigration), social divisions (heterogeneous social demands, the digital divide, inequality and poverty) and environmental consequences (energy inefficiency, waste management and pollution). The scope and magnitude of all of this create new challenges for cities' sustainability.

To meet these challenges, the world's cities must undergo a strategic review process and consider what kinds of cities they want to be, what their priorities are and where they stand now. In this regard, our index aims to become a platform that will enable an initial comprehensive assessment of cities to be carried out and offer a first point of reference with respect to other major cities through comparative analysis.

As in the previous editions, we faced the challenge of creating an index of cities that is better than those that already exist – an objective and comprehensive index with wide coverage and guided by the criteria of conceptual relevance and statistical rigor. The first two editions achieved great media coverage and were very well received in various forums related to city management, which has encouraged us to continue working to improve it. At our book launches, we received a lot of recommendations and suggestions, and we have tried to incorporate them into this new edition. Among the most important changes in this year's index are the following:

- **Wider geographical coverage:** We have increased by 23% the number of cities included in the ranking, with a total of 181 (72 of them capital cities) and more than 80 countries represented. This effort allows us to assert that the index is among those with the widest geographical coverage existing today.
- **Higher number of indicators:** We have increased by 10% the number of indicators measuring the 10 relevant dimensions of a city, with a total of 77 indicators.
- **Greater variability at city level:** As a result of the incorporation of new sources of information, some indicators that had been introduced in the first edition by country are applied now by city, which has enabled a better assessment to be obtained of the various cities.
- **Combination of objective and subjective indicators:** In calculating our index, we have applied quantitative variables that capture both objective and subjective data, which allows us to offer a wider view of the city based on the opinions of the public.
- **Better analysis:** We have incorporated new analyses of the dynamics of the **CIMI**, considering its evolution for the years 2013, 2014 and 2015.
- **Improved methodology:** We have refined our methodology in accordance with the latest statistical practices for creating synthetic indexes.

We trust that this report will be useful to mayors, city managers and all those interest groups whose aim is to improve the quality of life of city residents. We also hope that it will be useful to companies dedicated to urban solutions, since internationalization strategies are defined more and more at the city level and not at the country level.

We regard this project as a dynamic one. We continue to work so that future editions of the **CIMI** contain better indicators, wider coverage and an increasing predictive value. We are grateful, therefore, for any feedback that might help us improve, and we are always at your disposal via our website (www.iese.edu/cim).

We are convinced that we can live in better cities, but this will be possible only if all the social actors – the public sector, private companies, civic organizations and academic institutions – contribute and collaborate to achieve this common goal. This report is our small contribution.



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ABOUT US

IESE Cities in Motion Strategies is a research platform launched jointly by the Center for Globalization and Strategy and IESE Business School's Department of Strategy.

The initiative connects a global network of experts in cities and specialist private companies with local governments from around the world. The aim is to promote changes at the local level and to develop valuable ideas and innovative tools that will lead to more sustainable and smarter cities.

The platform's mission is to promote the Cities in Motion model, with an innovative approach to city governance and a new urban model for the 21st century based on four main factors: a sustainable ecosystem, innovative activities, fairness among citizens and connected territory.

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INTRODUCTION: THE NEED FOR A GLOBAL VISION

Today more than ever, cities require strategic planning. Only then can they consider pathways to innovation and prioritize what is most important for their future.

The strategic planning process should be participatory and flexible, and a central aim should be established: to define a sustainable action plan that will make the metropolis unique and renowned. Just as two companies do not have the same recipe for success, each city must look for its own model on the basis of some common considerations.

Experience shows that large cities must avoid a short-term outlook and expand their field of vision. They should turn to innovation more frequently to improve the efficiency and sustainability of their services. And, also, they should promote communication and ensure that residents and businesses are involved in their projects.

The time has come to practice intelligent governance that takes into account all the factors and social actors – and with a global vision. In fact, over the past few decades, various national and international organizations have produced studies focusing on the definition, creation and use of indicators with a variety of aims, although mainly to contribute to a diagnosis of the state of cities. In each of these studies, the definition of the indicators and their creation process are the result of the study's characteristics, the statistical and econometric techniques that best fit the theoretical model and available data, and the analysts' preferences.

Today we have a lot of “urban” indicators, although many of them are not standardized and are not consistent or comparable among cities. In fact, numerous attempts have been made to develop city indicators at the national, regional and international level. However, few have been sustainable in the medium term, as they were created for studies meant to cover the specific information needs of certain bodies, whose lifespan depended on how long the financing would last. In other cases, the system of indicators depended on a political desire in specific circum-

stances, so they were abandoned when political priorities or the authorities themselves changed. As for the indicators developed by international organizations, it is true that they strive for the consistency and solidity necessary to compare cities; however, for the most part, they tend to be biased or focused on a particular area (technology, the economy and the environment, among others).

Taking all this into account, 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.

The **CIMI** aims to help the public and governments to understand the performance of 10 fundamental dimensions for a city: governance, urban planning, public management, technology, the environment, international outreach, social cohesion, mobility and transportation, human capital, and the economy. All the indicators are linked with a strategic aim that leads to a different kind of local economic development: the creation of a global city, the promotion of the entrepreneurial spirit, and innovation, among others.

Each city is unique and unrepeatable and has its own needs and opportunities, so it must design its own plan, set its priorities and be flexible enough to adapt to changes.

Smart cities generate numerous business opportunities and possibilities for collaboration between the public and private sectors. All stakeholders can contribute, so an ecosystem network must be developed that will involve all of them: members of the public, organizations, institutions, government, universities, experts, research centers, etc.

Networking has its advantages: better identification of the needs of the city and its residents, the establishment of common aims and constant communication among participants, the expansion of learning opportunities, increased transparency, and the implementation of more flexible public policies. As a report by the Organization for Economic Cooperation and Development (OECD) pointed out back in 2001, the network approach allows local policies to be focused on the public.

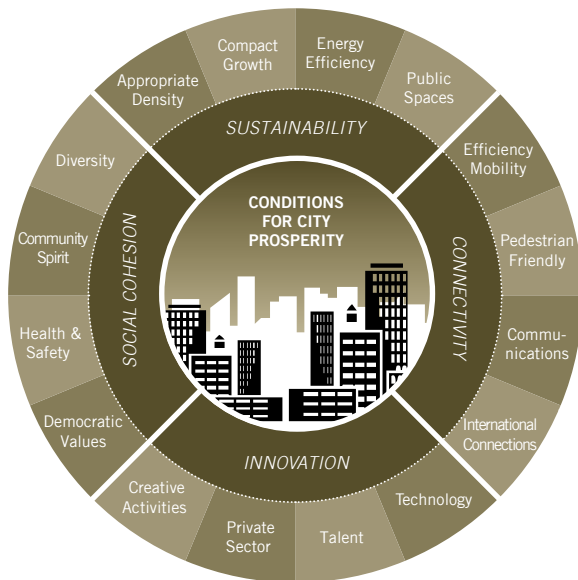
Private enterprise also has much to gain with this system of networking: it can collaborate with the administration

in the long term, access new business opportunities, gain a greater understanding of the needs of the local ecosystem, gain international visibility, and attract talent.

Thanks to its technical expertise and its experience in project management, private enterprise, in collaboration with universities and other institutions, is suited to lead and develop smart city projects. In addition, it can provide efficiency and significant savings to public-private bodies.

Finally, it must not be forgotten that the human factor is fundamental in the development of cities. Without a participatory and active society, any strategy, however intelligent and comprehensive, will be doomed to failure. Beyond technological and economic development, it is the public that holds the key for cities to go from “smart” to “wise.” That is the goal to which every city should aspire: that the people who live there and their leaders deploy all their talent in favor of progress.

To help cities identify effective solutions, we have created an index that captures 10 dimensions in a single indicator and includes 181 cities throughout the world. Thanks to its broad and integrated vision of the city, the Cities in Motion Index enables the strengths and weaknesses of each city to be identified.



OUR MODEL: CITIES IN MOTION. CONCEPTUAL FRAMEWORK, DEFINITIONS AND INDICATORS

Our platform proposes a conceptual model based on the study of a large number of success stories and a series of in-depth interviews with city leaders, entrepreneurs, academics and experts linked to urban development.

Our model proposes a set of steps that include diagnosis of the situation, the development of a strategy, and its subsequent implementation – and the first step to giving a good diagnosis is to analyze the status of key dimensions.

We will now, therefore, set out the 10 key dimensions of our model, as well as the indicators used in calculating the **CIMI**.

HUMAN CAPITAL

The main goal of any city should be to improve its human capital. A city with smart governance must be capable of attracting and retaining talent, creating plans to improve education, and promoting creativity and research.

Table 1 sets out the indicators used in the human capital dimension, descriptions of them, their units of measurement and the sources of information.

While human capital includes factors that make it more extensive than what can be measured with these indicators, there is international consensus that level of education and access to culture are irreplaceable components for measuring human capital. In fact, one of the pillars of human development is human capital and, taking into account that the Human Development Index published annually by the United Nations Development Program includes education and culture as dimensions, it is valid to regard these indicators as factors explaining the differences in human capital in a city.

TABLE 1. HUMAN CAPITAL INDICATORS

NO.	INDICATOR	DESCRIPTION / UNIT OF MEASURE	SOURCE
1	Higher education	Proportion of population with secondary and higher education	Euromonitor
2	Business schools	Number of business schools (top 100)	Financial Times
3	Movement of students	International movement of higher-level students. Number of students	UNESCO
4	Number of universities	Number of universities	QS Top Universities
5	Museums	Number of museums per city	2thinknow
6	Art galleries	Number of art galleries per city	2thinknow
7	Expenditure on leisure and recreation	Expenditure on leisure and recreation. Expressed in millions of U.S. dollars at 2014 prices	Euromonitor

In the case of the **CIMI**, the following are considered with a positive sign: the proportion of the population with secondary education and higher, the number of business schools, the flow of international students in each city or country, and the number of universities.

As a measure of access to culture, account is taken of the number of museums, the number of art galleries, and expenditure on leisure and recreation, all in direct relation to the indicator. These indicators show the city's commitment to culture and human capital. Creative and dynamic cities worldwide typically have museums and art galleries open to the public and offer visits to art collections and events for the preservation of art. The existence of a city's cultural and recreation provision results in greater expenditure on these activities by the population.

SOCIAL COHESION

Social cohesion is a sociological dimension of cities defined as the degree of consensus among the members of a social group or the perception of belonging to a common situation or project. It is a measure of the intensity of social interaction within the group. Social cohesion in the urban context refers to the degree of coexistence among groups of people with different incomes, cultures, ages and professions who live in a city. Concern about the city's social setting requires an analysis of factors such as immigration, community development, care of the elderly, the effectiveness of the health system and public inclusion and safety.

The presence of various groups in the same space and mixing and interaction between groups are essential in a sustainable urban system. In this context, social cohesion is a state in which there is a vision shared by citizens and the government of a model of society based on social justice, the primacy of the rule of law and solidarity. This allows us to understand the importance of policies that underpin social cohesion based on democratic values.

Table 2 sets out the indicators selected for this dimension, descriptions of them, their units of measurement, and the information sources. This selection of indicators seeks to incorporate all the sociological subdimensions of social cohesion, based on the different variables available.

The ratio of deaths per 100,000 inhabitants and the crime rate are incorporated with a negative sign, while the health index is incorporated with a positive sign in the creation of this dimension's indicator.

Employment, meanwhile, is a fundamental aspect in societies, to the extent that, according to historical evidence, a lack of employment can break the consensus or the implicit social contract. For this reason, the unemployment rate is incorporated with a negative sign in the dimension of social cohesion. However, the ratio of women workers in the public administration is incorporated with a positive sign, since it is an indicator of gender equality in access to government jobs.

TABLE 2. SOCIAL COHESION INDICATORS

NO.	INDICATOR	DESCRIPTION / UNIT OF MEASURE	SOURCE
8	Ratio of deaths	Ratio of death per 100,000 inhabitants	Euromonitor
9	Crime rate	Crime rate	Numbeo
10	Health index	Health index	Numbeo
11	Unemployment rate	Unemployment rate (number of unemployed / labor force)	Euromonitor
12	Gini index	The Gini index varies from 0 to 100, with 0 being a situation of perfect equality and 100 that of perfect inequality	Euromonitor
13	Price of property	Price of property as percentage of income	Numbeo
14	Ratio of women workers	Ratio of women workers in the public administration	International Labor Organization

The Gini index is calculated from the Gini coefficient and measures social inequality. It assumes a value equal to zero for situations in which there is a perfectly equitable income distribution (everyone has the same income) and it assumes the value equal to 100 when the income distribution is perfectly inequitable (one person has all the income and the others none). This indicator is incorporated into the dimension with a negative sign, since a higher index value has a negative effect on a city's social cohesion.

Finally, the price of property as a percentage of income is also related negatively since, when the percentage of income to be used to buy a property increases, the incentives to belong to a particular city's society decrease.

ECONOMY

This dimension includes all those aspects that promote the economic development of a territory: local economic development plans, transition plans, strategic industrial plans, and cluster generation, innovation and entrepreneurial initiatives.

The indicators used to represent the performance of cities in the economic dimension are specified in Table 3, along with descriptions of them, their units of measurement and the sources of information.

Considering that the **CIMI** seeks to measure, via multiple dimensions, sustainability into the future of the world's main cities and the quality of life of their inhabitants, real GDP is a measure of the city's economic power and of its

inhabitants' income. In addition, it is an important measure of the quality of life in cities. In numerous studies, GDP is considered the only or the most important measure of the performance of a city or country. However, in this report, it is not considered as exclusive nor as the most important measure: it is considered as one more indicator within one of the 10 dimensions of the **CIMI**. Thus, its share of the total is similar to that of other indicators. For example, a city with a high or relatively high GDP, if it does not have a good performance in other indicators, may not be in one of the top positions. In this way, a city that is very productive but has problems with transportation, inequality, weak public finance or a production process that uses polluting technology probably will not be in the top positions of the ranking.

For its part, labor productivity is a measure of the strength, efficiency and technological level of the production system, which, with regard to local and international competitiveness, will have repercussions, obviously, on real salaries, on capital income, on business profits – a reason why it is very important to consider the measure in the economic dimension, since different productivity rates can explain differences in the quality of life of a city's workers – and on the sustainability over time of the production system.

TABLE 3. ECONOMIC INDICATORS

NO.	INDICATOR	DESCRIPTION / UNIT OF MEASURE	SOURCE
15	Productivity	Labor productivity calculated as GDP/working population (in thousands)	Euromonitor
16	Time required to start a business	Number of calendar days needed so a business can operate legally	World Bank
17	Ease of starting a business	Ease of starting a business. Top positions in the ranking indicate a more favorable regulatory environment for creating and operating a local company	World Bank
18	Number of headquarters	Number of headquarters of publicly traded companies	Globalization and World Cities (GaWC)
19	Percentage of people at early business stage	Percentage of 18 to 64-year-old population who are new entrepreneurs or owners/managers of a new business	Global Entrepreneurship Monitor
20	Entrepreneurs	Companies in an initial phase that represent a city's economic bases. They represent economic dynamism and include a high proportion of companies devoted to technology. Used per capita	2thinknow
21	GDP	Gross domestic product in millions of U.S. dollars at 2014 prices	Euromonitor

The other indicators selected as representative of this dimension enable the measurement of some aspects of the business landscape of a city, such as the number of headquarters of publicly traded companies; the entrepreneurial capacity and possibilities of a city's inhabitants, represented by the percentage of people at an early business stage; entrepreneurial companies; the time required to start a business; and the ease of starting a business in regulatory terms. These indicators measure a city's sustainability capacity over time and the potential ability to improve the quality of life of its inhabitants. The time required to start a business and the ease of launching it are incorporated into the economic dimension with a negative sign, since lower values indicate a greater ease of starting businesses. The number of headquarters of publicly traded companies, the capacity, the number of entrepreneurs and the entrepreneurial possibilities of a city's inhabitants have a positive relationship, since the high values of these indicators reflect the economic dynamism of a city and the ease of allowing the installation and development of new businesses.

PUBLIC MANAGEMENT

The public management dimension encompasses all those actions aimed at improving the administration's efficiency, including the design of new organizational and management models. In this area, great opportunities open up for private initiative, which can bring greater efficiency.

In this work, public management is understood to be highly correlated with the state of public finances of a city or country. In this regard, public accounts decisively affect people's quality of life and a city's sustainability, since they determine the level of present and future taxes that must support the residents and the production system, the expected growth of the general price levels, the possibilities of public investment in basic social infrastructure, and incentives for private investment. In addition, if the state has funding needs, because of the weakness of the public finance system, it will compete with the private sector for funds available in the financial system, which will affect investment.

The indicators that represent the public management dimension in this report are listed in Table 4, along with descriptions of them, their units of measurement and the sources of information.

The indicators related to the tax system, which are incorporated with a negative sign in this dimension's synthetic indicator, cover aspects of the state of public finances since the greater the relative tax burden, the weaker a city's public accounts are. The total tax rate measures the total amount of taxes and compulsory contributions paid by businesses after accounting for deductions and exemptions allowed as part of commercial profits. Excluded are taxes withheld (such as income tax for natural persons) or taxes collected and remitted to tax authorities

TABLE 4. PUBLIC MANAGEMENT INDICATORS

NO.	INDICATOR	DESCRIPTION / UNIT OF MEASURE	SOURCE
22	Total tax rate	Total tax rate. This measures the total amount of taxes and compulsory contributions paid by businesses after accounting for deductions and exemptions allowed as part of commercial profits	World Bank
23	Reserves	Total reserves in millions of current U.S. dollars	World Bank
24	Reserves per capita	Reserves per capita in millions of current U.S. dollars	World Bank
25	Embassies	Number of embassies per city	2thinknow
26	Twitter	Twitter users listed in prominent Twitter directories (e.g., Twellow). It includes users self-defined as leaders (for example, writers, activists, business leaders and journalists). In thousands of people	2thinknow
27	Sales tax	Sales tax. This has a big impact on the economy. Lower rates of sales tax can be used to finance investment in services and intelligent infrastructure	2thinknow

(such as value added tax, sales tax or goods and services tax). Similarly, sales tax has a big impact on the economy. Lower rates of sales tax can be used to finance investment in services and intelligent infrastructure.

In turn, the level of reserves is an indicator of the strength of the public finance system in the short and medium term, of their ability to cope with changing economic cycles, and of the strength and sustainability of the economic structure in relation to the state. Likewise, the number of embassies and consulates is an indicator of the city's international importance for global standards and is based on the embassies that foreign countries assign to the city.

Active Twitter users with public data in the Twellow directory are those who are considered opinion leaders (activists, prominent critics of the government, business leaders, writers and journalists, among others). Twitter messages tend to be transmitted via opinion leaders, so global directories provide a guide to the prominence of dissenting voices and ideas within cities. In some authoritarian countries, publishing points of view and opinions as a thought leader is risky, so there will be fewer active leaders and critics in Twitter directories. This indicator is incorporated with a positive sign.

GOVERNANCE

Governance is the term commonly used to describe the effectiveness, quality and sound guidance of state intervention. Given that the citizen is the meeting point for solving all the challenges facing cities, account should be taken of factors such as the level of the public's participation, the authorities' ability to involve business leaders and local stakeholders, and the application of government plans.

Table 5 sets out the indicators used in the governance dimension to calculate the **CIMI**.

The strength of rights index measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate access to loans. The values go from 0 (low) to 12 (high) and the highest ratings indicate that the laws are better designed to expand access to credit. Creating the conditions and ensuring the effective implementation of the rights of the public and companies situated in their territory is a function of national or local states that cannot be delegated. The perception of the observance of legal rights influences all aspects of life of a country or city, such as the business climate, investment incentives and legal certainty, among others. For this reason, the strength of rights index has been incorporated with a positive sign in the creation of this dimension's indicator.

TABLE 5. GOVERNANCE INDICATORS

NO.	INDICATOR	DESCRIPTION / UNIT OF MEASURE	SOURCE
28	Strength of legal rights index	The strength of legal rights index measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate access to loans. The values go from 0 = low to 12 = high, where the highest ratings indicate that the laws are better designed to expand access to credit	World Bank
29	Corruption perceptions index	Corruption perceptions index. The values go from 0 = very corrupt to 100 = very transparent	Transparency International
30	Functions of the innovation department	Number of functions of the city's innovation department (or ministry if there is one)	2thinknow
31	Range of government Web services	Range of Web services for all city council users (residents or visitors). This is a measure of modern and technological municipal government. Scale from 0 to 5	2thinknow
32	Open data platform	This describes whether the city has an open data system	CTIC Foundation

The government corruption perceptions index is a way to measure the quality of governance, since a high perception in society of corruption in public bodies is a sign that state intervention is not efficient from the point of view of the social economy, given that public services – understood in a broad sense – involve higher costs in relation to a situation with no corruption. In addition, incentives to invest or settle in countries or cities with a high perception of corruption will be lower than in others with low levels, which negatively affects the sustainability of the country or city. In the case of the **CIMI**, it is taken as an explanatory indicator of the governance dimension, with a positive sign, due to how the index is calculated by the organization Transparency International, which assigns it a value of zero for countries with a high level of corruption and 100 for very transparent countries.

Likewise, having an innovation department is a central point of any government policy. The number of functions of this department is an indicator of governments' support for these policies. Therefore, it is incorporated with a positive sign: departments with more functions reflect greater support for innovation.

The range of Web services for a city council's users, meanwhile, is a sign of the government's responsiveness to a city's technological functions and to the needs of its residents and visitors (that is, the users of a city). No city can afford to disregard commitment to the users of their city, and every city should have an optimal online presence. This indicator is incorporated with a positive sign, since higher values reflect a greater number of Web services for city council users.

Finally, the variable that considers whether a city's government has an open data platform is an indicator of transparency in government management, a communication channel with the public and a platform for generating new business models. The variable assumes a value of 1 if there is an open data platform and 0 otherwise. Therefore, the indicator is incorporated with a positive sign into this dimension.

ENVIRONMENT

Sustainable development of a city can be defined as development “that meets the needs of the present without compromising the ability of future generations to meet their own needs.”¹ In this respect, factors such as improving environmental sustainability through antipollution plans, support for green buildings and alternative energy, efficient water management, and policies that help counter the effects of climate change are essential for the long-term sustainability of cities.

Since the **CIMI** also seeks to measure the environmental sustainability of cities, the environment is included as one of the essential aspects of measurement. Table 6 sets out the indicators selected in this dimension, descriptions of them, their units of measurement and the sources of information.

The indicators selected include measurements of air pollution sources and water quality in cities, which are indicators of the quality of life of their inhabitants, as well as the sustainability of their productive or urban matrix.

¹ Definition used in 1987 by the UN's World Commission on Environment and Development, created in 1983.

TABLE 6. ENVIRONMENTAL INDICATORS

NO.	INDICATOR	DESCRIPTION / UNIT OF MEASURE	SOURCE
33	CO ₂ emissions	Carbon dioxide emissions that come from the burning of fossil fuels and the manufacture of cement. Measured in kilotons (kt)	World Bank
34	CO ₂ emission index	CO ₂ emission index	Numbeo
35	Methane emissions	Methane emissions that arise from human activities such as agriculture and the industrial production of methane. Measured in kt of CO ₂ equivalent	World Bank
36	Percentage of the population with access to the water supply	Percentage of the population with reasonable access to an appropriate quantity of water resulting from an improvement in the water supply	World Bank
37	PM2.5	PM2.5 measures the amount of particles in the air whose diameter is less than 2.5 µm. Annual mean	World Health Organization
38	PM10	PM10 measures the amount of particles in the air whose diameter is less than 10 µm. Annual mean	World Health Organization
39	Pollution index	Pollution index	Numbeo
40	Environmental performance index	Environmental performance index (from 1 = poor to 100 = good)	Yale University

Carbon dioxide emissions come from the burning of fossil fuels and the manufacture of cement, while methane emissions arise from human activities such as agriculture and the industrial production of methane. CO₂ and methane emissions are the main measures that are commonly used to measure the degree of air pollution, since they are substances that have a lot to do with the greenhouse effect. In fact, the decline in these indicators' values is included as a target in the Kyoto Protocol.

Other very important indicators for air pollution in cities are PM2.5 and PM10, a designation that corresponds to small particles, solid or liquid, of dust, ash, soot, metal particles, cement or pollen, scattered in the atmosphere and whose diameter is less than 2.5 and 10 micrometers (µm) respectively. These particles are formed, in the main, by inorganic compounds such as silicates and aluminates, heavy metals and organic material associated with carbon particles (soot). These indicators are commonly used in the indexes that seek to measure the state of environmental pollution. These indicators are complemented by the information provided by the city pollution index, which estimates the overall pollution in the city. The greatest weight is given to those cities with the highest air pollution.

Finally, the environmental performance index (EPI), calculated by Yale University, is an indicator based on the measurement of two large dimensions related to the environment: environmental health and ecosystem vitality. The first is divided into three subdimensions: effects on human health of air pollution, effects of water quality on human health, and the environmental burden of diseases. Ecosystem vitality contains seven subdimensions: effects on the ecosystem of air pollution, effects on the ecosystem of water quality, biodiversity and habitat, afforestation, fish, and climate change. Given the completeness of this indicator – which covers almost all aspects related to measuring the state and evolution of the environment in a city, complemented by the other indicators that the **CIMI** incorporates – it is considered that the environmental dimension is represented proportionately.

The indicators that represent PM10, PM2.5, CO₂ and methane emissions, and the rate of pollution are considered with a negative sign in the dimension's indicator, while the other indicators have a positive effect on the environment.

MOBILITY AND TRANSPORTATION

The cities of the future have to tackle two major challenges in the field of mobility and transportation: facilitating movement through cities (often large ones) and facilitating access to public services.

Mobility and transportation – with regard to road and route infrastructure, the vehicle fleet and public transportation, and to air transportation – affect the quality of life of a city's inhabitants and can be vital to the sustainability of cities over time. However, perhaps the most important aspect is the externalities that are generated in the production system, both because of the workforce's need to commute and because of the need for an outlet for production.

Table 7 sets out the indicators selected in the dimension of mobility and transportation, descriptions of them, their units of measurement and the sources of information. The general traffic index, the index of traffic caused by commuting to work, and the inefficiency index are estimates of the traffic inefficiencies caused by long driving times and by the dissatisfaction that these situations generate in the population. These indicators, along with the number of road accidents, are a measure of the efficiency and safety of roads and public transportation, which, if it is effective

and has good infrastructure, promotes a decrease in vehicular traffic on the roads and reduces the number of accidents. All these are included with a negative sign in the calculation of the **CIMI**, since they have a negative impact on the development of a sustainable city.

In turn, the number of metro stations is an indicator of commitment to the development of the city and investment with respect to the population size. The means of transportation represent the public transportation options of a city. The value of this variable increases if there are more transportation options. The lack of transportation options can reduce the attractiveness of a city as a smart destination. The number of air routes (arrivals and departures) that a city has represents the infrastructure that it has to facilitate commercial air routes and, therefore, passenger circulation and transit. These three indicators are included with a positive sign because of the positive influence they have on the dimension.

TABLE 7. MOBILITY AND TRANSPORTATION INDICATORS

NO.	INDICATOR	DESCRIPTION / UNIT OF MEASURE	SOURCE
41	Traffic index	The traffic index is estimated by considering the time spent in traffic and the dissatisfaction this generates. It also includes estimates of CO ₂ consumption and the other inefficiencies of the traffic system	Numbeo
42	Inefficiency index	The inefficiency index is an estimate of the inefficiencies in traffic. High values represent high rates of inefficiency in driving, such as long journey times	Numbeo
43	Number of road accidents	Number of road accidents per 100,000 inhabitants	Euromonitor
44	Metro	Number of metro stations per city	2thinknow
45	Flights	Number of arrival and departure flights (air routes) in a city	2thinknow
46	Means of transportation	The means of transportation represents the public transportation options for smart cities. The value of the variable increases if there are more transportation options. The lack of transportation options can make a city less attractive as a smart destination	2thinknow
47	Index of traffic for commuting to work	Index of traffic considering the journey time to work	Numbeo

URBAN PLANNING

The urban planning of a city has several subdimensions and is closely related to sustainability. Inadequate urban planning causes a reduction in the public's quality of life in the medium term and also negatively affects investment incentives, since a city without planning or inadequate planning hinders and increases the costs of logistics and workers' transportation, among other aspects.

To improve the habitability of any territory, it is necessary to take into account the local master plans and the design of green areas and spaces for public use, as well as opting for smart growth. The new urban planning methods should focus on creating compact, well-connected cities with accessible public services.

Depending on the information available, several aspects related to urban plans, the quality of health infrastructure and housing policies are incorporated as indicators of this dimension. Table 8 sets out the available indicators included in the urban planning dimension, as well as descriptions of them, their units of measurement and the sources of information.

The quality of health infrastructure refers to the percentage of the population with at least sufficient access to sanitation facilities that prevent the contact of humans, animals and insects with excreta. For them to be effective, these facilities must be built correctly and undergo proper maintenance. This indicator is highly correlated

with that of urban planning, since it can be shown that inadequate planning inevitably results in health problems in the short and medium term.

In addition, from the urban planning and housing point of view, a city with proper urban planning generally has few or no problems of overcrowding in households, since normally housing policy, in relation to the estimated growth of the urban population, is a determining factor in urban planning. For this reason, within the explanatory indicators of this dimension, the number of occupants of each household was considered with a negative sign.

The bicycle is an effective, fast, economical, healthy and environmentally friendly means of transportation. The use of this means of transportation has a positive impact on a city's sustainable development as it does not cause pollution or use fuel, among other benefits. Considering this positive effect, two indicators related to the use of this means of mobility were incorporated. The number of cycling enthusiasts represents both a sustainable measure of transportation and a metric of the infrastructure that the city offers for this means. Many cities that historically are smart cities have a certain positive correlation with a high presence of cycling. This variable is incorporated, therefore, with a positive sign. Likewise, the number of bicycle shops is a good indicator of the actual use of the bicycle (through equipment sales and repairs). This is also incorporated with a positive sign.

TABLE 8. URBAN PLANNING INDICATORS

NO.	INDICATOR	DESCRIPTION / UNIT OF MEASURE	SOURCE
48	Percentage of the population with access to sanitation facilities	Percentage of the population with at least sufficient access to facilities for the disposal of excreta that can efficiently avoid the contact of humans, animals and insects with excreta	World Bank
49	Number of people per household	Number of people per household	Euromonitor
50	Bicycle shops	Number of bicycle shops per capita	2thinknow
51	Architects	Number of architecture firms per capita	2thinknow
52	Cycling	Cycling enthusiasts per capita. Bicycle use represents both a sustainable measure of transportation and a metric for a city's exercise and cultural aptitude. Many cities that historically are smart cities have a certain positive correlation with large cyclist populations (weather permitting)	2thinknow

Another indicator considered is the number of architecture firms (small, medium and large) that are devoted to designing projects for the city. Engineers, architects and urban planners are key to the transformation of a city and, therefore, this indicator is incorporated with a positive sign in the index calculation.

INTERNATIONAL OUTREACH

Cities that want to progress must secure a privileged place in the world. Maintaining global outreach involves improving the city brand and its international recognition through strategic tourism plans, the attracting of foreign investment and representation abroad.

Cities can be internationally renowned to a greater or lesser extent even if they are from the same country, but this is not independent of the degree of openness nationally. This dimension seeks to include those differences and to measure the cities' international outreach.

In this respect, the following indicators have been included: arrival of international tourists, number of passengers by airline, number of hotels in a city, ranking of the most photographed places in the world according to Sightsmap, and number of meetings and conferences that take place in a city according to data from the International Congress and Convention Association. This last

indicator is important for a city's international outreach, taking into account that these events usually take place in cities with international hotels, rooms specially fitted out for such ends, good frequency of international flights and appropriate security measures. Table 9 below, by way of summary, sets out these indicators, along with descriptions of them, their units of measurement and the source of information.

All indicators of this dimension, except Sightsmap, are incorporated with a positive sign into the calculation of the **CIMI** since, faced with higher values of the indicators, the city becomes more renowned in the world. Sightsmap is incorporated with a negative sign, since the top positions in the ranking correspond with the most photographed cities.

TECHNOLOGY

Although cities do not live on technology alone, information and communications technology (ICT) is part of the backbone of any society that wants to be called "smart."

Technology, an integral dimension of the **CIMI**, is an aspect of society that improves the present quality of life, and its level of development or spread is an indicator of the quality of life achieved in society or the potential quality of life. In addition, technological development is a dimension that allows cities to be sustainable over time and

TABLE 9. INTERNATIONAL OUTREACH INDICATORS

NO.	INDICATOR	DESCRIPTION / UNIT OF MEASURE	SOURCE
53	Number of international tourists	Number of international tourists who visit the city. In thousands of people	Euromonitor
54	Number of passengers of an airline	Number of passengers who travel with airlines. In thousands of people	Euromonitor
55	Hotels	Number of hotels per capita	2thinknow
56	Sightsmap	Ranking of cities according to the number of photos taken in the city and uploaded to Panoramio (community for sharing photographs online). The top positions correspond to the cities with the most photographs	Sightsmap
57	Number of conferences and meetings	Number of international conferences and meetings that take place in a city	International Meeting Congress and Convention Association

to maintain or extend the competitive advantages of their production system and the quality of employment. A technologically backward city has comparative disadvantages with respect to other cities, both from the point of view of security, education or health, all fundamental to the sustainability of society, and from the point of view of the productive apparatus. As a consequence of this, the production functions become anachronistic. Competitiveness, without protectionism, becomes depleted, which has a negative effect on the city's capacity for consumption and investment, as well as reducing labor productivity.

The indicators selected for measuring the cities' performance in terms of the reach of technology and growth in the cities are set out in Table 10 below.

The first indicator – the number of people signed up for broadband Internet – is a data item for the whole country and has a high correlation with the cities' general technological progress, since the technological development of applications and devices is necessary for the efficient use of broadband. Complementing this, the indicator co-

responding to the city – which represents the number of broadband users within a city as a measure of its technological development – is incorporated. This indicator includes wireless and fixed connections. With regard to the number of IP addresses assigned to the city, this is a commercial indicator of the adoption of the Internet by the public. Internet-enabled businesses and members of the public create economic value in the economy through the use of devices and, therefore, the allocation of IP addresses. The number of wireless access points globally represents the options to connect to the Internet by businesspeople when they travel. On the other hand, the number of Facebook users per capita measures the penetration of Facebook (or, in the case of China, Renren) within a city, based on actual data from Facebook. Facebook is the social media network par excellence and has high penetration rates in many global markets. Facebook has provided the data from 2015 and 2014, and algorithmic estimates have been used for previous years. This indicator is incorporated with a positive sign. As for the data item on the number of mobile phones per inhabitant, this is obtained through national data, population

TABLE 10. TECHNOLOGY INDICATORS

NO.	INDICATOR	DESCRIPTION / UNIT OF MEASURE	SOURCE
58	Number of broadband subscribers	Number of broadband subscribers per country with a digital subscriber line, cable modem or other high-speed technology, per 100 inhabitants	World Bank
59	Broadband	Number of broadband users within a city, including wireless and fixed connections	2thinknow
60	IP addresses	Number of IP addresses per capita	2thinknow
61	Facebook	Number of Facebook users per capita	2thinknow
62	Mobile phones	Number of mobile phones per capita	2thinknow
63	Quality of Web services	The quality of the city council's website measures the commitment of its information technology policy, support for the development of local businesses and other technology initiatives. Scale from 0 to 5, the maximum corresponding to the website with the best-quality services	2thinknow
64	Innovation index	Innovation index. Valuation of 0 = no innovation to 60 = a lot of innovation	Innovation Cities Program
65	Smartphones	Number of smartphones per capita. The use of smartphones and their penetration are a good indicator for the use of technologies	2thinknow
66	Wi-Fi hot spot	Number of wireless access points globally. These represent the options to connect to the Internet that businesspeople have when they travel	2thinknow



data and demographic information. This indicator is incorporated with a positive sign, since the greater the use of mobile telephony, the more open society is to the use of technology. The use of smartphones and their penetration are a good indicator for the use of technologies. The use of smartphones shows the number of applications that businesses and the government can put into practice. It is incorporated with a positive sign. For its part, the quality of a city council's website is an indicator that reflects the government's commitment to information technology policies. If a local government wants to promote the development of information and communications technology (ICT) among local businesses, it is necessary for the government itself to provide good-quality online services, showing support for this crucial sector's strategies. With regard to the innovation cities index (ICI), this is calculated by carrying out assessments of the basis of various factors regarding technological innovation in cities, in sectors such as health, the economy in general or the population, among others, becoming what is now the most comprehensive indicator to measure the degree of development of cities' innovation, divided methodologically into three aspects or dimensions: cultural assets, human infrastructure and interconnected markets.

All the indicators of this dimension are related directly to the technological dimension. Therefore, they are incorporated with a positive sign.

LIMITATIONS OF THE INDICATORS

Appendix 1 ("Indicators") describes, by way of summary, all the indicators used in each of the dimensions, providing their units of measurement and the sources of information.

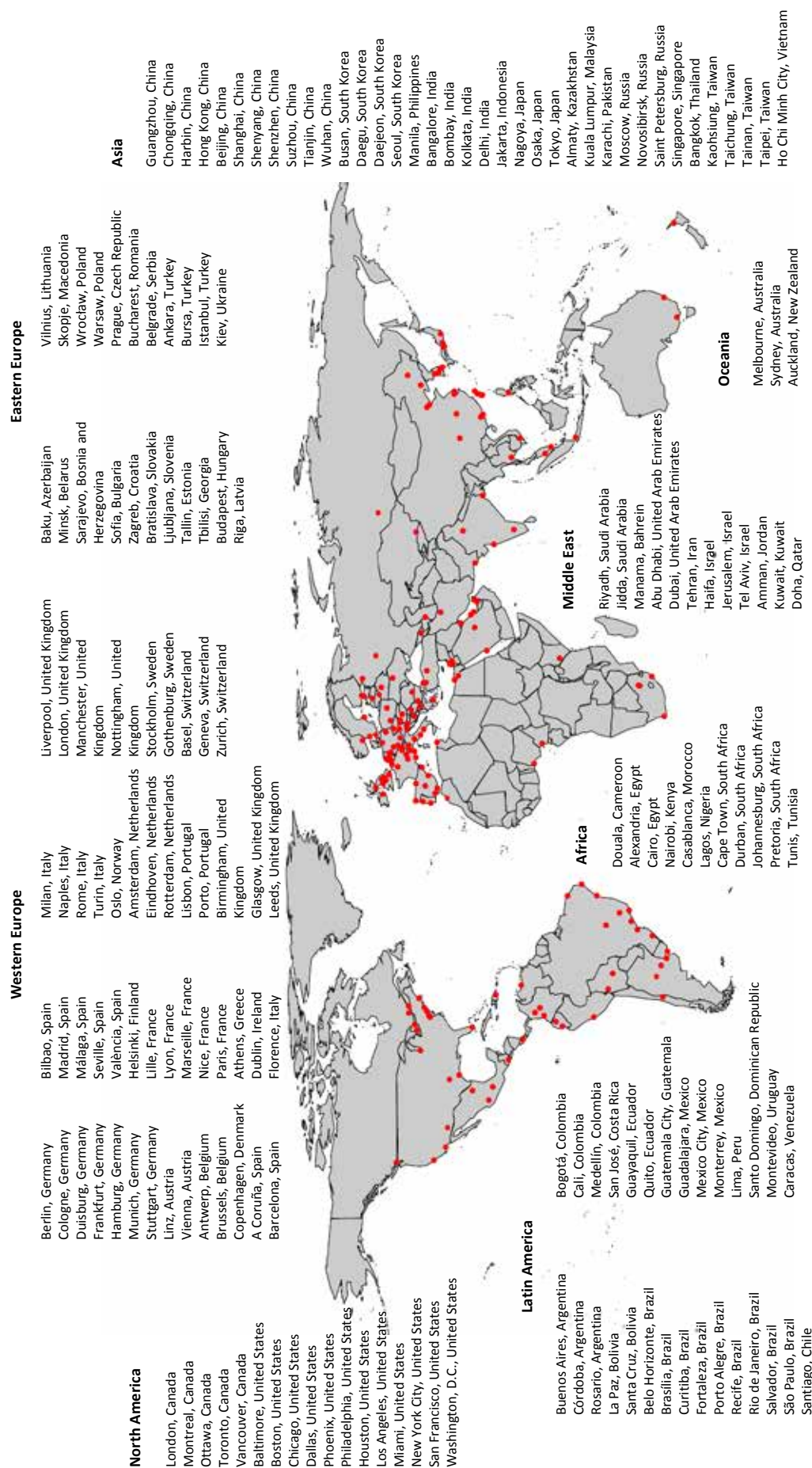
Perhaps the most significant limitation in the calculation of the **CIMI** is linked to the availability of data. Nevertheless, efforts were made to minimize the impact of this limitation. First of all, for those indicators that did not have data for the entire period under analysis, extrapolation techniques were used. For situations where the indicator values by city were nonexistent but where there were valid values by country, individual values were assigned to each city, connecting the indicator at country level via some other variable linked theoretically at the city level. Lastly, there were cases where the indicator did not have data for a particular city or group of cities for the whole period under consideration. In this case, cluster statistical techniques were used. The scope and detail of these tools are discussed in depth in the supplementary document "Methodology and Modeling" of 2014.

From the **CIMI** platform, we continue to work to obtain more complete and accurate indicators, while we urge cities to allow access to the information they generate.

GEOGRAPHICAL COVERAGE

For the calculation of the **CIMI**, 181 cities have been included, 33 of which were not taken into account the previous year. These new cities have been selected because of the size of their populations and their economic, political or cultural significance in their country. The geographical distribution of this study's 181 cities – 72 of which are country capitals – is shown in Figure 1.

FIGURE 1. GEOGRAPHICAL DISTRIBUTION OF THE CITIES INCLUDED IN THE INDEX





CITIES IN MOTION. RANKING

The indicator that is the subject of this report, the **CIMI**, is a synthetic one and, as such, is a function of the partial indicators available.

The model that sustains the process of creating the synthetic indicator is a weighted aggregation of partial indicators that represent each of the 10 dimensions that make up the **CIMI** theoretical model. The dimensions selected to describe the cities' situation in terms of sustainability and the quality of life of their inhabitants, in the present and in the future, are as follows: governance, urban planning, public management, technology, the environment, international outreach, social cohesion, mobility and transportation, human capital, and the economy.

The partial indicators representative of each dimension also correspond to the category of synthetic indicators, which are defined as "Weighted aggregations of each of the selected indicators that represent different factors of each dimension."

Given the type of indicator that had to be calculated and the data available, for the calculation of the **CIMI**, the DP2 technique was used, this being the most widely used internationally and the most suitable. Its methodology is based on distances – that is, the difference between an indicator's given value and another value taken as a reference or target. Likewise, this technique attempts to correct the dependence among the partial indicators, which would artificially increase the indicator's sensitivity to variations in certain partial values. The correction consists of applying the same factor to each partial indicator, assuming a linearly dependent function.²

Given the partial indicators, the factors are given by the complement of the coefficient of determination (R^2) for each indicator compared with the rest of the partial indicators. The order in which the indicators of each dimension were included as well as their relative weight in the **CIMI** are as follows: economy: 1; human capital: 0.4814; international outreach: 0.6212; urban planning: 0.841; environment: 0.6215; technology: 0.3763; governance: 0.4047; social cohesion: 0.5941; mobility and transportation: 0.4707; and public management: 0.571. While the order in which each synthetic index of each dimension is incorporated influences the value of the **CIMI**, the sensitivity studies carried out concluded that there are no significant variations in it. More details on the methodology can be seen in the supplementary document "Methodology and Modeling," published in 2014.

Table 11 sets out the **CIMI** city ranking, with the index value and the cities grouped according to their performance, measured by the value of the synthetic indicator. Cities with a high performance (H) are considered to be those with an index greater than 90; relatively high (RH), between 60 and 90; average (A), between 45 and 60; and low (L), below 45.

² Being linear estimates, they are necessary variables that have a normal distribution, so a log transformation was applied to some variables to obtain normality. Outlier techniques were also applied to avoid bias and overestimations of coefficients.

TABLE 11. CITY RANKING

Ranking	City	Performance	CIMI	Ranking	City	Performance	CIMI
1	New York City, United States	H	100,00	62	Lisbon, Portugal	RH	70,37
2	London, United Kingdom	H	99,65	63	Linz, Austria	RH	70,11
3	Paris, France	H	92,89	64	Taipei, Taiwan	RH	69,94
4	San Francisco, United States	H	92,41	65	Dubai, United Arab Emirates	RH	69,39
5	Boston, United States	H	91,68	66	Abu Dhabi, United Arab Emirates	RH	69,32
6	Amsterdam, Netherlands	H	90,32	67	Seville, Spain	RH	69,14
7	Chicago, United States	H	90,23	68	Budapest, Hungary	RH	69,03
8	Seoul, South Korea	RH	89,60	69	Bilbao, Spain	RH	68,84
9	Geneva, Switzerland	RH	87,44	70	Rotterdam, Netherlands	RH	68,84
10	Sydney, Australia	RH	86,06	71	Leeds, United Kingdom	RH	68,57
11	Copenhagen, Denmark	RH	86,00	72	Marseille, France	RH	68,52
12	Tokyo, Japan	RH	85,12	73	Duisburg, Germany	RH	68,50
13	Washington, D.C., United States	RH	85,12	74	Warsaw, Poland	RH	68,41
14	Zurich, Switzerland	RH	85,11	75	Nottingham, United Kingdom	RH	68,41
15	Los Angeles, United States	RH	84,72	76	Porto, Portugal	RH	68,22
16	Berlin, Germany	RH	84,72	77	Antwerp, Belgium	RH	67,87
17	Melbourne, Australia	RH	84,69	78	Riga, Latvia	RH	67,61
18	Baltimore, United States	RH	84,53	79	Lille, France	RH	66,77
19	Dallas, United States	RH	84,18	80	Santiago, Chile	RH	66,54
20	Vancouver, Canada	RH	83,52	81	Rome, Italy	RH	66,00
21	Munich, Germany	RH	83,34	82	Turin, Italy	RH	65,91
22	Singapore, Singapore	RH	82,80	83	Bratislava, Slovakia	RH	65,85
23	Philadelphia, United States	RH	82,80	84	Bangkok, Thailand	RH	65,75
24	Toronto, Canada	RH	82,78	85	Buenos Aires, Argentina	RH	65,60
25	Helsinki, Finland	RH	82,23	86	Ljubljana, Slovenia	RH	65,41
26	Vienna, Austria	RH	82,00	87	Nagoya, Japan	RH	65,17
27	Stockholm, Sweden	RH	80,66	88	Kuala Lumpur, Malaysia	RH	64,66
28	Oslo, Norway	RH	80,37	89	Vilnius, Lithuania	RH	64,47
29	Auckland, New Zealand	RH	79,56	90	Naples, Italy	RH	63,97
30	Ottawa, Canada	RH	79,53	91	Busan, South Korea	RH	63,89
31	Houston, United States	RH	78,46	92	Beijing, China	RH	63,53
32	Brussels, Belgium	RH	78,13	93	Shanghai, China	RH	63,35
33	Barcelona, Spain	RH	78,10	94	Wroclaw, Poland	RH	63,33
34	Madrid, Spain	RH	78,06	95	Sofia, Bulgaria	RH	63,29
35	Frankfurt, Germany	RH	77,93	96	Daejeon, South Korea	RH	62,56
36	Dublin, Ireland	RH	77,60	97	Tel Aviv, Israel	RH	61,96
37	London, Canada	RH	77,32	98	Daegu, South Korea	RH	61,71
38	Montreal, Canada	RH	77,32	99	Medellin, Colombia	RH	61,49
39	Hong Kong, China	RH	77,20	100	Mexico City, Mexico	RH	60,97
40	Phoenix, United States	RH	76,55	101	Haifa, Israel	RH	60,55
41	Hamburg, Germany	RH	75,36	102	Monterrey, Mexico	RH	60,54
42	Basel, Switzerland	RH	75,24	103	Kaohsiung, Taiwan	A	59,78
43	Manchester, United Kingdom	RH	75,18	104	Guangzhou, China	A	59,78
44	Milan, Italy	RH	74,65	105	Jerusalem, Israel	A	58,96
45	Prague, Czech Republic	RH	74,22	106	Cordoba, Argentina	A	58,53
46	Glasgow, United Kingdom	RH	74,08	107	Zagreb, Croatia	A	58,24
47	Birmingham, United Kingdom	RH	74,00	108	Moscow, Russia	A	58,12
48	Liverpool, United Kingdom	RH	73,85	109	Istanbul, Turkey	A	58,04
49	Valencia, Spain	RH	73,78	110	Bucharest, Romania	A	58,03
50	Florence, Italy	RH	73,68	111	Bogota, Colombia	A	57,96
51	Stuttgart, Germany	RH	73,66	112	Taichung, Taiwan	A	57,96
52	Cologne, Germany	RH	73,54	113	Athens, Greece	A	57,90
53	Miami, United States	RH	73,36	114	Belgrade, Serbia	A	57,75
54	Tallin, Estonia	RH	73,27	115	Jidda, Saudi Arabia	A	57,50
55	Lyon, France	RH	72,71	116	Guadalajara, Mexico	A	57,50
56	Osaka, Japan	RH	72,28	117	Doha, Qatar	A	57,20
57	Gothenburg, Sweden	RH	71,73	118	Porto Alegre, Brazil	A	56,97
58	Malaga, Spain	RH	71,61	119	Kuwait, Kuwait	A	56,94
59	Eindhoven, Netherlands	RH	71,37	120	Cape Town, South Africa	A	56,92
60	A Coruña, Spain	RH	70,45	121	Montevideo, Uruguay	A	56,44
61	Nice, France	RH	70,44	122	Lima, Peru	A	56,14

Ranking	City	Performance	CIMI
123	Riyadh, Saudi Arabia	A	55,78
124	São Paulo, Brazil	A	55,75
125	Almaty, Kazakhstan	A	55,43
126	Cali, Colombia	A	55,40
127	Ankara, Turkey	A	54,83
128	Bursa, Turkey	A	54,61
129	Curitiba, Brazil	A	54,42
130	Shenzhen, China	A	54,23
131	San Jose, Costa Rica	A	53,87
132	Quito, Ecuador	A	53,73
133	Saint Petersburg, Russia	A	53,59
134	Rosario, Argentina	A	52,93
135	Tbilisi, Georgia	A	51,96
136	Brasília, Brazil	A	51,94
137	Minsk, Belarus	A	51,86
138	Manama, Bahrain	A	51,52
139	Rio de Janeiro, Brazil	A	51,50
140	Johannesburg, South Africa	A	51,49
141	Tainan, Taiwan	A	51,44
142	Recife, Brazil	A	50,44
143	Kiev, Ukraine	A	50,08
144	Tunis, Tunisia	A	49,87
145	Manila, Philippines	A	49,55
146	Skopje, Macedonia	A	49,21
147	Chongqing, China	A	49,16
148	Guayaquil, Ecuador	A	49,08
149	Fortaleza, Brazil	A	48,87
150	Baku, Azerbaijan	A	47,23
151	Salvador, Brazil	A	47,11

Ranking	City	Performance	CIMI
152	Belo Horizonte, Brazil	A	47,01
153	Wuhan, China	A	46,67
154	Novosibirsk, Russia	A	46,47
155	Shenyang, China	A	46,32
156	Cairo, Egypt	A	45,47
157	Sarajevo, Bosnia and Herzegovina	L	45,00
158	Ho Chi Minh City, Vietnam	L	44,54
159	Durban, South Africa	L	44,45
160	Amman, Jordan	L	43,92
161	Guatemala City, Guatemala	L	43,47
162	Caracas, Venezuela	L	43,32
163	Casablanca, Morocco	L	43,13
164	Pretoria, South Africa	L	42,91
165	Suzhou, China	L	42,69
166	Tianjin, China	L	42,35
167	Bombay, India	L	42,32
168	La Paz, Bolivia	L	41,67
169	Harbin, China	L	41,41
170	Jakarta, Indonesia	L	41,24
171	Santa Cruz, Bolivia	L	40,88
172	Santo Domingo, Dominican Republic	L	39,88
173	Alexandria, Egypt	L	39,83
174	Delhi, India	L	39,53
175	Douala, Cameroon	L	39,02
176	Bangalore, India	L	38,93
177	Tehran, Iran	L	37,82
178	Nairobi, Kenya	L	37,75
179	Kolkata, India	L	37,67
180	Lagos, Nigeria	L	36,94
181	Karachi, Pakistan	L	32,86

For 2015, it can be observed that 56.35% of the cities (102) have a performance rated high (H) or relatively high (RH), and the ranking is headed by New York City and London. With an average (A) performance, we have 54 cities (29.83%), while the performances classified as low (L) include 13.81% of the selected cities. No city gets an average low (AL) rating. Of the top 25 cities, nine are European, 11 are North American, three are Asian and two are from Oceania.

CITIES IN MOTION. RANKING BY DIMENSION

This section sets out the ranking according to each of the dimensions that make up the index, with the overall position of the city and its position in each dimension. To facilitate a more intuitive visual observation, the darker greens represent the highest positions and the darker reds the least favorable, with intermediate positions in yellow shades.

New York City (United States) is in first place in the overall ranking, driven by its performance in the dimensions of the economy (first place), technology (third place) and in human capital, public management, governance, international outreach, and mobility and transportation (fourth place). However, for another year, it continues to be in very low positions in the dimensions of social cohesion (position 161) and in environment (position 93).

U.S. cities achieve the top positions in the overall ranking. Of the 12 cities, 10 are in the top 30, and New York City, San Francisco and Boston are in the top five.

The interpretation of Table 12 is very important for the analysis of the results, since the relative position of all cities in each of the dimensions can be observed. In Figure 2, the positions of the cities on the world map can be seen. Each city is represented by a color. The more yellow shades correspond to the top positions on the **CIMI** ranking, while the worst-positioned cities are represented in red. A more detailed description of the ranking by dimension is provided below.



HUMAN CAPITAL

The city that ranks first in this dimension is London (United Kingdom). This city stands out for being the one that has the most top-level business schools, as well as for being the one with the highest number of universities. Likewise, a high proportion of its population has secondary and higher education. Although the number one city is London, the top 10 ranking for this dimension has six U.S. cities.

SOCIAL COHESION

Helsinki (Finland) is the city with the highest rating in this dimension. It is a city with a low unemployment rate, an equitable distribution of income and the highest percentage of women in government positions (more than 70%). It is worth noting that eight of the top 10 cities in this ranking are European.

ECONOMY

The city that heads the ranking in this dimension is New York City (United States). This city achieves relatively high levels in all indicators but it stands out especially for its high GDP and number of headquarters of publicly traded companies. It is important to mention that the top 10 for this dimension has eight U.S. cities.

PUBLIC MANAGEMENT

In this case, Washington, D.C., is placed first, with good values in almost all the indicators, and it stands out especially for its low sales taxes and its high number of embassies. The top 10 for this dimension is made up of five Middle Eastern cities and five U.S. cities.

GOVERNANCE

In this dimension, Ottawa (Canada) ranks first, standing out in the strength of legal rights index and the corruption perceptions index. Among the top 10 cities in this dimension's ranking, there are four Canadian cities.

ENVIRONMENT

In this dimension, the cities that are best positioned are Zurich (Switzerland) and Helsinki (Finland). These cities are in the top of the environmental performance index (EPI) and have low levels of pollution and CO₂ emissions. All cities in the top 10 for this dimension are European.

MOBILITY AND TRANSPORTATION

The city of Seoul (South Korea) comes first in the ranking and stands out in almost all the indicators. Of the top 10 cities in the ranking for this dimension, there are seven European cities.

URBAN PLANNING

In this dimension, Copenhagen (Denmark) ranks first and is among the highest-ranking in almost all the indicators. It stands out because almost 100% of the population has access to adequate sanitation facilities. It is important to mention that six European cities are in the top 10 for this dimension.

INTERNATIONAL OUTREACH

Paris (France) is the top-ranking city for this dimension and London (United Kingdom) is in second place. This is because Paris is the city with the second-highest number of international tourists and ranks first in the ranking of cities by the number of photos taken in the city and uploaded to Panoramio. It is also the city where the most international conferences and meetings are organized. London, in turn, is the city that attracts a higher number of airline passengers, which is consistent with the fact that it is one of the cities with the largest number of air routes. Of the top 10 cities for this dimension, there are six European and three Asian cities.

TECHNOLOGY

Tokyo (Japan) is the city at the pinnacle of this ranking. This city achieves good levels in all the indicators and stands out especially for the percentage of broadband users in the city (90%). Tokyo, along with Seoul and Hong Kong, is considered the window for innovation and technology in the China and Asia-Pacific market. Of the cities that occupy the top 10 positions, there are three Asian cities and four U.S. cities.

TABLE 12 . RANKING BY DIMENSION

City	Economy	Human Capital	Social Cohesion	Environment	Public Management	Governance	Urban Planning	International Outreach	Technology	Mobility and Transportation	Cities in Motion
New York City, United States	1	4	161	93	4	4	68	4	3	4	1
London, United Kingdom	3	1	129	20	33	16	66	2	8	3	2
Paris, France	11	6	91	64	44	31	30	1	24	6	3
San Francisco, United States	2	9	75	92	12	15	48	45	16	27	4
Boston, United States	8	2	30	88	7	4	65	80	21	15	5
Amsterdam, Netherlands	27	34	40	42	53	23	3	7	4	20	6
Chicago, United States	7	7	103	89	10	4	29	27	9	17	7
Seoul, South Korea	20	13	11	53	38	21	73	22	2	1	8
Geneva, Switzerland	14	102	12	9	2	49	9	46	12	65	9
Sydney, Australia	18	21	70	32	16	25	28	32	7	22	10
Copenhagen, Denmark	34	61	3	15	163	11	1	34	26	30	11
Tokyo, Japan	5	8	69	27	56	71	133	17	1	34	12
Washington, D.C., United States	9	3	96	98	1	4	114	37	15	154	13
Zurich, Switzerland	19	80	8	1	25	18	101	49	34	7	14
Los Angeles, United States	4	5	112	124	14	9	127	30	17	24	15
Berlin, Germany	65	25	4	14	41	22	47	14	40	16	16
Melbourne, Australia	26	22	21	29	23	3	81	51	23	33	17
Baltimore, United States	13	15	66	97	13	44	7	63	5	49	18
Dallas, United States	10	11	78	133	24	7	22	56	27	28	19
Vancouver, Canada	31	75	43	41	18	6	4	55	43	82	20
Munich, Germany	41	47	2	3	59	51	35	26	28	14	21
Singapore, Singapore	25	33	122	24	17	14	105	20	14	13	22
Philadelphia, United States	12	10	110	127	21	9	15	105	18	23	23
Toronto, Canada	17	29	57	81	19	2	60	48	11	42	24
Helsinki, Finland	45	83	1	2	124	8	24	58	38	25	25
Vienna, Austria	53	46	47	5	83	26	52	15	31	8	26
Stockholm, Sweden	32	60	60	8	79	19	55	35	32	11	27
Oslo, Norway	28	110	16	10	95	65	5	61	37	19	28
Auckland, New Zealand	51	96	39	19	39	20	10	79	25	51	29
Ottawa, Canada	52	127	9	31	22	1	37	112	19	119	30
Houston, United States	6	14	81	144	15	7	130	72	6	117	31
Brussels, Belgium	44	48	33	69	80	27	31	31	36	21	32
Barcelona, Spain	79	27	97	65	69	24	46	6	55	10	33
Madrid, Spain	70	45	89	54	49	33	58	12	63	5	34
Frankfurt, Germany	48	38	62	11	75	73	57	44	42	2	35
Dublin, Ireland	23	66	123	22	57	17	39	33	30	46	36
London, Canada	24	36	145	30	28	10	23	36	76	132	37

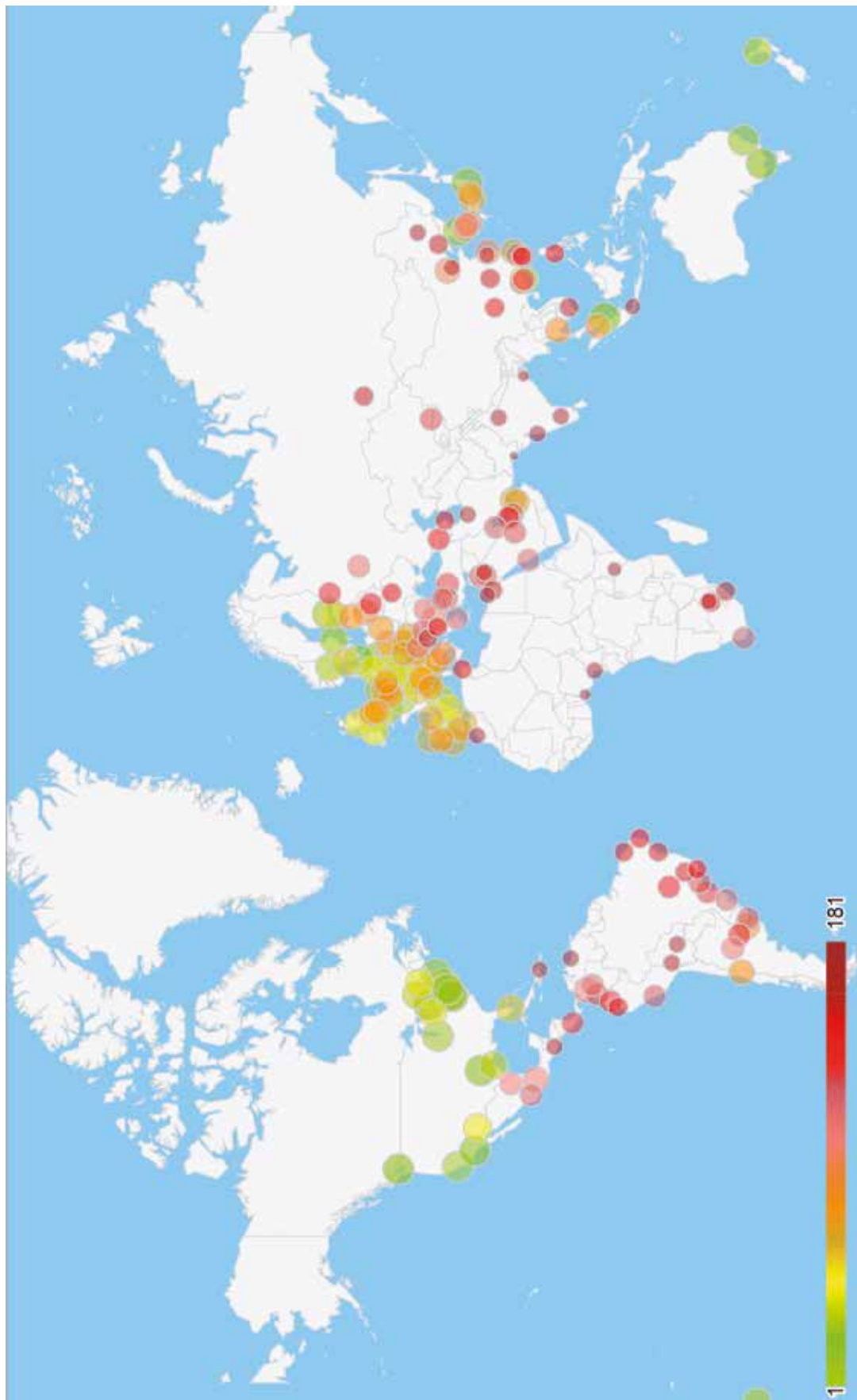
City	Economy	Human Capital	Social Cohesion	Environment	Public Management	Governance	Urban Planning	International Outreach	Technology	Mobility and Transportation	Cities in Motion
Montreal, Canada	33	63	51	57	32	6	38	60	60	125	38
Hong Kong, China	22	20	131	62	71	13	153	3	10	92	39
Phoenix, United States	21	17	100	123	27	28	19	117	45	81	40
Hamburg, Germany	59	54	49	13	70	22	74	76	44	35	41
Basel, Switzerland	36	73	18	6	36	49	59	107	130	66	42
Manchester, United Kingdom	46	24	19	59	67	16	79	98	145	29	43
Milan, Italy	61	37	88	68	72	58	11	39	33	57	44
Prague, Czech Republic	126	93	5	12	113	100	25	19	95	31	45
Glasgow, United Kingdom	47	32	58	52	93	12	32	113	49	102	46
Birmingham, United Kingdom	43	35	10	38	130	5	63	144	118	80	47
Liverpool, United Kingdom	39	43	15	35	129	12	71	131	93	79	48
Valencia, Spain	95	57	52	21	106	42	16	69	52	47	49
Florence, Italy	87	51	26	46	104	50	18	24	79	105	50
Stuttgart, Germany	42	67	32	16	114	45	61	77	89	39	51
Cologne, Germany	63	56	42	48	131	56	20	53	59	59	52
Miami, United States	16	18	114	119	9	53	90	40	80	85	53
Tallin, Estonia	71	131	13	4	121	87	45	64	35	55	54
Lyon, France	60	40	14	58	90	31	91	90	48	69	55
Osaka, Japan	40	26	27	63	50	81	109	81	41	54	56
Gothenburg, Sweden	35	105	59	17	154	34	36	96	67	88	57
Malaga, Spain	123	42	117	55	117	42	41	8	39	56	58
Eindhoven, Netherlands	50	52	82	51	156	29	17	95	29	159	59
A Coruña, Spain	100	16	128	23	167	77	6	21	51	118	60
Nice, France	67	55	36	56	125	80	26	54	81	84	61
Lisbon, Portugal	72	79	71	33	86	32	106	38	102	44	62
Linz, Austria	98	167	22	7	159	35	40	59	57	109	63
Taipei, Taiwan	103	31	25	168	26	38	95	28	20	53	64
Dubai, United Arab Emirates	102	104	31	115	3	52	155	16	65	43	65
Abu Dhabi, United Arab Emirates	15	176	55	108	5	61	158	101	13	68	66
Seville, Spain	99	50	67	26	126	68	69	47	50	89	67
Budapest, Hungary	122	100	65	47	160	70	21	42	77	36	68
Bilbao, Spain	74	72	63	49	153	30	34	83	123	75	69
Rotterdam, Netherlands	55	82	50	50	122	47	50	130	58	120	70
Leeds, United Kingdom	54	41	23	37	150	16	70	167	156	127	71
Marseille, France	73	64	53	61	109	31	67	111	105	77	72
Duisburg, Germany	83	28	76	25	145	73	42	92	87	76	73
Warsaw, Poland	113	121	34	66	140	78	12	87	68	61	74

City	Economy	Human Capital	Social Cohesion	Environment	Public Management	Governance	Urban Planning	International Outreach	Technology	Mobility and Transportation	Cities in Motion
Nottingham, United Kingdom	38	39	24	40	171	16	75	168	176	95	75
Porto, Portugal	85	119	61	39	152	103	8	68	144	50	76
Antwerp, Belgium	69	106	7	60	123	54	56	135	128	135	77
Riga, Latvia	84	134	54	44	94	90	49	93	92	71	78
Lille, France	68	59	44	70	146	67	78	74	96	133	79
Santiago, Chile	37	90	80	91	120	89	33	73	107	106	80
Rome, Italy	77	49	149	76	62	72	111	10	64	86	81
Turin, Italy	89	68	99	82	143	40	54	67	106	67	82
Bratislava, Slovakia	76	147	20	18	115	113	103	94	54	116	83
Bangkok, Thailand	57	70	92	151	34	137	104	13	86	72	84
Buenos Aires, Argentina	141	44	68	118	99	36	83	52	62	74	85
Ljubljana, Slovenia	109	158	45	28	134	75	77	127	72	103	86
Nagoya, Japan	78	65	29	45	64	54	143	155	74	110	87
Kuala Lumpur, Malaysia	104	120	138	103	29	83	116	23	56	60	88
Vilnius, Lithuania	80	135	56	36	133	88	87	84	88	121	89
Naples, Italy	114	71	86	34	137	138	85	82	82	45	90
Busan, South Korea	91	122	72	85	132	79	43	141	114	62	91
Beijing, China	81	23	139	179	96	55	72	5	78	9	92
Shanghai, China	96	12	137	173	144	48	110	9	66	12	93
Wrocław, Poland	121	146	77	71	170	94	14	116	53	126	94
Sofia, Bulgaria	97	129	74	75	92	106	64	110	99	108	95
Daejeon, South Korea	92	94	119	83	149	108	2	179	110	123	96
Tel Aviv, Israel	49	97	28	79	89	64	131	134	157	143	97
Daegu, South Korea	93	141	106	86	155	59	13	178	69	113	98
Medellin, Colombia	66	175	73	94	97	63	128	128	84	83	99
Mexico City, Mexico	56	58	124	152	58	57	152	62	75	38	100
Haifa, Israel	29	160	6	74	169	98	146	104	172	104	101
Monterrey, Mexico	64	140	87	112	98	92	113	136	122	64	102
Kaohsiung, Taiwan	107	92	41	163	136	48	96	71	98	99	103
Guangzhou, China	110	84	95	164	158	84	92	25	139	18	104
Jerusalem, Israel	86	138	90	80	112	43	145	106	132	151	105
Cordoba, Argentina	150	115	102	102	166	82	27	115	61	149	106
Zagreb, Croatia	139	152	48	67	148	130	100	119	91	128	107
Moscow, Russia	116	19	155	132	65	46	170	41	71	26	108
Istanbul, Turkey	90	81	121	113	68	141	172	11	47	32	109
Bucharest, Romania	111	144	98	109	102	102	99	103	108	100	110
Bogota, Colombia	88	77	147	111	60	63	123	78	103	147	111

City	Economy	Human Capital	Social Cohesion	Environment	Public Management	Governance	Urban Planning	International Outreach	Technology	Mobility and Transportation	Cities in Motion
Tai Chung, Taiwan	108	74	37	167	142	48	115	99	46	140	112
Athens, Greece	106	87	160	73	101	85	139	50	83	63	113
Belgrade, Serbia	135	126	156	72	100	104	84	108	73	78	114
Jidda, Saudi Arabia	130	181	153	101	8	131	108	165	22	112	115
Guadalajara, Mexico	62	157	108	107	110	118	89	120	158	101	116
Doha, Qatar	30	177	38	148	11	144	164	97	162	98	117
Porto Alegre, Brazil	165	145	93	100	119	69	62	152	137	115	118
Kuwait, Kuwait	143	125	17	43	20	105	175	121	94	176	119
Cape Town, South Africa	145	89	144	116	37	41	129	100	109	162	120
Montevideo, Uruguay	120	132	85	90	168	37	120	129	138	172	121
Lima, Peru	58	139	143	120	111	39	157	85	125	111	122
Riyadh, Saudi Arabia	75	179	83	106	6	131	144	153	90	179	123
São Paulo, Brazil	146	69	159	139	46	93	138	43	70	73	124
Almaty, Kazakhstan	131	130	46	77	82	147	149	171	165	70	125
Cali, Colombia	82	161	142	128	61	60	82	169	149	170	126
Ankara, Turkey	117	117	116	105	76	127	141	137	126	87	127
Bursa, Turkey	105	165	35	87	174	127	134	125	166	90	128
Curitiba, Brazil	166	128	118	110	77	76	107	126	116	155	129
Shenzhen, China	112	113	84	162	178	129	53	29	131	37	130
San Jose, Costa Rica	151	168	152	84	73	151	44	132	147	122	131
Quito, Ecuador	125	101	150	99	40	149	121	139	160	137	132
Saint Petersburg, Russia	159	30	104	147	87	107	159	89	117	94	133
Rosario, Argentina	152	103	127	104	172	111	93	124	119	150	134
Tbilisi, Georgia	124	153	109	95	127	117	136	142	167	124	135
Brasilia, Brazil	167	133	125	96	54	120	156	122	152	52	136
Minsk, Belarus	129	118	79	78	135	148	148	159	177	107	137
Manama, Bahrain	94	53	64	136	30	110	178	18	163	180	138
Rio de Janeiro, Brazil	169	62	179	131	74	62	119	65	104	93	139
Johannesburg, South Africa	138	112	169	153	48	74	112	163	100	145	140
Tainan, Taiwan	133	116	111	172	85	132	88	102	97	153	141
Recife, Brazil	174	108	141	149	84	58	80	158	115	177	142
Kiev, Ukraine	158	91	157	140	91	126	137	143	140	41	143
Tunis, Tunisia	160	173	126	114	118	119	122	161	134	148	144
Manila, Philippines	137	85	101	157	52	133	169	91	85	129	145
Skopje, Macedonia	134	170	162	122	108	125	51	133	150	175	146
Chongqing, China	153	159	133	174	176	84	76	70	159	40	147
Guayaquil, Ecuador	128	169	146	145	47	142	132	174	136	174	148

City	Economy	Human Capital	Social Cohesion	Environment	Public Management	Governance	Urban Planning	International Outreach	Technology	Mobility and Transportation	Cities in Motion
Fortaleza, Brazil	175	136	148	141	157	91	118	149	120	152	149
Baku, Azerbaijan	118	150	154	138	139	140	151	145	121	141	150
Salvador, Brazil	177	99	165	137	107	120	102	146	111	161	151
Belo Horizonte, Brazil	173	111	132	146	138	121	117	150	146	166	152
Wuhan, China	132	86	115	178	177	114	135	75	151	48	153
Novosibirsk, Russia	162	88	105	154	161	95	160	166	142	156	154
Shenyang, China	148	107	134	177	175	112	97	123	141	97	155
Cairo, Egypt	164	76	175	159	45	128	140	148	112	131	156
Sarajevo, Bosnia and Herzegovina	172	155	172	129	173	109	94	118	113	168	157
Ho Chi Minh City, Vietnam	155	166	173	143	105	99	163	88	124	130	158
Durban, South Africa	142	143	151	117	103	66	174	173	153	173	159
Amman, Jordan	156	162	113	142	66	146	165	157	170	167	160
Guatemala City, Guatemala	127	148	166	130	88	97	168	160	148	169	161
Caracas, Venezuela	181	123	170	134	31	152	86	151	173	91	162
Casablanca, Morocco	136	174	167	126	162	139	142	156	169	138	163
Pretoria, South Africa	140	137	158	150	43	136	147	176	175	178	164
Suzhou, China	147	114	136	175	179	114	98	86	135	134	165
Tianjin, China	119	78	120	176	181	129	125	140	129	96	166
Bombay, India	176	142	140	170	55	96	167	109	127	136	167
La Paz, Bolivia	157	124	163	135	116	135	161	147	171	171	168
Harbin, China	149	98	135	177	180	114	126	114	101	142	169
Jakarta, Indonesia	161	95	168	160	35	116	177	57	168	146	170
Santa Cruz, Bolivia	163	178	164	121	147	150	154	175	155	158	171
Santo Domingo, Dominican Republic	144	151	178	158	128	143	124	164	179	144	172
Alexandria, Egypt	171	163	177	125	78	124	150	162	180	160	173
Delhi, India	178	109	107	180	141	86	179	66	143	58	174
Douala, Cameroon	115	171	171	156	81	123	166	181	133	114	175
Bangalore, India	179	154	94	165	165	115	173	138	154	163	176
Tehran, Iran	154	149	181	155	63	134	162	154	178	139	177
Nairobi, Kenya	168	164	180	161	42	101	176	172	161	164	178
Kolkata, India	180	156	130	171	164	96	171	170	164	181	179
Lagos, Nigeria	101	172	176	166	51	145	181	180	174	165	180
Karachi, Pakistan	170	180	174	169	151	122	180	177	181	157	181

FIGURE 2. MAP OF CITIES IN THE CIMI RANKING





**GOOD URBAN
DEVELOPMENT TAKES INTO
ACCOUNT 10 DIMENSIONS
FOR A CITY'S
PROSPERITY**

CITIES IN MOTION. REGIONAL RANKING

TOP 5 WESTERN EUROPE

CITY	REGIONAL POSITION	GLOBAL POSITION 2013	GLOBAL POSITION 2014	GLOBAL POSITION 2015
London, United Kingdom	1	2	1	2
Paris, France	2	3	3	3
Amsterdam, Netherlands	3	7	7	6
Geneva, Switzerland	4	12	10	9
Copenhagen, Denmark	5	13	19	11

In Europe, the city that heads the ranking is London, which also takes second place in the world ranking. Within Europe, Paris, Amsterdam and Geneva come next in importance. Closing out the table is the city of Copenhagen, which, along with Geneva, shows the best progression in the world ranking.

TOP 5 LATIN AMERICA

CITY	REGIONAL POSITION	GLOBAL POSITION 2013	GLOBAL POSITION 2014	GLOBAL POSITION 2015
Santiago, Chile	1	84	82	80
Buenos Aires, Argentina	2	85	85	85
Medellin, Colombia	3	99	101	99
Mexico City, Mexico	4	120	98	100
Monterrey, Mexico	5	108	103	102

For another year, Santiago de Chile leads the ranking among the best Latin American cities, climbing four positions over the past three years in the global ranking. Second place is occupied by Buenos Aires, followed by Medellin. Closing out the table are Mexico City and Monterrey. It is worth noting that Mexican cities are those that have progressed the most in the overall ranking.

TOP 5 ASIA-PACIFIC

CITY	REGIONAL POSITION	GLOBAL POSITION 2013	GLOBAL POSITION 2014	GLOBAL POSITION 2015
Seoul, South Korea	1	9	9	8
Tokyo, Japan	2	8	8	12
Singapore, Singapore	3	25	21	22
Hong Kong, China	4	31	32	39
Osaka, Japan	5	50	52	56

Seoul leads the ranking in the Asia-Pacific region, coming in eighth globally, down one position since 2012. Tokyo is in second place in the region. It is followed by Singapore, Hong Kong and Osaka. Of these cities, only Singapore and Seoul have improved their positions in the overall ranking in the 2013–2015 period.

TOP 5 MIDDLE EAST

CITY	REGIONAL POSITION	GLOBAL POSITION 2013	GLOBAL POSITION 2014	GLOBAL POSITION 2015
Dubai, United Arab Emirates	1	59	57	65
Abu Dhabi, United Arab Emirates	2	70	65	66
Tel Aviv, Israel	3	100	97	97
Haifa, Israel	4	98	100	101
Jerusalem, Israel	5	101	104	105

The Middle East ranking is headed by the city of Dubai, which is in position number 65 in the global ranking. Just one position behind is the city of Abu Dhabi. Completing the ranking of the five best in the region are Tel Aviv, Haifa and Jerusalem. It is worth noting that, unlike other emerging regions where the top five positions are spread among different countries, in the Middle East the top five cities are located in only two countries (the United Arab Emirates and Israel).

TOP 5 AFRICA

CITY	REGIONAL POSITION	GLOBAL POSITION 2013	GLOBAL POSITION 2014	GLOBAL POSITION 2015
Cape Town, South Africa	1	106	119	120
Johannesburg, South Africa	2	139	141	140
Tunis, Tunisia	3	150	144	144
Cairo, Egypt	4	163	162	156
Durban, South Africa	5	162	159	159

Africa's ranking is headed by the South African city of Cape Town, followed by Johannesburg, also in South Africa. Completing the list of the five best cities in the region are Tunis, Cairo and Durban. It is worth noting that, of the African cities included in the index, all of them are in the last places in the overall ranking.

TOP 5 NORTH AMERICA

CITY	REGIONAL POSITION	GLOBAL POSITION 2013	GLOBAL POSITION 2014	GLOBAL POSITION 2015
New York City, United States	1	1	2	1
San Francisco, United States	2	5	5	4
Boston, United States	3	4	4	5
Chicago, United States	4	6	6	7
Washington, D.C., United States	5	16	13	13

In North America, the ranking is led by New York City, which also leads in the overall classification. It is followed by San Francisco and Boston, which are also in the top five of the overall ranking. Closing the list of the top five North American cities are Chicago and Washington, D.C. As in previous years, no Canadian city appears among the top five cities in the region. The first city from this country is Vancouver, which occupies position 20 in the overall ranking.

TOP 5 EASTERN EUROPE

CITY	REGIONAL POSITION	GLOBAL POSITION 2013	GLOBAL POSITION 2014	GLOBAL POSITION 2015
Prague, Czech Republic	1	44	42	45
Tallin, Estonia	2	54	51	54
Budapest, Hungary	3	60	68	68
Warsaw, Poland	4	75	77	74
Riga, Latvia	5	78	80	78

In Eastern Europe, the ranking is led by Prague, which also occupies significant positions in the social cohesion and environment dimensions in the overall ranking. It is followed by Tallinn and Budapest. Closing the list of the top five cities in the region are Warsaw and Riga. It is worth noting that this region is the one that has progressed the least compared with other emerging regions.

TOP 3 OCEANIA

CITY	REGIONAL POSITION	GLOBAL POSITION 2013	GLOBAL POSITION 2014	GLOBAL POSITION 2015
Sydney, Australia	1	11	11	10
Melbourne, Australia	2	22	17	17
Auckland, New Zealand	3	32	31	29

In Oceania, the ranking is led by Sydney, which is also in the top 20 in dimensions such as technology, public management and the environment. It is followed in the regional ranking by Melbourne, which also occupies third place in governance in the overall ranking. Closing this ranking is Auckland (New Zealand). These three cities have gone up in the general ranking.

SOME NOTEWORTHY CASES

This section provides descriptions of some noteworthy cases. Appendix 2 (“181 City Profiles”) provides a graphical analysis of the 181 cities included in the **CIMI**.



AMSTERDAM

The official capital of the Netherlands, it is the country's largest city and a major financial and cultural center with international renown. This city is in sixth place in the ranking and is third in its region. It shows good performance in all the dimensions and stands out especially in urban planning and international outreach.



BARCELONA

It is in position 33 in the ranking, making it the best positioned Spanish city. It outdoes Madrid in human capital, governance, urban planning, international renown and technology.



BOSTON

This is the capital and most populous city of the Commonwealth of Massachusetts and one of the oldest cities in the United States. It is considered the region's economic and cultural hub. It is in fifth place in the ranking and is third in the region, and it stands out in human capital, the economy, public management and governance.



BUENOS AIRES

This is the capital and the most populous city of the Argentine Republic. It is also the most visited city in South America and has the second highest number of skyscrapers in the region. In the ranking it is in position 84 and is second in its region.



COPENHAGEN

This is the capital and the most populous city of Denmark. Copenhagen is a business and science hub, not only for Denmark but also for the Øresund region and Scandinavia. Many international companies have set up their regional headquarters in Copenhagen (for example, Microsoft and Maersk). It occupies position 11 in the ranking, being first in urban planning and third in social cohesion.



DUBAI

Located in the United Arab Emirates, Dubai is one of the cities that has grown the most in the past decade. It is in position 65 in the ranking and is in top place for its region. It stands out especially in social cohesion, public management and international outreach.



HELSINKI

This is the capital and the most populous city of Finland. Helsinki is the largest political, financial and research hub and one of the most important cities in northern Europe. About 70% of foreign companies that operate in Finland set up in Helsinki or its surroundings. It is in position 25 in the ranking and is in first place for social cohesion and second place for the environment.



HONG KONG

A special administrative region of the People's Republic of China, Hong Kong is made up of a peninsula and several islands off China's south coast, in the South China Sea. It is currently one of the most influential cities in Southeast Asia. It is in position 38 in the ranking and is in fourth place in the region. It occupies 10th place for technology and is third for governance.



LONDON

The capital of England and the United Kingdom, London is the largest city and urban area of Great Britain. It is a nerve center in the field of the arts, commerce, education, entertainment, fashion, finance, the media, research, tourism and transportation. For this reason, London takes second place in the ranking, with high levels in almost all the dimensions. It stands out in the dimensions of human capital, public management and international renown but is also in the top positions for the economy, technology, and mobility and transportation. However, in social cohesion it shows its worst side, occupying position 129.



MADRID

Madrid is second in the ranking for Spain, just behind Barcelona. It stands out in the dimensions of mobility and transportation – where it is in fifth place – and for international renown, where it ranks 12th.



NEW YORK CITY

New York City is one of the three largest and most populous urban agglomerations in the world and is the second largest urban concentration in North America after Mexico City. New York City is in the top position in the ranking. It is the world's most important economic center and ranks third in technology.



PARIS

The French capital is the world's most popular tourist destination, with more than 42 million foreign tourists a year. Europe's main business district is found there, hosting the head office of almost half of big French companies, as well as the headquarters of 20 of the 100 largest companies in the world. It is in third place in the ranking and is first in international outreach. Likewise, it excels in human capital and in mobility and transportation.



SEOUL

South Korea's capital is one of the world's largest metropolitan areas. Headquarters to some of the world's biggest companies (such as Samsung, LG Group, Hyundai and Kia Motors), it is in eighth place in the ranking and is first in its region. It stands out in technology (second), mobility and transportation (first) and social cohesion (11th), although it is among the top 25 positions in almost all the dimensions.



SAN FRANCISCO

This is the fourth most populous city in the state of California. It is the cultural, financial and transportation hub of the San Francisco Bay Area. Tourism is the most important activity of San Francisco's economy. It is in fourth place and stands out in the rankings regarding the economy in second place, and human capital in ninth position.



SYDNEY

Sydney is the largest and most populous city in Australia and the main destination for immigrants. It is in 10th place in the ranking and stands out in the economy, technology, and public management.



SANTIAGO DE CHILE

The Chilean capital is in position 80 in the ranking and gets the best score of the Latin American cities, beating Buenos Aires, São Paulo and Mexico City. In addition, it stands out in urban planning, occupying position 33.



SINGAPORE

Singapore is a city-state in Southeast Asia. Founded as a British trading colony in 1819, since its independence it has become one of the world's most prosperous cities and has the world's busiest port. It is in 21st place in the ranking and third place in the region. It stands out especially in technology, governance, public management, and mobility and transportation.



TOKYO

Tokyo, the capital of Japan, is the world's most populous conurbation and one of the cities with the highest rate of labor productivity. It is in 12th place in the ranking and is second in its region. It is also in fifth place for the economic dimension and is first for technology.



ZURICH

The main city in Switzerland, Zurich is the country's financial engine and cultural center. It was chosen as the city with the world's highest quality of life in 2006 and 2008. It is in 14th place in the ranking and in first place for the environment. It also stands out in the dimensions of social cohesion and mobility and transportation.



VANCOUVER

This is a city located on the west coast of Canada. It has one of the most important ports in North America and its airport is the second most used in Canada. In addition, it is an important tourist center and a filmmaking hub. It occupies position 20 in the ranking and stands out in urban planning and governance.



VIENNA

Vienna is the capital of Austria and the country's most populous city. Given its wide range of cultural offerings and its high standard of living, it is known as the country's biggest cultural and political center. It is in position 26 in the ranking. It stands out for the environment (fifth place) and is in the top 20 for mobility and transportation and for international outreach.

EVOLUTION OF THE CITIES IN MOTION INDEX

Looking at a city's evolution is vitally important in understanding the direction of its development objectives. Therefore, this section sets out the evolution of the past three years of the **CIMI** for the top 50 cities in the 2015 ranking.

The results show a certain stability in the top positions. The top position in the ranking varied between New York City and London between 2013 and 2015. Paris remained in third place throughout the period, while San Francisco lost fourth place, which ended up in the hands of Boston in 2015.

It is interesting to analyze the evolution of cities such as Copenhagen, which climbed eight positions between 2014 and 2015. That progress is reflected in the position that this city occupies in the general ranking for social cohesion and the environment, where it is in the top 15. Another city that has evolved very favorably is Los Angeles, which rose 12 positions in the 2013–2015 period. This evolution is also due to advances in the general ranking for social cohesion and the environment, where it continues to occupy very high positions (above position 100). As for the rest of the cities, they display quite a lot of stability throughout the period, with the exception of Dublin, which falls several positions.

Table 13 sets out the evolution of the index during the past three years for the top 100 cities in the 2015 ranking.

TABLE 13. EVOLUTION OF THE INDEX FOR THE TOP 100 CITIES IN THE 2015 RANKING (PAST THREE YEARS)

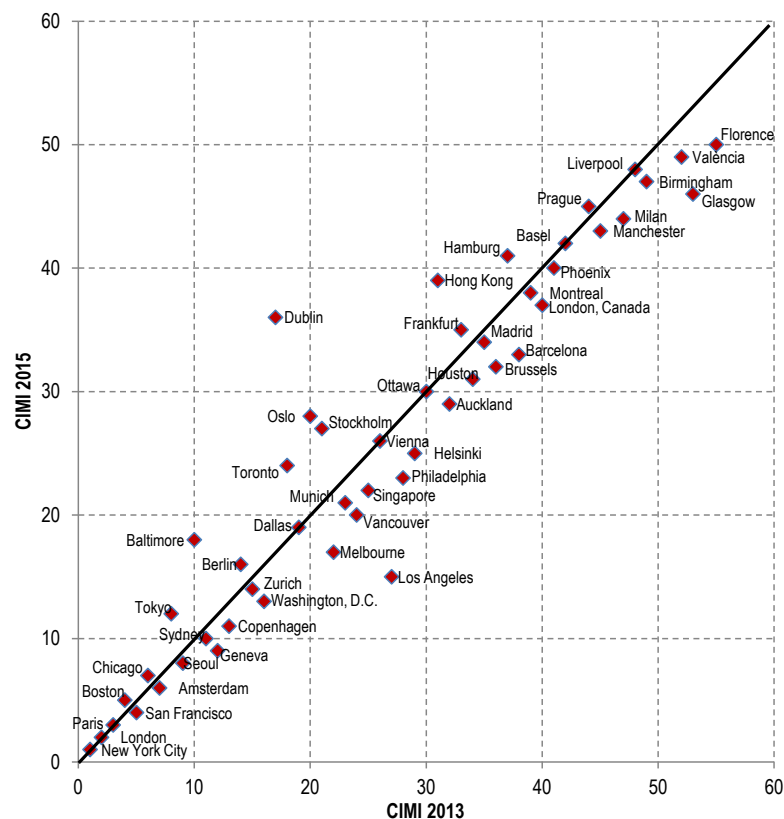
City	2013	2014	2015		2013–2014		2014–2015
New York City, United States	1	2	1		-1		1
London, United Kingdom	2	1	2		1		-1
Paris, France	3	3	3		0		0
San Francisco, United States	5	5	4		0		1
Boston, United States	4	4	5		0		-1
Amsterdam, Netherlands	7	7	6		0		1
Chicago, United States	6	6	7		0		-1
Seoul, South Korea	9	9	8		0		1
Geneva, Switzerland	12	10	9		2		1
Sydney, Australia	11	11	10		0		1
Copenhagen, Denmark	13	19	11		-6		8
Tokyo, Japan	8	8	12		0		-4
Washington, D.C., United States	16	13	13		3		0
Zurich, Switzerland	15	12	14		3		-2
Los Angeles, United States	27	24	15		3		9
Berlin, Germany	14	18	16		-4		2
Melbourne, Australia	22	17	17		5		0
Baltimore, United States	10	14	18		-4		-4
Dallas, United States	19	15	19		4		-4
Vancouver, Canada	24	28	20		-4		8
Munich, Germany	23	20	21		3		-1
Singapore, Singapore	25	21	22		4		-1
Philadelphia, United States	28	22	23		6		-1
Toronto, Canada	18	23	24		-5		-1
Helsinki, Finland	29	27	25		2		2
Vienna, Austria	26	25	26		1		-1
Stockholm, Sweden	21	29	27		-8		2
Oslo, Norway	20	26	28		-6		-2
Auckland, New Zealand	32	31	29		1		2
Ottawa, Canada	30	30	30		0		0
Houston, United States	34	33	31		1		2
Brussels, Belgium	36	37	32		-1		5
Barcelona, Spain	38	34	33		4		1
Madrid, Spain	35	35	34		0		1
Frankfurt, Germany	33	36	35		-3		1
Dublin, Ireland	17	16	36		1		-20
London, Canada	40	38	37		2		1
Montreal, Canada	39	39	38		0		1
Hong Kong, China	31	32	39		-1		-7
Phoenix, United States	41	41	40		0		1
Hamburg, Germany	37	40	41		-3		-1
Basel, Switzerland	42	43	42		-1		1
Manchester, United Kingdom	45	44	43		1		1
Milan, Italy	47	54	44		-7		10
Prague, Czech Republic	44	42	45		2		-3
Glasgow, United Kingdom	53	47	46		6		1
Birmingham, United Kingdom	49	45	47		4		-2
Liverpool, United Kingdom	48	46	48		2		-2
Valencia, Spain	52	49	49		3		0
Florence, Italy	55	55	50		0		5
Stuttgart, Germany	51	50	51		1		-1
Cologne, Germany	46	48	52		-2		-4
Miami, United States	43	53	53		-10		0

City	2013	2014	2015		2013–2014		2014–2015
Tallin, Estonia	54	51	54		3		-3
Lyon, France	56	56	55		0		1
Osaka, Japan	50	52	56		-2		-4
Gothenburg, Sweden	57	58	57		-1		1
Malaga, Spain	62	59	58		3		1
Eindhoven, Netherlands	61	63	59		-2		4
A Coruña, Spain	68	60	60		8		0
Nice, France	58	61	61		-3		0
Lisbon, Portugal	65	62	62		3		0
Linz, Austria	66	69	63		-3		6
Taipei, Taiwan	69	76	64		-7		12
Dubai, United Arab Emirates	59	57	65		2		-8
Abu Dhabi, United Arab Emirates	70	65	66		5		-1
Seville, Spain	76	71	67		5		4
Budapest, Hungary	60	68	68		-8		0
Bilbao, Spain	73	72	69		1		3
Rotterdam, Netherlands	72	70	70		2		0
Leeds, United Kingdom	67	66	71		1		-5
Marseille, France	64	64	72		0		-8
Duisburg, Germany	63	67	73		-4		-6
Warsaw, Poland	75	77	74		-2		3
Nottingham, United Kingdom	71	73	75		-2		-2
Porto, Portugal	80	75	76		5		-1
Antwerp, Belgium	82	78	77		4		1
Riga, Latvia	78	80	78		-2		2
Lille, France	81	81	79		0		2
Santiago, Chile	84	82	80		2		2
Rome, Italy	77	79	81		-2		-2
Turin, Italy	87	89	82		-2		7
Bratislava, Slovakia	91	84	83		7		1
Bangkok, Thailand	74	74	84		0		-10
Buenos Aires, Argentina	85	85	85		0		0
Ljubljana, Slovenia	83	91	86		-8		5
Nagoya, Japan	79	83	87		-4		-4
Kuala Lumpur, Malaysia	89	86	88		3		-2
Vilnius, Lithuania	90	90	89		0		1
Naples, Italy	95	93	90		2		3
Busan, South Korea	88	87	91		1		-4
Beijing, China	93	92	92		1		0
Shanghai, China	86	88	93		-2		-5
Wroclaw, Poland	96	96	94		0		2
Sofia, Bulgaria	92	94	95		-2		-1
Daejeon, South Korea	94	95	96		-1		-1
Tel Aviv, Israel	100	97	97		3		0
Daegu, South Korea	97	99	98		-2		1
Medellin, Colombia	99	101	99		-2		2
Mexico City, Mexico	120	98	100		22		-2

Figure 3 sets out the positions in 2013 and 2015 for the top 30 cities in the ranking. Those cities that show a positive evolution are below the 45 degree angle formed by the diagonal line, while the cities whose evolution was not positive are above that line. For example, Dublin, as mentioned above, shows a clearly negative evolution, since in

2013 it was in 17th place in the ranking and ended up in position 36 in 2015. In contrast, Los Angeles shows a positive evolution, going from position 27 to 15 in 2015.

FIGURE 3



CITIES IN MOTION VS. OTHER INDEXES

In this section we conduct a comparative study of the **CIMI** and other indexes. To begin, we do a comparison with the City RepTrak index created by the Reputation Institute, which gathers opinions from more than 22,000 consumers around the world. The index measures the degree to which people admire and respect a city, trust it and have a good feeling or an emotional bond with regard to it. This index has been produced since 1999 for both cities and countries.

Figure 4 sets out a comparison between the rankings of the **CIMI** and the City RepTrak for 2015. All cities above

the diagonal line boast a higher ranking in the **CIMI** with respect to the City RepTrak position. The opposite happens with the cities that are below the line. Especially noteworthy are the U.S. cities that are in the top positions of the **CIMI** ranking but are higher than position 25 in the City RepTrak. Another similar example is Seoul, which is in eighth place in the **CIMI** but is in position 59 of the City RepTrak. On the other hand, cities such as Rome (Italy), Prague (Czech Republic) and Florence (Italy) enjoy a reputation that is better than the **CIMI** indicates. The cities that are near the line are cities that have a reputation in accordance with what the **CIMI** suggests. Within this group are found, for example, Tokyo (Japan), Zurich and Geneva (Switzerland), Abu Dhabi (United Arab Emirates), Frankfurt (Germany) and Toronto (Canada).

FIGURE 4

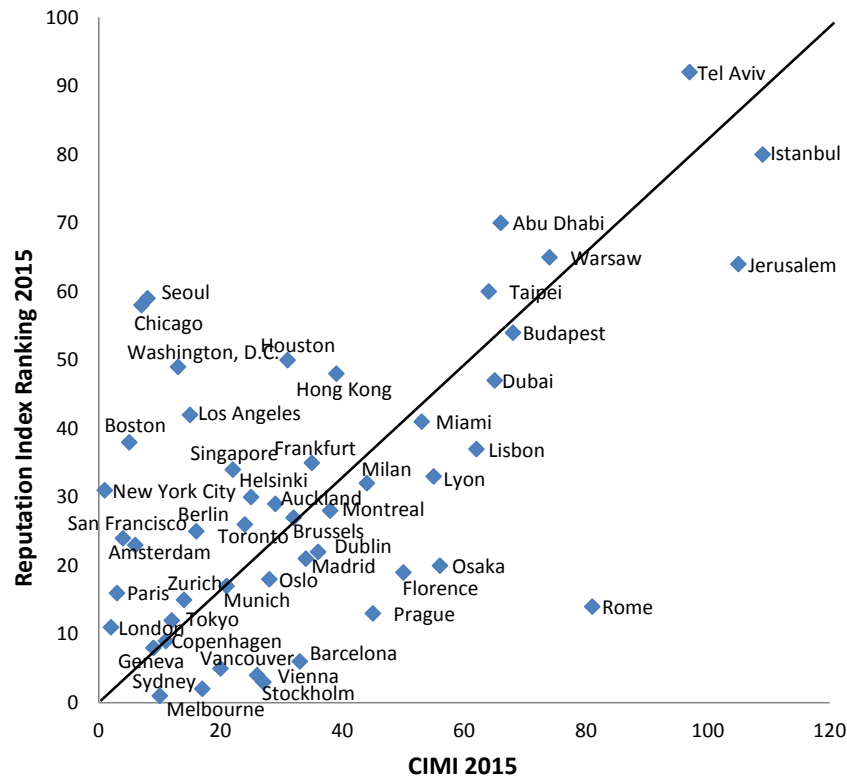


Table 14 shows a comparison of the **CIMI** index with other city indexes from various organizations. While the indexes under consideration vary in terms of methodology and indicators, all agree that a city is more powerful, prosperous and competitive if it manages to develop in its various dimensions – from the economy and finance to the ease of creating businesses, the quality of life, the use of high technology, and its cultural importance, including aspects such as the promotion of music and fashion. It can be observed that the cities of New York, London and Paris appear in six of the seven indexes compared. These three cities are characterized by strong economic and financial power and they likewise stand out in the dimensions of human capital, technology, mobility and transportation, and international renown, as we have been able to verify through the **CIMI**.

The cities of Chicago, Seoul and Sydney also appear frequently in other rankings among the 10 most prosperous cities in the world or those with the best quality of life. However, cities such as San Francisco, Amsterdam, Boston and Geneva do not appear in the top 10 cities considered by other indexes. It should be emphasized that these differences are due to the fact that our index has a higher number of dimensions (and, hence, indicators) and greater geographical coverage than most of the rankings considered. On the other hand, most of the cities that occupy the top positions in other rankings but are not in the top 10 of the **CIMI** are found in the top 25 of our index.

TABLE 14. COMPARISON WITH OTHER INDEXES. TOP 10

City Ranking	CIMI-2015 (IESE)	Global Cities Index-2015 (A.T. Kearney)	Cities Prosperity Index-2015 (United Nations)	Global Financial Centres Index-2015 (Z/Yen)	Global City Competitiveness Index- 2014 (The Economist)	Global Metro Monitor Map-2014 (Brookings)	Global Power City Index- 2015 (MMF)
1	New York City	New York City	Oslo	London	New York City	Tokyo	London
2	London	London	Copenhagen	New York City	London	New York City	New York City
3	Paris	Paris	Stockholm	Hong Kong	Singapore	Los Angeles	Paris
4	San Francisco	Tokyo	Helsinki	Singapore	Hong Kong	Seoul	Tokyo
5	Boston	Hong Kong	Paris	Tokyo	Tokyo	London	Singapore
6	Amsterdam	Los Angeles	Vienna	Seoul	Sydney	Paris	Seoul
7	Chicago	Chicago	Melbourne	Zurich	Paris	Osaka	Hong Kong
8	Seoul	Singapore	Montreal	Toronto	Stockholm	Shanghai	Berlin
9	Geneva	Beijing	Toronto	San Francisco	Chicago	Chicago	Amsterdam
10	Sydney	Washington, D.C.	Sydney	Washington, D.C.	Toronto	Moscow	Vienna

CITIES IN MOTION: A DYNAMIC ANALYSIS

To assess the growth trends and potential of cities, we have created a graph that seeks to capture these aspects. Figure 5 sets out the current position of each city in the **CIMI** index (horizontal axis) and the trend (vertical axis). As a measure to calculate the trend, the change in terms of number of positions in the **CIMI** ranking between 2013 and 2015 has been used. This assumes that the cities in the top part of the graph are those that have gained position and those in the bottom part of the graph are those that have lost position. The cities in the center of the graph are those that have not experienced significant changes of location in the years analyzed.

The graph area has been divided into four quadrants of cities, namely: consolidated, challenging, potential and vulnerable.

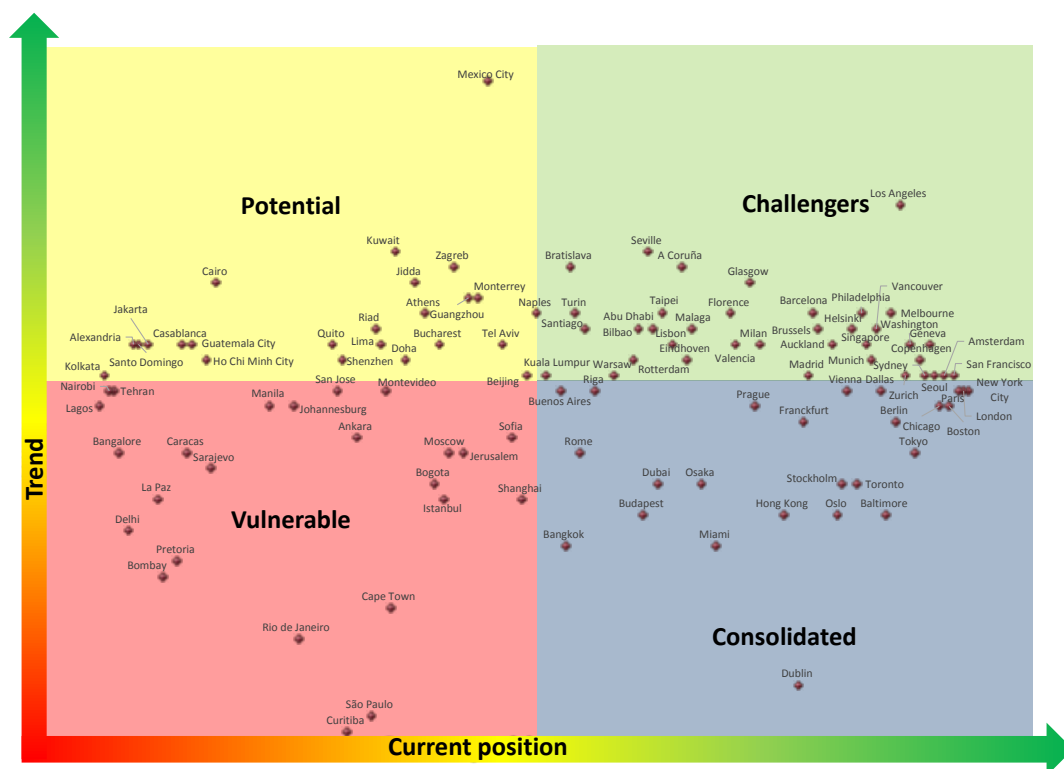
The first group, that of consolidated cities (bottom right quadrant), includes cities that have a middle to high overall position but have maintained their position throughout the period or even lost position somewhat. It is made up of cities from different geographical regions: Baltimore, Miami, and Toronto, from North America; Dublin, Frank-

furt, and Rome, representing Europe, together with the Nordic capitals of Oslo and Stockholm; and Osaka and Dubai as representatives of Asia. The challenger cities are the second group that can be observed in the graph (top right quadrant). It is made up of cities that have improved their positions in the index at a fast rate and are already in the middle to high area. In this quadrant we can find cities such as Los Angeles (the city with the fastest growth of this group), Vancouver and Melbourne.

The third group is of cities with great potential and is made up of those that, despite their current position, are in the middle to low area of the index and are evolving positively at great speed (top left quadrant). In this quadrant, we can find Latin American capitals such as Quito, Lima, Monterrey and Santo Domingo, in addition to Asian cities such as Shenzhen, Guangzhou and Ho Chi Minh City.

The last group of cities includes those that are in a vulnerable position (bottom left quadrant). This is a group that is growing at a slower pace than the rest and is in the middle to low position of the classification. It is made up of cities such as Bombay, Istanbul and La Paz. Within the group, what stands out especially is the situation of the Brazilian cities of Rio de Janeiro, São Paulo and Curitiba, which are those that have lost the most positions during the period analyzed.

FIGURE 5



Complementing Figure 5 is an analysis of variance of the dimensions concerning the cities. That is, the aim is to understand not only how much they have grown but also how they have done so. To do this, the variation of the different dimensions was calculated for each of the cities that are set out in Figure 6. Cities in the bottom of the graph below are ones that have similar positions in all the dimensions and therefore show a more homogeneous distribution. The cities in the top stand out in one or more dimensions but in others they are in a relatively low position. This information, combined with the position of each city, allows us to identify four categories of cities.

The first category is that of “balanced” cities (bottom right quadrant): those cities that are in the upper middle part of the table and have relatively high values in all the dimensions. Within this category are cities such as Amsterdam, Sydney, Berlin, Brussels, Munich, Melbourne, Seoul and Stockholm.

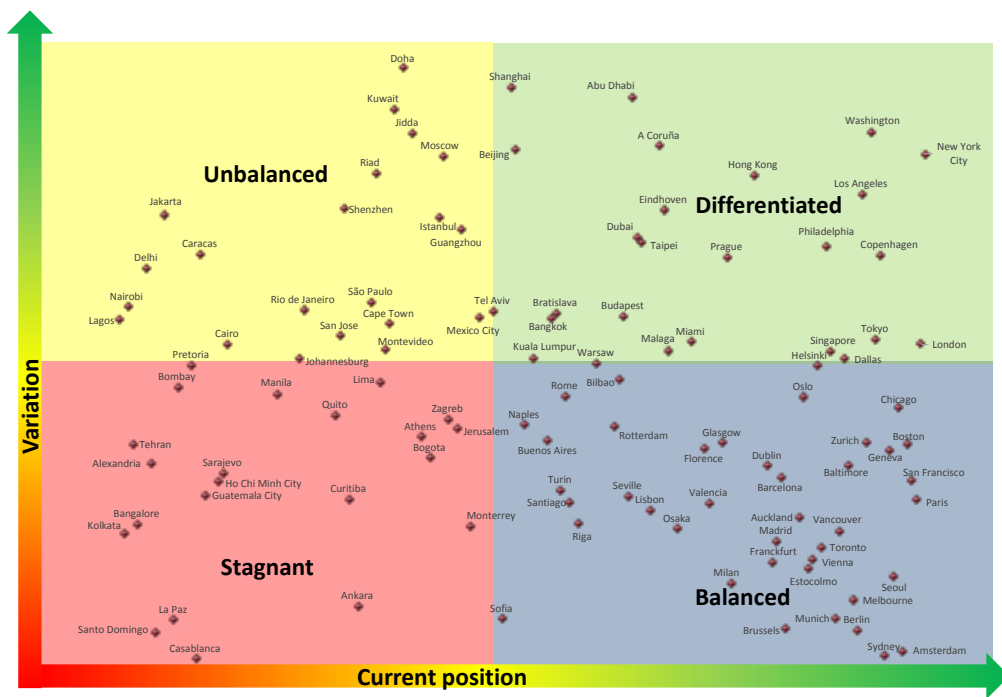
The second category consists of the cities (top right quadrant) – that is, those cities that are in high positions in the ranking and that get very good results in several dimensions but relatively poor ones in others. An example is the city of Washington, D.C., which is among the top positions in public management, human capital, governance and the economy but among the worst positions in mobility and transportation and in urban planning. Another example is New York City, which ranks among the

top positions in almost all the dimensions but in the last positions on social cohesion and the environment. In this category we find cities such as Hong Kong, A Coruña and Abu Dhabi.

The third quadrant (top left quadrant) considers cities that are at the bottom of the table but stand out in one dimension. For example, the cities of Doha, Kuwait and Riyadh, which in most of the dimensions are in positions beyond 100, stand out in the public management dimension. In this category we also find cities such as Caracas, Jakarta and Shenzhen.

In the last quadrant (bottom left quadrant) are those cities that achieve poor results in (almost) all the dimensions. An example is the city of La Paz, which is below position 100 in all the dimensions. In this category we find cities such as Casablanca and Santo Domingo.

FIGURE 6



CONCLUSIONS

The **CIMI** synthetic index allows us, through an objective calculation methodology, to compile a ranking of cities taking into account various aspects. The 10 dimensions analyzed offer a broad and holistic vision of what a city represents, while allowing greater understanding of its composition and its evolution over time. A comparative and in-depth analysis of the various profiles of cities reflected in the **CIMI** enables the following conclusions to be drawn:

- **There is no single model of success.** The cities that top the ranking are not identical but prioritize various dimensions. (See Appendix 2.) There are various ways through which a city can succeed in getting to the top of the index. This means that cities must escape the one-size-fits-all approach. The evidence set out in this report is consistent with the message that our platform conveys to city managers: the first step to succeed in being a better city is to define what kind of city is desired and which dimensions to improve.
- **It is not enough to be good in only one dimension.** Certain cities are at the top of the ranking in some dimensions. This is the case of Riyadh, Jidda, Doha and Kuwait, which in the overall ranking are in positions 123, 115, 117 and 119 respectively, while in the public management dimension they are in positions 6, 8, 11 and 20 respectively. These are the cities that we have

called “unbalanced” in the analysis of variance. The recommendation for these cities is that, if they want to play in the Champions League, they should be capable of reaching acceptable minimums in the dimensions as a whole.

- **It is important to take the whole into account and break down barriers.** In relation to the previous point and in accordance with the proposed model, it is important to encourage an overview in the urban management process. The separation of the 10 dimensions is useful as a tool that facilitates analysis, but in practice the elements are linked. For example, the mobility and transportation models that a city might choose will have an impact on its environmental dimension, in the same way that governance and public management are not independent of each other. One of the main responsibilities of urban managers consists of understanding what the interrelationships are between the various dimensions that make up a city, as well as the advantages and disadvantages they involve. In this regard, the city's structure should reflect these interrelationships, avoiding barriers between the city halls' various departments and achieving an appropriate balance.
- **The perfect city does not exist.** It is very difficult for a city to maximize all the dimensions. Even those cities in the top positions of the rankings have weak points. For example, cities such as London and New York have a long way to go in the social cohesion dimension. These cities have been classified as "differentiated" cities

and we recommend that they make the most of the advantages they have in the dimensions where they are leaders in order to progress in the positions where they are lagging behind. For example, a city can make the most of its technological leadership to improve its environmental dimension. For the cities that we have classified as “balanced” (Amsterdam, Sydney, Melbourne and Seoul, among others), the main recommendation is that they should not rest on their laurels. Despite their more harmonious growth, they still have room for improvement.

- **Change is slow for most cities.** While our temporal analysis of the **CIMI** indicates that there are cities that can make great progress in a relatively short time and move to higher positions quickly (Los Angeles, Vancouver and Glasgow), in general it shows us that, for most of the cities, their position in the ranking does not change significantly from one year to the next. This is due, to a large extent, to the time they need to crystallize projects of any magnitude. Therefore, if they seek to generate changes needed to become smart and sustainable cities, they should adopt long-term policies as soon as possible, especially those that are the worst placed and that we have called “stagnant” cities in our analysis. There are many that still have problems dealing with the major challenges of cities: the lack of collaboration between public and private bodies, civic institutions, and the public; the impossibility of promoting new business models that provide financing for new businesses; and a shortsighted vision of smart cities, among others. Many of these cities still see technology as the main ingredient of a smart city and do not take into account other critical dimensions that define the urban situation.
- **Use of the CIMI as a planning tool.** In order to define the future city that is desired – that is, the vision of the city – it is important to start off with a good diagnosis. This report provides a conceptual framework and empirical evidence that can be helpful both for the cities included in the index and for those that have been left out in order to compile this diagnosis. For the former, an X-ray of their current status is provided, indicating the aspects where there is room for improvement. For the latter, this report allows them to identify the dimensions worth considering in their urban planning and to define the group of cities that it would be desirable to emulate. In this respect, the point of reference that the **CIMI** becomes should be understood as such and not as a road map that must be followed down to the last detail. It is also important to point out that our recommendation to urban managers is that they pay more attention to the trend (dynamic analysis) than to the position.

- **Cities do not always have the reputation they deserve.** The comparative study of what a city is (**CIMI**) and the perception that the public in general has of the city (City RepTrak) confirms that there are cities that should improve when it comes to communicating their virtues. (For example, New York City is in first place in the **CIMI** but in position 31 in the City RepTrak.) On the other hand, there are cities with a better reputation than what the **CIMI** indicates (for example, Rome, which is in 81st place in the **CIMI** but ranks 14 in the City RepTrak). These cities should take care because, if the distance between “what the city really is” and “what it says it is” is very wide, this can adversely affect its legitimacy.
- **Cities do not operate in isolation.** Each city is different, but none of them works in isolation from the situation of the country in which they are located. While it is true that investors, talent and tourists tend to compare and decide between cities, these decisions are not unconnected with the conditions provided by the countries where these cities are located. In this regard, the urban manager must be able to identify the threats and opportunities that the national context presents to set up defenses against the former and make the most of the latter.

The urbanization process is one of the most significant challenges of the 21st century. As the world population moves toward cities, existing problems grow and new ones are generated that, in addition, are influenced profoundly by the globalization process. This trend means a closer relationship between global dynamics and cities, generating local impacts: effects on the economy, demographics, social divisions or environmental impacts.

Despite these challenges, cities and their leaders or managers have little time and few tools to take a step back and analyze their problems, discover what other cities do or learn what good practices are being carried out elsewhere in the world. The day-to-day management of a city makes it difficult for cities to ask themselves how to promote the positive effects of the urbanization process and how to reduce the negative effects. Thus, the IESE Cities in Motion platform aims to create awareness and generate innovative tools to achieve smarter government systems. With this index, we hope to have contributed to this goal.

APPENDIX 1. INDICATORS

NO.	INDICATOR	DESCRIPTION / UNIT OF MEASURE	DIMENSION / CLUSTER	SOURCE
1	Higher education	Proportion of population with secondary and higher education	Human capital	Euromonitor
2	Business schools	Number of business schools (top 100)	Human capital	Financial Times
3	Movement of students	International movement of higher-level students. Number of students	Human capital	UNESCO
4	Number of universities	Number of universities	Human capital	QS Top Universities
5	Museums	Number of museums per city	Human capital	2thinknow
6	Art galleries	Number of art galleries per city	Human capital	2thinknow
7	Expenditure on leisure and recreation	Expenditure on leisure and recreation. Expressed in millions of U.S. dollars at 2014 prices	Human capital / country cluster	Euromonitor
8	Ratio of deaths	Ratio of death per 100,000 inhabitants	Social cohesion	Euromonitor
9	Crime rate	Crime rate	Social cohesion	Numbeo
10	Health index	Health index	Social cohesion	Numbeo
11	Unemployment rate	Unemployment rate (number of unemployed / labor force)	Social cohesion	Euromonitor
12	Gini index	The Gini index varies from 0 to 100, with 0 being a situation of perfect equality and 100 that of perfect inequality	Social cohesion	Euromonitor
13	Price of property	Price of property as percentage of income	Social cohesion	Numbeo
14	Ratio of women workers	Ratio of women workers in the public administration	Social cohesion	International Labor Organization
15	Productivity	Labor productivity calculated as GDP/working population (in thousands)	Economy	Euromonitor
16	Time required to start a business	Number of calendar days needed so a business can operate legally	Economy	World Bank
17	Ease of starting a business	Ease of starting a business. Top positions in the ranking indicate a more favorable regulatory environment for creating and operating a local company	Economy	World Bank
18	Number of headquarters	Number of headquarters of publicly traded companies	Economy	Globalization and World Cities (GaWC)
19	Percentage of people at early business stage	Percentage of 18 to 64-year-old population who are new entrepreneurs or owners/managers of a new business	Economy	Global Entrepreneurship Monitor
20	Entrepreneurs	Companies in an initial phase that represent a city's economic bases. They represent economic dynamism and include a high proportion of companies devoted to technology. Used per capita	Economy	2thinknow

NO.	INDICATOR	DESCRIPTION / UNIT OF MEASURE	DIMENSION / CLUSTER	SOURCE
21	GDP	Gross domestic product in millions of U.S. dollars at 2014 prices	Economy	Euromonitor
22	Total tax rate	Total tax rate. This measures the total amount of taxes and compulsory contributions paid by businesses after accounting for deductions and exemptions allowed as part of commercial profits	Public management	World Bank
23	Reserves	Total reserves in millions of current U.S. dollars	Public management	World Bank
24	Reserves per capita	Reserves per capita in millions of current U.S. dollars	Public management	World Bank
25	Embassies	Number of embassies per city	Public management	2thinknow
26	Twitter	Twitter users listed in prominent Twitter directories (e.g., Twellow). It includes users self-defined as leaders (for example, writers, activists, business leaders and journalists). In thousands of people	Public management	2thinknow
27	Sales tax	Sales tax. This has a big impact on the economy. Lower rates of sales tax can be used to finance investment in services and intelligent infrastructure	Public management	2thinknow
28	Strength of legal rights index	The strength of legal rights index measures the degree to which collateral and bankruptcy laws protect the rights of borrowers and lenders and thus facilitate access to loans. The values go from 0 = low to 12 = high, where the highest ratings indicate that the laws are better designed to expand access to credit	Governance	World Bank
29	Corruption perceptions index	Corruption perceptions index. The values go from 0 = very corrupt to 100 = very transparent	Governance	Transparency International
30	Functions of the innovation department	Number of functions of the city's innovation department (or ministry if there is one)	Governance	2thinknow
31	Range of government Web services	Range of Web services for all city council users (residents or visitors). This is a measure of modern and technological municipal government. Scale from 0 to 5	Governance	2thinknow
32	Open data platform	This describes whether the city has an open data system	Governance	CTIC Foundation
33	CO ₂ emissions	Carbon dioxide emissions that come from the burning of fossil fuels and the manufacture of cement. Measured in kilotons (kt)	Environment	World Bank
34	CO ₂ emission index	CO ₂ emission index	Environment	Numbeo
35	Methane emissions	Methane emissions that arise from human activities such as agriculture and the industrial production of methane. Measured in kt of CO ₂ equivalent	Environment	World Bank

NO.	INDICATOR	DESCRIPTION / UNIT OF MEASURE	DIMENSION / CLUSTER	SOURCE
36	Percentage of the population with access to the water supply	Percentage of the population with reasonable access to an appropriate quantity of water resulting from an improvement in the water supply	Environment	World Bank
37	PM2.5	PM2.5 measures the amount of particles in the air whose diameter is less than 2.5 µm. Annual mean	Environment	World Health Organization
38	PM10	PM10 measures the amount of particles in the air whose diameter is less than 10 µm. Annual mean	Environment	World Health Organization
39	Pollution index	Pollution index	Environment	Numbeo
40	Environmental performance index	Environmental performance index (from 1 = poor to 100 = good)	Environment	Yale University
41	Traffic index	The traffic index is estimated by considering the time spent in traffic and the dissatisfaction this generates. It also includes estimates of CO ₂ consumption and the other inefficiencies of the traffic system	Mobility and transportation	Numbeo
42	Inefficiency index	The inefficiency index is an estimate of the inefficiencies in traffic. High values represent high rates of inefficiency in driving, such as long journey times	Mobility and transportation	Numbeo
43	Number of road accidents	Number of road accidents per 100,000 inhabitants	Mobility and transportation	Euromonitor
44	Metro	Number of metro stations per city	Mobility and transportation	2thinknow
45	Flights	Number of arrival and departure flights (air routes) in a city	Mobility and transportation	2thinknow
46	Means of transportation	The means of transportation represents the public transportation options for smart cities. The value of the variable increases if there are more transportation options. The lack of transportation options can make a city less attractive as a smart destination	Mobility and transportation	2thinknow
47	Index of traffic for commuting to work	Index of traffic considering the journey time to work	Mobility and transportation	Numbeo
48	Percentage of the population with access to sanitation facilities	Percentage of the population with at least sufficient access to facilities for the disposal of excreta that can efficiently avoid the contact of humans, animals and insects with excreta	Urban planning	World Bank
49	Number of people per household	Number of people per household	Urban planning	Euromonitor

NO.	INDICATOR	DESCRIPTION / UNIT OF MEASURE	DIMENSION / CLUSTER	SOURCE
50	Bicycle shops	Number of bicycle shops per capita	Urban planning	2thinknow
51	Architects	Number of architecture firms per capita	Urban planning	2thinknow
52	Cycling	Cycling enthusiasts per capita. Bicycle use represents both a sustainable measure of transportation and a metric for a city's exercise and cultural aptitude. Many cities that historically are smart cities have a certain positive correlation with large cyclist populations (weather permitting)	Urban planning	2thinknow
53	Number of international tourists	Number of international tourists who visit the city. In thousands of people	International outreach	Euromonitor
54	Number of passengers of an airline	Number of passengers who travel with airlines. In thousands of people	International outreach	Euromonitor
55	Hotels	Number of hotels per capita	International outreach	2thinknow
56	Sightsmap	Ranking of cities according to the number of photos taken in the city and uploaded to Panoramio (community for sharing photographs online). The top positions correspond to the cities with the most photographs	International outreach	Sightsmap
57	Number of conferences and meetings	Number of international conferences and meetings that take place in a city	International outreach	International Congress and Convention Association
58	Number of broadband subscribers	Number of broadband subscribers per country with a digital subscriber line, cable modem or other high-speed technology, per 100 inhabitants	Technology	World Bank
59	Broadband	Number of broadband users within a city, including wireless and fixed connections	Technology	2thinknow
60	IP addresses	Number of IP addresses per capita	Technology	2thinknow
61	Facebook	Number of Facebook users per capita	Technology	2thinknow
62	Mobile phones	Number of mobile phones per capita	Technology	2thinknow
63	Quality of Web services	The quality of the city council's website measures the commitment of its information technology policy, support for the development of local businesses and other technology initiatives. Scale from 0 to 5, the maximum corresponding to the website with the best-quality services	Technology	2thinknow
64	Innovation index	Innovation index. Valuation of 0 = no innovation to 60 = a lot of innovation	Technology	Innovation Cities Program
65	Smartphones	Number of smartphones per capita. The use of smartphones and their penetration are a good indicator for the use of technologies	Technology	2thinknow
66	Wi-Fi hot spot	Number of wireless access points globally. These represent the options to connect to the Internet that businesspeople have when they travel	Technology	2thinknow

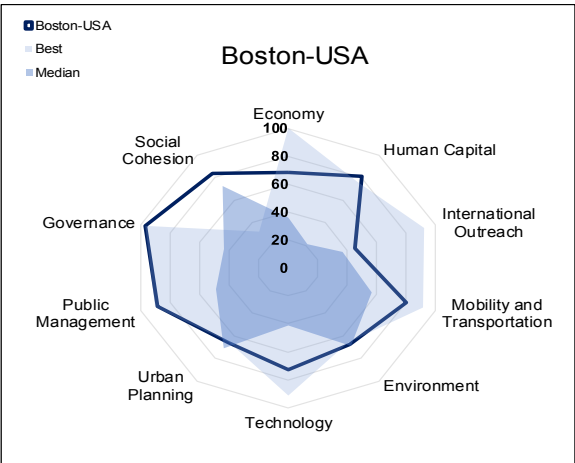
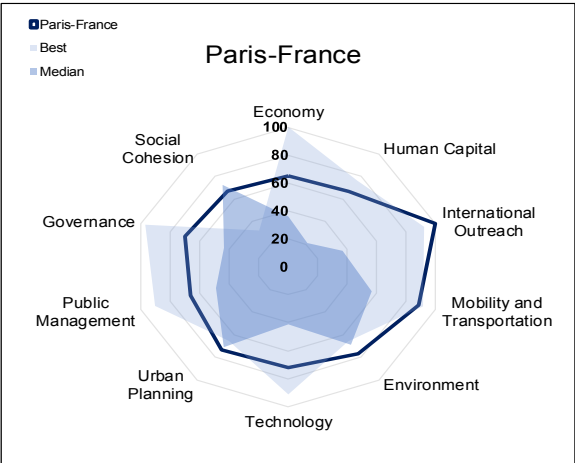
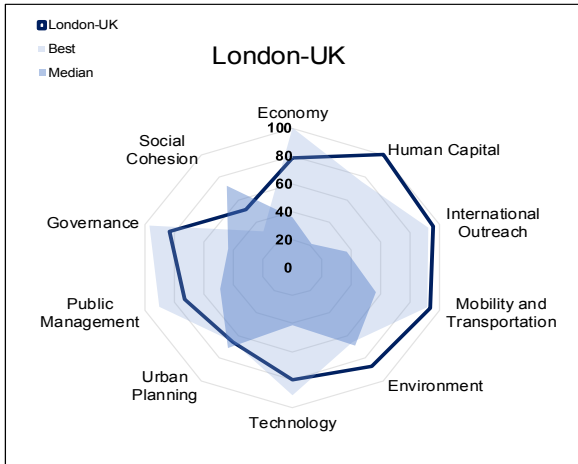
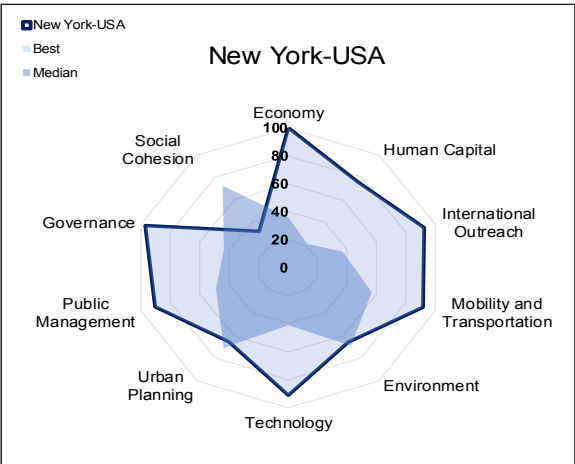
NO.	INDICATOR	DESCRIPTION / UNIT OF MEASURE	DIMENSION / CLUSTER	SOURCE
67	Disposable income	Disposable income (annual average). Decile 1. Expressed in U.S. dollars	City cluster	Euromonitor
68	Disposable income	Disposable income (annual average). Decile 2. Expressed in U.S. dollars	City cluster	Euromonitor
69	Disposable income	Disposable income (annual average). Decile 5. Expressed in U.S. dollars	City cluster	Euromonitor
70	Disposable income	Disposable income (annual average). Decile 7. Expressed in U.S. dollars	City cluster	Euromonitor
71	Disposable income	Disposable income (annual average). Decile 9. Expressed in U.S. dollars	City cluster	Euromonitor
72	Population	Number of inhabitants	City / country cluster	Euromonitor
73	Percentage of population employed	Percentage of population employed	Country cluster	Euromonitor
74	Expenditure on education per inhabitant	Expenditure on education per inhabitant. Expressed in millions of U.S. dollars at 2014 prices	Country cluster	Euromonitor
75	Expenditure on medical and health services per inhabitant	Expenditure on medical and health services per inhabitant. Expressed in millions of U.S. dollars at 2014 prices	Country cluster	Euromonitor
76	Expenditure on hospitality and catering services per inhabitant	Expenditure on hospitality and catering services per inhabitant. Expressed in millions of U.S. dollars at 2014 prices	Country cluster	Euromonitor
77	Expenditure on housing per inhabitant	Expenditure on housing per inhabitant. Expressed in millions of U.S. dollars at 2014 prices	Country cluster	Euromonitor

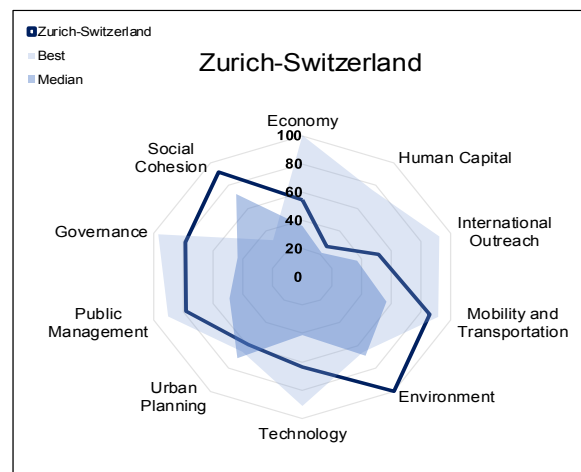
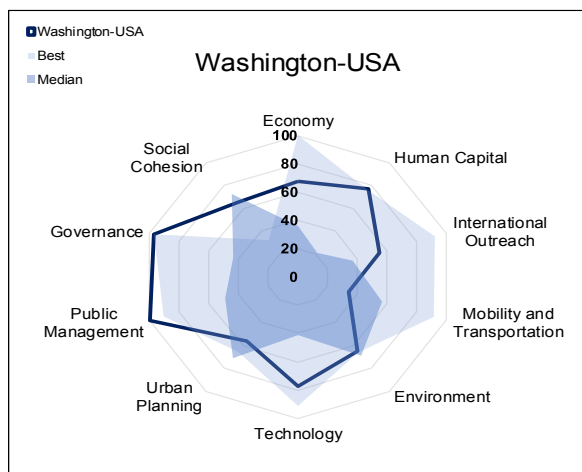
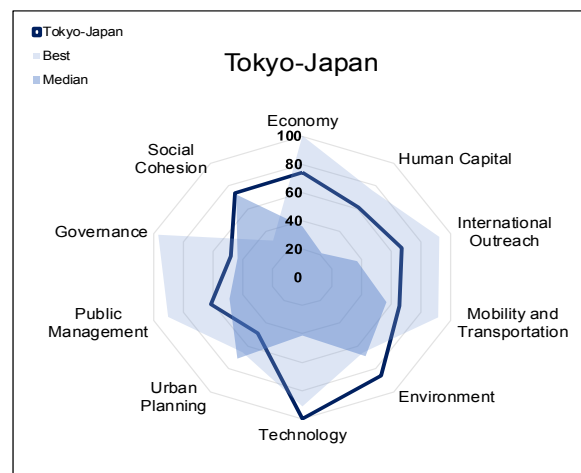
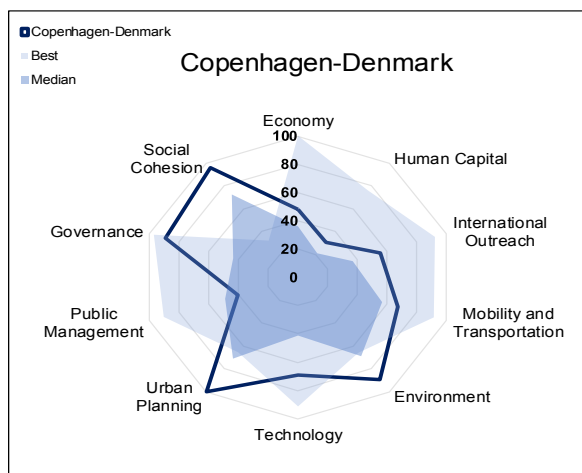
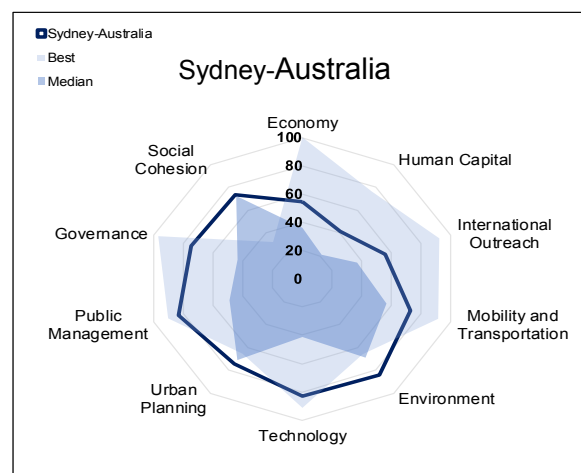
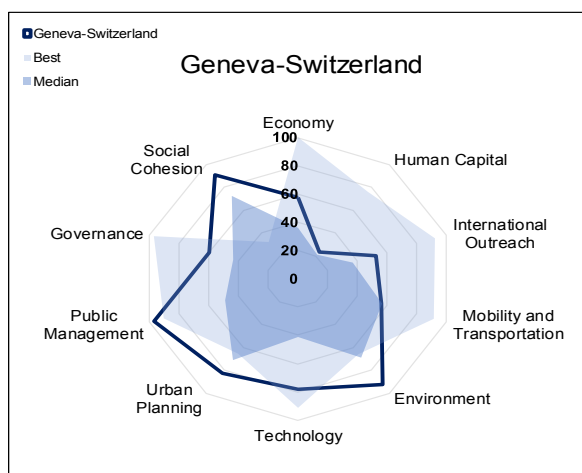
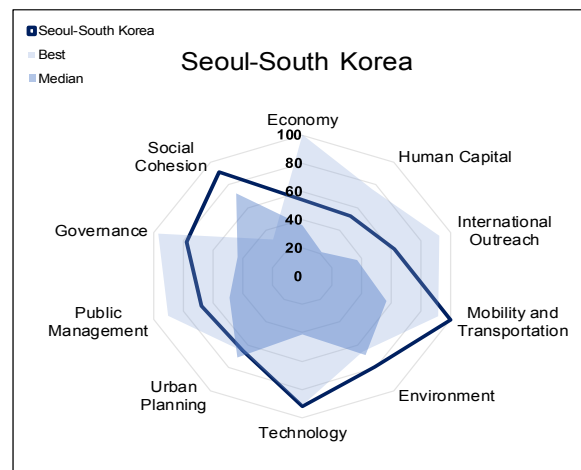
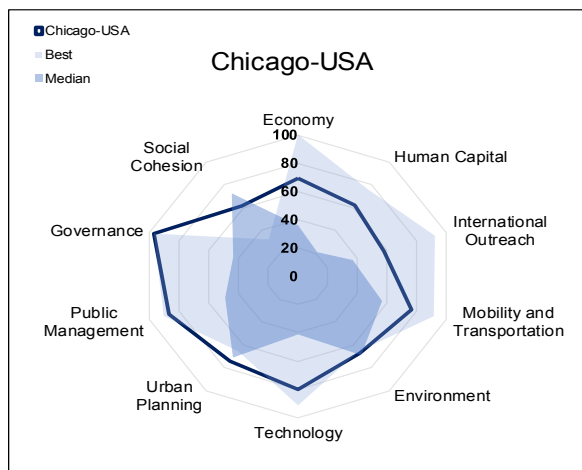
APPENDIX 2.

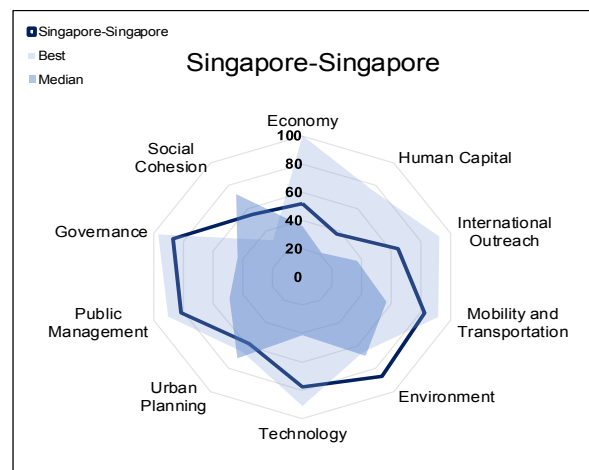
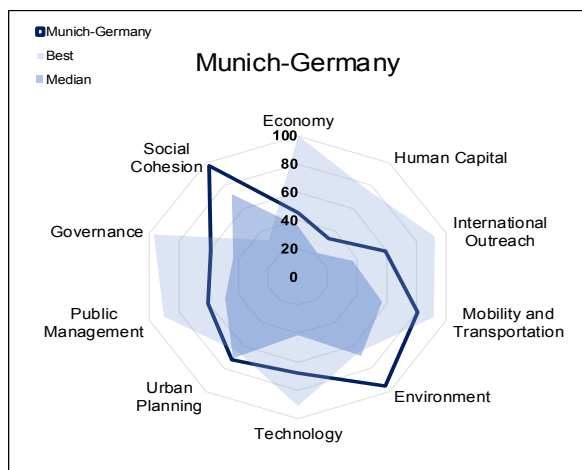
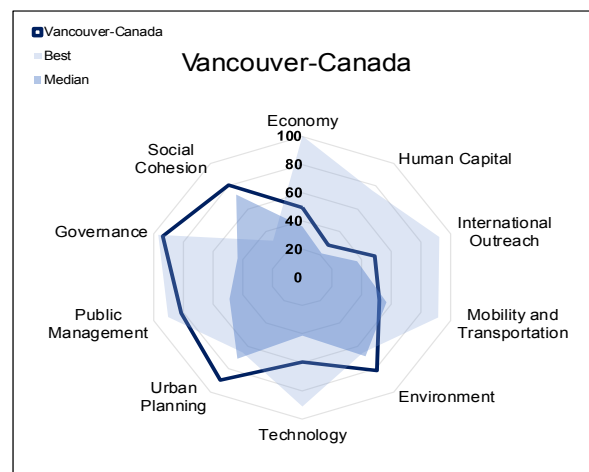
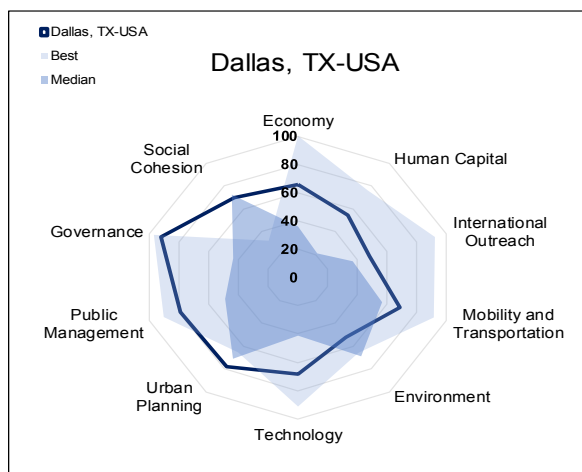
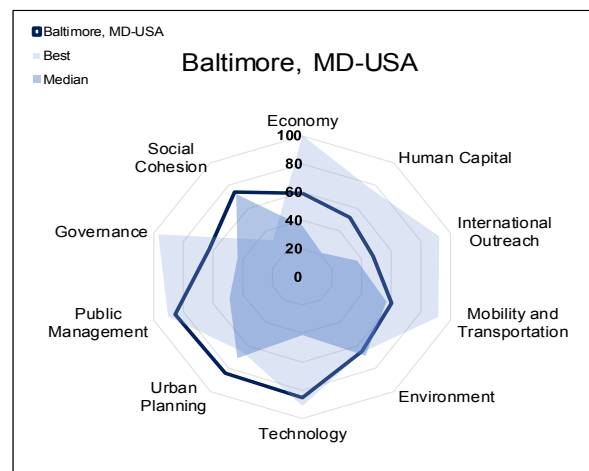
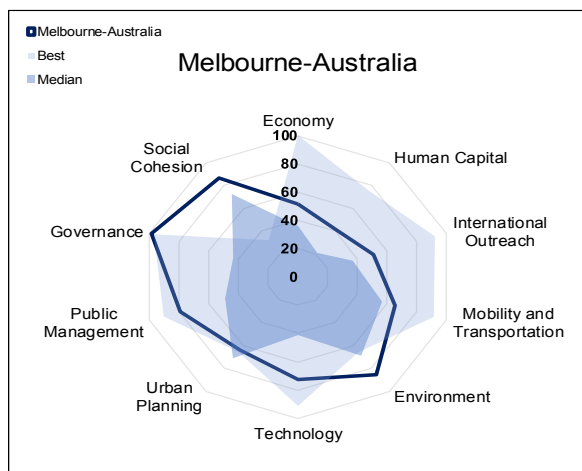
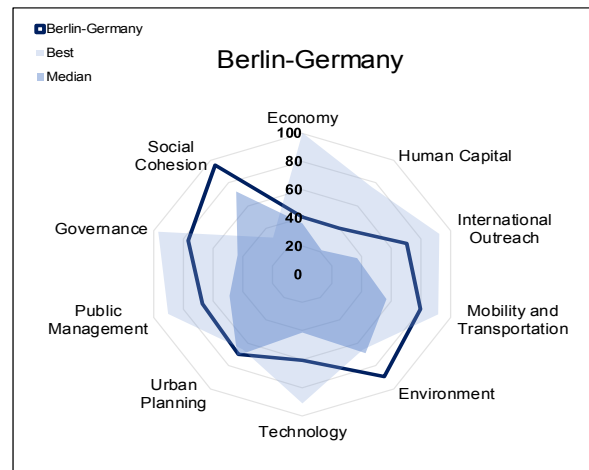
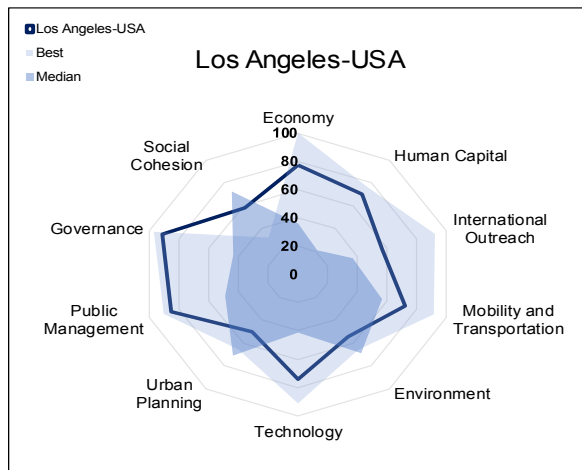
181 CITY PROFILES

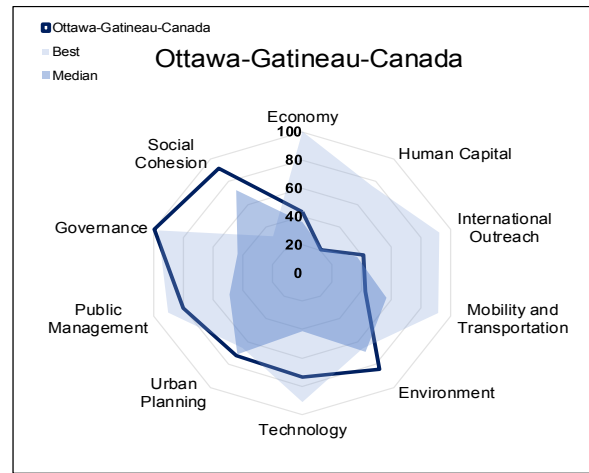
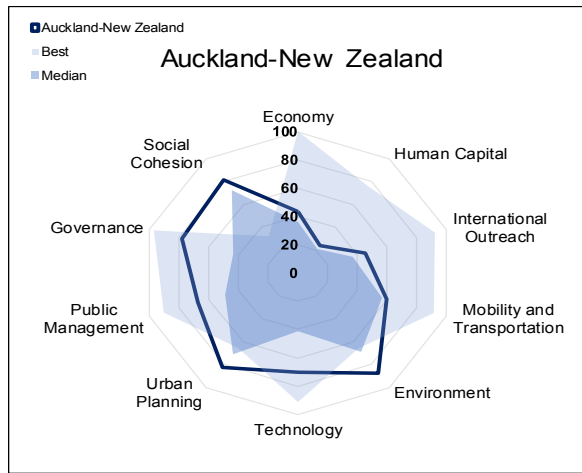
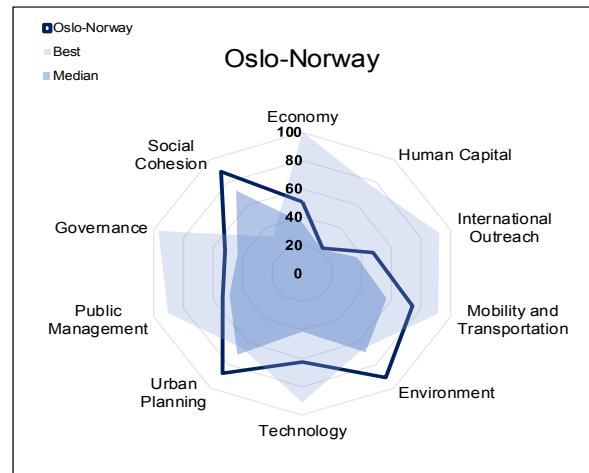
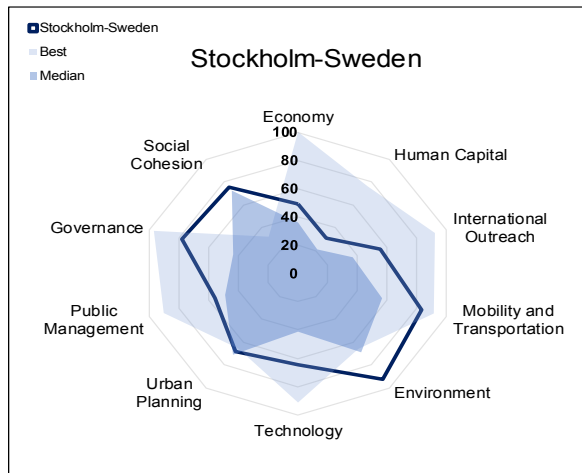
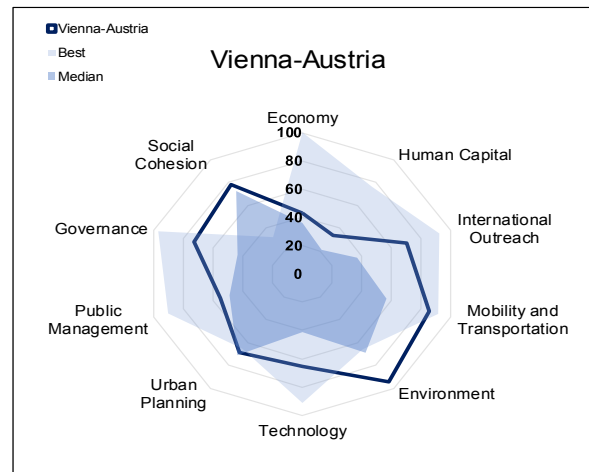
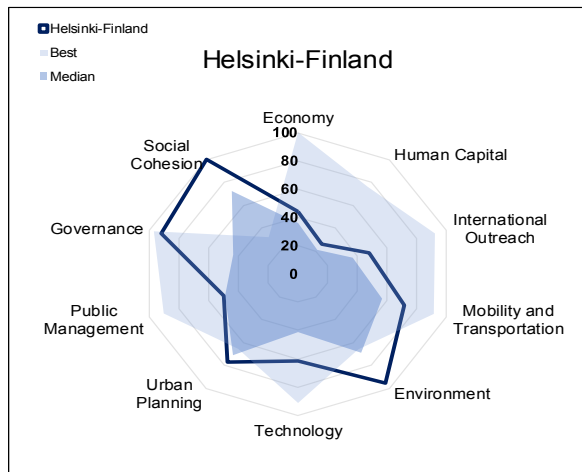
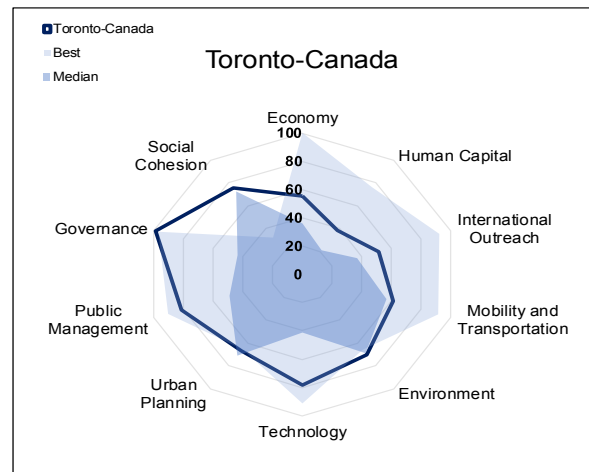
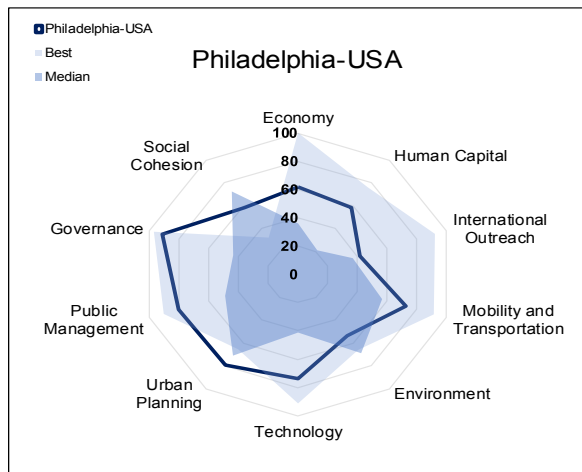
Below is a graphical analysis of the 181 cities included in the **CIMI**, based on the 10 key dimensions. These radar charts aim to facilitate interpretation of each city's profile, identifying the values of the various dimensions.

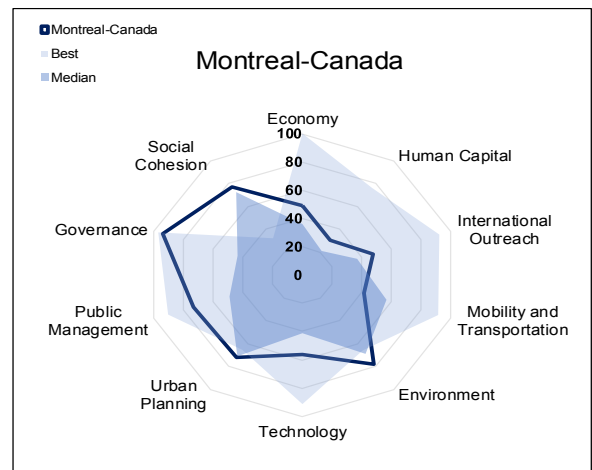
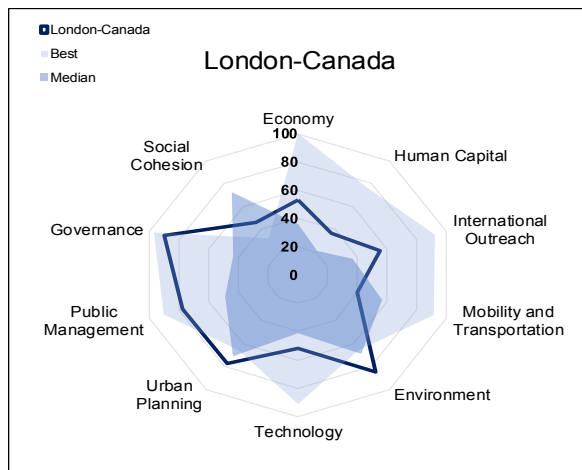
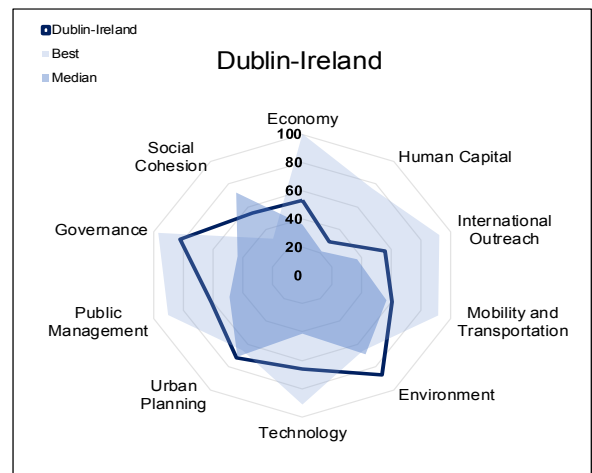
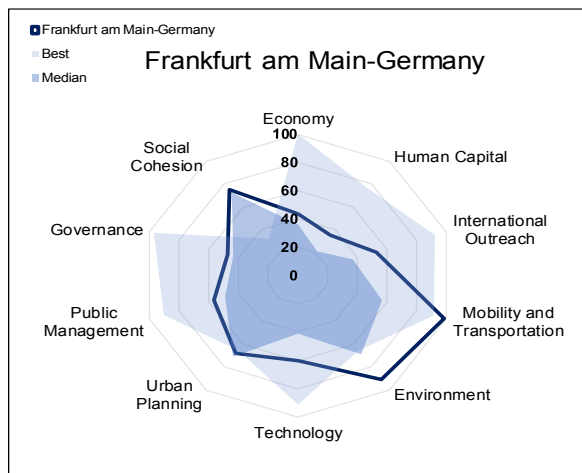
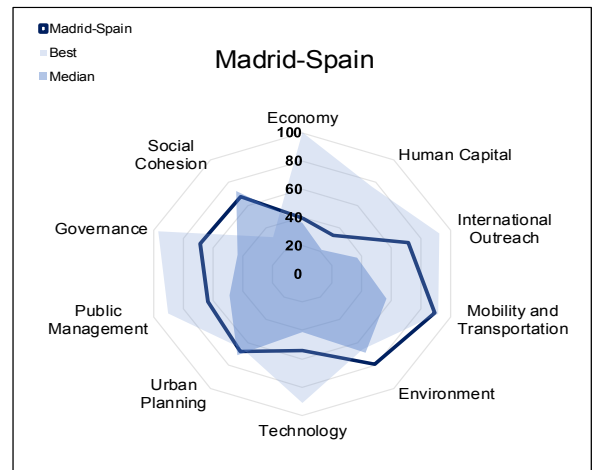
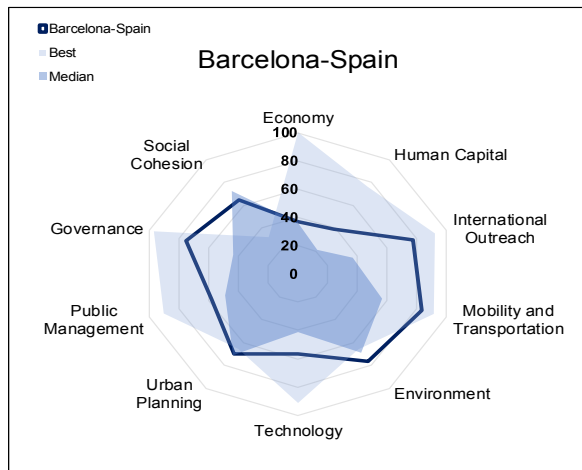
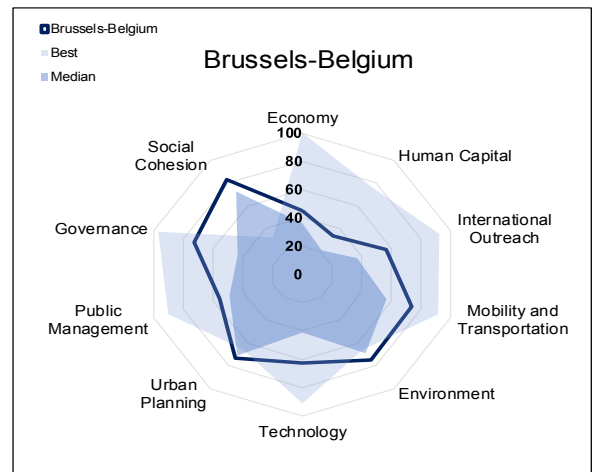
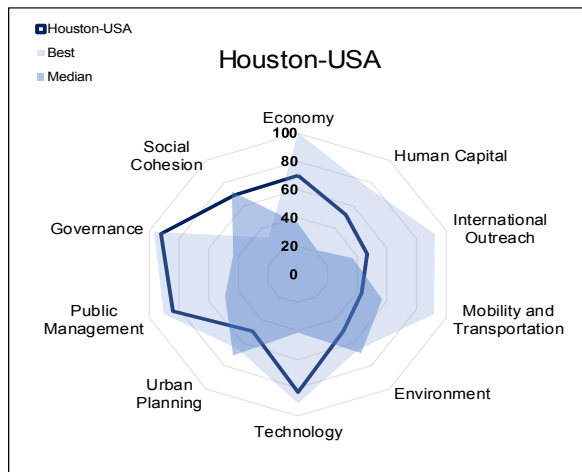
At the same time, they enable comparisons of two or more cities at a glance.

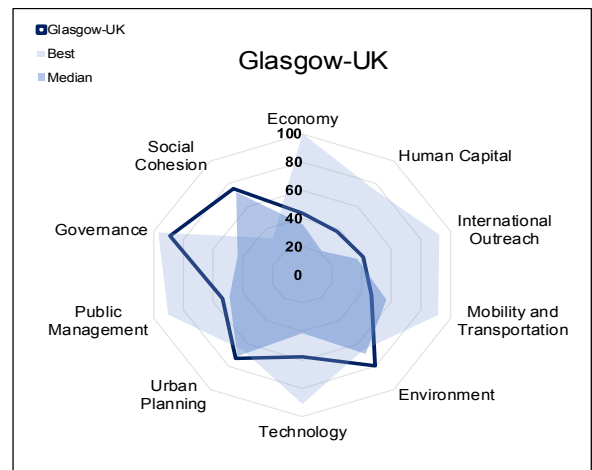
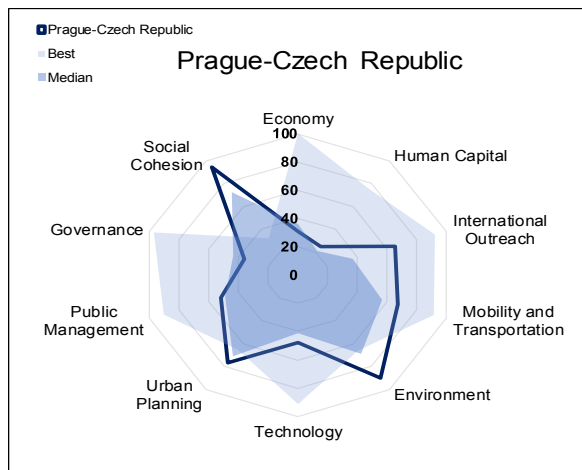
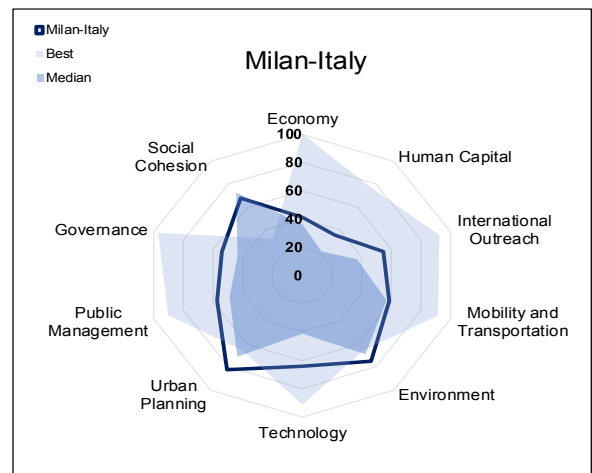
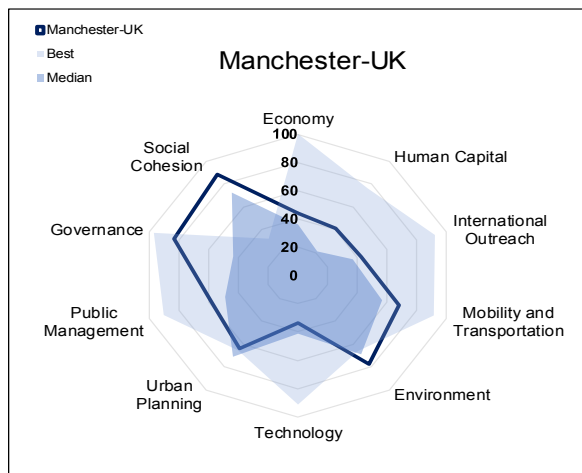
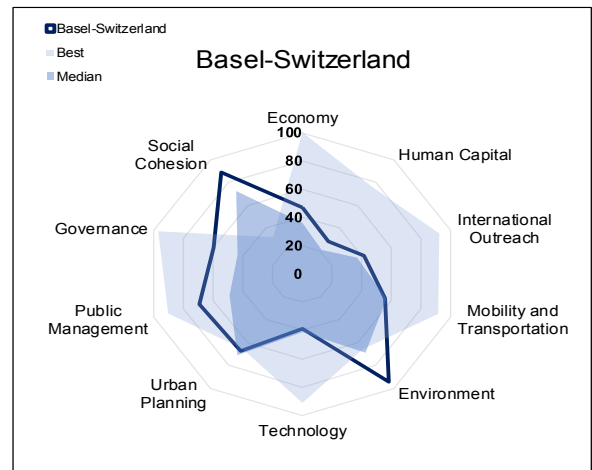
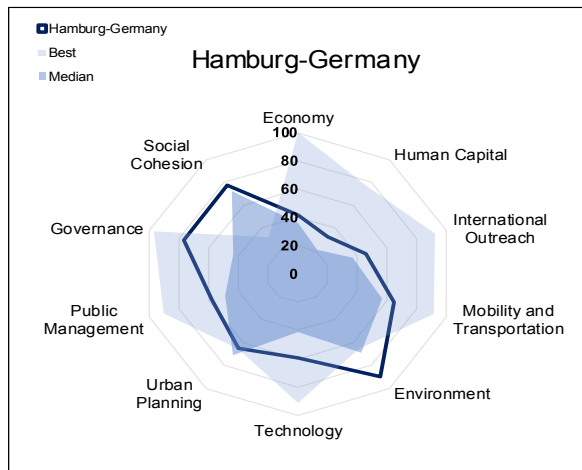
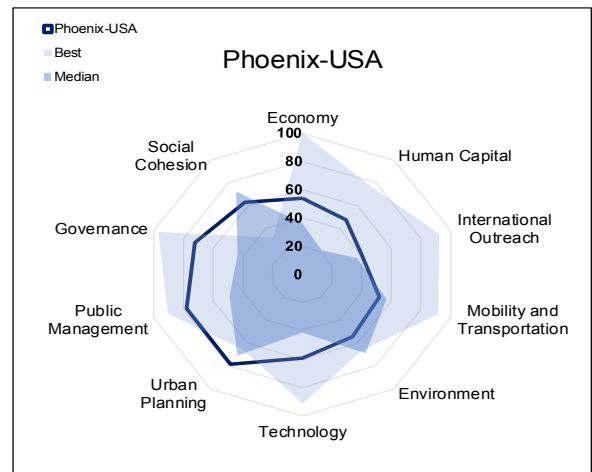
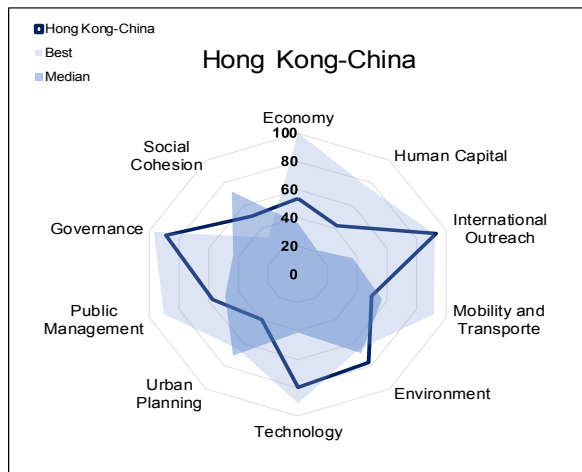


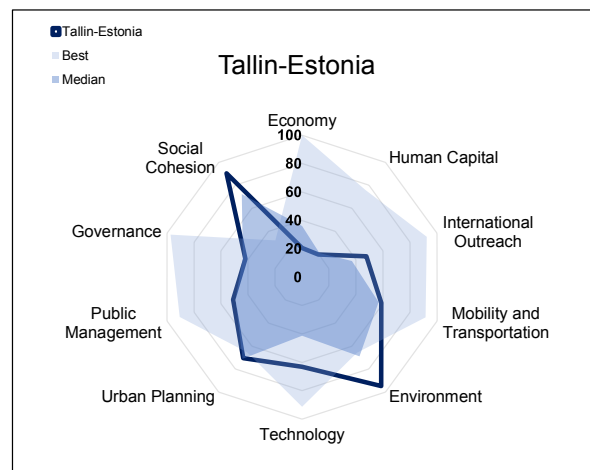
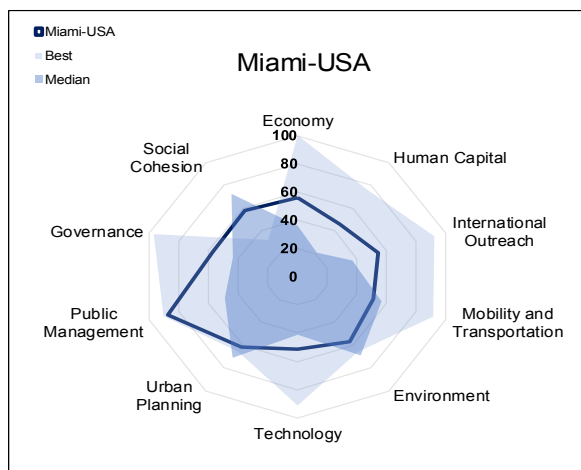
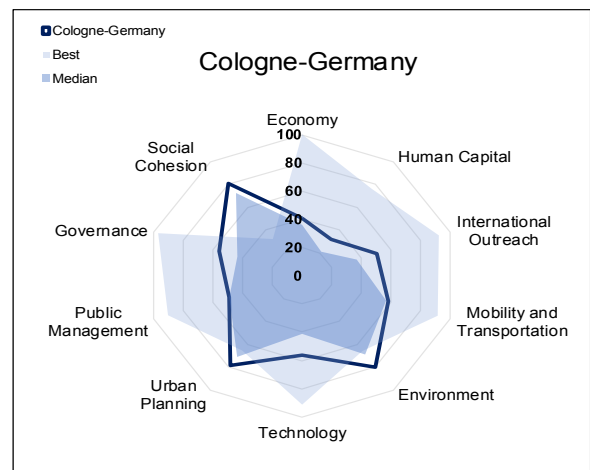
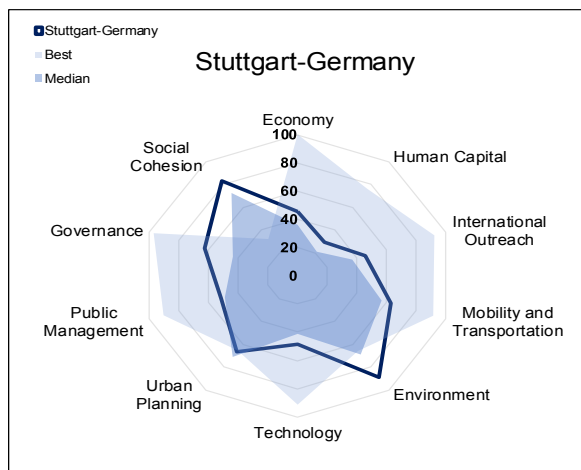
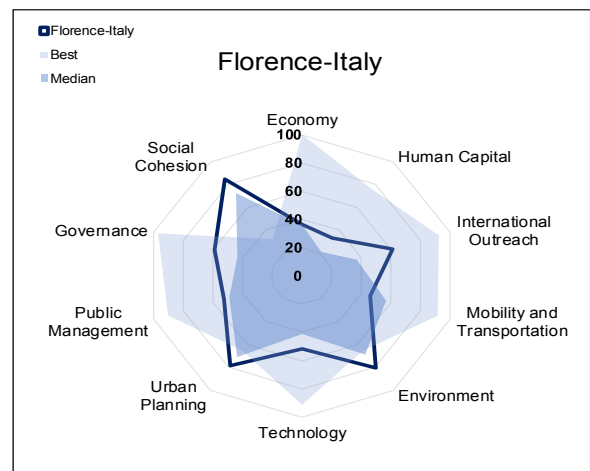
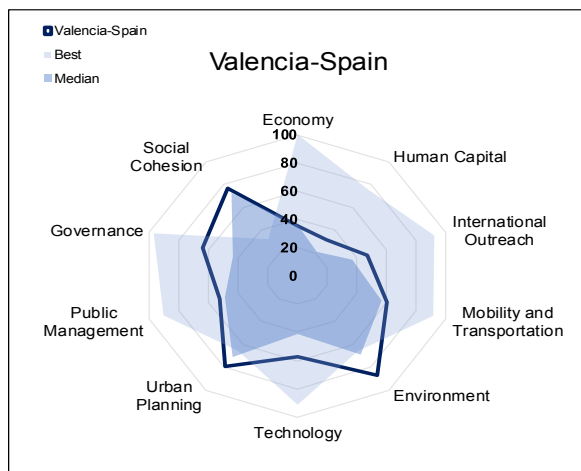
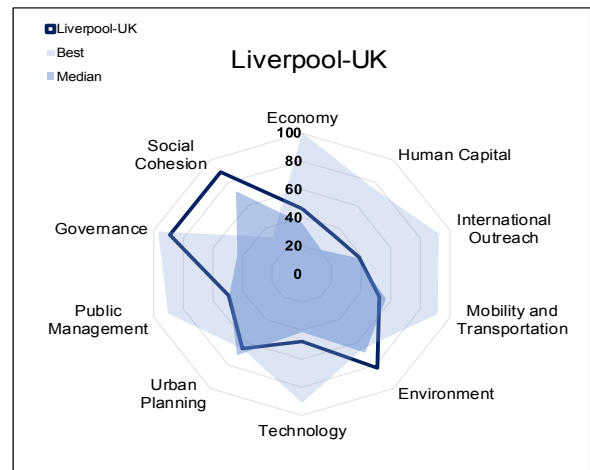
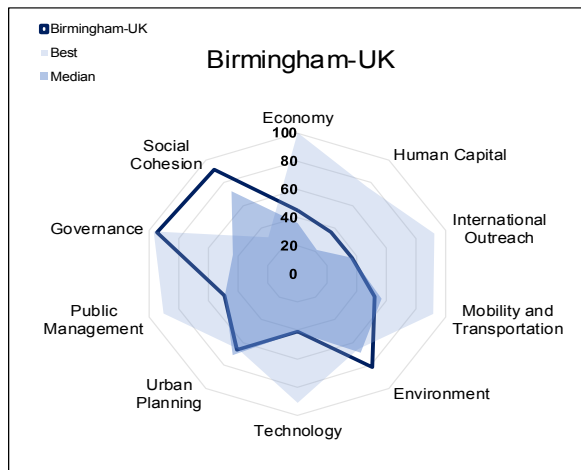


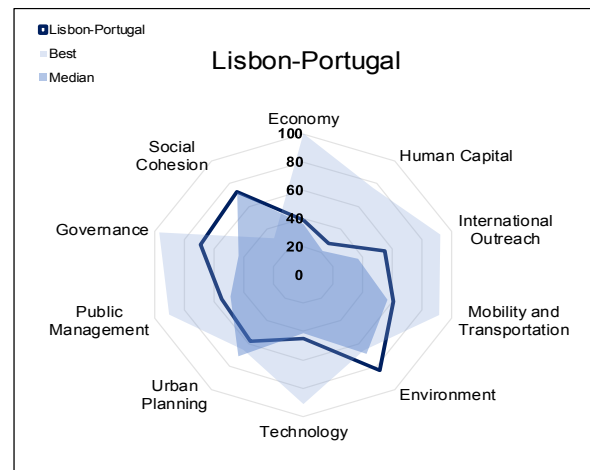
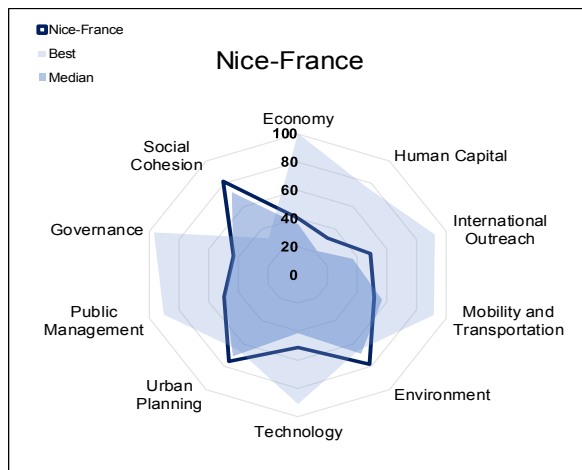
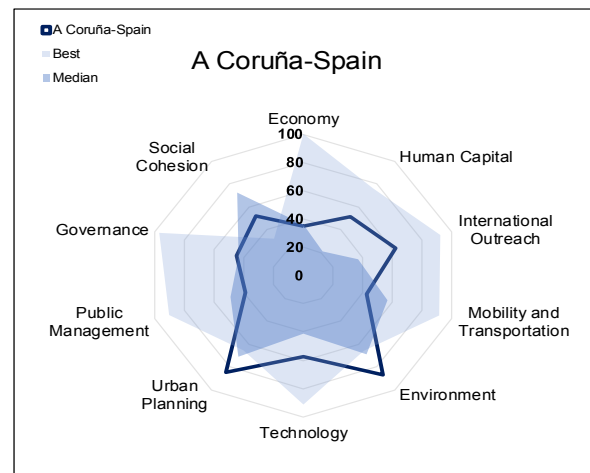
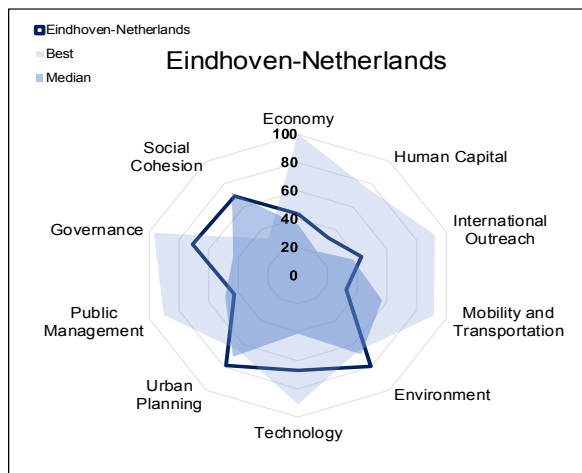
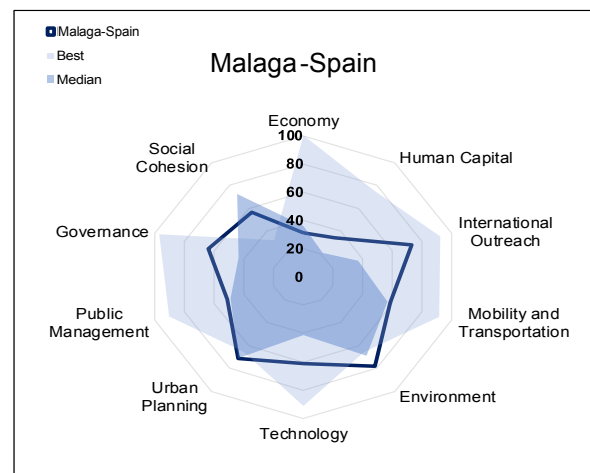
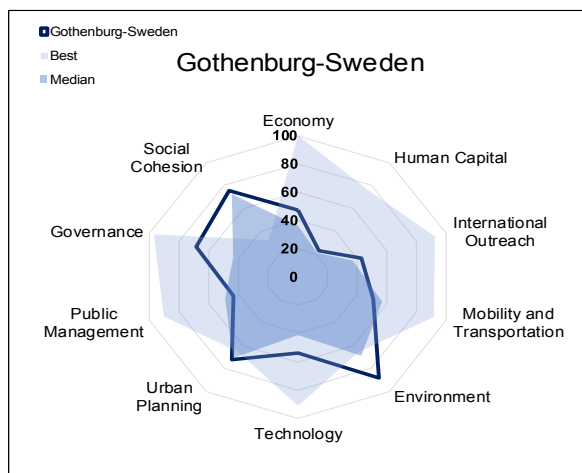
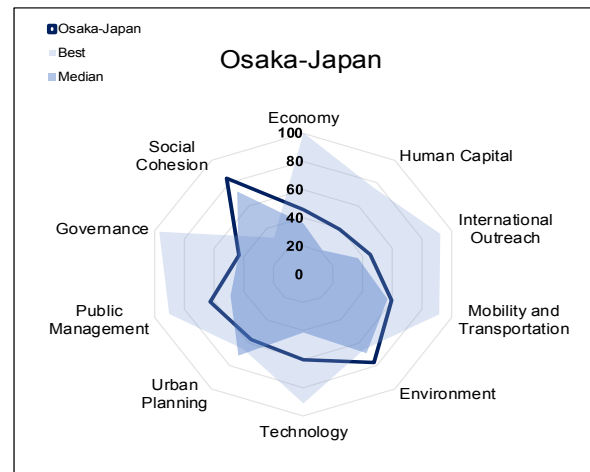
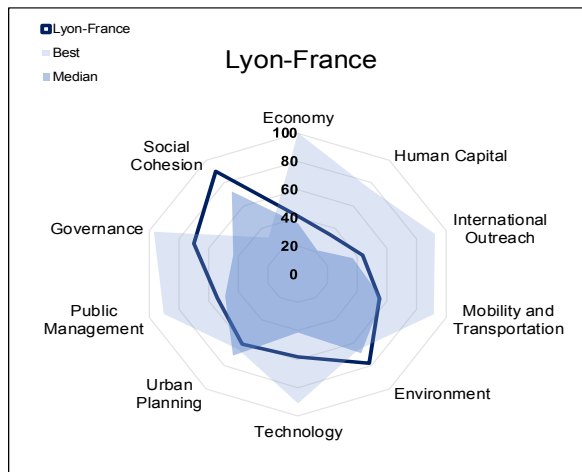


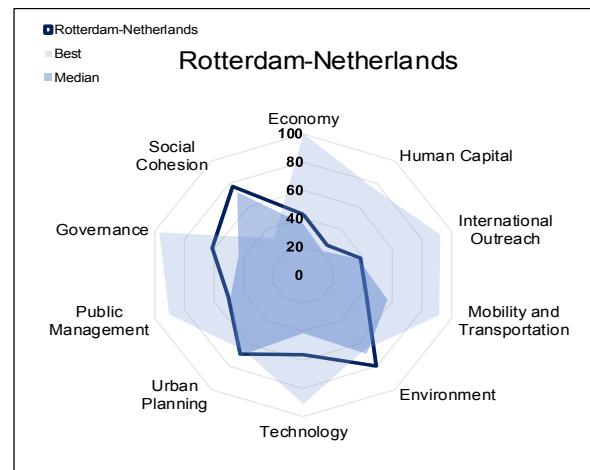
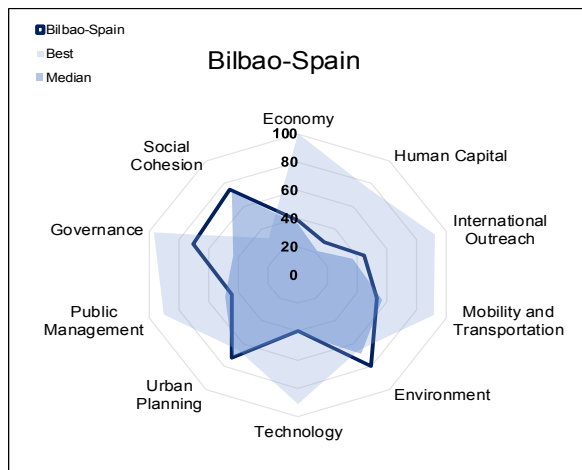
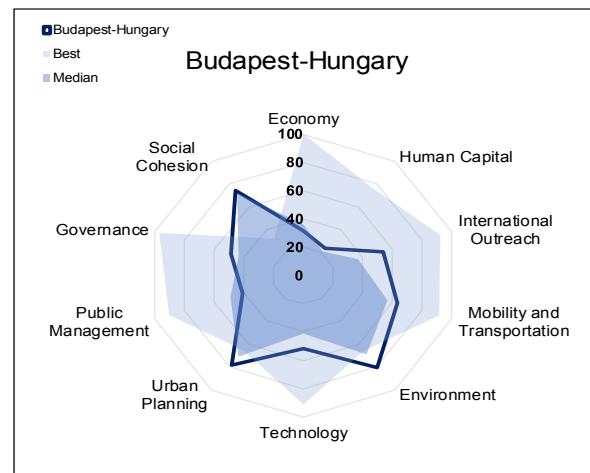
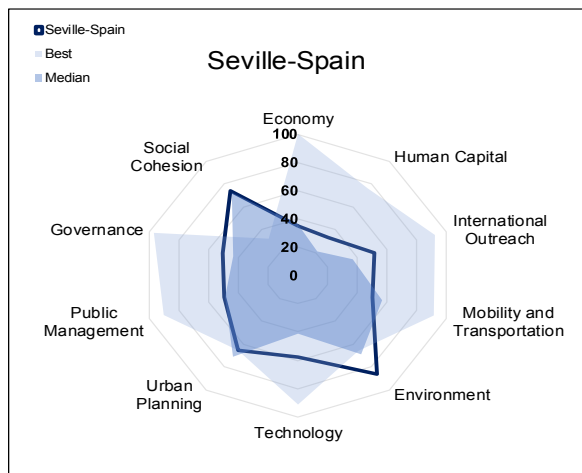
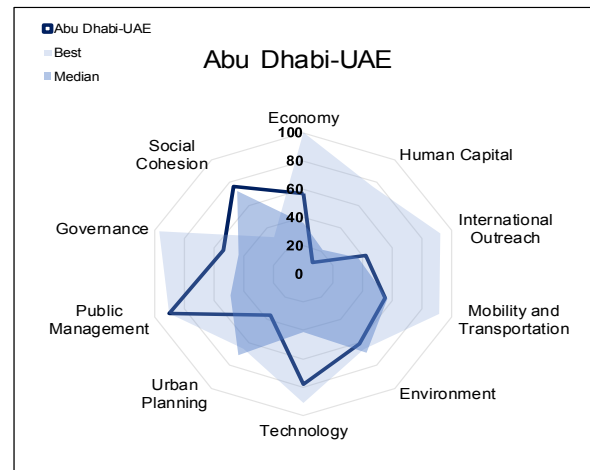
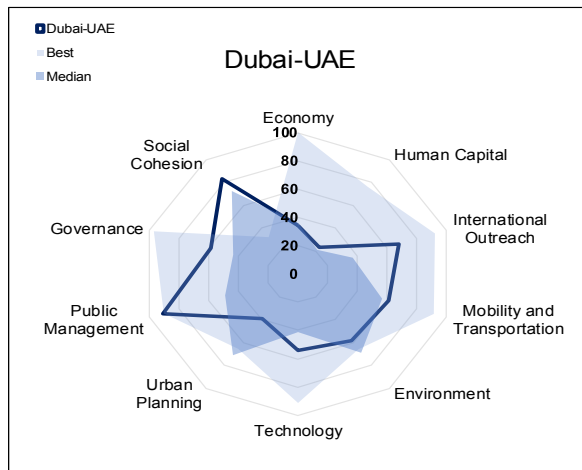
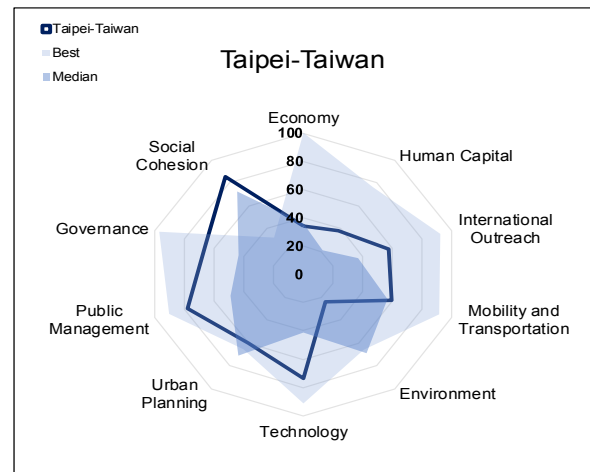
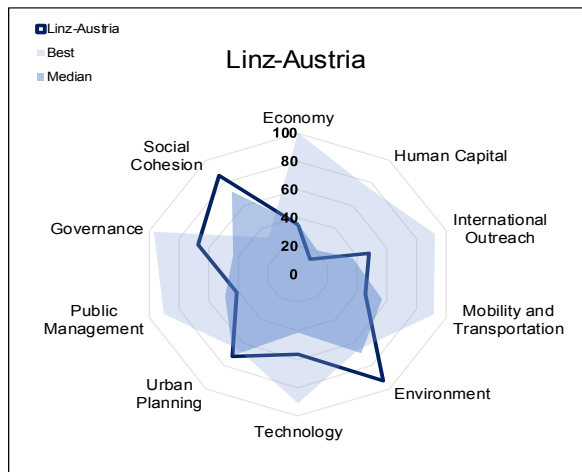


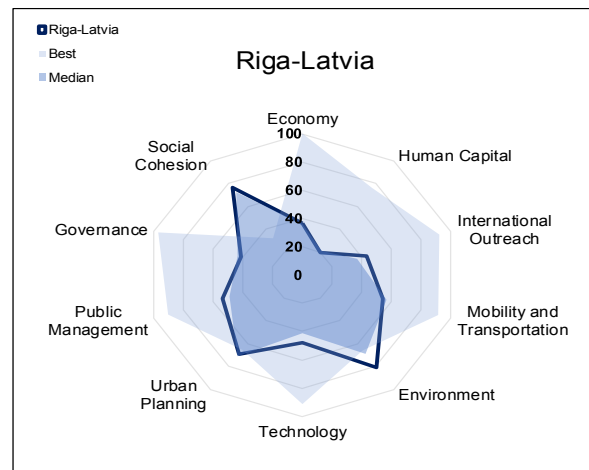
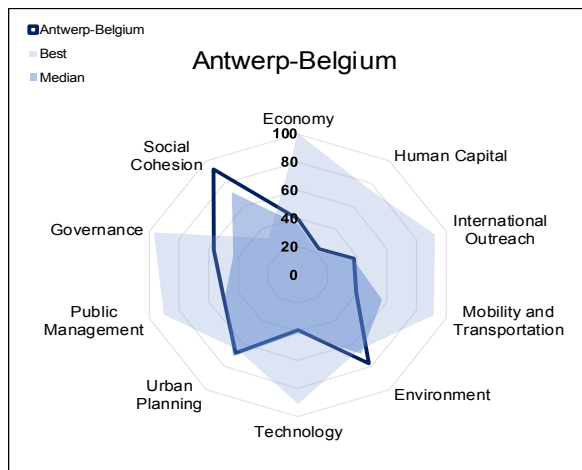
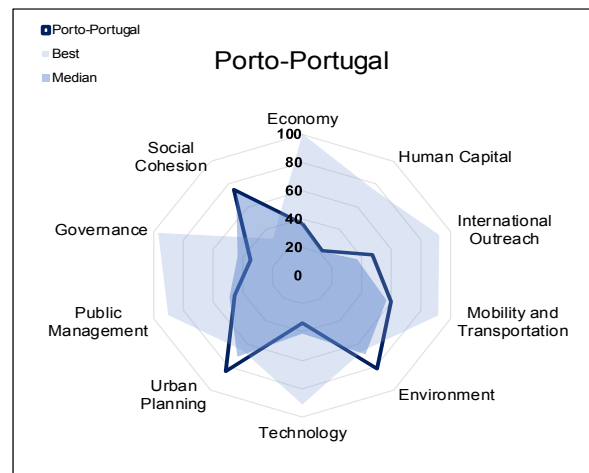
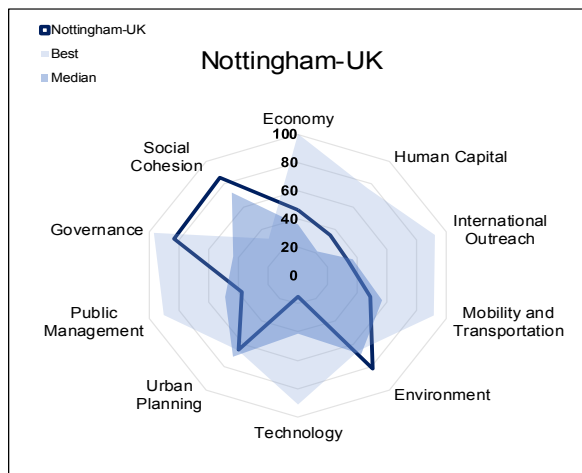
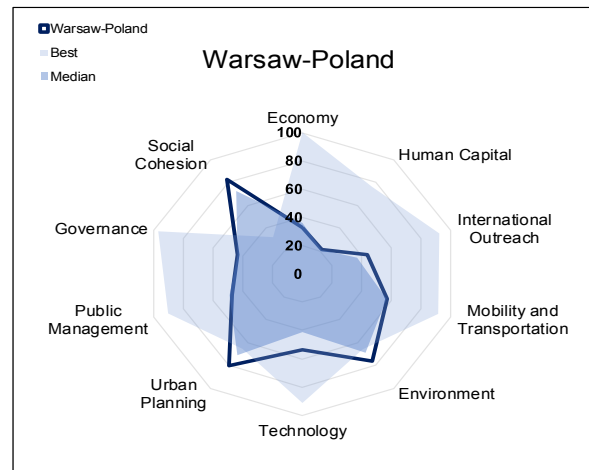
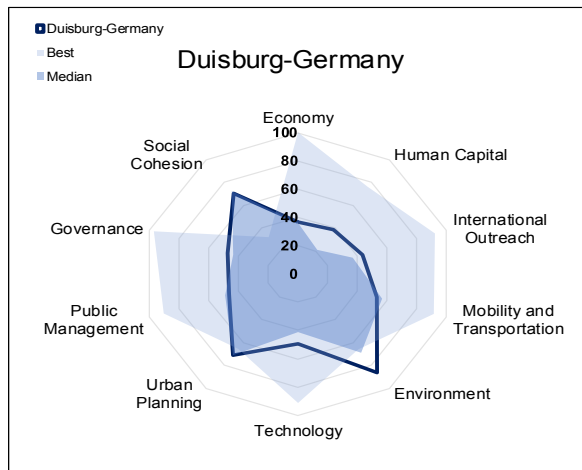
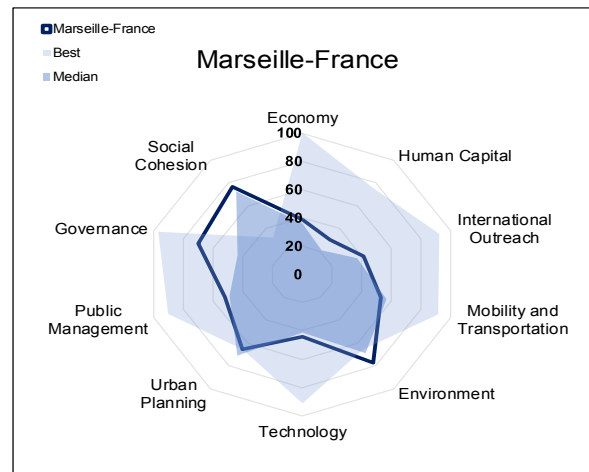
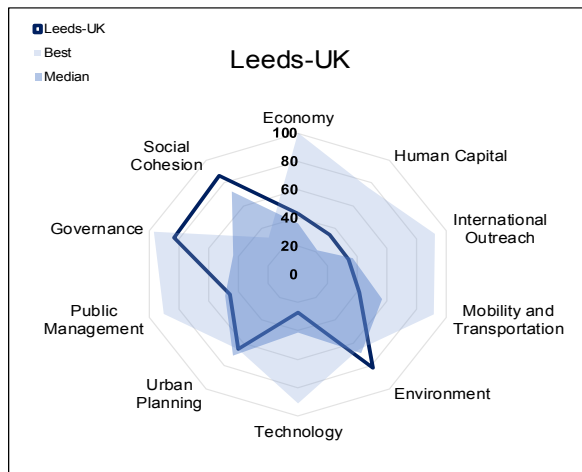


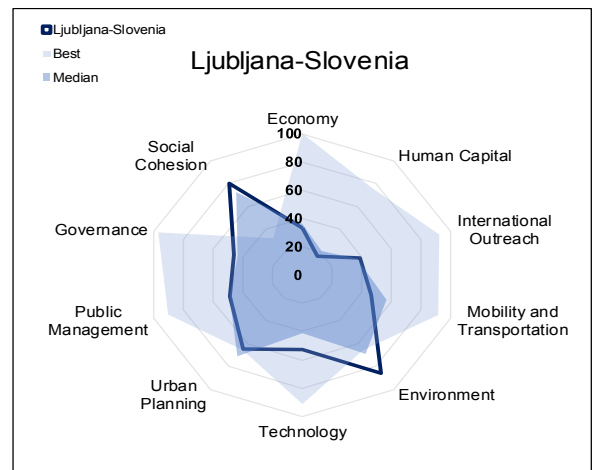
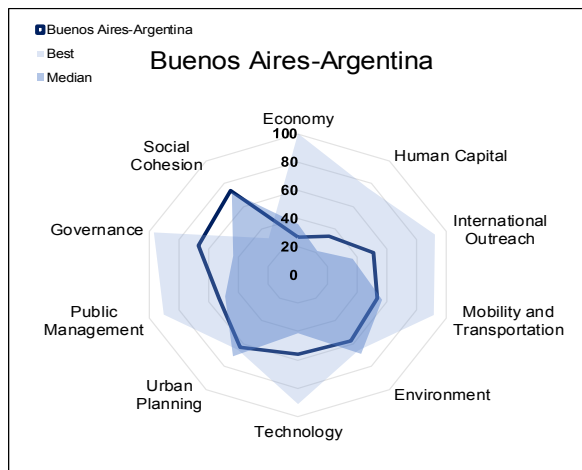
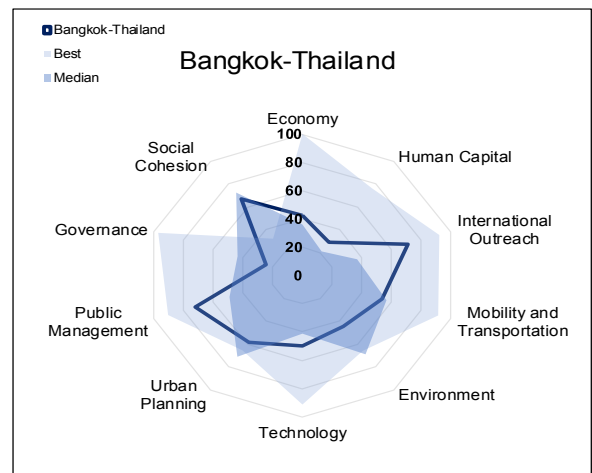
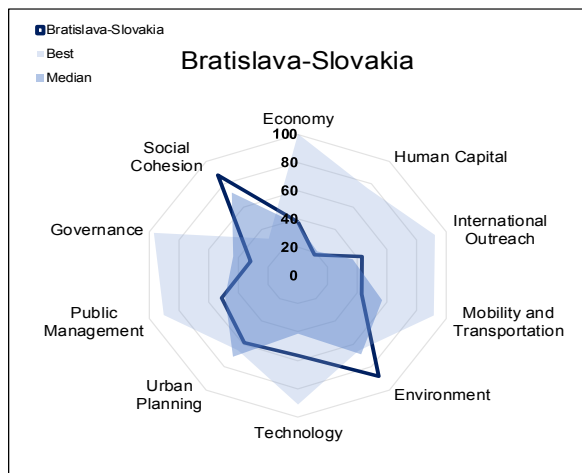
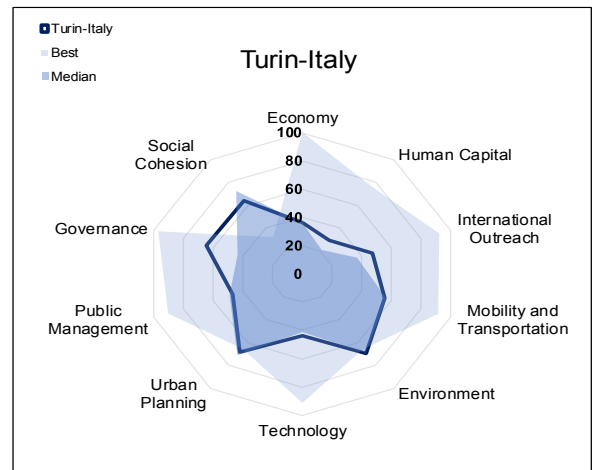
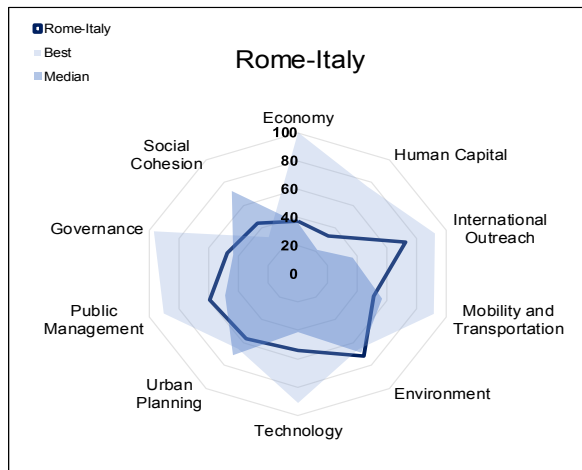
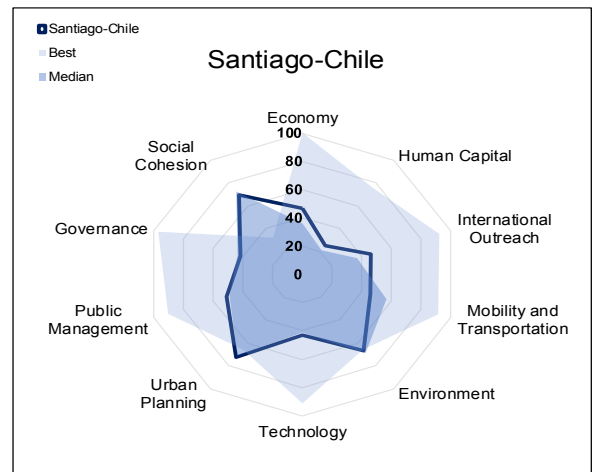
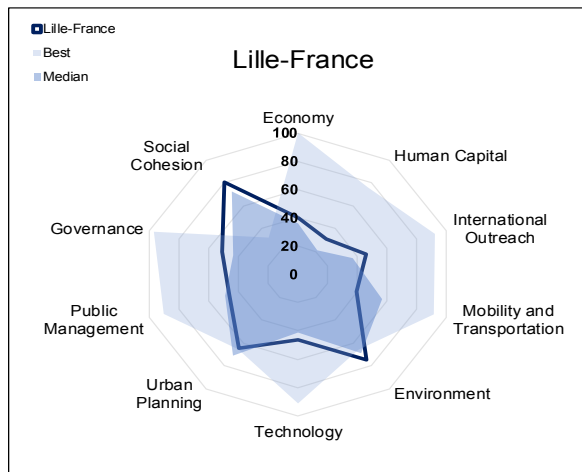


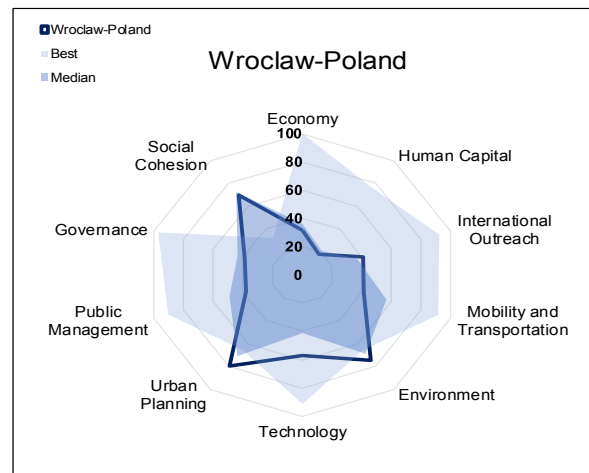
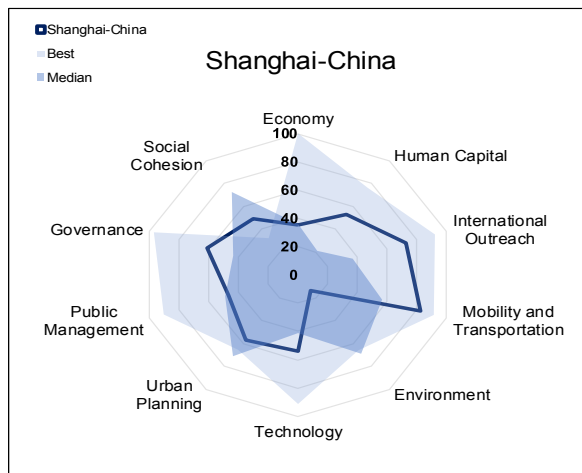
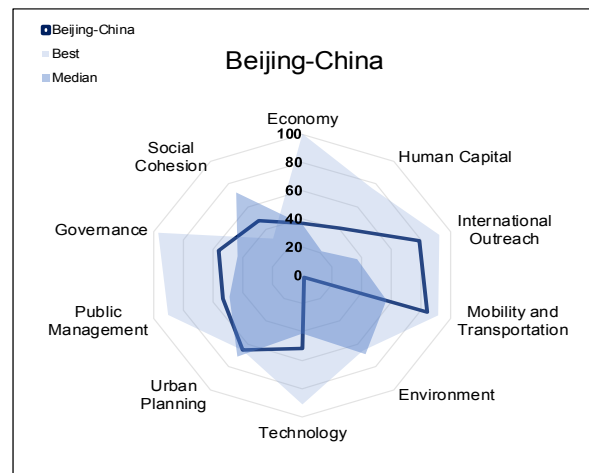
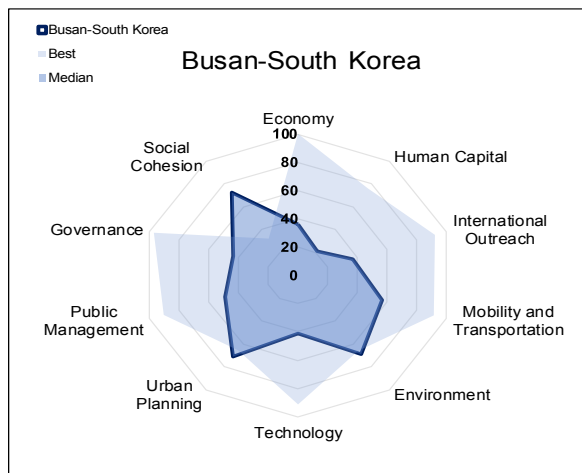
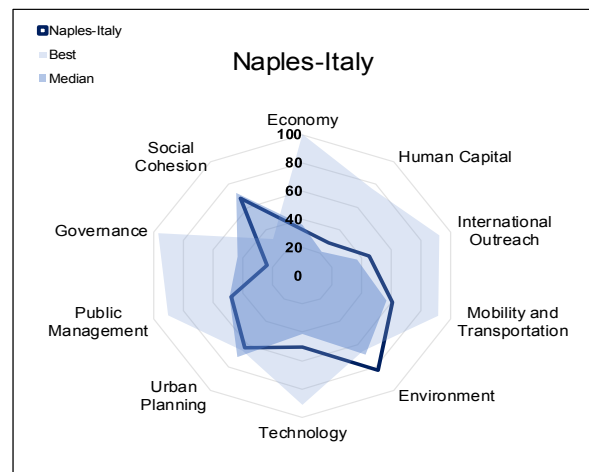
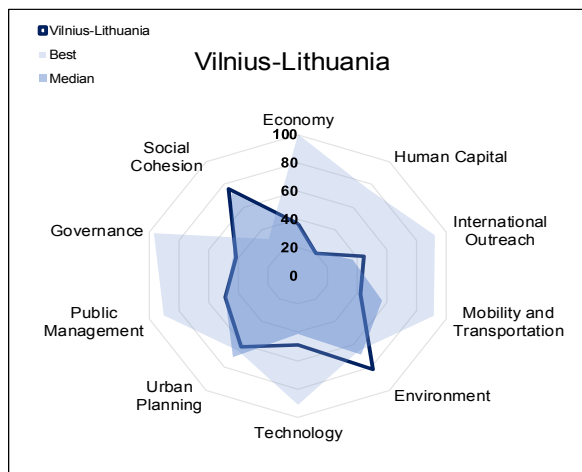
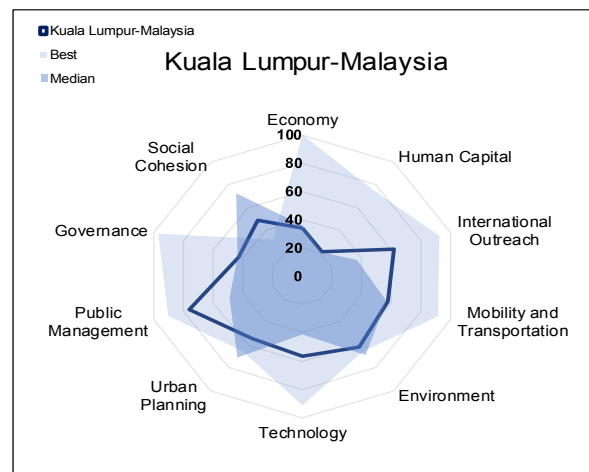
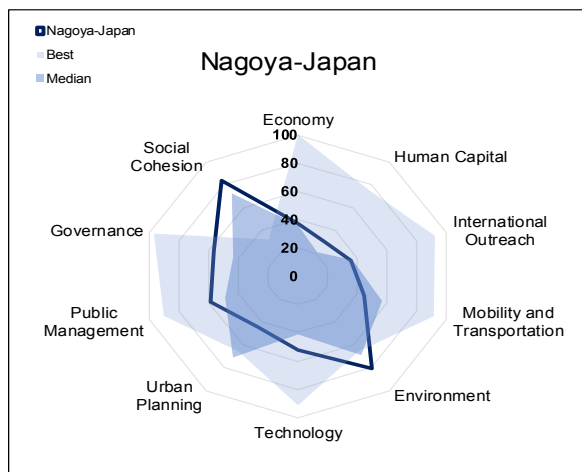


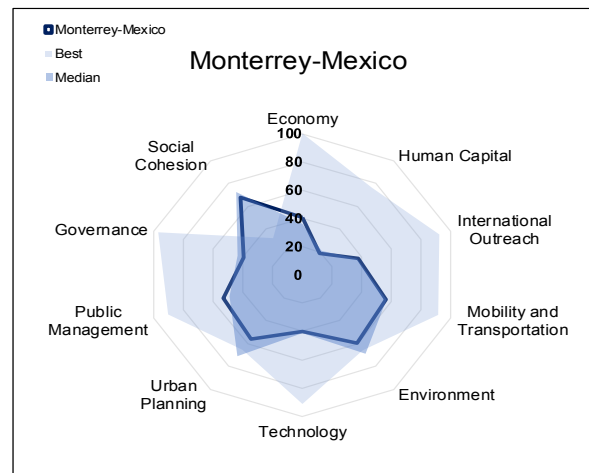
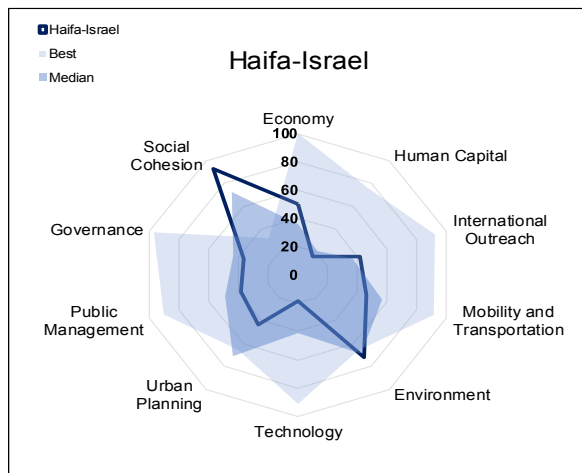
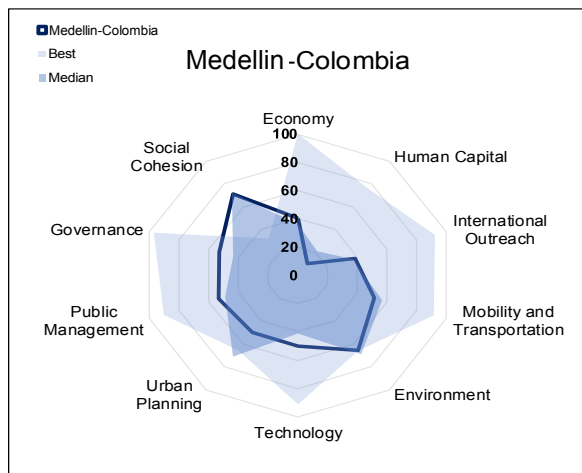
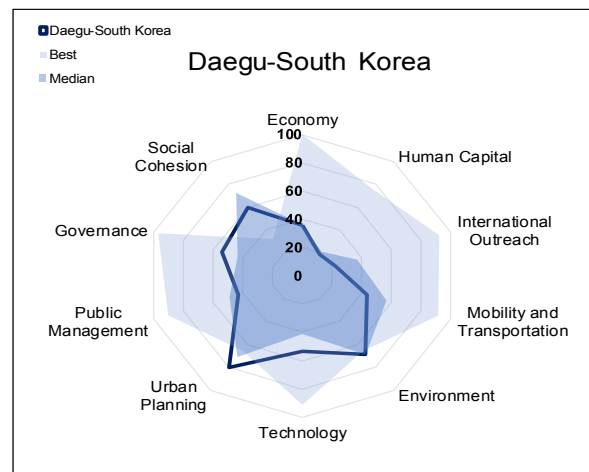
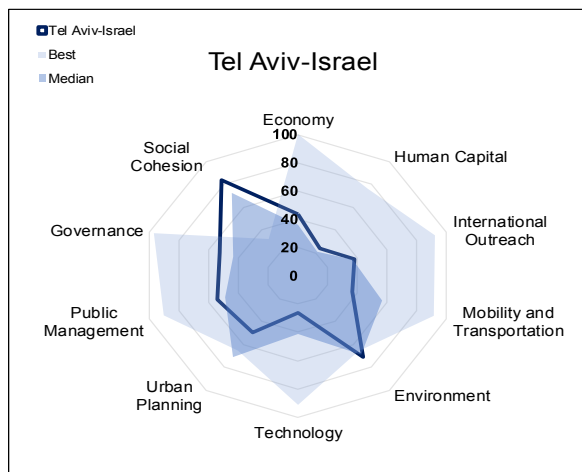
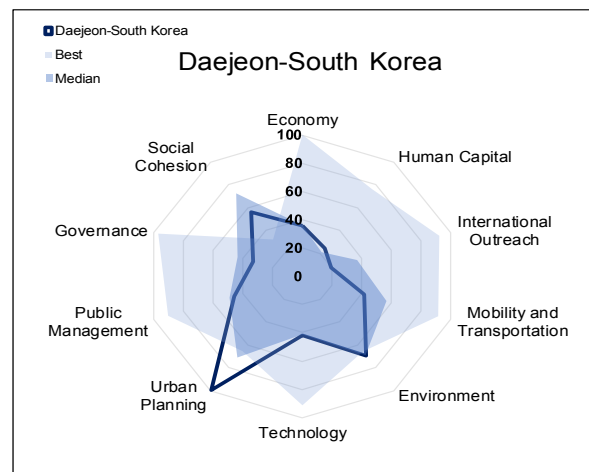
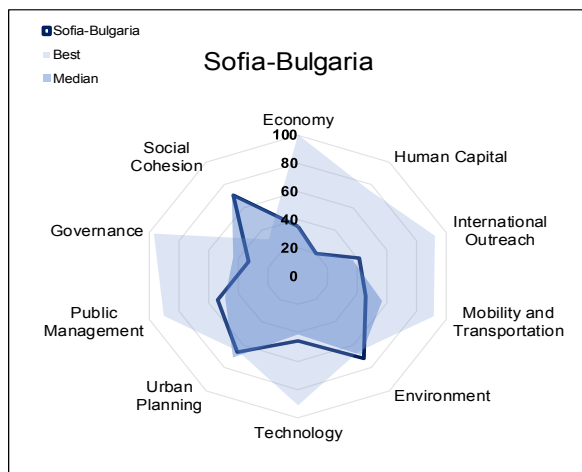


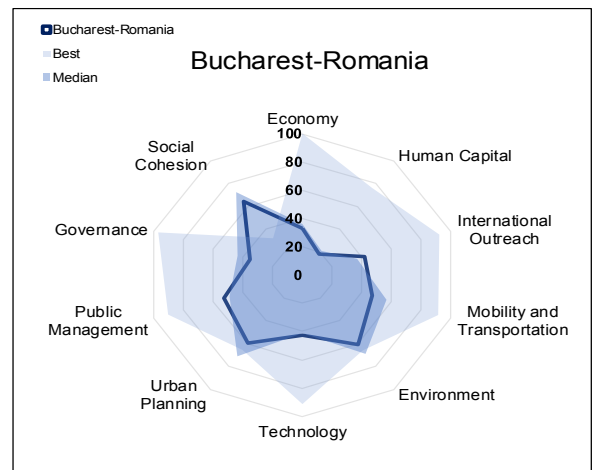
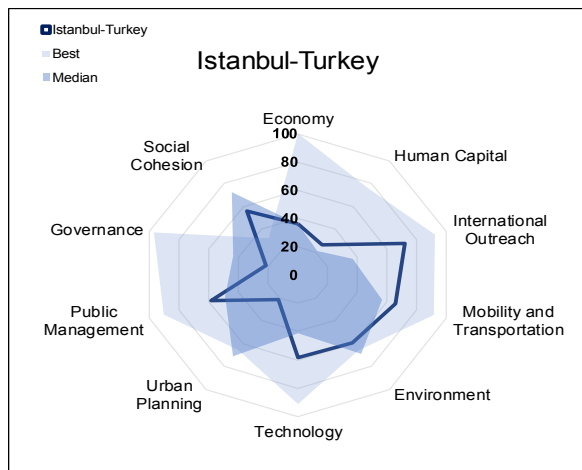
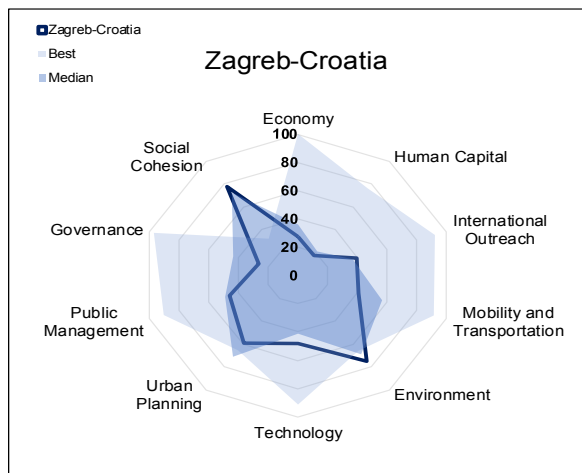
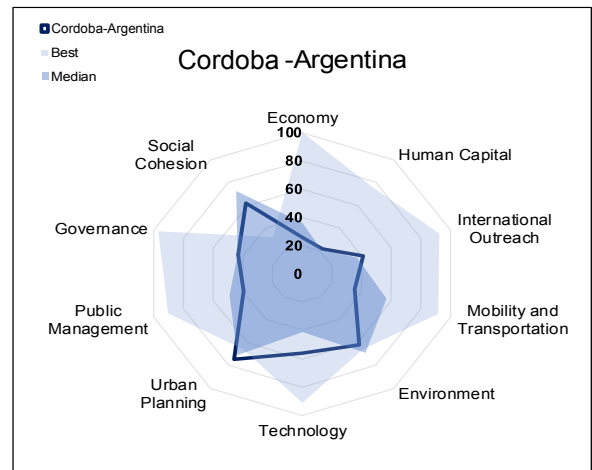
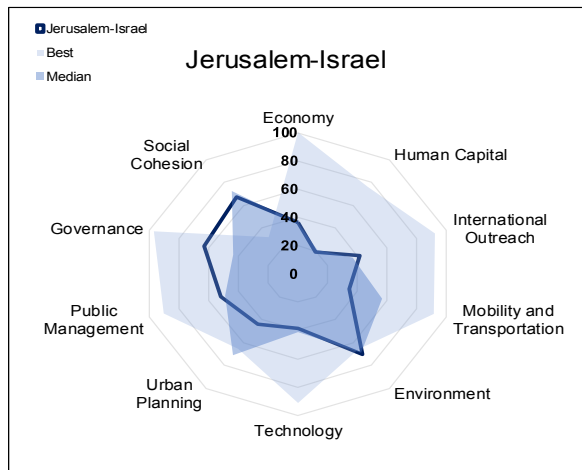
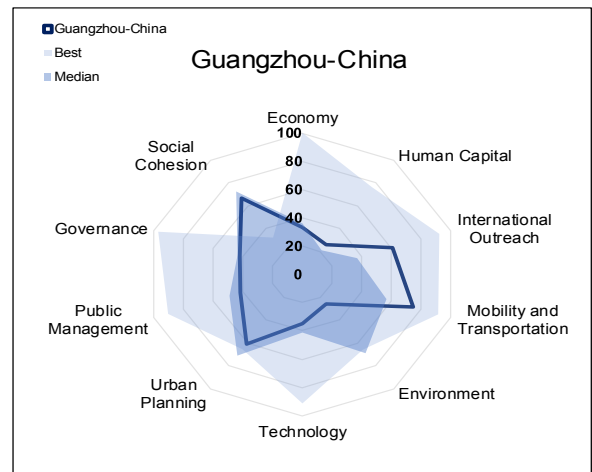
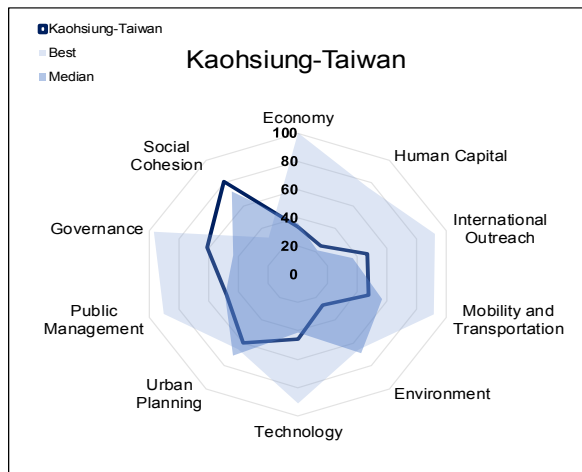


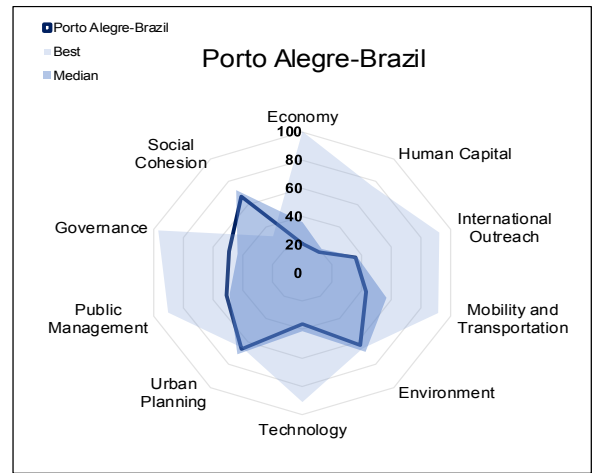
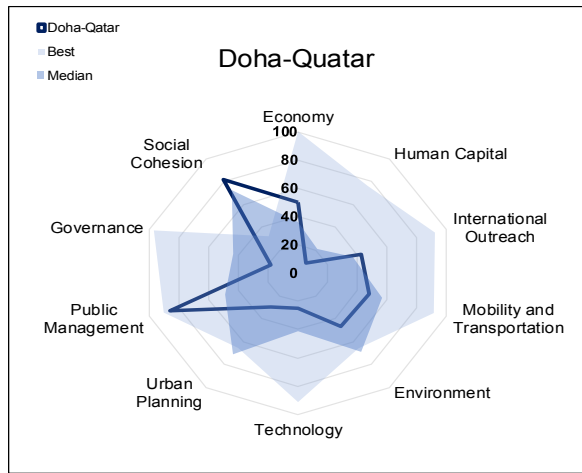
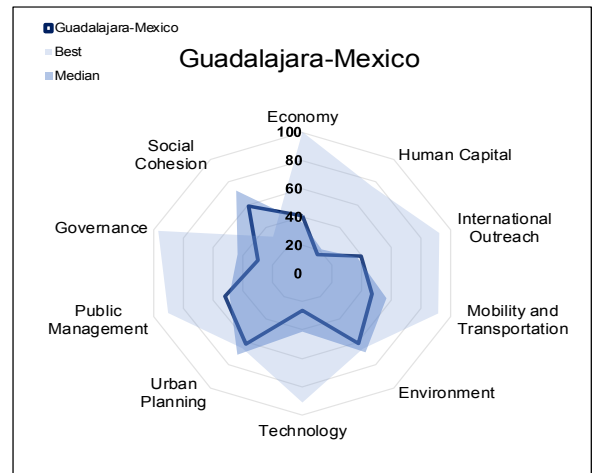
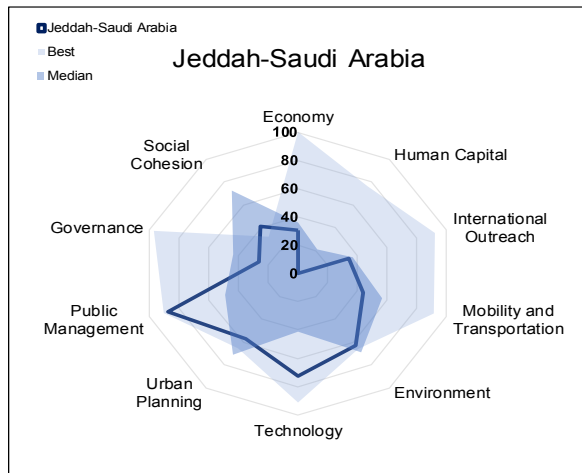
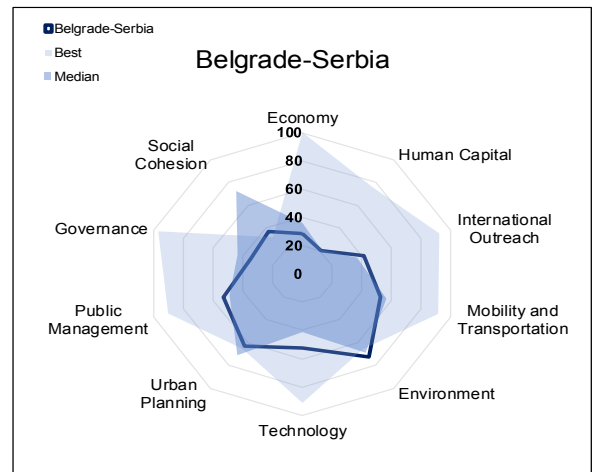
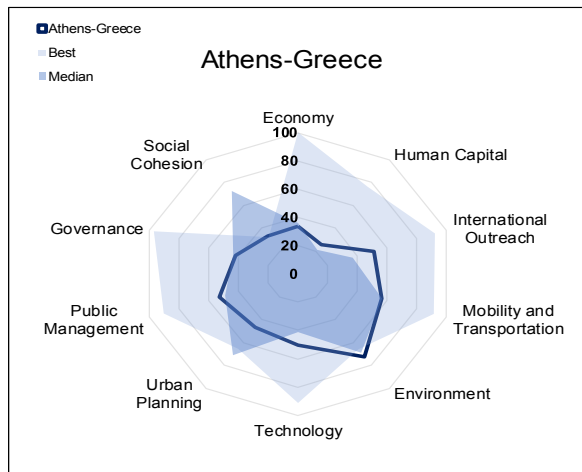
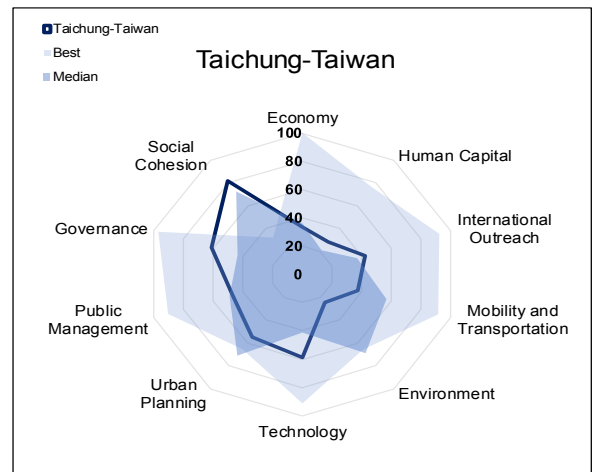
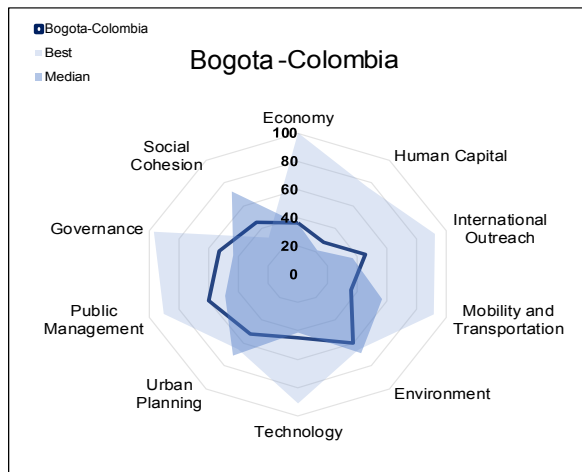


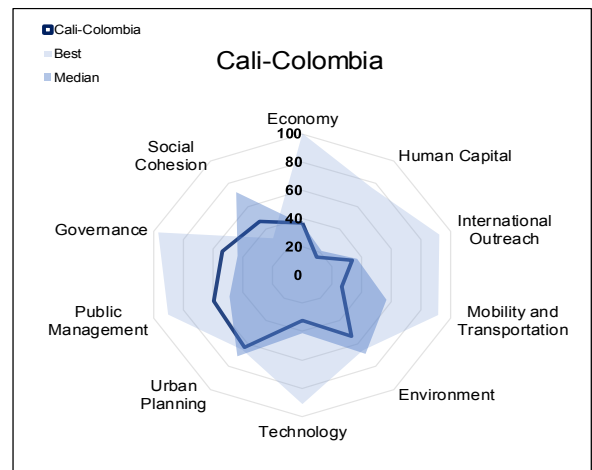
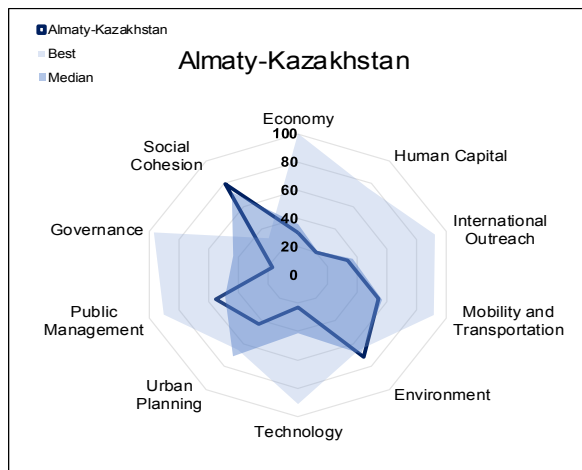
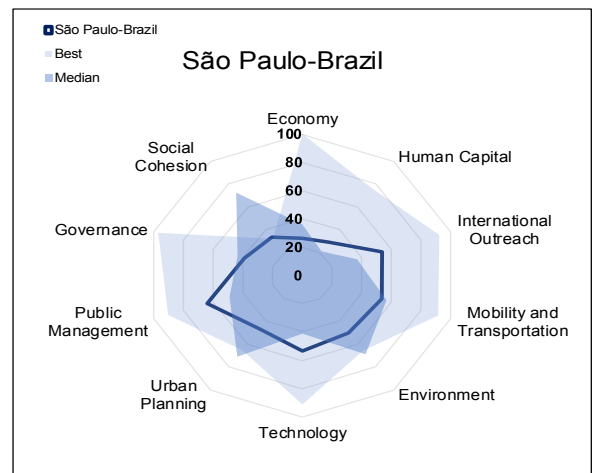
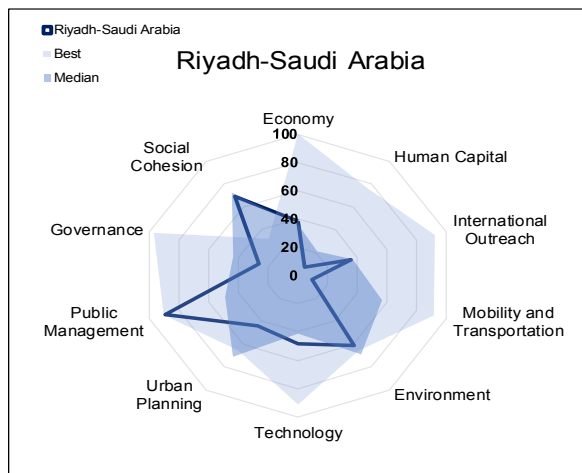
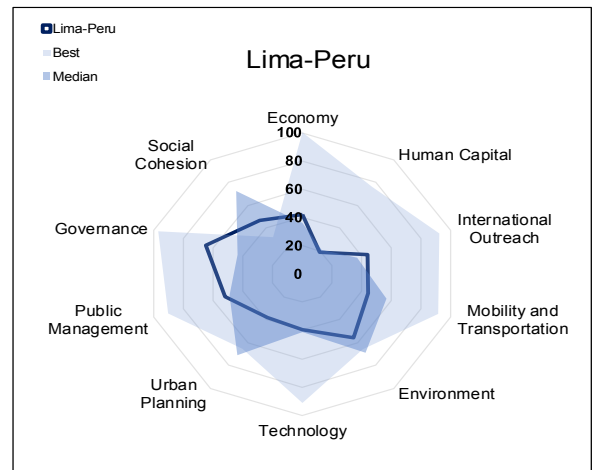
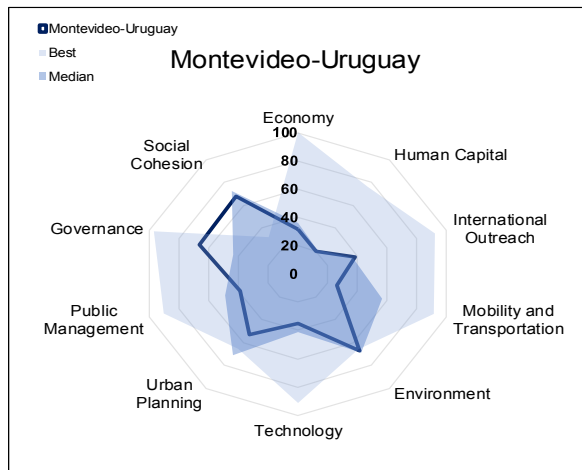
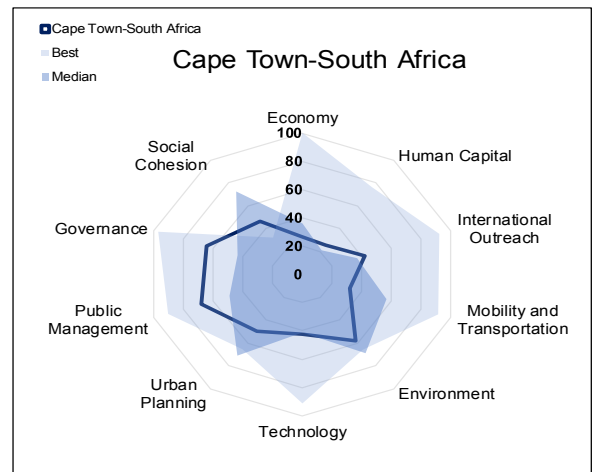
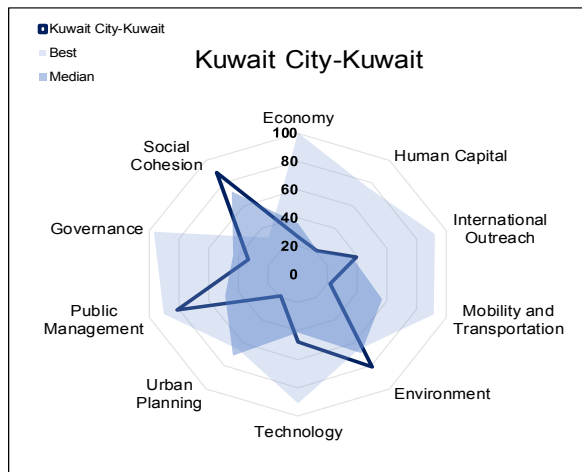


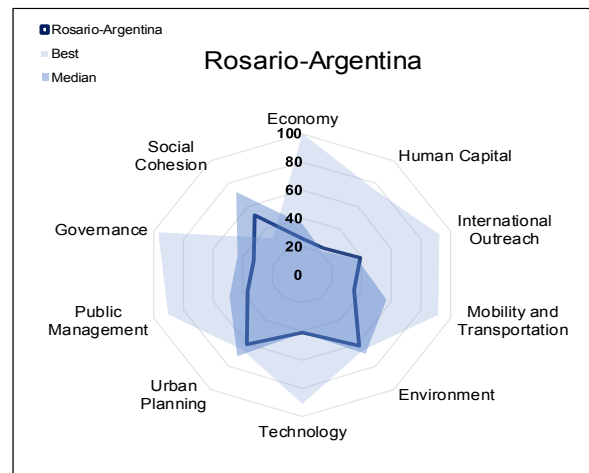
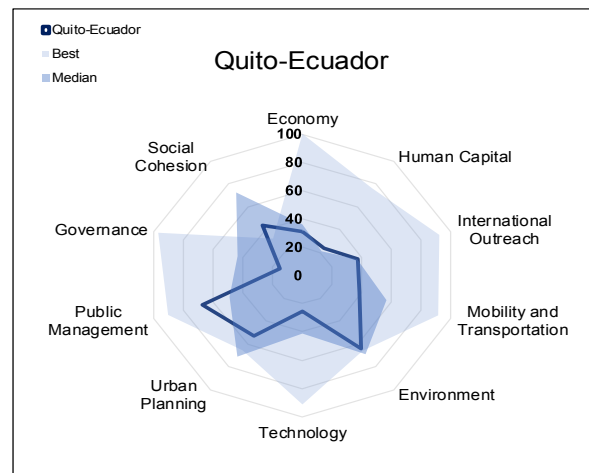
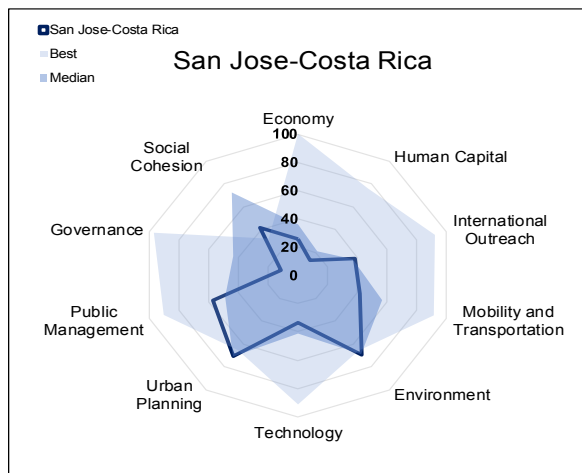
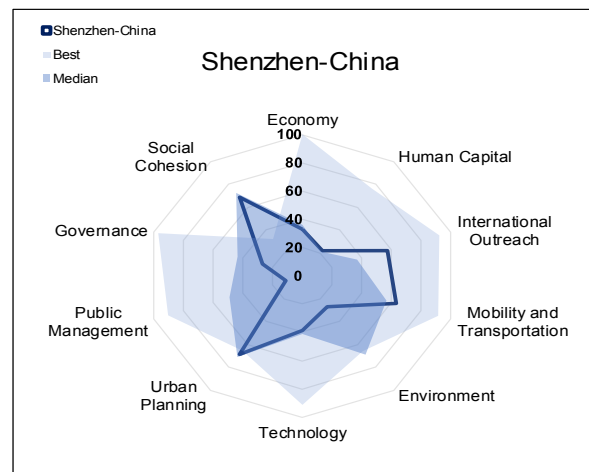
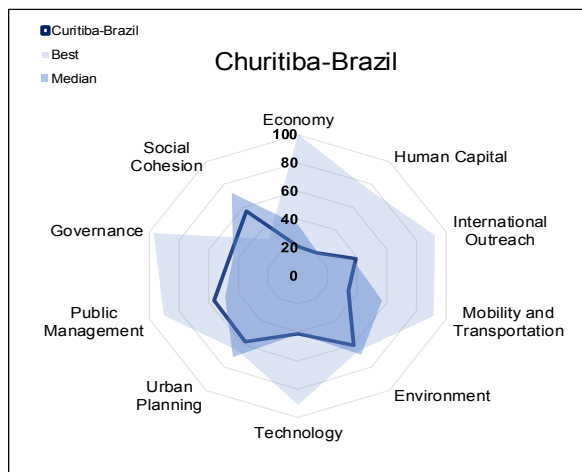
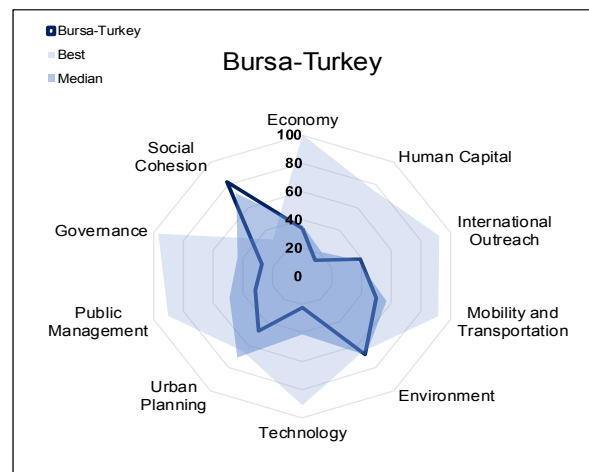
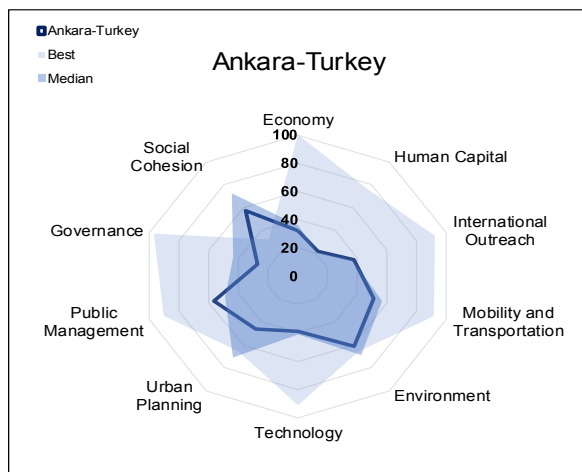


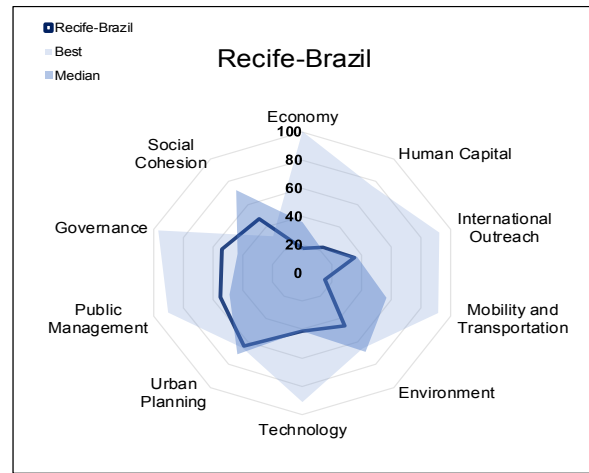
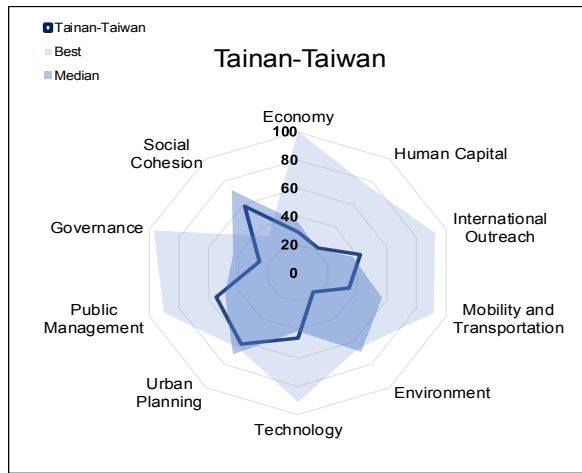
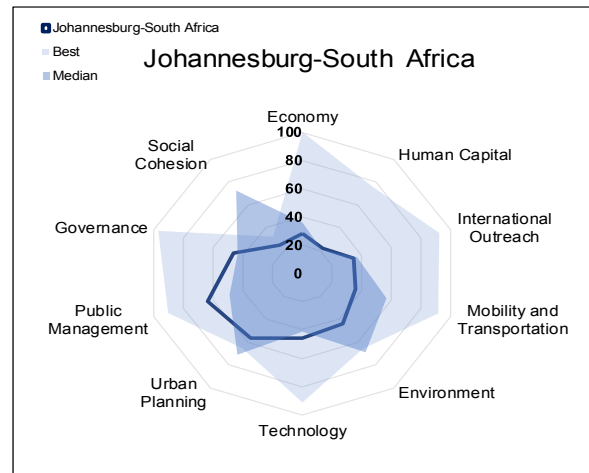
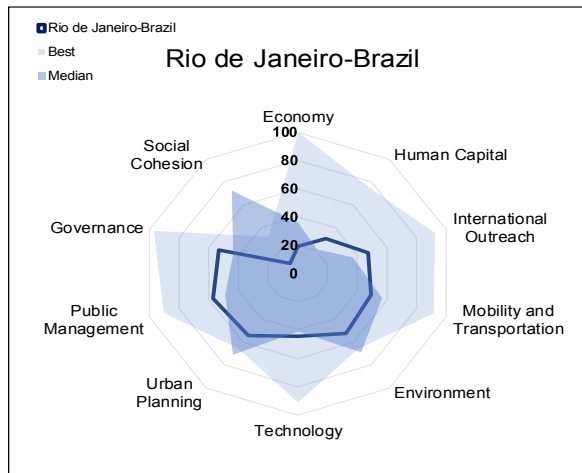
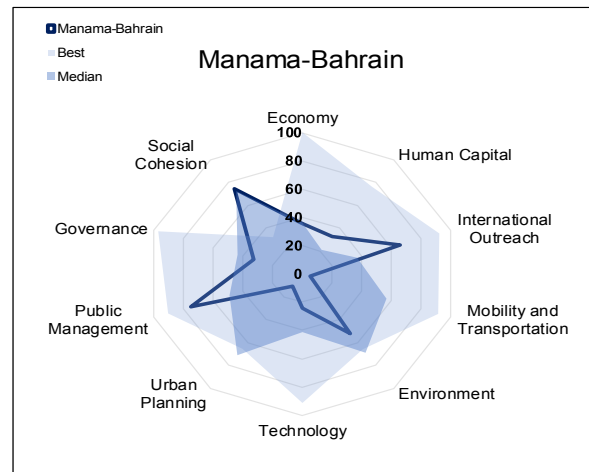
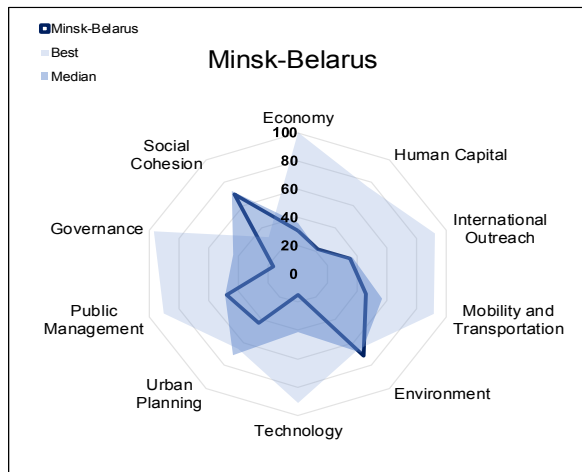
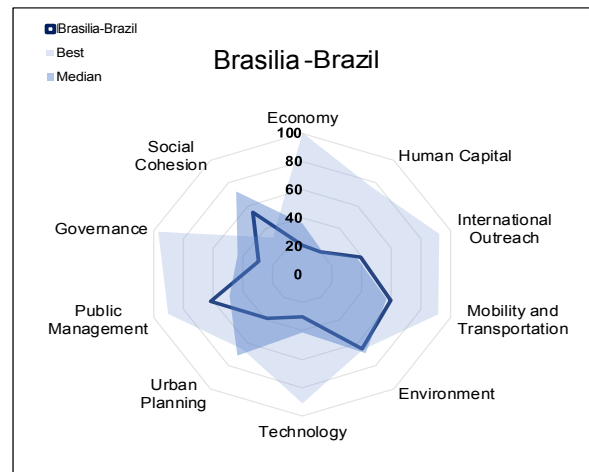
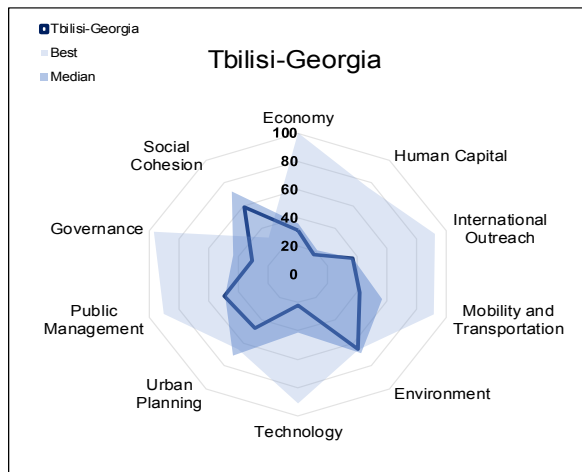


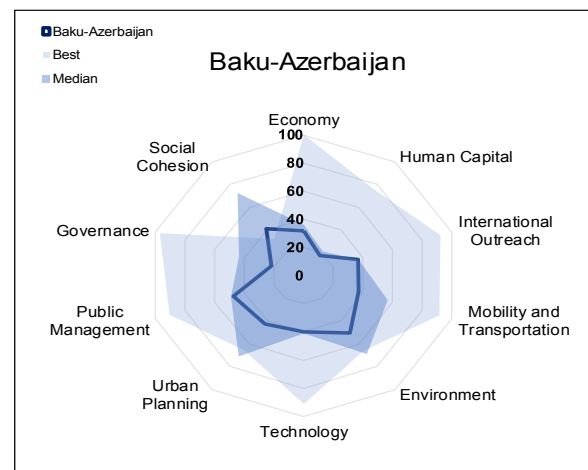
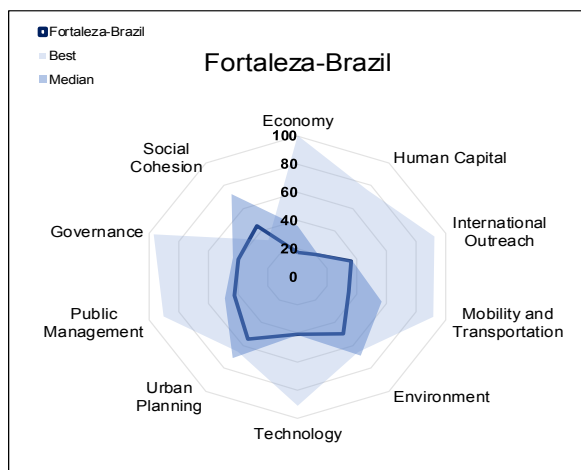
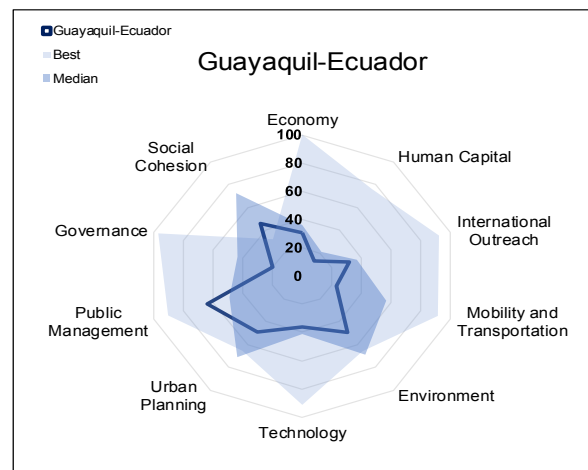
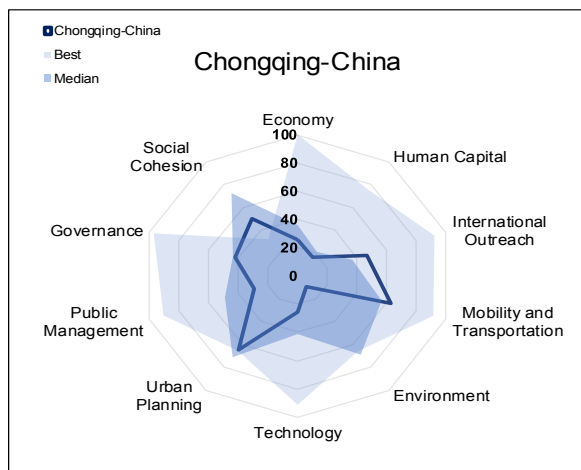
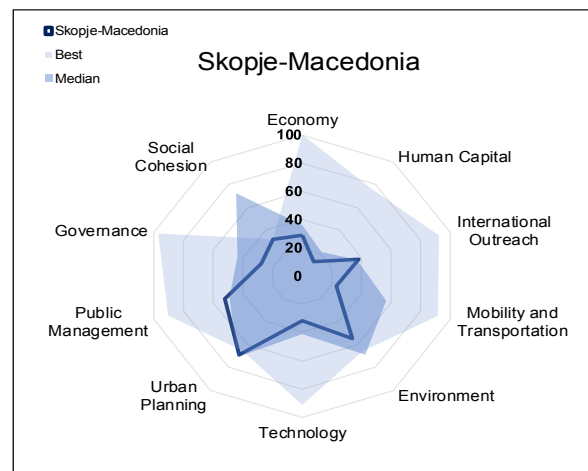
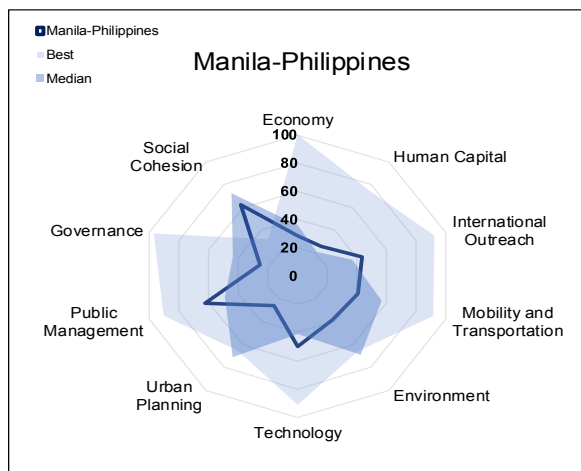
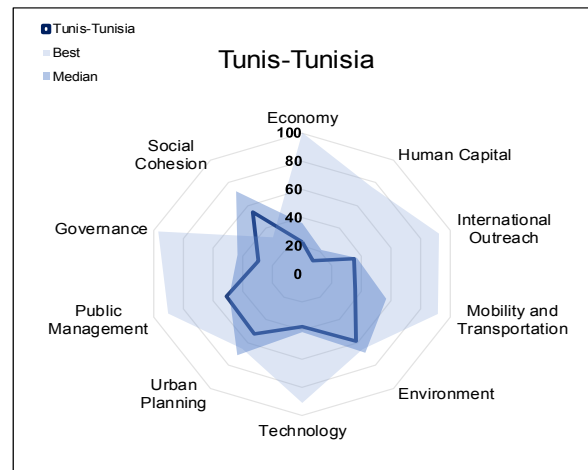
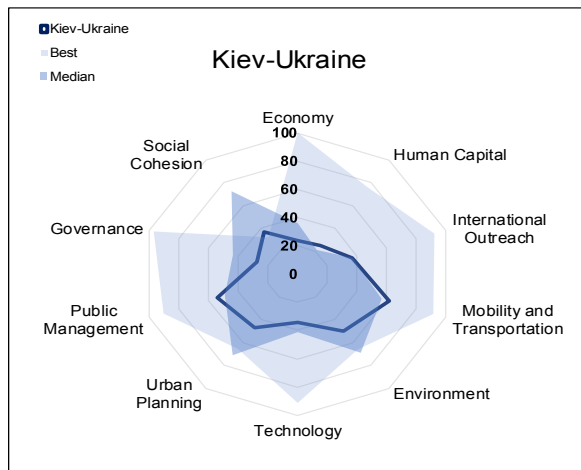


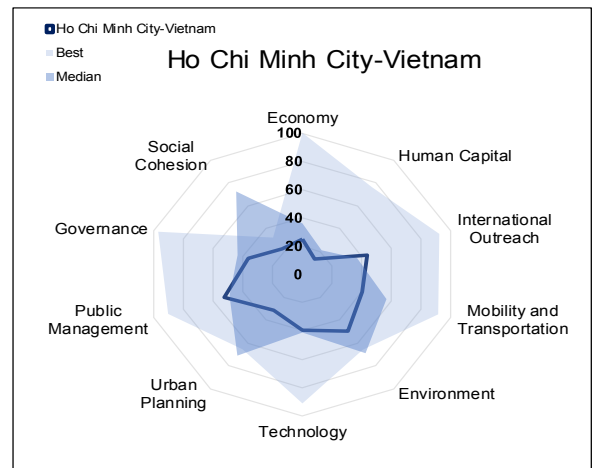
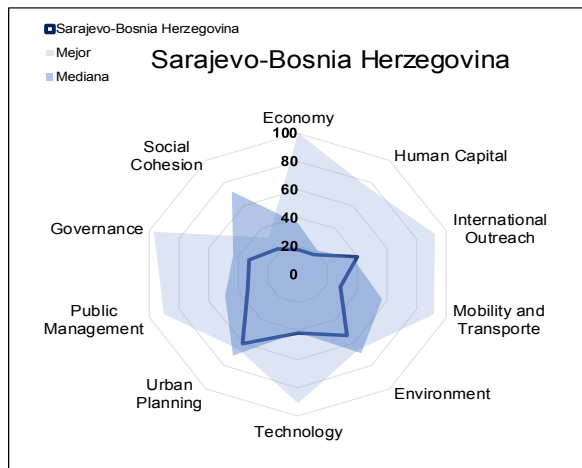
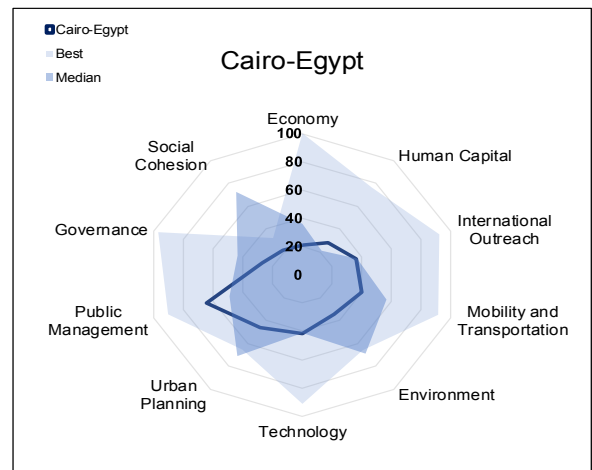
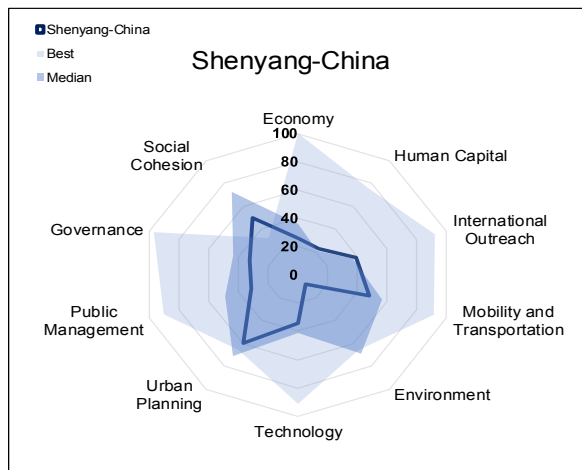
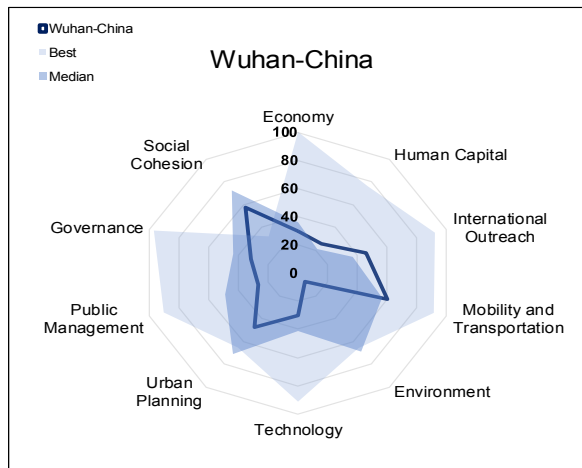
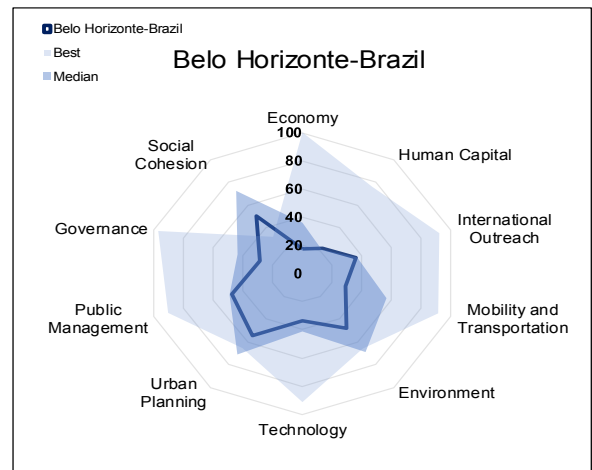
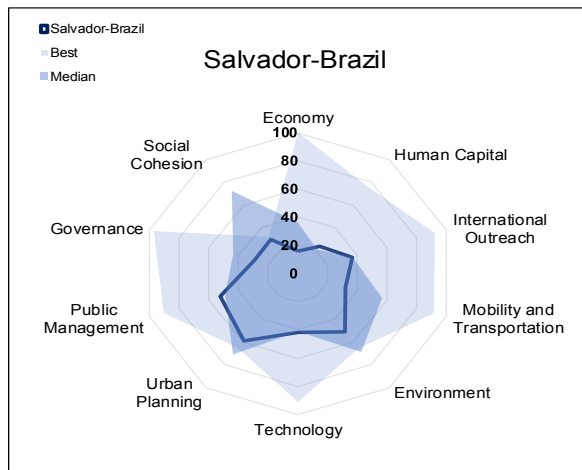


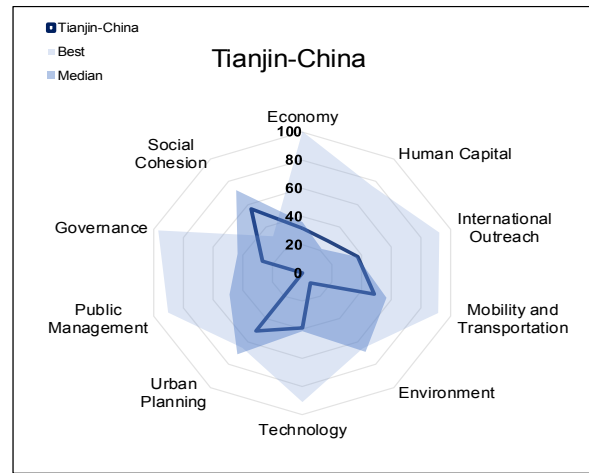
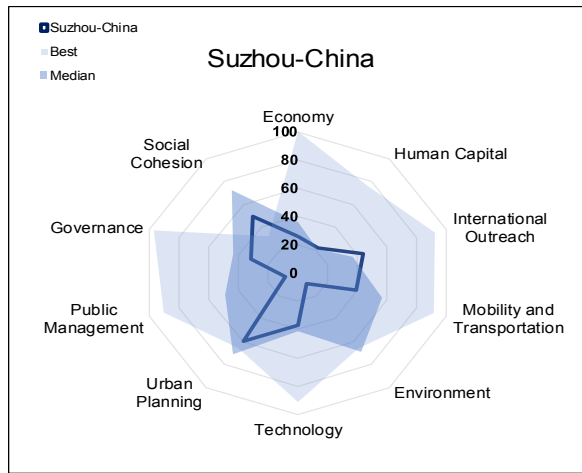
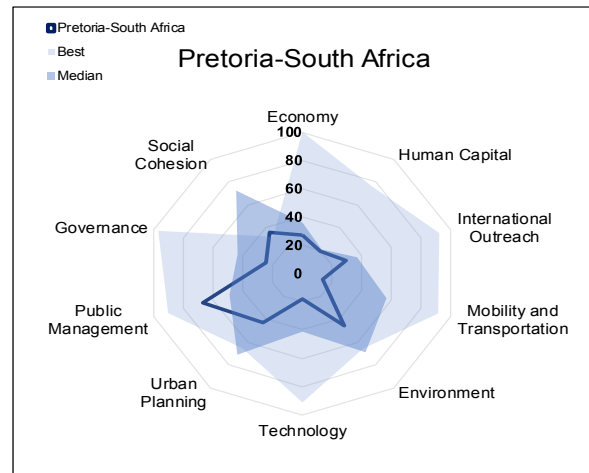
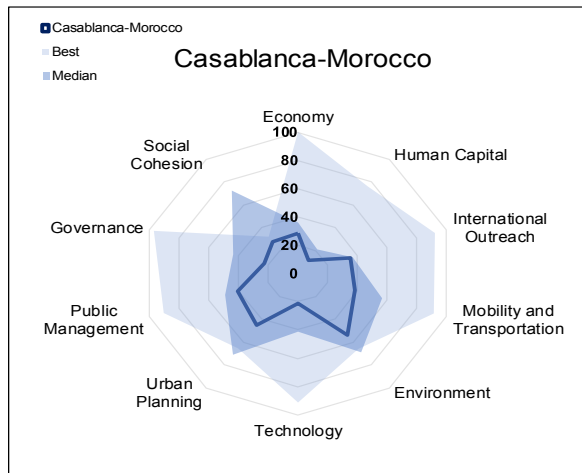
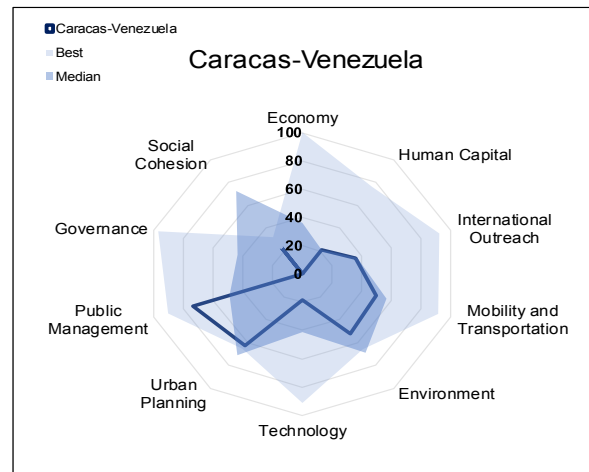
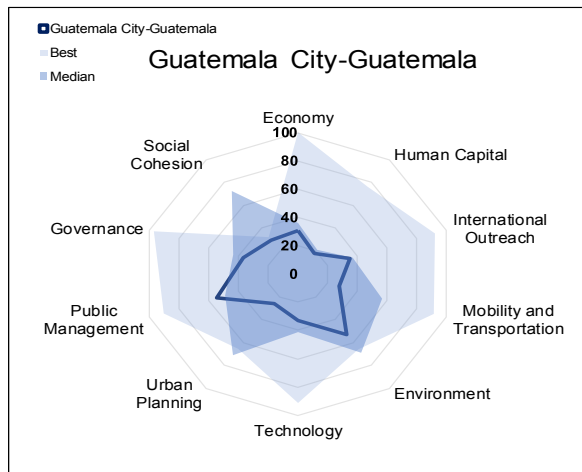
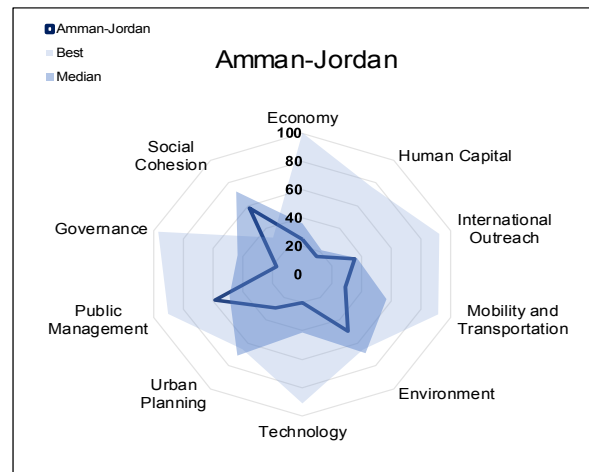
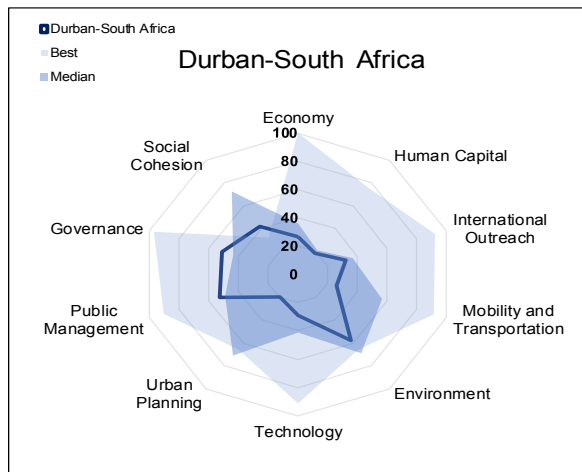


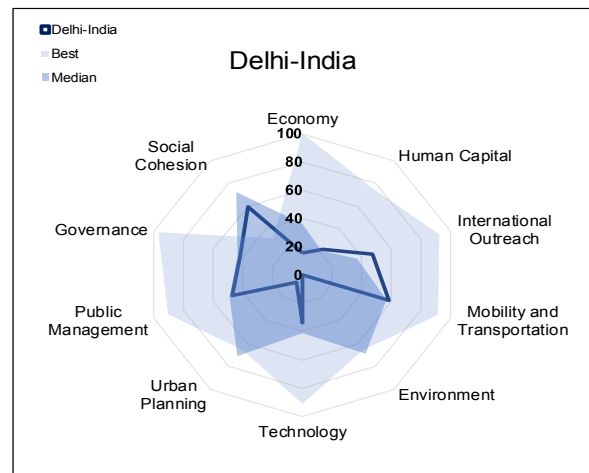
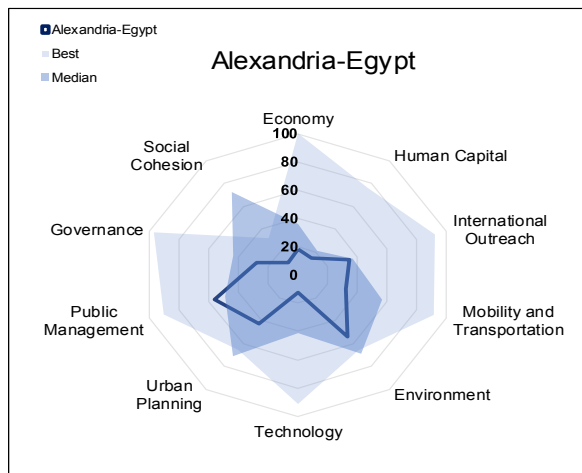
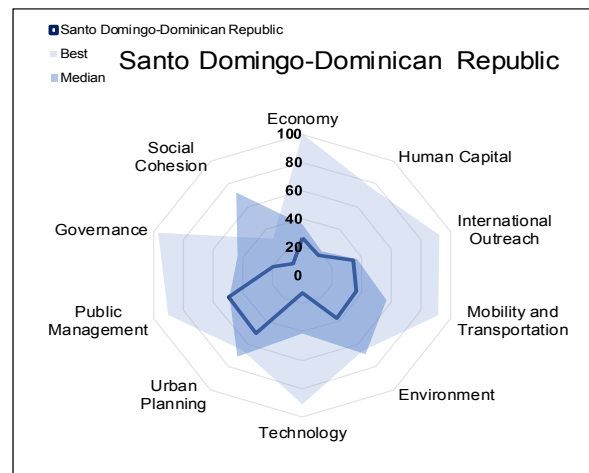
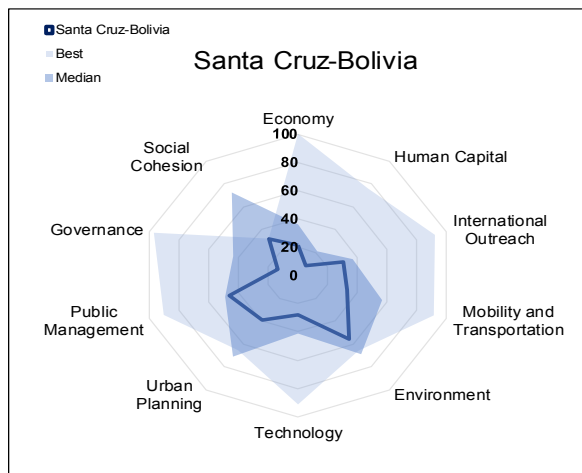
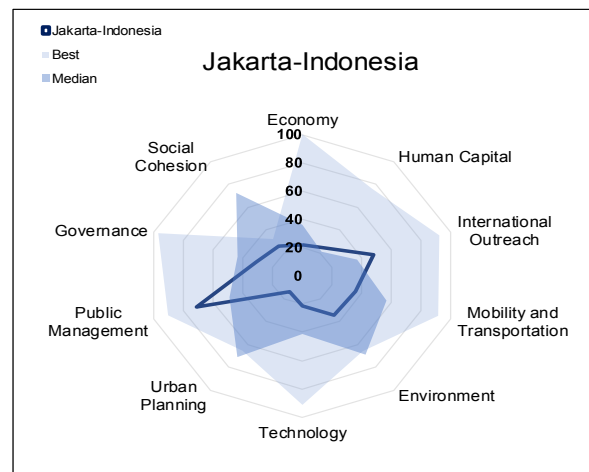
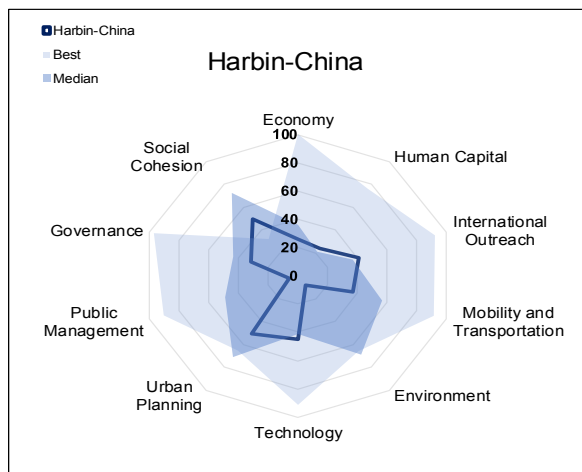
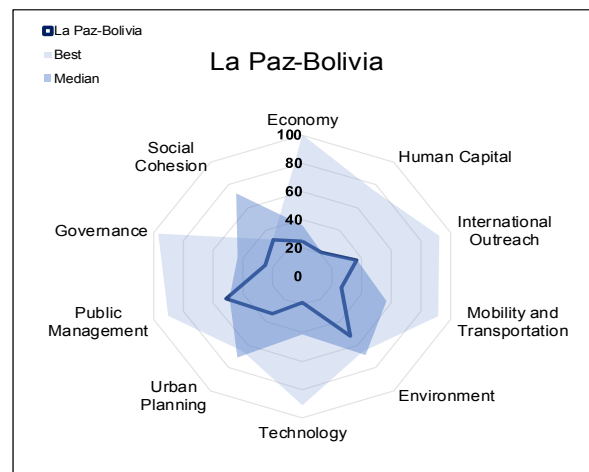
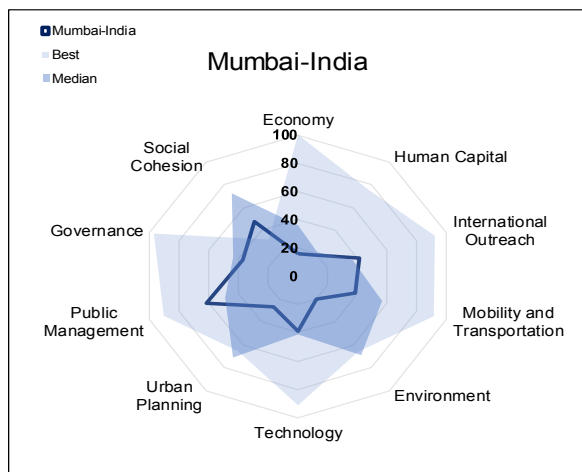


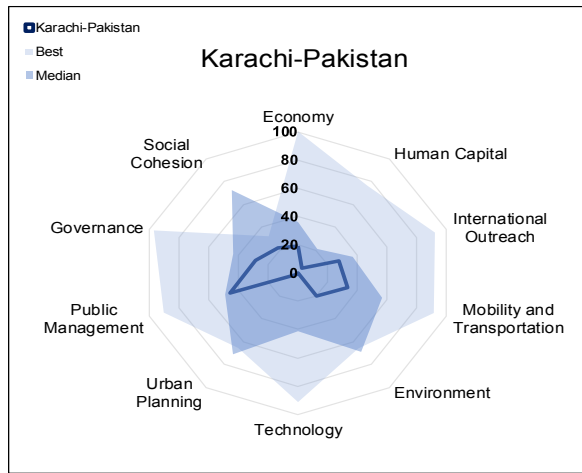
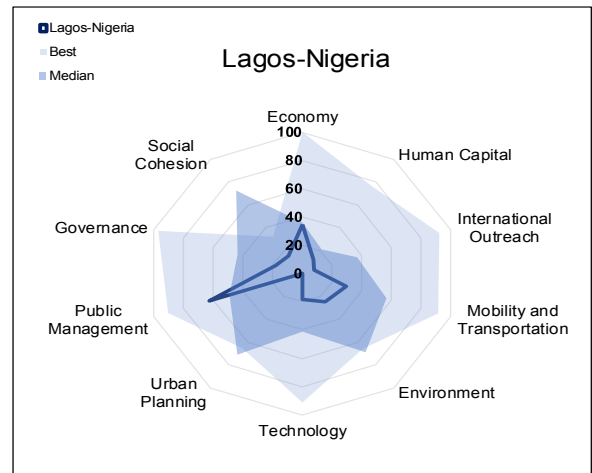
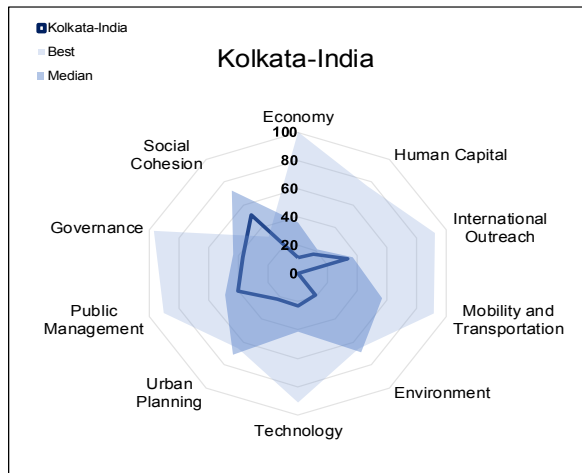
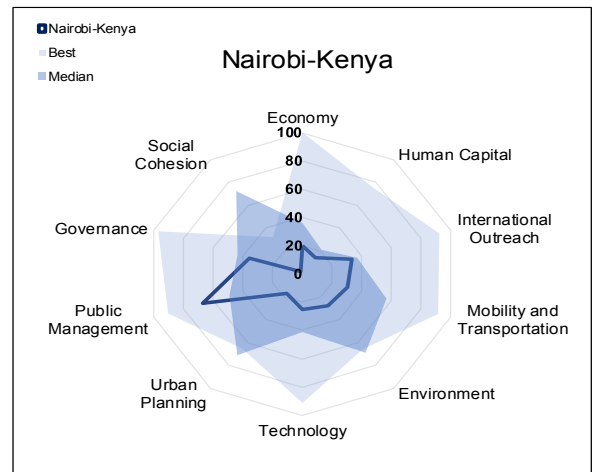
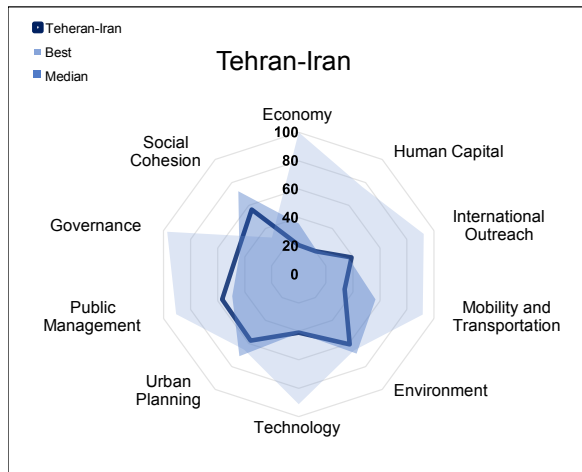
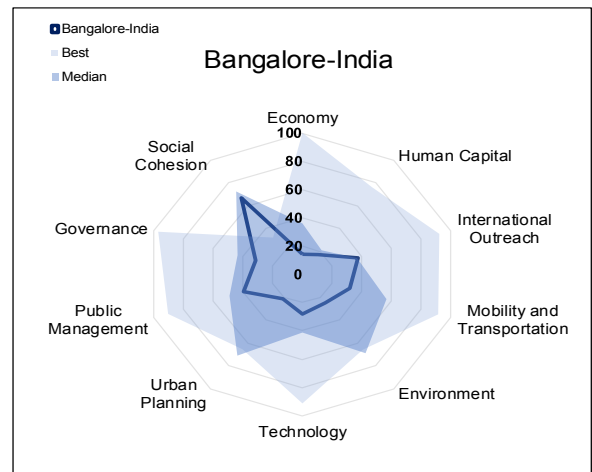
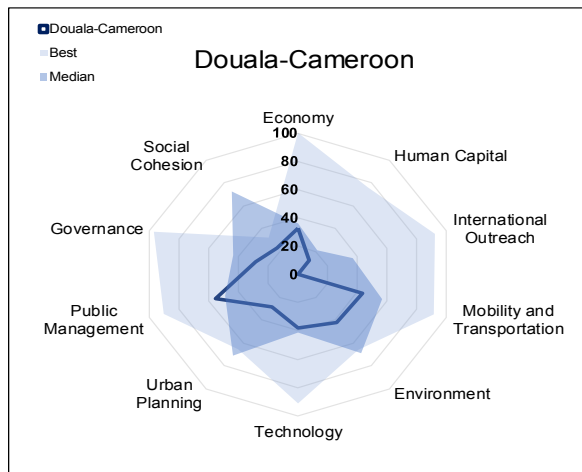












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