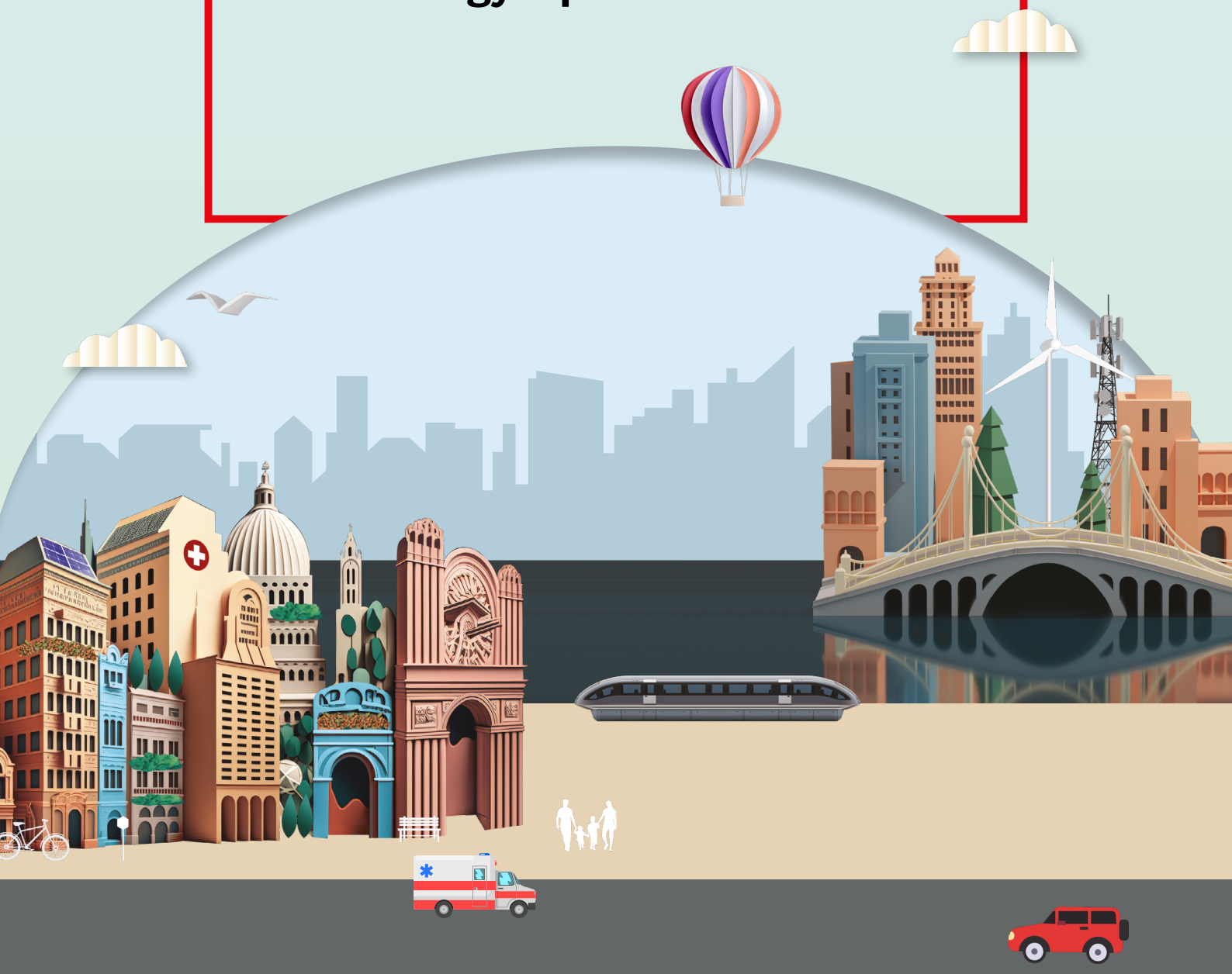


**ECONOMIST
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Resilient Cities Index

Methodology report



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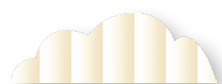
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Index framework

The *Resilient Cities Index* (RCI) is a global policy benchmarking tool to measure cities' resilience. The index defines resilient cities as those that can predict, fend off, adapt to and recover from environmental, economic, social and climate changes efficiently. A resilient city values learning and innovation to bounce back better from a shock and thrive in altered circumstances. The index assesses the performance of 25 cities across four pillars, 19 indicators and 42 sub-indicators. The four pillars—critical infrastructure, environment, socio-institutional and economic—offer a holistic approach to examine resilience with.

These pillars are defined as follows:

Critical infrastructure: this kind of resilience relates to the ability to reduce the vulnerabilities of a city's essential structures to shocks. This is done with the aim that communities can bounce back and recover from cascading disasters, ensuring the continuity of service. Critical infrastructure includes highways, connecting bridges and tunnels, railways, utilities and buildings necessary to maintain normalcy in daily life.

Environment: this is defined as embracing climate change adaptation, mitigation actions, and disaster risk reduction while recognising the complexity of rapidly growing urban areas and the uncertainty associated with climate change. Urban resilience requires the responsible and sustainable management of natural resources for the benefit of people and the planet.

Socio-institutional: this refers to the capacity of different institutions in an urban society to prepare, adapt and withstand shocks. This is indicative of how prepared "society-as-a-whole" is. This also involves measuring how well municipalities are taking into consideration diverse groups of people who are more exposed and will be limited in terms of how they recover following disruptions and shock events.

Economic: the inherent or adaptive capability of systems to foresee and withstand adverse economic shocks that challenge its stability, viability and growth. A resilient economic setup is one with minimised economic exposure, the ability to weather a financial crisis and a robust approach in applying economic counter-measures.

Indicators and sub-indicators within each pillar highlight key topic areas to measure cities' performance in resilience. Each city receives a resilience score, calculated from a weighted mean of the underlying sub-indicator scores (see "Weights" sub-section below).

Expert consultation

The index framework was developed through extensive desktop research and expert interviews.

We would like to thank the following experts who were consulted on the development of the RCI framework (listed alphabetically by surname):

- **Sachin Bhoite**, director of climate resilience, C40 Cities
- **Vincent Cheng**, PhD, fellow and director of climate and sustainability services, East Asia, Arup
- **Ross Eisenberg**, disaster risk management specialist, World Bank
- **Shivangi Jain**, senior manager, advanced analytics, Economist Impact
- **Timon McPhearson**, professor of urban ecology, The New School; director, Urban Systems Lab
- **Professor Rajib Shaw**, professor, Graduate School of Media and Governance, Keio University
- **Professor James Simmie**, professor emeritus in innovation studies, School of the Built Environment, Oxford Brookes University
- **Pratima Singh**, principal, Economist Impact
- **Lauren Sorkin**, executive director, Resilient Cities Network
- **Katherine Stewart**, principal and head of benchmarking, Economist Impact



Indicators

The RCI framework is made up of 41 sub-indicators (see Table A1.4), which are quantitative or qualitative.

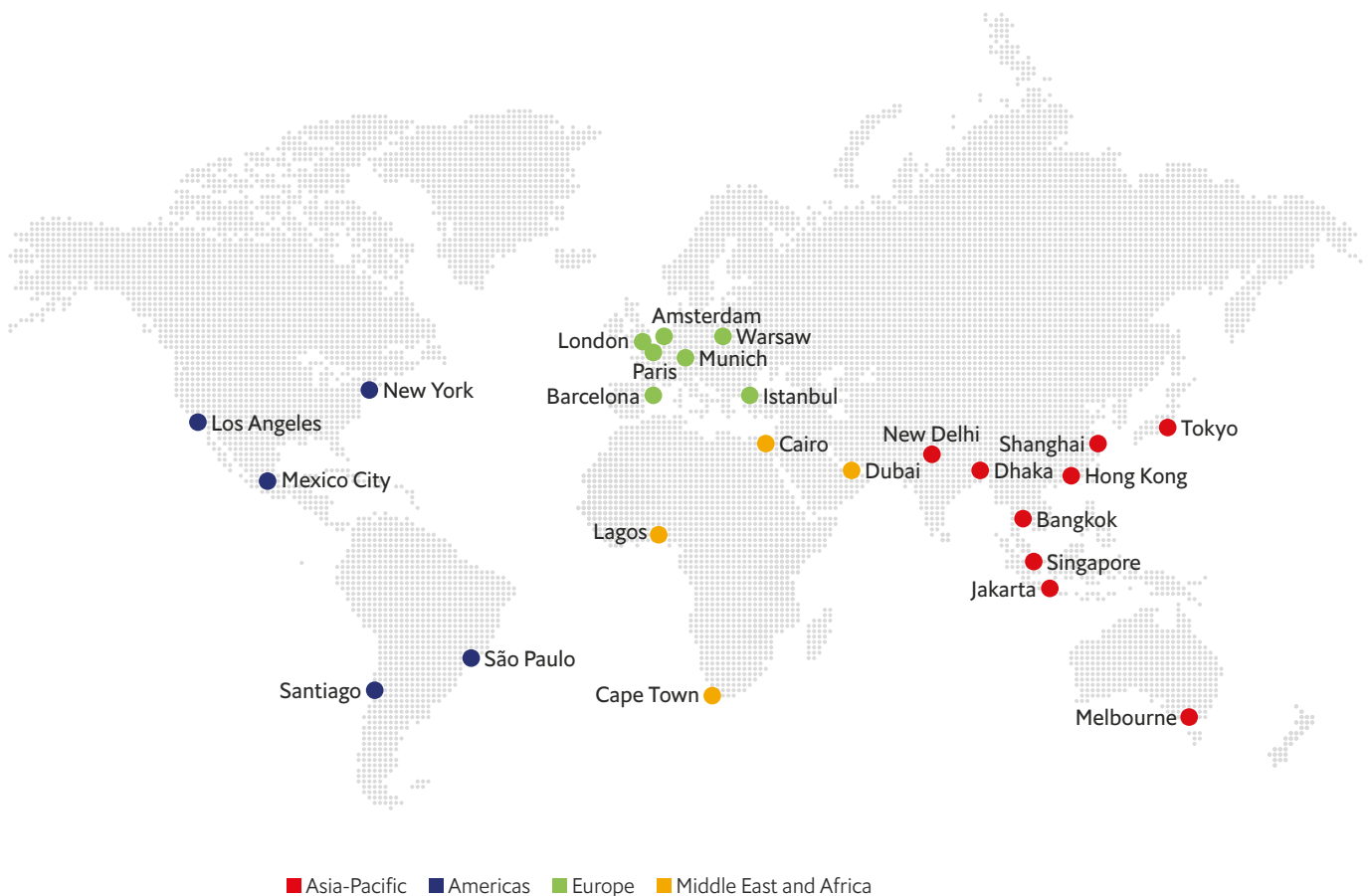
Quantitative data sourced from city, national or international statistical sources is used for 17 out of the 41 sub-indicators. An example of quantitative data is *1.1.1) Electricity price*, which measures the price of one kilowatt hour (kWh) of electricity. Where there are missing data values, data from other cities/countries that have similar profiles (based on an extensive literature review) have been utilised as proxies.

Qualitative assessments are employed based on a methodology determined by Economist Impact for 24 of the 41 sub-indicators. The data collection for these includes research using credible sources such as: international organisations, municipality and country websites, and academic literature. Examples of qualitative indicators are *2.5.1) Net zero progress* and *2.5.2) Carbon removal*.

The data were collected between May and August 2023.

City selection

The RCI assesses 25 cities across the world, which includes nine from Asia-Pacific, five from the Americas, seven from Europe, and four from Middle East and Africa. This geographically diverse selection, which includes developed and emerging cities, allows the index to reflect a global perspective in its resilience assessment.



Score measurement

First, data for sub-indicators are normalised to a common 0-100 scale to enable aggregation across different sub-indicators of varying ranges (see “Indicator normalisation” sub-section below).

The normalised scores are then aggregated as follows to arrive at indicator and pillar scores:

Indicator scores are calculated as the weighted average of all underlying normalised sub-indicator scores, eg, indicator 1.1) *Electricity is calculated as the weighted average score of 1.1.1) Electricity price and 1.1.2) Electricity quality.*

Pillar scores are calculated as the weighted average of all underlying indicator scores, eg, pillar 3) *SOCIO-INSTITUTIONAL is calculated as the weighted average score of 3.1) Digital government, 3.2) Legal, 3.3) Inclusivity, involvement and awareness, and 3.4) Health and well-being.*

Finally, the overall resilience score of a city is calculated as the weighted average of all four underlying pillars: 1) *CRITICAL INFRASTRUCTURE*, 2) *ENVIRONMENT* 3) *SOCIO-INSTITUTIONAL* and 4) *ECONOMIC*.

Indicator normalisation

Quantitative sub-indicators are generally normalised to a 0–100 scale using bookends that correspond to the minimum and maximum data points across the 25 cities, ensuring that

the lowest-performing city receives a 0 and the highest-performing city receives a 100.

The formula used is:

$x_{\text{NORMALISED}} = 100 * (x - \text{Min}(x)) / (\text{Max}(x) - \text{Min}(x))$, where $\text{Min}(x)$ and $\text{Max}(x)$ are respectively the lowest and highest values across the city sample.

Some quantitative indicators may feature a built-in scale as part of the source data (eg, 1 to 5). In such cases, even if none of the 25 cities received a 1 or a 5, we still use 1 and 5 as the bookends for normalisation, as this represents a well-defined range of potential scores.

All quantitative sub-indicators have been evaluated for outliers using Tukey’s method. Where outliers were detected and judged to be material, an adjustment is made to the $\text{Min}(x)$ and $\text{Max}(x)$ used in the normalisation, as follows. The trimmed mean and trimmed standard deviation are calculated on the central 95% of the distribution. Values further than 3 trimmed standard deviations away from the trimmed mean were replaced by the trimmed mean plus 3.1 times the trimmed standard deviation if they were in the right-hand tail. They were replaced by the trimmed mean minus 3.1 times the trimmed standard deviation if they were in the left-hand tail. Scores are then calculated by normalising across the minimum and maximum values observed in this adjusted set of observations.

This adjustment has been made for two sub-indicators: 4.2.1) *Economic volatility* and 4.3.2) *Innovation ecosystem*.

For qualitative indicators, the process is similar. We use bookends that correspond to the minimum or maximum possible points that a city can score on each indicator, regardless of whether any of the 25 cities actually do.

Weights

The RCI framework includes weights assigned to each pillar, indicator and sub-indicator that reflect assumptions regarding their relative importance.

The framework provides two sets of pre-assigned weights along with a functionality that allows users to enter their own weights:

- Expert-assigned weights
- Uniform weights

The expert-assigned weights (see Table A1.1, Table A1.2 and Table A1.3) are the default setting and are used for the basis of discussion throughout this report. They are based on extensive discussions between Economist Impact and experts on the relative value of each

pillar, indicator and sub-indicator. The second weighting option, uniform weights, assumes equal importance of all pillars, indicators and their respective sub-indicators and evenly distributes weights on that basis.

The first option, the default weighting scheme, uses expert judgement to assign weights to indicators and brings a real-world perspective to an index. This is important if an index is to guide policy actions. The second option—in which all categories are weighted equally—has the advantage of simplicity and does not involve subjective judgement. A disadvantage of this option is that it assumes that all pillars, indicators and sub-indicators are equally significant.

The RCI model provides an adjustable weightings functionality that allows users to assign more or less importance to various resilience areas that they deem to be more relevant. Using this functionality can help users better understand resilience performance of cities on specific issues.

Appendix 1

Table A1.1: Overall weights

Pillar	Weights, %
1) Critical infrastructure	27.38%
2) Environment	26.19%
3) Socio-institutional	27.38%
4) Economic	19.05%

Table A1.2: Indicator weights

1) CRITICAL INFRASTRUCTURE	
1.1) Electricity	21.00%
1.2) Water and sanitation	22.00%
1.3) Transportation	19.00%
1.4) Built environment	21.00%
1.5) Digital infrastructure	17.00%
2) ENVIRONMENT	
2.1) Flooding	19.20%
2.2) Heat stress	18.40%
2.3) Air pollution	15.20%
2.4) Disaster management	18.40%
2.5) Decarbonisation	12.80%
2.6) Waste management	16.00%
3) SOCIO-INSTITUTIONAL	
3.1) Digital government	19.28%
3.2) Legal	25.30%
3.3) Inclusivity, involvement and awareness	28.92%
3.4) Health and well-being	26.51%
4) ECONOMIC	
4.1) Economic robustness	25.71%
4.2) Exposure and risk	24.29%
4.3) Innovation and entrepreneurship	24.29%
4.4) Human capital	25.71%

Table A1.3: Sub-indicator weights

1) CRITICAL INFRASTRUCTURE	
1.1) Electricity	21.00%
1.1.1) Electricity price	41.18%
1.1.2) Electricity quality	58.82%
1.2) Water and sanitation	22.00%
1.2.1) Water provision quality	35.71%
1.2.2) Wastewater treatment	30.36%
1.2.3) Water management	33.93%
1.3) Transportation	19.00%
1.3.1) Congestion	20.22%
1.3.2) Smart traffic management	23.47%
1.3.3) Public transport quality	28.88%
1.3.4) Transport electrification	27.44%
1.4) Built environment	21.00%
1.4.1) Energy efficiency	46.34%
1.4.2) Future-proofing the structures	53.66%
1.5) Digital infrastructure	17.00%
1.5.1) Internet quality	46.15%
1.5.2) Cybersecurity preparedness	53.85%
2) ENVIRONMENT	
2.1) Flooding	19.20%
2.1.1) Riverine flood risk	50.00%
2.1.2) Coastal flood risk	50.00%
2.2) Heat stress	18.40%
2.2.1) Heat stress	100.00%
2.3) Air pollution	15.20%
2.3.1) Air quality	100.00%
2.4) Disaster management	18.40%
2.4.1) Hazard monitoring	51.02%
2.4.2) Hazard management	48.98%
2.5) Decarbonisation	12.80%
2.5.1) Net zero progress	36.54%
2.5.2) Carbon removal	28.85%
2.5.3) Renewable energy adoption	34.62%
2.6) Waste management	16.00%
2.6.1) Recycling and circular economy initiatives	52.94%
2.6.2) Single-use plastic	47.06%
3) SOCIO-INSTITUTIONAL	
3.1) Digital government	19.28%
3.1.1) E-gov portal for residents	48.48%
3.1.2) Open data availability and accessibility	51.52%
3.2) Legal	25.30%
3.2.1) Crime and safety	50.00%
3.2.2) Justice and law enforcement	50.00%
3.3) Inclusivity, involvement and awareness	28.92%
3.3.1) Income inequality	24.44%
3.3.2) Social protection benefits	24.44%
3.3.3) Vulnerable group integration	25.56%
3.3.4) Culture of readiness	25.56%
3.4) Health and well-being	26.51%
3.4.1) Health emergency response	40.82%
3.4.2) Longevity	34.69%
3.4.3) Work-life balance	24.49%
4) ECONOMIC	
4.1) Economic robustness	25.71%
4.1.1) Business environment	100.00%
4.2) Exposure and risk	24.29%
4.2.1) Economic volatility	48.39%
4.2.2) Insurance penetration	51.61%
4.3) Innovation and entrepreneurship	24.29%
4.3.1) AI readiness	46.15%
4.3.2) Innovation ecosystem	53.85%
4.4) Human capital	25.71%
4.4.1) High-skilled workforce	100.00%

Table A1.4: Detailed list of sub-indicators

1) Critical infrastructure					
1.1 Electricity					
Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
1.1.1 Electricity price	This indicator measures the price of electricity for households and includes all items in the electricity bill such as the distribution and energy cost, various environmental and fuel cost charges and taxes.	USD per kWh Lower = better	What is the price of one kilowatt hour (kWh) of electricity? USD	Global Petrol Prices	2022
1.1.2 Electricity quality	This indicator measures the quality of electricity provision.	Score (0-4) Higher = better	What is the quality of electricity provision? 0- Supply is completely inadequate, delivered by an out of date and potentially dangerous network. Disruptions such as surges or outages are commonplace and maintenance is extremely poor and very slow. An alternative source of supply such as a generator is considered to be an essential part of life. 1- Interruptions are regular and an alternative source of supply such as a generator may be required during these times. However, a largely uninterrupted supply is maintained. Maintenance is poor but does seek to resolve problems as they occur usually within a few days. 2- Supply is generally good but interruptions do occur at a frequency of every month or two, even for short amounts of time. Sustained outages take place far less frequently but can leave homes without supply for hours and delays for essential maintenance in restoring specific supply issues can take days. 3- A good and modern network that delivers a relatively consistent supply but suffers from very occasional power outages or surges (perhaps a few times per year maximum), or where maintenance can sometimes be delayed. 4- A very good, extensive and modern network with very few disruptions. Speedy and regular maintenance is available.	EIU Liveability Index and desk-based research	2022

1.2 Water and sanitation

Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
1.2.1 Water provision quality	This indicator assesses the quality of water supply by looking at water network, disruption and maintenance.	Score (0-4) Higher = better	<p>What is the quality of water provision?</p> <p>0- Supply is completely inadequate and delivered by an out-of-date pipe network that makes drinking water potentially dangerous. Shortages in water are commonplace and maintenance is extremely poor and very slow. Bottled drinking water has to be delivered regularly and tap water is not consumed by a substantial part of the population.</p> <p>1- Interruptions are regular. Alternative water supplies such as storage tanks are often kept in reserve to tide-supply over during these times. Maintenance is poor and concerns over the quality mean that most people favour bottled drinking water, which is delivered regularly by private services.</p> <p>2- Supply is generally good but interruptions do occur at a frequency of every month or two. Sustained shortages take place far less frequently but can leave homes without water for hours and delays for essential maintenance can take days. Water is ok to drink but many prefer to opt for bottled water.</p> <p>3- A good and modern network that delivers a relatively consistent water supply but suffers from very occasional shortages (perhaps a few times per year maximum), or where maintenance can sometimes be delayed. Water quality is considered fine for residents but some visitors may prefer bottled water.</p> <p>4- A very good, extensive and modern network with few disruptions. Speedy and regular maintenance is available. Quality of water is drinkable and often preferred to bottled water.</p>	EIU Liveability Index and desk-based research	2023
1.2.2 Wastewater treatment	This indicator measures the proportion of wastewater treated before being discharged.	Score (0-5) Higher = better	<p>What percentage of wastewater is treated before discharge?</p> <p>0- 0-10%</p> <p>1- 11-30%</p> <p>2- 31-50%</p> <p>3- 51-70%</p> <p>4- 71-90%</p> <p>5- 91-100%</p>	City websites and desk-based research	2023
1.2.3 Water management	This indicator measures the level of water management in a city by assessing the presence of a system for water accounting as well as any programmes to protect existing water resources from overuse and depletion. Water accounting is the systematic study of the current status and trends in water supply, demand, accessibility and use.	Score (0-3) Higher = better	<p>Does the city have an ongoing programme(s) to protect existing natural water sources from overuse and depletion?</p> <p>0- No plans to protect water resources.</p> <p>1- There are plans to protect water resources but the budget/funding/responsible agency has not been outlined.</p> <p>2- There are plans to protect water resources and the budget/funding/responsible agency has been outlined.</p> <p>+1 if the city has a system for water accounting</p>	City websites and desk-based research	2023

1.3 Transportation

Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
1.3.1 Congestion	This indicator assesses a city's congestion level.	Average travel time per 10 km in minutes Lower = better	What is the average travel time? Average travel time per 10 km in minutes	Tomtom traffic index	2022
1.3.2 Smart traffic management	This indicator assesses the stage of implementation of smart traffic management technologies.	Score (0-2) Higher = better	Does the city have smart traffic management systems that leverage AI, IoT and data analytics? 0- No 1- In planning/pilot stage 2- There are smart traffic control systems in place	City websites and desk-based research	2023
1.3.3 Public transport quality	This indicator captures the quality of transport in terms of commute efficiency and regularity, and the level of maintenance.	Score (0-4) Higher = better	What is the quality of public transport considering efficiency and level of maintenance? 0- There is little or no public transport network to speak of. Any routes that are on offer are antiquated, dirty, overcrowded, and can be unsafe. There is little regard for the regularity and punctuality of routes and a number of private services such as private bus or taxi services mean that public transport is only considered by many to be a last resort. 1- Public transport is extremely limited and alternatives are regularly used. Networks may be limited to just bus or rail routes with few options available to undertake journeys. Concerns over safety, cleanliness and crowding act as a disincentive for many routes. 2- The city has a public transport system that is inefficient. Although there are a number of networks, some may be antiquated and an irregularity of service or delays means regular overcrowding, even outside peak travel hours. Travel options on some routes are limited and may be avoided due to concerns over crowding, safety or cleanliness. 3- The city has a public transport system that is large and incorporates a number of different networks. Service is regular but is not always punctual and overcrowding can occur, especially during peak travel times, with occasional delays or a lack of choice sometimes limiting options. 4- The city has an excellent public transport system that uses a range of different options such as buses, rail, underground and tram networks. It is regular, punctual, and clean or modern. The system is not overcrowded with multiple routes available for most journeys.	Tomtom traffic index	2022

1.3.4 Transport electrification	This indicator measures whether the city has any policies at the planning or implementation stage to encourage electrification of public transport and/or private cars for greener transportation.	Score (0-4) Higher = better	<p>Does the city have a plan/policies to encourage the electrification of public transport and/or private cars?</p> <p>0- The city doesn't have a plan/policies.</p> <p>1- The city has a basic plan/policy to promote the electrification of its transport.</p> <p>Cities get an additional score for each of the below:</p> <p>+1 The plan/policy includes measures to develop EV charging infrastructure.</p> <p>+1 The plan/policy includes financial support for electrification of transport.</p> <p>+1 There is electric public transport operating in the city (not pilot).</p>	City websites and desk-based research	2023
1.4 Built environment					
Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
1.4.1 Energy efficiency	This indicator measures the presence of energy codes for new buildings as of 2021.	Score (0-3) Higher = better	<p>Does the city have energy building codes?</p> <p>0- No known code</p> <p>1- In development</p> <p>2- Voluntary</p> <p>3- Mandatory</p>	IEA Energy Efficiency 2021 Report and desk-based research	2021
1.4.2 Future-proofing structures	This indicator assesses if the city has any strategies/frameworks to promote and incentivise the future-proofing of infrastructure.	Score (0-1) Higher = better	<p>Are there regulatory frameworks/policies/strategies that legislate/support (in the form of financial incentives) innovative solutions for future-proofing (these include adopting flexible/adaptable design approaches, using durable/renewable materials and building green roofs against heat) infrastructure projects apart from energy efficiency?</p> <p>0- No</p> <p>1- Yes</p>	City websites and desk-based research	2023

1.5 Digital infrastructure

Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
1.5.1 Internet quality	This indicator assesses the internet quality in the context of downloading (how quickly you can pull data from a server on the internet to your device) and uploading speed (how quickly you can send data from the mobile device to the internet).	Score Higher = better	What is the downloading speed? 0- 0-20 Mbps 1- 20-40 Mbps 2- 40-80 Mbps 3- 80-120 Mbps 4- 120-160 Mbps 5- >160 Mbps What is the uploading speed? 0- 0-5 Mbps 1- 6-10 Mbps 2- 10-15 Mbps 3- 15-20 Mbps 4- 20-25 Mbps 5- 25-30 Mbps Average of scores for uploading and downloading speeds	Ookla Speedtest Intelligence Global Index	2023
1.5.2 Cybersecurity preparedness	This indicator looks at the capacity of a city to withstand cyberattacks through aspects like strategy, infrastructure and awareness.	Score (0-4) Higher = better	How prepared is the city/country to withstand cyberattacks? 0- Very low preparedness, reflecting an absence of a national cybersecurity strategy and near absence of barriers in place to defend key infrastructure. 1- Low preparedness, reflecting low awareness within both the government and corporate sector, and intermittent implementation of policy. 2- Moderate preparedness, reflecting a lack of co-ordination over cybersecurity, and gaps in awareness and technical capacity at the corporate and government level. 3- High preparedness, with uniform cybersecurity awareness, but co-ordination and capacity gaps exist. 4- Very high preparedness, with uniform cybersecurity awareness, and advanced technical barriers in place to defend key infrastructure.	EIU Risk Tool	2023

2) Environment

2.1 Flooding

Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
2.1.1 Riverine flood risk	This indicator measures the percentage of the population expected to be affected by riverine flooding in an average year, accounting for existing flood-protection standards. Flood protection is calculated using the Flood Protection Standards (FLORPOS) model and includes policy (information on protection standards from policy regulations). Flood risk is assessed using hazard (inundation caused by river overflow), exposure (population in flood zone), and vulnerability.	Score (0-4) Lower = better	What is the proportion of people expected to be impacted by riverine flooding? 0- Low (0 to 1 person in 1,000) 1- Low-medium (1 person in 1,000 to 2 people in 1,000) 2- Medium-high (2 people in 1,000 to 6 people in 1,000) 3- High (6 people in 1,000 to 1 person in 100) 4- Extremely high (more than 1 in 100)	Aqueduct Water Risk Atlas	2023
2.1.2 Coastal flood risk	This indicator measures the percentage of the population expected to be affected by coastal flooding in an average year, accounting for existing flood-protection standards. Flood protection is calculated using the Flood Protection Standards (FLORPOS) model and includes policy (information on protection standards from policy regulations). Flood risk is assessed using hazard (inundation caused by storm surge), exposure (population in flood zone), and vulnerability.	Score (0-4) Lower = better	What is the proportion of people expected to be impacted by coastal flooding? 0- Low (0 to 9 people in 1,000,000) 1- Low-medium (9 people in 1,000,000 to 7 people in 100,000) 2- Medium-high (7 people in 100,000 to 3 people in 10,000) 3- High (3 people in 10,000 to 2 people in 1,000) 4- Extremely high (more than 2 people in 1,000)	Aqueduct Water Risk Atlas	2023

2.2 Heat stress

Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
2.2.1 Heat stress	This indicator measures the level of heat stress by considering the average of the daily maximum values of the Universal Thermal Climate Index (based on temperature, humidity, wind and radiation) during the warmest month of the year. It also considers heat mitigation efforts by assessing whether the city has a heat action plan in place to tackle heat stress. This is assessed on two levels: the availability and the detailedness of the plan.	Score (0-2) Higher = better	How prepared is the city to mitigate heat stress (current mitigation plans vs 2030 heat stress projections)? 0- No heat mitigation plan but is expected to have medium-high heat stress. 1- Has a vague heat plan and is expected to have a medium-high heat stress. 2- Is expected to have a low heat stress or has a detailed heat plan and is expected to have a medium-high heat stress.	Lobelia Climate Change Services City/country websites and desk-based research	2023

2.3 Air pollution

Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
2.3.1 Air quality	This indicator measures air pollution in terms of PM 2.5 using 2017-22 average data.	$\mu\text{g}/\text{m}^3$ Higher = worse	What is the city's annual average PM2.5 concentration ($\mu\text{g}/\text{m}^3$) between 2017 and 2022? Average of PM2.5 concentration ($\mu\text{g}/\text{m}^3$)	IQAir	2022

2.4 Disaster management

Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
2.4.1 Hazard monitoring	This indicator measures whether the city has a multi hazard early warning system (MHEWS).	Score (0-2) Higher = better	Does the city have a comprehensive early warning system? 0- No early warning system. 1- Early warning system exists but it doesn't capture a multi-hazard approach. 2- Early warning system exists with a multi-hazard approach.	City websites and desk-based research	2023
2.4.2 Hazard management	This indicator assesses if the city has a clear plan for disaster management.	Score (0-2) Higher = better	Does the city have a disaster management plan? 0- The city doesn't have a disaster management plan in place. 1- The city has a disaster management plan but it's not comprehensive. It doesn't include details such as disaster preparedness plan (ie, evacuation routes) and clearly defined responsibilities, emergency response team, emergency facilities and emergency communication. 2- The city has a comprehensive disaster management plan. It includes details such as a disaster preparedness plan (i.e. evacuation routes) and clearly defined responsibilities, emergency response team, emergency facilities and emergency communication.	City/country websites and desk-based research	2023

2.5 Decarbonisation

Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
2.5.1 Net zero progress	This indicator assesses whether the city has a city-level net-zero target and plan.	Score (0-2) Higher = better	What is the status of the city's net zero target? 0- No target 1- Target exists + What is the status of the city's net zero plan? 0- No plan 1- Plan exists	City/country websites and desk-based research	2023
2.5.2 Carbon removal	This indicator assesses whether the city has plans for carbon removal and considers the specific method of carbon removal.	Score (0-2) Higher = better	Does the city mention carbon removal in its net zero target plan? 0- The city doesn't have any plans. 1- The city has either nature-based removal, or carbon capture and storage removal plans. 2- The city has both nature-based removal, and carbon capture and storage removal plans.	City/country websites and desk-based research	2023
2.5.3 Renewable energy adoption	This indicator measures the extent of energy generated from renewable sources.	% of total electricity generated Higher = better	What is the percentage of electricity generated from renewable sources? % of total electricity generated	Our World in Data	2022

2.6 Waste management

Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
2.6.1 Recycling and circular economy initiatives	This indicator assesses whether the city has any policies to incentivise circular economy and/or recycling.	Score (0-2) Higher = better	Does the city have any comprehensive long-term policies/initiatives/strategies to encourage recycling and/or the circular economy? 0- The city doesn't have any recycling or circular economy strategies/plans. 1- The city has recycling strategies/plans but not circular economy. 2- The city has both recycling and circular economy strategies/plans.	City websites and desk-based research	2023
2.6.2 Single-use plastic	This indicator assesses whether the city has any policies to incentivise circular economy and/or recycling.	Score (0-3) Higher = better	Does the city/country enforce a ban on plastic bags or single-use plastic? (Eg, plastic bags, single-use cutlery, straws) 0- No ban. 1- There is a fee charged on plastic bags or single use plastics or a limited ban on plastic bags. 2- There is a full scale ban on plastic bags. 3- There is a full-scale ban on single-use items (more than just plastic bags)	City websites and desk-based research	2023

3) Socio-institutional

3.1 Digital government

Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
3.1.1 E-gov portal for residents	This indicator assesses whether a city provides its residents with online, accessible information about laws, policies; has platforms offering help links, tutorials on online tools, online skills development; and functionalities that allow for the use of e-services like application for visas, ID cards and social protection.	Index Score (0-1) Higher = better	What is the scope and quality of online government services? The UN online services index assesses government websites to assess their ease and accessibility for an average citizen, and scope and quality of online services. The composite value of the index is normalised between the range of 0 to 1.	United Nations Division for Public Institutions and Digital Government	2022
3.1.2 Open data availability and accessibility	This indicator assesses the availability (coverage) and accessibility (openness) of government data (such as national statistics, procurement) online.	Index Score (0-100) Higher = better	What is the level of accessibility and availability of open data on government websites?	Open Data Watch rankings	2022

3.2 Legal

Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
3.2.1 Crime and safety	This indicator measures the level of overall safety in the city.	Score (0-4) Higher score= lower crime rate	What is the level of crime rate in the city? Petty crime: this refers to minor crimes such as theft and trespassing, where no physical harm is inflicted on the victim. Violent crime: this refers to armed robbery, mugging or assault as well as more serious acts of violence such as rape and murder. 0- Very high level of petty crime and violent crime. 1- High level of pretty crime and violent crime. 2- Moderate level of pretty crime and violent crime. 3- Low level of petty crime and violent crime. 4- Very low level of petty crime and violent crime.	EIU Liveability Index and desk-based research	2023
3.2.2 Justice and law enforcement	This indicator assesses the effectiveness of the city's law enforcement and justice system by considering the capacity of relevant personnel and the system's effectiveness.	Index Score (0-1) Higher = better	What is the capacity of the city's law enforcement and justice system? The World Justice Project's Rule of Law Index considers an effective criminal justice system as a key aspect of the rule of law. Scores for criminal justice are calculated from data collected from academics, practitioners and community leaders via questionnaires. Scores are normalised to a range between 0 to 1.	World Justice Project	2022

3.3 Inclusivity, involvement and awareness

Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
3.3.1 Income inequality	This indicator captures the Gini coefficient which measures how much the distribution of income within a city deviates from a perfectly equal distribution.	Gini coefficient (0-100) Lower = better	What is the extent of income inequality in the city? Gini score	Wise voter	2022
3.3.2 Social protection benefits	This indicator assesses the city's spend on social assistance programmes. Social expenditure could consist of cash benefits, direct in-kind provision of goods and services, and tax breaks targeted at low-income households, the elderly, disabled, sick, unemployed or young persons.	% of population Higher = better	What is the percentage of population covered by at least one social protection benefit (excluding health)?	ILO's World Social Protection Data	2022
3.3.3 Vulnerable group integration	This indicator looks at evidence of volunteering or mentoring programmes provided by the government and public institutions for the social integration of vulnerable groups such as refugees, migrants, the homeless population and others such as those living with mental health issues and/or addictions.	Score (0-2) Higher = better	Is there any evidence to support the vulnerable groups in the city? This includes existing schemes or plans aimed to ensure their social integration and inclusion in society. 0- No evidence of any schemes/plans 1- Evidence of several individual schemes/plans provided by the government for at least two vulnerable groups (these could be provided in collaboration with other stakeholders or civil society, etc) 2- Evidence of a single comprehensive and detailed scheme/plan	City websites and desk-based research	2023

3.3.4 Culture of readiness	This indicator evaluates initiatives and awareness campaigns in a city towards developing cultural readiness of a city's population to act in case of disasters (natural disaster, environmental, digital etc.).	Score (0-3) Higher = better	What is the level of societal disruption readiness in a society to act decisively amid major shocks and stresses? <ol style="list-style-type: none"> Educational programmes (evidence of either of the two below) <ul style="list-style-type: none"> - Does the school curriculum involve subjects such as disaster/disruption management and preparedness? - Any evidence of conducting training programmes such as drills at a school level? Information sources (evidence of either of the two below) <ul style="list-style-type: none"> - Does the city provide comprehensive and detailed information to make citizens "aware" of disaster/disruption preparedness? - Is there evidence of the availability of disaster preparedness educational materials? Awareness campaigns <ul style="list-style-type: none"> - Is there evidence/examples of awareness campaigns undertaken by the government on various kinds of threats/disasters/disruptions in the preceding year? <p>0- No evidence of educational programmes, information sources and awareness campaigns 1- Evidence of only one of the three categories 2- Evidence of only two of the three categories 3- Evidence of all the three categories</p>	City websites and desk-based research	2022
3.4 Health and well-being					
Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
3.4.1 Health emergency response	This indicator measures average health emergency response time for first responders in the city.	Score (0-2) Higher = better	What is the average response time for an ambulance in the city? <p>0- No emergency service, or more than one hour response time. 1- Emergency response time is 10 minutes to 1 hour 2- Emergency response time is less than 10 minutes</p>	City websites and desk-based research	2023
3.4.2 Longevity	This indicator assesses the provision of campaigns and initiatives by city governments to manage: <ul style="list-style-type: none"> - lifestyle diseases (such as diabetes, blood pressure, obesity); and - mental health issues (depression, anxiety, obesity, diabetes, etc) 	Score (0-2) Higher = better	Is there any evidence of public information awareness campaigns/campaigns on preventive measures on non-communicable diseases (NCDs) in the city in the past five years? <p>0- No evidence of campaigns or initiatives on NCDs. +1: Evidence of information campaigns for preventative measures including exercise, healthy eating and/or screening. +1: Evidence of a mental health campaign.</p>	City websites and desk-based research	2023
3.4.3 Work-life balance	This indicator gives an overview of the work-life balance of employees in the city.	Average weekly working hours Lower = better	What are the average working hours per week in the city?	ILO	Latest year available

4) Economic

4.1 Economic robustness

Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
4.1.1 Business environment	This indicator assesses the degree to which businesses can invest and operate in a free, open and competitive market, with policies and legal assurances that their rights and assets are secure.	Average score on a scale of 1 to 5, where 5 = most favourable business environment Higher = better	How favourable is the business environment in the city? The indicator is a composite of 13 sub-indicators from two pillars from the EIU Business Environment Rankings. The two pillars are: -Private enterprise policy, which covers aspects like the protection of private property, government regulation, freedom to compete, competition policy, price controls, lobbying, state control and minority shareholders. Protection of intellectual property is not included. -Foreign investment policy, which covers policies around foreign investors, openness of national culture, expropriation risk, investor protection and government favouritism.	EIU Business Environment Rankings 2022	2022

4.2 Exposure and risk

Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
4.2.1 Economic volatility	This indicator measures the volatility of the city's current GDP in USD during 2016-20.	Coefficient of variation for GDP values Lower = better	What is the variance in the economic output for the city?	EIU	2020
4.2.2 Insurance penetration	This indicator measures the total insurance premiums collected as a share of a country's GDP.	% of GDP Higher = better	What is the level of total insurance penetration (direct gross premiums/GDP) in the city? Percent	OECD and desk-based research	2021

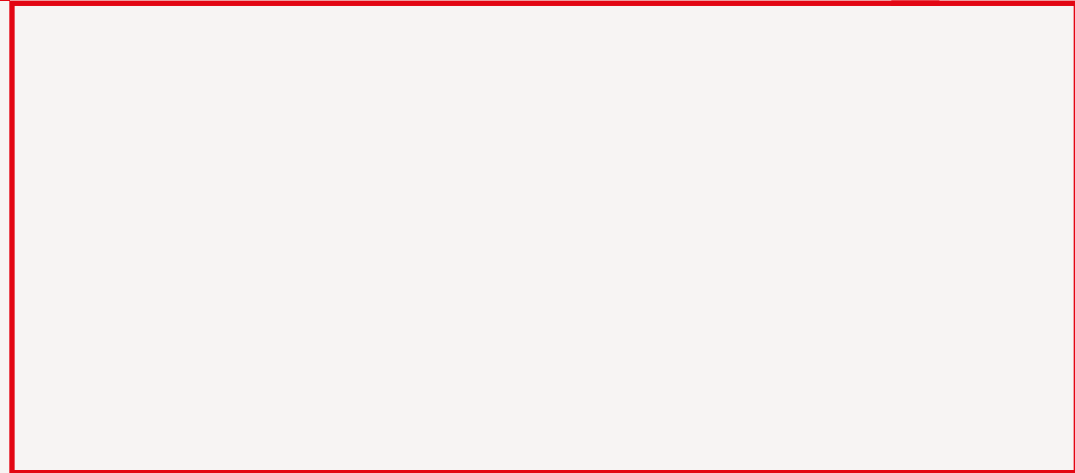
4.3 Innovation and entrepreneurship

Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
4.3.1 AI readiness	This indicator assesses how ready the government is to implement AI in the delivery of public services to businesses.	Indexed score (0-100) Higher = better	What is the government's AI readiness index score?	Oxford Insights - Government AI Readiness Index	2022
4.3.2 Innovation ecosystem	This indicator captures the level of business innovation in the city based on factors such as total number of patents filed in the latest fiscal year and total R&D spend, etc.	Score Higher = better	What is the level of innovation for businesses in the city? This indicator uses the Startup Ecosystem score, which assesses a broad range of elements within a city such as: performance, funding, market reach, connectedness, talent and experience, and knowledge. In addition, the Startup Ecosystem score considers a critical mass of activity in each city, which partially explains score differentials between cities in the same country.	Startup Ecosystem Report 2023	2023

4.4 Human capital					
Sub-indicator	Definition	Unit	Scoring Guidance	Source	Year
4.4.1 High-skilled workforce	This indicator assesses the quality of the city workforce by considering the level of advanced educational attainment in the city. Advanced education comprises short-cycle tertiary education, a bachelor's degree or equivalent education level, a master's degree or equivalent education level, or doctoral degree or equivalent education level according to the International Standard Classification of Education 2011.	% of working-age population Higher = better	What is the percentage of the total working-age population with advanced education?	World Bank	2022

While every effort has been taken to verify the accuracy of this information, Economist Impact cannot accept any responsibility or liability for reliance by any person on this report or any of the information, opinions or conclusions set out in this report.

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