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Best cities ranking and report

A special report from the Economist Intelligence Unit

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Earlier this year the Economist Intelligence Unit (EIU) teamed up with data sharing company BuzzData to host a competition offering users the opportunity to combine data from the Worldwide Cost of Living and Liveability surveys with other sources to provide a ranking of their own. Here Jon Copestake, the Editor of the EIU's Cost of Living and Liveability surveys, discusses his experience of the competition.

Why we did it

If there's one thing that becomes apparent when working on rankings, especially rankings that are close to people's hearts (or wallets) like liveability and the cost of living, it's that everyone has an opinion. In over a decade of working on these reports I've received a constant flow of feedback and opinion—much of it constructive and well thought out—on the reports and rankings that we publish.

The EIU is always looking to improve its products, and these two highly visible rankings are no exception. The fact that they elicit such a strong public reaction makes them ideal candidates for feedback and finding ways that we can improve our offerings. With this in mind we embarked—along with BuzzData—on a competition challenging entrants to find new ways of visualising and expressing the data as well as adding in series that may be important for future consideration.

In opening up the survey to others we also wanted to explore possible limits to the coverage of new data and whether we could accurately discover new series or innovative approaches that would enable us to enhance the city-based scoring system we use.

The judges

The judging panel was made up of David Eaves, a public policy entrepreneur, open government activist and negotiation expert; Nathan Yau, a writer for Flowing Data; Hilary Mason, the Chief Scientist at bit.ly; Jon Copestake, Editor of the Worldwide Cost of Living and Liveability Ranking reports at the EIU; and Charles Barber, Digital Brand Strategy Marketing Director at the EIU.

The entries

As you'd expect from a social network dedicated to interpreting data and creating innovative visualisations of those data, the quality of the entries was very high. In addition, opening up the concept of "best cities" to a diverse group generated plenty of innovative approaches for consideration.

Many of the better entrants to the competition fell into two categories: those with visually impressive or functionally interactive expression of the data and those with a methodological "value added" that incorporates new data series.

The addition of interactivity allowed contestants to supply elements that the current survey cannot. These include factors like distance and language and, more importantly, the ability of users to prioritise or weight their own requirements to reach a personalised choice of "best city". This approach had the dual benefit of allowing people to make their own choices and effectively crowdsourcing responses to inform future methodology on how average weightings could be adapted.

Other interactive entries allowed users to compare and correlate elements of the ranking to see if there were similarities in the behaviour of distinct indicators. The existence of such similarities effectively allows users to conduct their own analysis and reach their own conclusions about which indicators may influence or have a relationship with others.

Entries that sought to add value did so along a variety of avenues. Many recognised that the current survey methodology falls short in terms of sustainability or environmentally conscious indicators. Others sought to utilise general web resources in an innovative way to add value to categories such as the availability of cultural activities.

These approaches supplied a number of possible sources that could add value to the survey methodology, both by providing entirely new categories and by strengthening the existing qualitative scoring system with a more quantitative approach.

The winning entry

The final shortlist contained many strong entries. These were divided into those that added value by creating an interactive user experience or strong visualisation and those that added value to the scope of indicators surveyed.

Filippo Lovato was deemed the winner. His entry did well in both areas, but was especially strong in the latter category. His visualisation expresses the change he made in methodology and the new ranking is expressed as a both a score and a map indicator. But more impressive was the groundwork that Lovato put into adding value to the final index.

Lovato's additions in terms of green space and other assets reflect a mix of quantitative factors such as pollution levels and qualitative judgments determined by using Google maps to assess and score sprawl, for example. He also focussed heavily on pollution and how "green" a city is, a category that the survey currently lacks. This focus enabled some practical possible solutions to strengthen the survey.

It was also interesting to see the impact that Lovato's changes had on the ranking: Hong Kong came out on top. Although the top cities in the standard liveability ranking were absent from the sample Lovato used, the addition of indicators like connectivity brought some larger cities into the mix while keeping the integrity of other areas of the survey.

Judge David Eaves said "Filippo's Spatially Adjusted Livability Index is a fantastic example of someone taking a data set—park surface area—that is available across hundreds of cities, and creatively adapting it into a tool to quantify quality of life. It is exactly the kind of innovative analysis using data, particularly open data, that gets me excited about what the future holds. . . . No methodology for quantifying the quality of life is perfect, but Filippo's creative and innovative approach definitely allows a new set of important variables—especially those relating to the natural environment—to be better reflected. Exciting stuff."

The top and bottom 10

The top 10

City	Spatial Adjusted Liveability Index	RANK - Spatial Adjusted Liveability Index	RANK - EIU Liveability index (from city sample used)	Change in ranks
Hong Kong	87.8	1	10	9
Amsterdam	87.4	2	8	6
Osaka	87.4	3	3	0
Paris	87.1	4	5	1
Sydney	86.0	5	2	-3
Stockholm	86.0	6	4	-2
Berlin	85.9	7	7	0
Toronto	85.4	8	1	-7
Munich	85.1	9	9	0
Tokyo	84.3	10	6	-4

Several indicators affected the adjusted index to define the best city ranking. Notable was the introduction of an isolation indicator, which was a key factor in moving Hong Kong to the top of the ranking, above cities like Amsterdam, Sydney and Berlin. Although Hong Kong scored relatively poorly for pollution and cultural assets, the city benefited from strong scores in the natural assets and sprawl categories.

Compared with the EIU liveability ranking, the spatial awareness ranking has some notable absences. The 70 cities ranked in the spatial awareness index did not include Melbourne, Vienna and Vancouver—which were the top three cities in the EIU liveability ranking. That said, Sydney and Toronto make adequate proxy cities as top 10 candidates. Toronto saw the biggest drop between the results of the standard EIU methodology and the spatial awareness score, for which it achieved only a 50% rating thanks largely to weak scores for isolation and cultural assets. Tokyo, in 10th place, was also hampered, perhaps surprisingly, by a poor cultural asset score.

The bottom 10

The bottom 10

City	Spatial Adjusted Liveability Index	RANK - Spatial Adjusted Liveability Index	RANK - EIU Liveability index (from city sample used)	Change in ranks
Tehran	47.7	61	65	4
Nairobi	47.4	62	61	-1
Lusaka	44.7	63	62	-1
Phnom Penh	44.6	64	63	-1
Karachi	42.8	65	67	2
Dakar	41.9	66	64	-2
Abidjan	41.0	67	66	-1
Dhaka	37.9	68	70	2
Lagos	34.8	69	68	-1
Harare	33.4	70	69	-1

The bottom-scoring cities correlate fairly closely to those in the EIU ranking. Perhaps this is because cities that score poorly will do so in all areas, regardless of the methodology applied. Harare receives the lowest possible score for three of the seven additional indicators (isolation, connectivity and cultural assets).

However, some of the bottom 10 cities receive respectable scores from the additional indicators. Karachi and Tehran achieve overall spatial adjustment scores of 48.5 and 53.6, respectively—this compares with scores of 53.3 and 50, respectively, for Tokyo and Toronto in this category.

Natural asset scores in the bottom 10 seem to outperform other indicators, while the key challenges appear to be those of connectivity and isolation.

The next step

The survey has given us a lot to digest. It has supplied us with some practical solutions and innovative approaches to finding other means of benchmarking locations. There is a lot—of both new material and new approaches—for us to think about.

Primarily our aim is certainly to add categories to the EIU surveys that reflect greener aspects of a city as well utilise sources that add value to existing categories. An interactive approach that allows people to weight their own scores can also really augment what we offer.

Submissions commonly used a reduced city set. This is because finding data to enhance the index for all cities in our survey may be hard, or even impossible. We need to consider how we can proxy score cities where there are no available data.

Best cities competition: The winning entry's view

The competition was won by Filippo Lovato, who produced an additional category based on "spatial adjustments". This category incorporates seven new indicators: Green Space, Sprawl, Natural Assets, Cultural Assets, Connectivity, Isolation and Pollution. Methods of gathering data for these indicators ranged from the use of global secondary databases to making qualitative judgments based on web resources such as Google maps. Here Lovato discusses his experience of the competition.

The research

This competition pushed me to look for new ways of observing and measuring cities. My initial thought was that spatial characteristics were an important ingredient in liveability. This was followed by a stimulating research period in which I looked for ways to use existing resources to capture a city's spatial qualities. I also wanted to ensure that the indicators used were comparable across all the cities, especially in cases where satellite imagery was used.

This created a very exciting research experience, in which I developed new indicators and made use of resources that were not considered to be standard sources of data. Although the data collection was not difficult in itself (simply a little time consuming), the main issue was to establish that the methodologies used were sound and that they ensured comparability across cities. Data analysis and design took a lot of time, so the time available for actual data collection was limited. More time to develop the methodologies used and extend them to all cities in the sample would be very useful.

The results

There was no precise expectation for the final ranking. I did think that including characteristics such as urban sprawl and cultural assets would favour European and wealthy Asian cities over North American ones. What is more interesting than the winning city is the geographical distribution of the top quintile of cities, which is composed of eight cities from Western Europe, three from East Asia, and one each from Australia, Canada and the United States. These are cities that perform well on both the original liveability categories and on new the spatial characteristics.

Hong Kong, the winner, is a very compact city that has managed to maintain its natural heritage, create a dense network of green spaces and enjoy extensive links to the rest of the world. It responded very well to the addition of spatial characteristics to the liveability index. However, I was a little surprised to see it reach first place, given that it achieves only rank 13 in the United Nations Development Programme (UNDP)'s Human Development Index. Hong Kong is the winner because I chose to give prominence to spatial characteristics.

Very interestingly, the addition of spatial characteristics to the liveability index did not have a significant impact only at the top of the rankings table. It also made apparent that vast differences exist in the spatial configuration of cities in the developing world. Lima, New Delhi, Tehran and Cairo, for example, were found to have extensive networks of green spaces that far surpassed the averages of their respective regions. Johannesburg, Harare and Dalian have a much more extensive sprawl than the cities that surround them. Spatial characteristics are thus important to determine liveability in cities at all development levels.

Acknowledgements

I would like to acknowledge that my submission draws on the research developed by Guido Robazza and Antoine Paccoud at LSE Cities at the London School of Economics.

Best cities competition: The winning methodology

The Spatially Adjusted Liveability Index

The aim of this submission is to complement the existing EIU Liveability index with an awareness of cities' spatial characteristics. In practical terms, this means proportionately reducing the weight of the five categories of Stability, Healthcare, Culture and Environment, Education and Infrastructure to 75% and adding in a sixth category (spatial characteristics) that carries a weight of 25%. This new category seeks to account for spatial aspects of city life: urban form (sprawl, green space), the geographical situation of the city (natural assets, isolation and connectivity), cultural assets and pollution.

These spatial characteristics were evaluated for 70 out of the 140 cities in the Liveability index because of time and resource availability. The selection of these 70 cities was guided by population size and geographical distribution. The importance of these spatial characteristics stems from their inherently democratic quality: all residents can benefit from the natural assets in the city's vicinity, but all can also suffer from high air pollution. It is because of this indiscriminate effect on all residents that I chose to give spatial characteristics the highest weight of all categories: it is an aspect of city life that can be enjoyed by all and escaped by none.

Spatial characteristics

The methods used to construct the seven indicators in our Spatial Characteristics category are explained below. All sources are given in detail and with a hyperlink in the associated excel. The Spatial Characteristics category is a simple average of these seven indicators:

Green space

The importance of a dense network of green spaces for the quality of urban life is well documented. I used Google Earth satellite imagery and the information available on Open Street Map to evaluate the public green spaces available in the city (parks, squares, gardens but excluding golf

courses) based on three criteria: the distribution of green spaces within the metropolitan region, the number of local green spaces and the number of metropolitan scale green spaces. Cities were given a score from 1 (best) to 5 (worst) on these three criteria. These were then averaged to obtain the Green Space score.

Sprawl

Sprawl, or the excessive spreading out of the urban fabric, has a negative impact on the quality of urban in myriad ways: it decreases accessibility, encourages private car use and makes public transport networks more costly, and degrades the quality of the natural environment around the city. As for the indicator of green spaces, sprawl was assessed according to three criteria using Google Earth satellite imagery and Open Street Map information: an estimated relation between the metropolitan region's surface and its total population, the overall coherence of the metropolitan form and an estimate of the extent of low density urban fabric. Cities were given a score from 1 (best) to 5 (worst) on these three criteria. These were then averaged to obtain the Sprawl score.

Natural assets

Access to nature is a key factor in the quality of urban life. To measure the natural assets available to residents of a city, I averaged the scores obtained through two separate exercises. The first consisted of using Google Earth satellite imagery and information from Open Street Map to assign points to cities based on the natural features available within a radius of 100km from the city centre (sea, river, lake and mountain over 500m). These points were transformed into a score from 1 (best) to 5 (worst). The second exercise consisted in the calculation (using GIS) of the surface of all categories of protected areas (from a database made publically available by the United Nations Environment Programme, or UNEP, and the UNEP's World Conservation Monitoring Centre) in a 75km radius around the city centre. This surface was transformed into a score from 1 (best) to 5 (worst) based on natural breaks within the data series.

Cultural assets

The availability of world-class cultural assets is crucial to liveability. To construct this indicator, I relied on the United Nations Educational, Scientific and Cultural Organisation (UNESCO)'s World Heritage interactive map. For each of the 70 cities evaluated, I counted the number of World Heritage sites within it or in its vicinity. The best score (1) was obtained by cities with a large number of large world-class cultural sites; the worst score (5) was given to cities with no such sites. The number and the importance (measured by surface and fame) of the site were important in determining the final score.

Connectivity

Liveability also depends on how easy it is to reach the rest of the world. I chose to include this indicator because I was not sure what criteria the EIU's Liveability indicator "Quality of regional or international links" was based on. To construct the connectivity indicator, I used the publically available International Civil Aviation Organisation (ICAO) World Air Traffic database to compute two measures of connectivity. The first is the total number of other cities than can be reached by plane from the city

under consideration (given a score from 1 to 5 based on the natural breaks in the data series). The second is the average number of daily flights leaving from that city (also given a score from 1 to 5 based on the natural breaks in the series). These two scores (of reach and intensity) were averaged to obtain the final connectivity score.

Isolation

Isolation negatively affects leisure opportunities and the possibilities of discovering different ways of life. To gain an understanding of the isolation of a particular city, I chose to measure the number of other large cities (over 750,000 inhabitants) in a 200km radius around the city. This decision was taken because of data availability: the UN Population Division's World Urbanisation Prospects (2009 revision) is the only comprehensive and trustworthy database of city populations. Unfortunately, it covers only cities with more than 750,000 inhabitants. This measure of isolation combines two criteria: the number of other large cities in a 200km radius (transformed into a 1 to 5 score using the natural breaks in the data) and the population living in those other large cities (transformed into a score in the same way). These two scores were averaged to obtain final score for this indicator.

Pollution

Pollution is linked to myriad serious health issues and is thus crucial to any measurement of quality of life. I decided to include it in the dataset because I was not sure whether it had already been integrated within the Healthcare category. To measure pollution I used the World Health Organisation (WHO)'s Air Pollution in Cities database and the World Bank's Air Pollution in World Cities database. The indicator selected was the concentration of particulate matter of over 10 micrometres (PM10) in the air. Scores from 1 to 5 were attributed based on the natural breaks in the data.

Best cities competition – BuzzData's view

BuzzData hosted the Economist Intelligence Unit data and provided resources and discussion forums for entrants in the competition. Nick Edouard, EVP Business Development & Marketing at BuzzData, shares his thoughts:

BuzzData ran the entire contest on **BuzzData.com**, the public data hub (or "Hive") that BuzzData operates and on which anyone can share data.

The EIU published the contest's source data files on BuzzData.com and the contest made use of a number of BuzzData hub's features including:

1. BuzzData Datarooms enabled participants to easily communicate the story and information in their submissions, rather than just the files per se, by being able to keep the data files together with the supporting documentation and visualizations.

2. It was always easy to see how the contest was progressing as the Best City Contest Topic homepage (**http://buzzdata.com/topics/best-city-contest**) aggregated the activity across all public Datarooms tagged "Best City Contest". Anyone interested in the contest could "Follow" the Best City Contest Topic (or indeed specific Datarooms or People) to automatically receive relevant activity notifications / updates.

3. Once all the competition entries had been submitted the competition moved to the next stage. Participants reviewed the submissions against their own, commented, applauded and asked questions – and as all of this engagement happened it was recorded in the hub's social stream.

4. Several participants developed applications to allow people to identify which is the best city for them. These applications were typically driven by data hosted on the BuzzData data hub via the API (Application Programming Interface) and some returned a new version of the dataset to BuzzData.com every time someone completed the application.

During the contest, we identified a number of changes that we wanted to make to how data hubs operate, some of which, such as the ability to support multiple data files in a Dataroom, we've already implemented. We're actively working on tools that will help you interrogate, understand, and present information in new ways.

For more information please visit **www.buzzdata.com**

	RANK - Spatial Adjusted Liveability Index	RANK - EIU Liveability index	Change in ranks	Green Space (1=best - 5=worst)	Sprawl (1=best - 5=worst)	Natural Assets (1=best - 5=worst)	Cultural Assets (1=best - 5=worst)	Connectivity (1=best - 5=worst)	Isolation (1=best - 5=worst)	Pollution (1=best - 5=worst)
Hong Kong	1	10	9	1.2	1.0	1.3	4	2.3	1.3	3
Amsterdam	2	8	6	1.7	3.0	1.3	2	1.3	4.3	1.5
Osaka	3	3	0	2.8	2.8	2.7	2	2.3	2.5	2
Paris	4	5	1	1.2	3.2	2.3	3	1.3	3.8	2.5
Sydney	5	2	-3	1.3	4.3	2.0	4	2.3	4.5	1
Stockholm	6	4	-2	2.3	3.2	2.0	2	2.0	5.0	2
Berlin	7	7	0	1.3	4.5	1.7	1	2.5	4.8	2
Toronto	8	1	-7	1.0	4.5	4.0	5	1.8	3.8	1
Munich	9	9	0	1.2	2.5	1.3	4	1.5	5.0	2
Tokyo	10	6	-4	3.3	2.7	3.3	5	1.3	3.0	1.5
Rome	11	18	7	2.3	3.0	1.3	1	1.8	4.8	2
London	12	22	10	1.0	4.0	1.7	2	1.0	4.0	1
Madrid	13	15	2	1.8	2.3	1.7	4	1.8	4.3	2
Washington DC	14	11	-3	1.5	4.7	2.7	5	1.3	3.0	1.5
Chicago	15	12	-3	1.5	4.7	3.3	5	1.0	3.3	1.5
New York	16	23	7	1.3	4.3	2.3	4	1.0	2.3	1.5
Los Angeles	17	17	0	3.2	5.0	2.0	5	1.3	3.0	1.5
San Francisco	18	21	3	2.2	4.7	1.3	5	2.3	3.3	1.5
Boston	19	16	-3	2.0	5.0	2.7	5	2.0	3.8	1.5
Seoul	20	25	5	2.8	2.3	3.7	3	1.8	1.5	3.5
Atlanta	21	12	-9	2.0	5.0	4.0	5	1.0	4.5	1.5
Singapore	22	20	-2	2.2	2.0	4.0	5	2.3	4.5	2
Miami	23	12	-11	3.3	5.0	3.7	5	1.8	4.3	1
Budapest	24	19	-5	3.7	3.8	2.7	2	3.8	5.0	2
Lisbon	25	24	-1	3.0	3.7	3.7	3	3.3	4.8	2
Buenos Aires	26	26	0	2.8	3.3	4.0	4	2.8	3.8	2.5
Moscow	27	30	3	2.7	3.3	3.3	3	1.8	3.8	2
St Petersburg	28	29	1	2.7	2.8	4.0	2	3.5	4.5	2
Athens	29	28	-1	2.7	3.0	2.3	4	2.5	4.8	2.5
Beijing	30	32	2	3.3	2.8	3.7	2	2.0	2.3	4.5
Santiago	31	27	-4	3.7	2.7	3.3	4	3.3	4.3	4
Warsaw	32	31	-1	2.3	3.8	2.7	5	3.3	5.0	2
Shanghai	33	35	2	3.3	3.5	4.0	4	2.3	1.0	4
Shenzhen	34	37	3	2.8	2.7	3.7	4	3.5	1.3	3.5

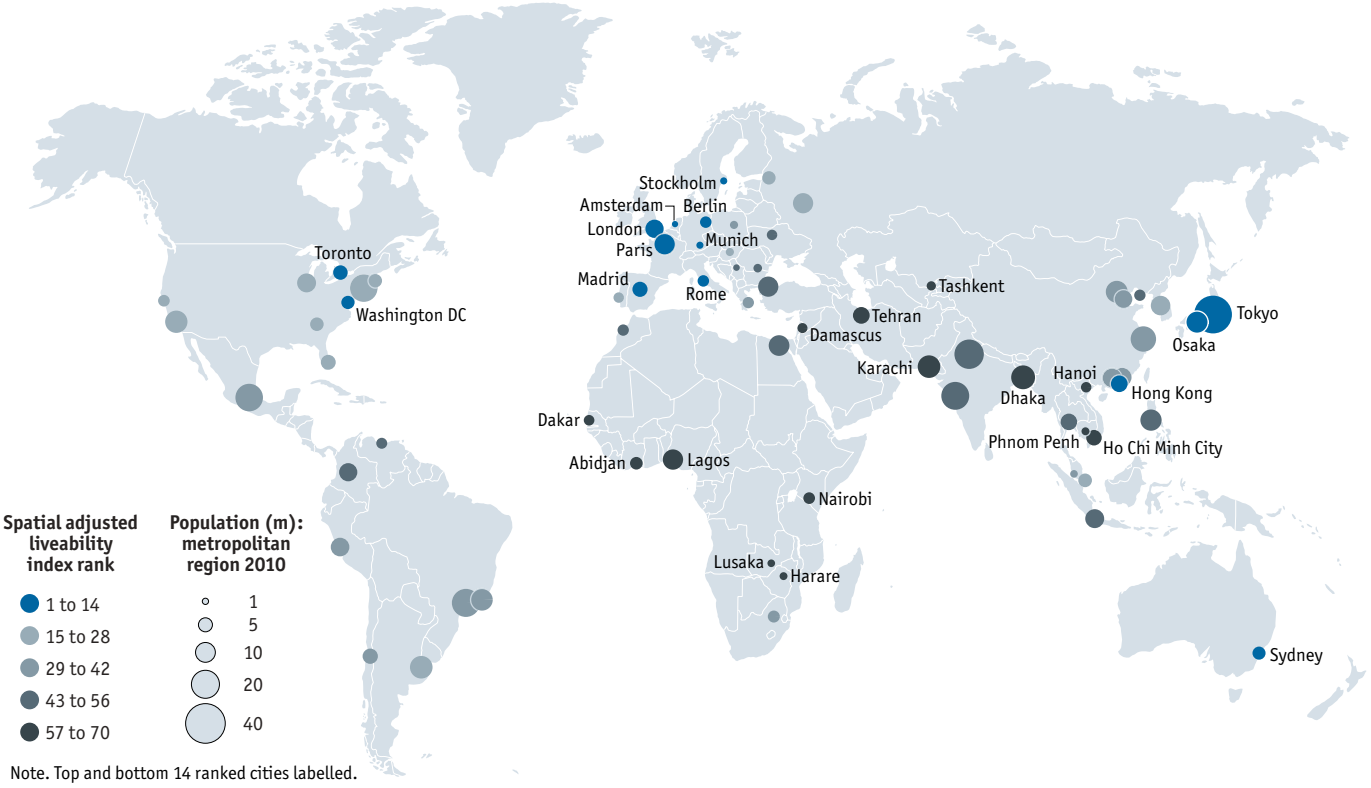
	RANK - Spatial Adjusted Liveability Index	RANK - EIU Liveability index	Change in ranks	Green Space (1=best - 5=worst)	Sprawl (1=best - 5=worst)	Natural Assets (1=best - 5=worst)	Cultural Assets (1=best - 5=worst)	Connectivity (1=best - 5=worst)	Isolation (1=best - 5=worst)	Pollution (1=best - 5=worst)
Lima	35	36	1	1.2	2.7	3.7	2	4.3	4.0	4
Sao Paulo	36	42	6	4.0	2.7	2.7	4	2.3	2.3	2.5
Kuala Lumpur	37	34	-3	3.7	2.7	2.7	5	2.8	5.0	3
Tianjin	38	33	-5	4.7	2.8	4.0	5	4.8	1.5	4.5
Guangzhou	39	40	1	3.7	3.0	3.3	5	2.8	1.3	4
Johannesburg	40	44	4	2.8	4.2	2.7	4	2.8	2.5	3.5
Mexico City	41	48	7	3.8	3.3	1.7	1	2.0	1.8	3
Rio de Janeiro	42	43	1	2.7	3.2	1.3	5	3.3	3.8	3.5
Bucharest	43	38	-5	2.7	4.2	2.7	4	3.8	5.0	3
Kiev	44	41	-3	2.3	4.0	3.3	5	3.3	4.8	3
Belgrade	45	45	0	1.7	3.5	3.0	5	4.3	5.0	2.5
New Delhi	46	52	6	1.8	2.3	3.7	1	3.0	1.8	5
Dalian	47	39	-8	4.5	3.7	3.7	5	4.0	4.8	3.5
Manila	48	47	-1	4.3	2.0	2.0	4	3.0	3.8	3
Bangkok	49	46	-3	4.0	3.7	3.7	4	2.3	4.3	3
Bogota	50	50	0	2.0	1.5	1.3	5	3.0	4.0	4
Istanbul	51	49	-2	3.0	2.2	3.0	4	2.8	3.3	3.5
Mumbai	52	53	1	2.5	1.3	3.3	3	3.0	2.3	5
Casablanca	53	51	-2	3.2	1.8	4.0	4	3.8	4.0	2
Caracas	54	55	1	3.5	2.2	2.0	4	3.0	3.3	2.5
Cairo	55	58	3	2.5	1.3	3.7	2	3.3	3.8	5
Jakarta	56	56	0	3.2	2.7	3.3	5	3.8	2.8	2.5
Hanoi	57	57	0	3.5	1.8	1.7	4	4.8	4.0	4.5
Tashkent	58	54	-4	3.3	3.3	3.3	5	3.8	4.8	4
Damascus	59	59	0	3.8	2.8	4.7	2	4.3	2.8	4.5
Ho Chi Minh City	60	60	0	4.0	2.5	1.7	5	4.3	4.3	3.5
Tehran	61	65	4	1.8	1.2	1.0	5	3.5	3.0	4.5
Nairobi	62	61	-1	2.8	3.5	2.7	5	3.8	4.8	3
Lusaka	63	62	-1	4.8	3.0	1.7	5	5.0	5.0	4
Phnom Penh	64	63	-1	4.3	2.3	3.3	5	4.8	5.0	3.5
Karachi	65	67	2	2.7	1.3	1.7	4	3.8	3.0	5
Dakar	66	64	-2	4.5	2.3	3.3	4	4.8	4.8	5
Abidjan	67	66	-1	4.0	2.8	2.0	5	4.8	4.5	3.5
Dhaka	68	70	2	3.0	1.5	3.0	5	4.5	3.0	5
Lagos	69	68	-1	4.8	2.7	4.0	5	4.5	3.3	4.5
Harare	70	69	-1	4.0	3.8	3.3	5	5.0	5.0	4

	Spatial Characteristics (1=best - 5=worst)	Stability (18.75%)	Healthcare (15%)	Culture and Environment (18.75%)	Education (7.5%)	Infrastructure (15%)	Spatial Characteristics (25%)	Spatial Adjusted Liveability Index
Hong Kong	2.0	95.0	87.5	85.9	100.0	96.4	75.0	87.8
Amsterdam	2.1	80.0	100.0	97.2	91.7	96.4	71.3	87.4
Osaka	2.4	90.0	100.0	93.5	100.0	96.4	64.0	87.4
Paris	2.5	85.0	100.0	97.2	100.0	96.4	63.7	87.1
Sydney	2.8	90.0	100.0	94.4	100.0	100.0	55.7	86.0
Stockholm	2.6	95.0	95.8	91.2	100.0	96.4	58.9	86.0
Berlin	2.5	85.0	100.0	97.2	91.7	96.4	61.7	85.9
Toronto	3.0	100.0	100.0	97.2	100.0	89.3	50.0	85.4
Munich	2.5	85.0	100.0	97.2	91.7	89.3	62.5	85.1
Tokyo	2.9	90.0	100.0	94.4	100.0	92.9	53.3	84.3
Rome	2.3	80.0	87.5	91.7	100.0	92.9	67.3	83.6
London	2.1	70.0	87.5	97.2	100.0	89.3	72.6	83.5
Madrid	2.5	85.0	87.5	94.4	100.0	92.9	61.3	83.5
Washington DC	2.8	80.0	91.7	94.4	100.0	96.4	55.1	82.2
Chicago	2.9	85.0	91.7	91.7	100.0	92.9	52.7	81.5
New York	2.4	70.0	91.7	91.7	100.0	89.3	65.2	81.3
Los Angeles	3.0	80.0	91.7	94.4	100.0	89.3	50.3	79.9
San Francisco	2.9	85.0	91.7	94.4	83.3	85.7	53.0	79.7
Boston	3.1	80.0	91.7	91.7	100.0	96.4	46.7	79.6
Seoul	2.7	80.0	83.3	85.6	100.0	89.3	58.8	79.1
Atlanta	3.3	85.0	91.7	91.7	100.0	92.9	42.9	79.0
Singapore	3.1	95.0	87.5	76.6	83.3	100.0	46.7	78.2
Miami	3.4	85.0	91.7	91.7	100.0	92.9	39.3	78.1
Budapest	3.3	85.0	91.7	90.0	100.0	83.9	43.0	77.4
Lisbon	3.3	80.0	87.5	95.1	91.7	80.4	41.7	75.3
Buenos Aires	3.3	70.0	87.5	85.9	100.0	85.7	42.3	73.3
Moscow	2.8	65.0	79.2	81.5	91.7	83.9	54.2	72.3
St Petersburg	3.1	65.0	87.5	81.5	83.3	80.4	48.2	70.9
Athens	3.1	75.0	83.3	83.1	75.0	75.0	47.3	70.8
Beijing	2.9	80.0	66.7	72.2	83.3	85.7	51.5	70.5
Santiago	3.6	75.0	70.8	89.1	83.3	85.7	35.1	69.3
Warsaw	3.4	80.0	70.8	80.3	75.0	82.1	39.0	68.4
Shanghai	3.2	80.0	62.5	75.0	75.0	75.0	46.1	66.8
Shenzhen	3.1	85.0	62.5	63.7	66.7	82.1	48.5	66.7
Lima	3.1	60.0	66.7	81.7	91.7	75.0	47.3	66.5

	Spatial Characteristics (1=best - 5=worst)	Stability (18.75%)	Healthcare (15%)	Culture and Environment (18.75%)	Education (7.5%)	Infrastructure (15%)	Spatial Characteristics (25%)	Spatial Adjusted Liveability Index
Sao Paulo	2.9	60.0	70.8	80.3	66.7	66.1	52.4	64.9
Kuala Lumpur	3.5	80.0	62.5	67.8	91.7	76.8	36.6	64.6
Tianjin	3.9	90.0	66.7	65.3	66.7	82.1	27.7	63.4
Guangzhou	3.3	80.0	62.5	61.1	66.7	76.8	42.9	63.1
Johannesburg	3.2	50.0	58.3	90.5	83.3	69.6	44.9	63.0
Mexico City	2.4	45.0	66.7	82.4	75.0	46.4	65.8	62.9
Rio de Janeiro	3.2	55.0	66.7	77.5	83.3	71.4	44.0	62.8
Bucharest	3.6	80.0	66.7	74.3	66.7	66.1	34.7	62.5
Kiev	3.7	70.0	75.0	73.4	83.3	50.0	33.3	60.2
Belgrade	3.6	60.0	75.0	73.1	75.0	57.1	36.0	59.4
New Delhi	2.7	55.0	58.3	55.6	75.0	58.9	58.6	58.6
Dalian	4.2	85.0	62.5	62.0	66.7	75.0	21.0	58.4
Manila	3.2	60.0	58.3	63.2	66.7	64.3	46.1	58.0
Bangkok	3.5	50.0	62.5	64.4	100.0	69.6	36.3	57.8
Bogota	3.0	35.0	62.5	75.2	66.7	64.3	50.6	57.3
Istanbul	3.1	55.0	50.0	68.8	58.3	67.9	47.5	57.1
Mumbai	2.9	60.0	54.2	56.3	66.7	51.8	52.1	55.7
Casablanca	3.3	65.0	45.8	60.9	58.3	60.7	43.8	54.9
Caracas	2.9	30.0	41.7	76.6	75.0	60.7	52.1	54.0
Cairo	3.1	55.0	45.8	54.9	58.3	53.6	48.2	51.9
Jakarta	3.3	50.0	45.8	59.3	66.7	57.1	42.3	51.5
Hanoi	3.5	55.0	54.2	53.7	58.3	51.8	38.4	50.2
Tashkent	3.9	50.0	58.3	55.3	75.0	51.8	26.8	48.6
Damascus	3.5	55.0	50.0	54.2	41.7	55.4	36.5	48.5
Ho Chi Minh City	3.6	55.0	50.0	49.5	66.7	48.2	35.1	48.1
Tehran	2.9	50.0	62.5	35.9	50.0	33.9	53.6	47.7
Nairobi	3.6	40.0	45.8	69.9	66.7	42.9	33.9	47.4
Lusaka	4.1	60.0	33.3	59.7	41.7	55.4	23.2	44.7
Phnom Penh	4.0	60.0	37.5	49.3	58.3	53.6	24.1	44.6
Karachi	3.1	20.0	45.8	38.7	66.7	51.8	48.5	42.8
Dakar	4.1	50.0	41.7	59.7	50.0	37.5	22.6	41.9
Abidjan	3.8	25.0	45.8	54.2	50.0	53.6	30.1	41.0
Dhaka	3.6	50.0	29.2	43.3	41.7	26.8	35.7	37.9
Lagos	4.1	25.0	33.3	52.3	33.3	48.2	22.3	34.8
Harare	4.3	30.0	20.8	53.0	66.7	35.7	17.3	33.4

Map 1

Spatially Adjusted Liveability Index



Note. Top and bottom 14 ranked cities labelled.

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