
Cities of Opportunity 7

Results overview



Amsterdam
Beijing
Berlin
Bogotá
Chicago
Dubai
Hong Kong
Jakarta
Johannesburg
Kuala Lumpur
Lagos
London
Los Angeles
Madrid
Mexico City
Milan
Moscow
Mumbai
New York
Paris
Rio de Janeiro
San Francisco
São Paulo
Seoul
Shanghai
Singapore
Stockholm
Sydney
Tokyo
Toronto

This Results Overview provides highlights, fundamental findings and methodology to gain a quick understanding of Cities of Opportunity 7, an analysis of 30 global or regional centers of business, finance and commerce. See www.pwc.com/cities for the full report with more extensive commentary, economic and demographic analysis, spotlights on urban resilience, taxation and public transport as well as modeling tools, interviews with leaders from business, government and universities.

A note on Brexit and London.

London's performance, as that of all our 30 cities, is based on a detailed assessment of data mostly from 2014 and 2015. Right now, the city remains one of the world's most cosmopolitan, and a major financial center with a rich foundation of human capital and flexible tradition to build on. Any effects of Brexit—the UK vote to exit the EU which took place after our assessment closed—would occur in a process that will evolve over time in areas like talent mobility and migration, trade, investment and regulation. In future editions, we will try to gauge the impact, if any.

A walk in the city

Walking in a great city inspires wonder. Passing the Tower of London and crossing the bridge toward our offices on the South Bank of the Thames, you breathe the nature of a modern city. London rises over, amid, and around itself in a marvelous tangle of tradition and change, ambition, and imagination from futuristic, new skyscrapers to other walkers drawn, like you, to the city from all over the world. Other cities in the study are striking in different ways, but each reflects the great scale of modern urban challenges as well as the potential.

Complexity lies at the heart of it all. How does a city work, this system of complex systems—energy, transportation, healthcare, water and recycling, communications, technology, education, safety, governance, food supply, stores, and, ultimately, millions of people of different ages, occupations, and backgrounds? From London to Lagos, San Francisco to Shanghai, Tokyo to Toronto, city life gives us the opportunity to be the best we can be in terms of community, collaboration, and the chance to create common wellbeing. Learning more about how to develop that urban potential, and how to keep all the moving parts meshing smoothly, remains the heart of *Cities of Opportunity*.

In this seventh edition, we continue our approach of making transparent and consistent comparisons to understand urban patterns, based on data predominantly from 2014 and 2015. We've taken a step back to enrich our core research, adding 15 new variables and modifying or deleting another 12. Amsterdam, Bogotá, and Lagos also enter the study. And we focus on three issues critical to the everyday functioning and extreme challenges of urban life. These are the abilities to *withstand disaster and remain resilient* to natural, manmade, and disease risks; to *offer effective public transit* as people and jobs move further from the center of town; and to *knit together a tax system that works* for local needs.

In the results this year, London widens its lead from *Cities of Opportunity* 6 and once more performs at the top of our cities based on data before the UK's June decision to exit the EU. The city is one of the most cosmopolitan in the world, a global hub with a large, flexible economy and rich human capital to keep building its future. If Brexit has effects on London, they will play out in a process over time in areas like talent mobility, trade and regulation. Singapore, the city-state renowned for its planned development, comes in second. Toronto, a city of quiet civility, finishes third. At fourth, Paris demonstrates that one benefit of a great city can be the resilience its systems confer. In the case of the City of Light, resilience is shown as Paris scores as high as it did in 2012 after nearly a decade of European financial pressure and dark intervals of manmade terror. Four hundred years after the Dutch founded New Amsterdam, the old world city has overtaken the new as Amsterdam, entering the study in this edition, finishes in fifth place over New York in sixth. Stockholm and San Francisco, two of our smallest cities, finish seventh and

eighth, respectively. And from Asia and the Pacific, Hong Kong and Sydney round out the top 10, in that order.

Looking deeper into the relationships within our data, the study sustains our hypothesis that a city requires balanced social and economic strengths to work as a whole. Despite the fact that all our cities represent business centers, engines of the global or regional economies, the strongest relationships with overall success appear in areas like quality of living, senior wellbeing, housing, and disaster preparedness. Put differently, effectively dealing with human needs, both everyday and extraordinary ones, remains the essence of city success.

As in every edition, we speak with leaders of urban thought and action to deepen insight. *Jacob Wallenberg*, chairman of Investor AB, the Stockholm industrial holding company distinguished by its focus on long-term value and public-private collaboration, reflects on the qualities needed to attract talent and build healthy urban economies. *Carlo Ratti*, director of MIT's Senseable City Lab, defines what "smart cities" really mean. A *Tokyo transportation panel* details how a highly urbanized nation, beset by earthquakes and demographically challenged by an aging population, makes public transit work effectively, safely, and profitably. From Toronto, *Bruce McCuaig*, president and CEO of Metrolinx, discusses the challenges of keeping up with transit needs in a fast-growing city.

We speak with two front-line leaders in the fight to increase urban disaster preparedness. *Margareta Wahlström*, former special representative of the UN Secretary-General for disaster risk reduction, discusses tools to assess risk, raise awareness, and limit damage to people and property. *Henk Ovink* provides his experienced view as the Netherlands' special envoy for international water affairs. For a look at cutting-edge culture and its role in a downtown renaissance, we visit the *Brooklyn Academy of Music*. Rounding out the urban picture, *the governor of Jakarta, Basuki Tjahaja Purnama*, discusses the challenge of steering the burgeoning Asian megacity into a well-managed future.

At a time when cities drive world growth socially and economically, the ability to understand them is ever more important. That requires a wide range of credible and transparent data and a robust and realistic picture of city life. The goal of our report is to create that image for a few bellwether cities so lessons can be applied more broadly. We hope you benefit from the effort.

Sincerely,



Tim Ryan
US Chairman and Senior Partner PricewaterhouseCoopers LLP

Approach

We refined and enriched our data, focused on resilience, transit, and tax but held to principals of transparency, simplicity, and balance

True to our purpose—and what, after seven editions, can fairly be called our established practice—of continually updating and improving our data and enriching our methodology, *Cities of Opportunity 7* is not a simple replication of *Cities of Opportunity 6*. There are changes not only in the details but in the broader arc of our analyses.

While our underlying approach of transparency, simplicity, consistency, and balance remains the same, *Cities of Opportunity* has never adhered to a fixed or inalterable process, predictable from edition to edition. We continually upgrade and enhance the research. In each edition, we try to develop the most comprehensive quantitative view of urban reality that we can in order to shed further light on the tools needed, and the directions to be taken, to support and sustain urban development.

In this year's edition, we bolstered both the depth and breadth of our core data variables (with details on refinements presented in the 10 indicator discussions). Separately, we also incorporated several new perspectives on our cities. These include a look at their economic and demographic profiles, as well as correlation analyses within the data to see which qualities are the strongest markers of overall urban success.

We took a step back in a few areas of the core data, which predominantly reflects 2014 and 2015 performance, to home in on particular issues of urban importance: disaster preparedness, taxation, and metropolitan transit. In the first two cases, we added data variables to create a more complete view, and we discuss the findings as a subtext of the main results. In the last instance, we gathered intracity mobility data into one grouping to develop a street-level picture.

- ***Urban resilience is an area that today demands critical attention across a wide front.*** Our variables begin with exposure to the wind, water, and earthquakes of natural disaster, measured by economic and human effect rather than the likelihood of occurrence, as we've done in the past. We add a separate measure of the risk of manmade threats and pandemics (including cyber attack, market crash, nuclear accident, oil price shock, sovereign default, terrorism, power outage, human pandemic, and plant pandemic). Then, with the help of PwC's actuarial and forensics practice members who also developed our natural disaster exposure variable, we factor in each city's natural disaster preparedness,

accounting for active strategies and their implementation, and the robustness of municipal systems such as transport and health. All in all, we now present a fuller view of risk and preparedness than in past years.

- ***The tax picture builds from the corporate total tax rate*** included in previous reports. This time, we also engaged the PwC team that collaborates with the World Bank Group to produce the *Paying Taxes* report. It added personal tax and tax efficiency to our evaluation in order to reflect the tax assessment on citizens and provide a broad sense of wider systems and process effectiveness.
- ***To better reflect the reality of public transport***, we realigned and refined our mix of data to complement our perspective on system engineering and efficiency. We moved two variables, traffic congestion and ease of commute, to the transportation and infrastructure indicator to capture the reality of city life as experienced on the ground. And what was straightforward “cost of public transport” in our previous editions has now been adjusted to reflect affordability of public transport. We also removed a variable measuring the efficiency, reliability and safety of public transport systems to avoid overweighting the issue with the factors included in other measures such as mass transit coverage. In addition, we've revised the major construction activity variable, which is now derived from three equally weighted measures: number of buildings planned or under construction; number of properties sold; and construction employment.
- ***We also include cross-cutting analysis of the economic and demographic factors*** at work in our cities, and we look at relationship patterns within the data themselves, to enrich perspective on our cities and their signposts.

The basic study itself, however, remains essentially the same, although the devil is always in the details. So it is important to outline the report's bases, which are the three criteria that fundamentally govern our choice of cities and have never changed from report to report. These are:

Capital market centers. While many of our cities are hubs of commerce, communications, and culture, *all* of them are financial centers in their respective regions. What this means in practice is that while each might play an important role locally, they all are

also—and, for our purposes, even more significantly—vital links of a *global* economic network.

Broad geographic sampling. This second criterion is very closely related to the first. Functionally, in other words, although each of our cities is a center of finance and commerce regionally, they *collectively* form a representative international distribution.

Mature and emerging economies. Finally, it is critically important that just as there is broad geographic balance, there must also be an equilibrium between mature and emerging urban economies. 16 mature cities and 14 emerging ones are included this year, with three new cities—Amsterdam, Bogotá, and Lagos—replacing three cities from our previous report. Of course, distinctions between “developed” and “developing” economies—let alone societies—are often purely statistical. They certainly have no meaningful explanatory purpose other than as shorthand to indicate certain “benchmarks” reached, such as high income, low crime, good healthcare, or clean air, just to give four random examples. In the event, given the extremely rapid pace of urban evolution in the contemporary world—which is actually historically unprecedented—we utilize these distinctions carefully and warily.

With a total of 30 cities, as in our last report, our sample size remains compact, and flexible, enough to permit a study, and a series of analyses, that is broad but detailed. It is also comprehensive enough (in geographic breadth, magnitudes of population, and gross domestic product (GDP) to be fully representative of global realities.

With 67 variables constituting our 10 indicator groups this year, we’ve added 15 new variables to our report, increasing the number from 59 in *Cities of Opportunity* 6. Moreover, 12 variables have been deleted or modified.

As *Cities of Opportunity* is based on publicly available information supported by extensive research, three main sources are used to collect the relevant data:

Global multilateral development organizations, such as the World Bank and the International Monetary Fund, **national statistics organizations**, such as UK National Statistics and the US Census Bureau, and **commercial data providers**. The data were collected between the second and fourth quarters of 2015. In the majority of cases, the data in the study refer to 2014 and 2015.

In some cases, national data are used as a proxy for city data. Use of national data tends to disadvantage the 30 cities in our study, all of which are either national or regional capitals of finance and business that tend to outperform national averages in measures of socioeconomic advancement. This effect might be more pronounced in developing economies and in those with larger rural populations. Nonetheless, because consistent comparisons across all cities are critical to maintain objectivity, country-level data are used when other consistent, highly reliable sources of publicly available data are not available for all 30 cities (as with math/science skills attainment, for example).

Our scoring methodology has been developed to ensure transparency and simplicity for readers, as well as comparability across cities. The output makes for a robust set of results and a strong foundation for analysis and discussion.

In attempting to score cities based on relative performance, we decided at the outset of our process, when we first initiated this study in 2007, that maximum transparency and simplicity required that we avoid overly complicated weightings of variables. Consequently, each one of the 67 in this report is treated with equal importance and, thus, weighted equally. This approach makes the study easy to understand and use by business leaders, public policymakers, academics, and laypersons alike.

Taking the data for each variable, the 30 cities are sorted from the best performing to the worst. They are then assigned a score from 30 (best performing) to 1 (worst performing). In the case of a tie, they are given the same score.

Once all 67 variables are ranked and scored, they are placed into their 10 indicators (for example, intellectual capital and innovation or ease of doing business). Within each group, the variable scores are then summed to produce an overall score for that indicator. This produces 10 indicator league tables that display the relative performance of our 30 cities. The overall table is the sum of performance in all 67 variables.

Highlights

Benchmarking and correlations offer a message on the shape of cities now and potentially to come.



Toronto

Here we sketch some highlights of *Cities of Opportunity 7* results benchmarking as well as how our 10 indicators, 67 variables, and different economic and demographic signposts correlate with successful cities. All data reflect *Cities of Opportunity* jurisdictional boundaries and are derived from local sources or deduced from national ones, based predominantly on 2014 and 2015 results. See www.pwc.com/cities for the full report with more extensive commentary, economic and demographic analysis, spotlights on urban resilience, taxation and public transport as well as interviews with leaders from business, government and universities.

Results show what works

Balance works best in today's complex urban ecosystems. Education, transit, health, economics, and governance all have to line up for a city to lead. London proves this again as its balanced strengths create distance from advanced cities like New York, Paris, Toronto, and Singapore. Further, eight cities make the top 3 in two or more indicators—London, Toronto, Singapore, Paris, New York, Sydney, Stockholm and Beijing. This confirms cities need a good combination of social and economic strengths to succeed.

The good life is not a luxury. It's a basic requirement for cities and businesses to get and keep talent. Our quality of living variable shows the strongest relationship with overall success in the study, as well as with 10 other telltales of urban wellbeing.

A great city delivers on its responsibility to shared good. Senior wellbeing, housing, relocation attractiveness, workforce management risk, and natural disaster preparedness all relate strongly with overall score and top performance in a wide range of healthy measures. In other words, cities need to support real human needs to work as balanced ecosystems; a civilized society handles the tests and provides broadly.

The core of the modern city economy is intellectual work. Finance and business services contribute almost half to GDP growth of our cities from 2010 to 2015. And that doesn't count intellectual work in healthcare, life sciences, technology, communications, and other sectors. City people and business need good education to prosper.

Greater systemic resilience is one of the dividends of broad and strong foundations. A good example is offered by the top 10 cities across intellectual capital and innovation, technology readiness, and city gateway (collectively, our Tools for a Changing World). Paris and Amsterdam make the top 10 list in this grouping after almost a decade of financial turmoil in Europe. Tokyo remains in the top 10 after Japan's "lost two decades" of stagnation. Neither Rome, nor any of our top cities, were or will be built in a day. But the work is worth it.

A dependable workforce offers one key to city leadership. Low workforce management risk relates strongly with a range of healthy traits including high city productivity; ease of doing business; intellectual capital; technology readiness; health, safety, and security; and overall score. Clearly, a city that takes care of business on the office and shop floor has a better chance of success.

Taxes add another ingredient in the local recipe to consider, and the tax system in our three top cities, London, Singapore, and Toronto compare well. An analysis of corporate total tax rate, personal rate, and tax efficiency shows Dubai, Hong Kong, and Singapore have the lowest rates and highest efficiency collectively. But Toronto and London are not far behind. However, it's hard to take taxes out of the context in which they are paid in terms of economic, political, social, demographic, and environmental ecosystems and the needs of cities, their businesses, and citizens.



But findings also spotlight challenges

Achieving and sustaining resilience presents a major test for the urban world over a wide range of modern risks. Disaster preparedness must be intensified. If there is good news, it is that the most vulnerable cities can be the best prepared. Earthquake-prone Tokyo and flood-threatened Amsterdam display strong ability to manage risk. Beyond climate change, potential pandemics and manmade threats like cyber attack, market meltdown, and terrorism, all demand that cities heighten awareness, strategic and technological acumen, good governance, adaptability, and, perhaps most important, the commitment of institutions and the community to work together as one unit.

Disaster exposure is enormous in financial and human terms. Powerful cities like New York, Beijing, San Francisco, Paris, Los Angeles, Shanghai, and São Paulo fall in the middle or lower ranks of our triple measure of urban resilience—natural disaster exposure, natural disaster preparedness, and security and disease risk. All are significant world centers of economics, communications, technology, and population where major disaster can cripple the city and send ripples far beyond.

Lack of affordable housing could hold back cities. While housing quality exhibits a strong relationship with success, cities with the greatest economic strength today often have housing that is priced out of reach. Five of our top 10 cities in economic clout fall at midpoint or lower in rent affordability (London, New York, San Francisco, Beijing, and Shanghai). This foreshadows difficulty in talent attraction, retention, and, ultimately, cities possessing critical, hands-on skills they need.

Income distribution presents an issue for cities to be aware of and manage in terms of social and political impact and the ability to build and sustain resilient economies that include the wide range of occupations and salary levels that make cities run. While average, absolute income and number of middle-class households are projected to rise across our cities, they also show widely differing income distributions. For instance, US cities are among the top 10 with household income distributions earning less than 50% of median income.

Aging, slowing birth rates, and migration will realign public and private demands. Both the public and private sectors benefit if the city's quality of life attracts the talent needed to build the future.



All in all...

Cities are the future. They are not only where people are moving but where young people are moving. The healthiest cities are likely to win the global competition for talent and growth.

...But they also face demographic tests. Aging, slowing birth rates, and migration will realign public and private demands.

Almost half of the increase in our cities' population by 2030 will be in those over 65 years old. Demographics challenge the growth and the finances of many cities with increasing pension, healthcare, and other service costs. Businesses gain opportunities to develop new services and products to respond to the changing pattern. Both the public and private sectors benefit if the city's quality of life attracts the talent needed to build the future.

Leading cities put together concerted strategies to understand their own strengths, weaknesses, and identities and then orchestrate growth to suit their own profile. Because cities are complex systems of systems—economic, demographic, technological, infrastructural, governance, social, and cultural—leadership will build from local identity, not formulas.

Businesses depend on city wellbeing and governments on healthy economies for shared success. They need to work together actively to help shape operating environments in a world where a continued urban renaissance is not guaranteed. The market will not necessarily resolve all issues cities face. Economic pictures can change fast. And governments often face tight resources. Successful cities align the private and public sectors into a potent force for shared prosperity.

Build it for humans, and they will come:

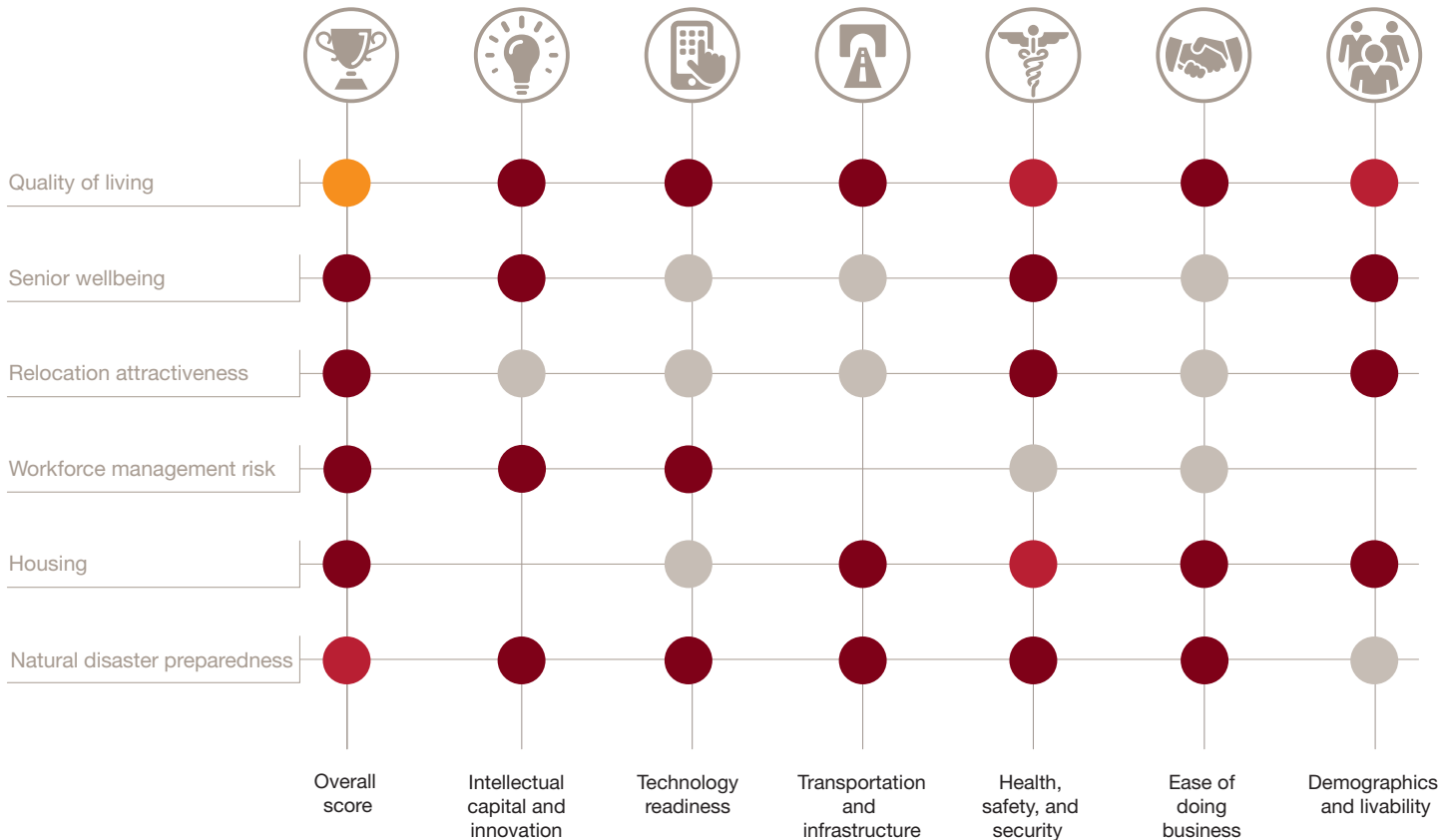
Quality of life factors jump out in relation to urban success

Cities of Opportunity grows from the hypothesis that a balance of social and economic strengths is needed to create a virtuous circle of urban wellbeing, with tangible and intangible qualities reinforcing each other and driving healthy momentum. Or, as Jane Jacobs said, simply, in closing *The Death and Life of Great American Cities*, “Lively, diverse, intense cities contain the seeds of their own regeneration, with energy enough to carry over for problems and needs outside themselves.”¹ We see this to an extraordinary, and even surprising, degree when we correlate the 67 variables, 10 indicator categories, and other economic and demographic qualities among themselves.

Fulfilling human needs jumps out of our study as the cornerstone of success in city life. Quality of living and senior wellbeing show striking relationships with excellent urban performance as reflected by 12 key measures, including overall score, six indicator categories, and five variables. Quality of living correlates at over 90% to 60% with all 11 key measures possible, posting a 91% correlation with success in the study. Senior wellbeing—essentially, how effectively older residents are woven into the community fabric—also exceeds 60% in strength of correlations 11 times. City relocation attractiveness correlates strongly with 11 key measures. Workforce management risk does so in 10 instances. And the availability, diversity, cost, and quality of housing, as well as natural disaster preparedness, a new variable this year, show a strong correlation 9 times.

The heart of the city beats with a rhythm we all understand

Six variables correlate* very strongly with the right stuff for urban wellbeing



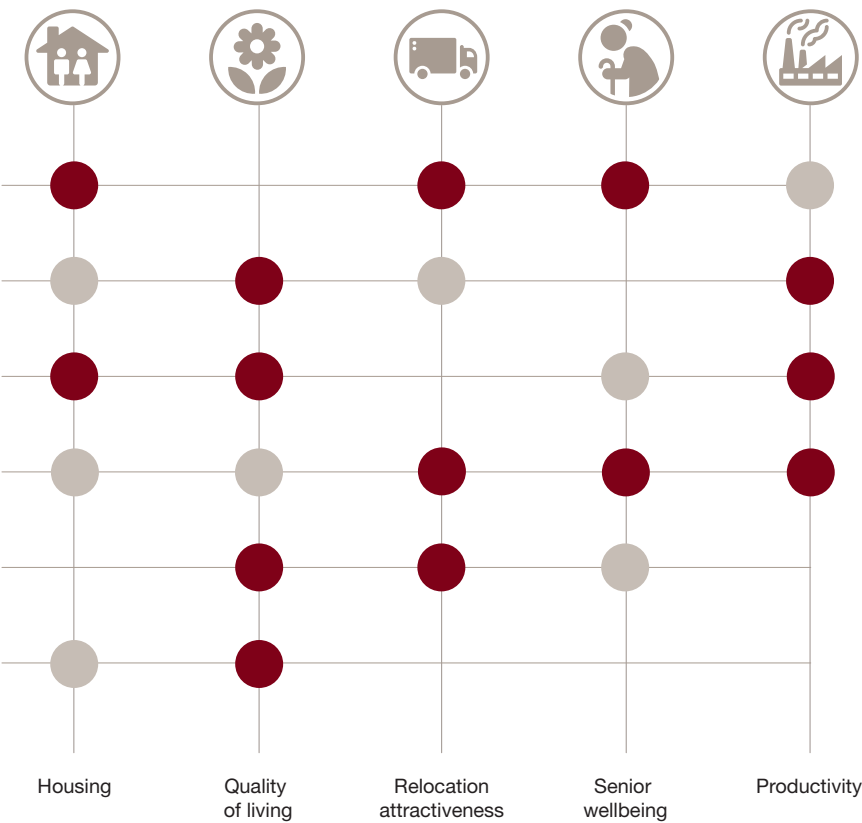
Source: PwC Cities of Opportunity 7, UUEPC

A range of messages can be drawn from the pattern. But most important, a well-functioning city delivers on its responsibility to shared wellbeing. The community stands resilient in the face of disaster and values older citizens and their needs. The city is a good place to live and hire workers. People want to move there.

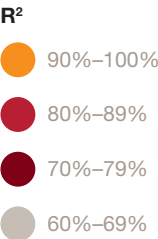
Considering our study focuses on cities that are global and regional capitals of business, finance, and commerce—the engines of the world economy—these relationships can appear eye-opening. But on an intuitive level, it makes sense that the true sign of a civilized city is how it cares for the weak, prepares for the worst, and deals with the necessities of everyday life. As Jane Jacobs wrote, “We human beings are the only city building

creatures in the world...Cities are in a sense natural ecosystems for us...The humble, vital services performed by grace of good city streets and neighborhoods are probably as good a starting point as any”² to understand city ecology. The data say she’s right.

1 Jane Jacobs, *The Death and Life of Great American Cities*, 1961; 1993 Modern Library Edition, page 585.
2 Ibid., *The Death and Life of Great American Cities*, Foreword to the Modern Library Edition, page xvii.



* A strong relationship refers to a statistically significant one measured as the coefficient of determination (R^2). The coefficient of determination measures the strength of the relationship between two variables and lies between 0–100% with a higher value representing a stronger relationship. Correlations reveal associations between two series of data and not causality. Put simply, R^2 represents the strength of the relationship between the two variables—the bigger the percent, the stronger the relationship.



Rankings at a glance

Overall results

The following pages present tabular results for the overall rankings and the 10 indicator categories into which *Cities of Opportunity* research is organized. The *Key to the variables* at the end provides sources and definitions to aid understanding. See the full report at www.pwc.com/cities for a more thorough analysis of the study with additional economic and demographic elements as well as interviews and spotlights on urban resilience, taxation and public transit.

	Intellectual capital and innovation	Technology readiness	City gateway	Transportation and infrastructure	Health, safety, and security	Sustainability and the natural environment
30 London	184	142	187	130	133	115
29 Singapore	136	167	146	174	136	95
28 Toronto	166	121	99	126	150	151
27 Paris	168	121	169	130	125	143
26 Amsterdam	166	140	146	117	134	145
25 New York	158	140	142	133	111	106
24 Stockholm	146	139	84	152	137	168
23 San Francisco	171	126	96	141	121	136
22 Hong Kong	131	129	159	122	122	100
21 Sydney	147	100	97	129	140	168
20 Seoul	136	115	136	122	117	151
19 Berlin	131	83	108	142	137	143
18 Chicago	146	104	110	139	111	124
18 Los Angeles	151	118	95	103	114	111
16 Tokyo	149	123	153	106	153	108
15 Madrid	79	88	141	127	127	131
14 Dubai	94	91	160	153	93	54
13 Milan	87	76	84	115	116	132
12 Beijing	108	95	164	86	55	89
11 Kuala Lumpur	65	67	128	110	42	67
10 Shanghai	92	92	149	89	64	89
9 Moscow	96	93	116	92	42	120
8 Mexico City	68	41	64	90	74	91
7 Johannesburg	51	35	82	75	58	99
6 São Paulo	43	62	67	78	43	91
5 Bogotá	68	61	30	75	39	84
4 Rio de Janeiro	40	37	52	95	43	100
3 Jakarta	41	42	61	59	42	49
2 Mumbai	43	47	43	64	40	59
1 Lagos	26	13	15	11	11	60

Demographics and livability	Economic clout	Ease of doing business	Cost	Score
162	152	194	67	1,466
108	107	209	99	1,377
147	98	182	126	1,366
165	110	163	66	1,360
151	101	143	91	1,334
165	142	158	69	1,324
133	101	173	83	1,316
157	126	144	84	1,302
129	98	205	95	1,290
122	116	135	91	1,245
119	88	156	98	1,238
146	70	146	124	1,230
133	82	147	116	1,212
158	84	153	125	1,212
122	91	134	70	1,209
120	119	130	113	1,175
107	98	105	119	1,074
83	91	114	77	975
88	135	85	51	956
67	98	151	119	914
89	111	65	61	901
95	76	90	66	886
112	80	104	87	811
62	74	110	139	785
71	56	77	100	688
65	54	99	107	682
91	45	76	80	659
43	77	56	103	573
50	81	58	83	568
9	64	23	84	316

Each city's score (here 1,466 to 316) is the sum of its rankings across variables. The city order from highest rank in each indicator 30 to 1 is based on these scores.

High

Medium

Low





























































Highest rank in each indicator

Intellectual capital and innovation

Great cities are major intellectual centers, year in and year out

	Libraries with public access	Math/science skills attainment*	Percent of population with higher education	World university rankings	Innovation Cities Index
30 London	29	20	27	30	28
29 San Francisco	25	16	30	21	30
28 Paris	30	19	21	27	27
27 Amsterdam	24	24	29	14	26
27 Toronto	23	23	24	20	25
25 New York	21	16	22	22	29
24 Los Angeles	17	16	18	28	22
23 Tokyo	22	26	15	23	21
22 Sydney	20	21	14	25	19
21 Chicago	19	16	23	24	17
21 Stockholm	26	11	25	19	20
19 Seoul	12	27	20	29	24
19 Singapore	7	29	17	16	16
17 Berlin	18	22	16	17	23
17 Hong Kong	11	28	7	26	18
15 Beijing	3	25	26	18	13
14 Moscow	27	12	28	11	11
13 Dubai	5	10	19	6	15
12 Shanghai	2	30	10	13	14
11 Milan	14	17	12	15	12
10 Madrid	13	18	4	12	9
9 Bogotá	15	6	13	9	4
9 Mexico City	28	5	11	6	5
7 Kuala Lumpur	8	8	9	6	8
6 Johannesburg	16	1	1	8	2
5 Mumbai	1	9	3	7	10
5 São Paulo	10	4	6	10	7
3 Jakarta	6	2	5	6	3
2 Rio de Janeiro	9	4	8	6	6
1 Lagos	4	8	2	6	1

Commentary is available in the full *Cities of Opportunity 7* report at www.pwc.com/cities.

Intellectual property protection*	Entrepreneurial environment*	Score
 28	 22	184
 20	 29	171
 24	 20	168
 26	 23	166
 25	 26	166
 20	 28	158
 20	 30	151
 29	 13	149
 23	 25	147
 20	 27	146
 21	 24	146
 9	 15	136
 30	 21	136
 16	 19	131
 27	 14	131
 12	 11	108
 2	 5	96
 22	 17	94
 12	 11	92
 8	 9	87
 7	 16	79
 3	 18	68
 6	 7	68
 14	 12	65
 15	 8	51
 10	 3	43
 5	 1	43
 13	 6	41
 5	 2	40
 1	 4	26

Each city's score (here 184 to 26) is the sum of its rankings across variables. The city order from 30 to 1 is based on these scores.

- High
- Medium
- Low
- Highest rank in each indicator































* Country-level data

Technology readiness

An extensively revised indicator confirms past performance of most top 10 cities

	Internet access in schools*	Broadband quality score	Mobile broadband speed	ICT usage [†]	Software development and multimedia design
30 Singapore	29	29	30	27	23
29 London	28	19	18	30	28
28 Amsterdam	30	21	29	28	14
28 New York	23	23	17	25	24
26 Stockholm	27	25	21	29	12
25 Hong Kong	19	30	16	22	15
24 San Francisco	23	20	15	24	20
23 Tokyo	16	26	9	12	30
22 Paris	9	27	27	24	22
22 Toronto	26	17	22	27	8
20 Los Angeles	23	22	14	22	11
19 Seoul	25	28	11	19	29
18 Chicago	23	18	13	22	6
17 Sydney	24	10	28	17	1
16 Beijing	15	13	25	6	26
15 Moscow	13	24	12	13	27
14 Shanghai	15	14	24	5	25
13 Dubai	18	9	26	11	4
12 Madrid	10	16	20	16	13
11 Berlin	12	12	19	19	10
10 Milan	6	11	23	15	5
9 Kuala Lumpur	17	6	4	15	19
8 São Paulo	4	15	7	10	18
7 Bogotá	8	2	10	10	16
6 Mumbai	7	4	1	1	17
5 Jakarta	11	3	3	2	21
4 Mexico City	5	7	5	3	7
3 Rio de Janeiro	4	8	6	10	2
2 Johannesburg	1	5	8	7	9
1 Lagos	2	1	2	4	3

Commentary is available in the full *Cities of Opportunity 7* report at www.pwc.com/cities.

Digital security ²	Score
 29	167
 19	142
 18	140
 28	140
 25	139
 27	129
 24	126
 30	123
 12	121
 21	121
 26	118
 3	115
 22	104
 20	100
 10	95
 4	93
 9	92
 23	91
 13	88
 11	83
 16	76
 6	67
 8	62
 15	61
 17	47
 2	42
 14	41
 7	37
 5	35
 1	13

Each city's score (here 167 to 13) is the sum of its rankings across variables. The city order from 30 to 1 is based on these scores.

-  High
-  Medium
-  Low

 Highest rank in each indicator

* Country-level data





























































1. Sourced from Ericsson's Networked Society City Index 2014, the ICT usage score is based on three elements: technology use, individual use, and public and market use.
2. The Economist Intelligence Unit's Safe Cities Index measures a city's digital security based on factors such as dedicated cyber security teams (input) and the frequency of identity theft (output).

City gateway

London continues to lead as the world's hub

	Hotel rooms	International tourists	International association meetings ¹	Incoming/outgoing passenger flows	Airport to CBD access
30 London	28	29	27	30	17
29 Paris	24	27	29	27	19
28 Beijing	30	13	23	24	29
27 Dubai	27	26	14	21	30
26 Hong Kong	23	30	24	19	22
25 Tokyo	25	20	21	28	12
24 Shanghai	22	22	17	25	22
23 Amsterdam	7	19	25	16	28
23 Singapore	20	28	26	15	12
21 New York	29	25	10	29	10
20 Madrid	21	12	30	13	26
19 Seoul	9	23	22	20	15
18 Kuala Lumpur	18	24	18	14	20
17 Moscow	16	17	7	23	10
16 Chicago	15	4	8	26	24
15 Berlin	19	15	28	7	8
14 Toronto	14	9	16	11	16
13 Sydney	6	8	19	10	26
12 San Francisco	12	10	6	18	24
11 Los Angeles	26	18	3	22	6
10 Milan	8	21	12	6	14
10 Stockholm	5	11	20	4	19
8 Johannesburg	1	16	5	3	27
7 São Paulo	18	3	13	12	4
6 Mexico City	10	7	11	9	13
5 Jakarta	11	6	4	17	7
4 Rio de Janeiro	13	5	15	5	5
3 Mumbai	4	14	2	8	3
2 Bogotá	3	1	9	2	2
1 Lagos	2	2	1	1	1

Commentary is available in the full *Cities of Opportunity 7* report at www.pwc.com/cities.

World Top 100 airports	Airport connectivity ²	Score
 26	 30	187
 15	 28	169
 24	 21	164
 17	 25	160
 28	 13	159
 27	 20	153
 19	 22	149
 25	 26	146
 30	 15	146
 12	 27	142
 20	 19	141
 29	 18	136
 23	 11	128
 14	 29	116
 10	 23	110
 7	 24	108
 16	 17	99
 22	 6	97
 18	 8	96
 8	 12	95
 7	 16	84
 11	 14	84
 21	 9	82
 7	 10	67
 7	 7	64
 13	 3	61
 7	 2	52
 7	 5	43
 9	 4	30
 7	 1	15

Each city's score (here 187 to 15) is the sum of its rankings across variables. The city order from 30 to 1 is based on these scores.

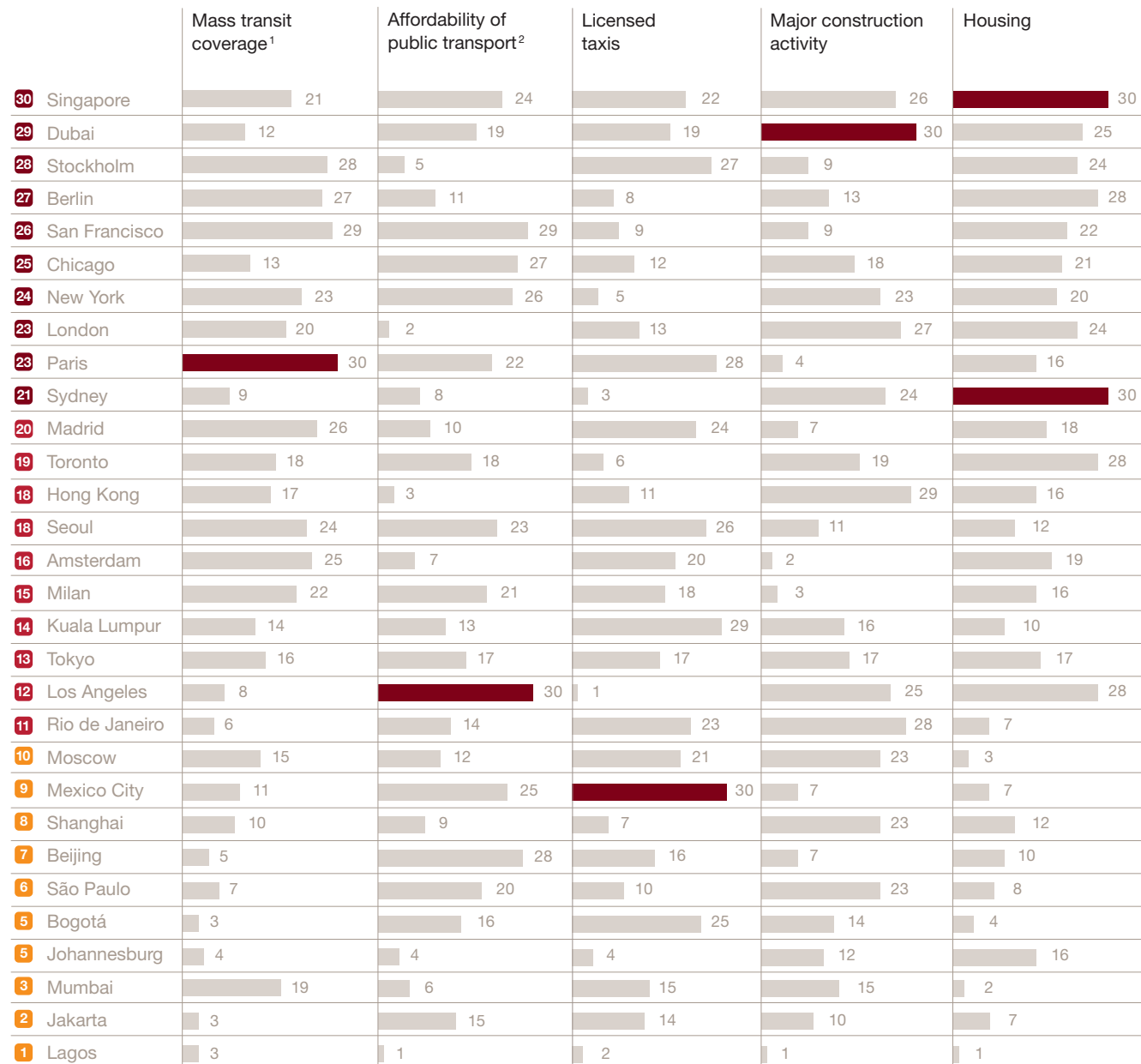
 High
 Medium
 Low

 Highest rank in each indicator





























































1. A measure combining both the number of international association meetings per city in 2014 and the compound annual growth rate (CAGR) from 2009-2014. The meetings measured take place on a regular basis and rotate between a minimum of three countries. Figures provided by the International Congress and Convention Association.
2. A measure of the number of routes operating from the airports servicing a city, with greater weight given to international destinations.

Transportation and infrastructure

Urban mobility data alters top rankings, but Singapore retains the fast lane



Commentary is available in the full *Cities of Opportunity 7* report at www.pwc.com/cities.

Traffic congestion	Ease of commute ³	Score
 30	 21	174
 25	 23	153
 29	 30	152
 26	 29	142
 15	 28	141
 22	 26	139
 14	 22	133
 24	 20	130
 17	 13	130
 28	 27	129
 23	 19	127
 19	 18	126
 21	 25	122
 10	 16	122
 20	 24	117
 18	 17	115
 16	 12	110
 12	 10	106
 7	 4	103
 11	 6	95
 4	 14	92
 1	 9	90
 13	 15	89
 9	 11	86
 3	 7	78
 8	 5	75
 27	 8	75
 5	 2	64
 7	 3	59
 2	 1	11

Each city's score (here 174 to 11) is the sum of its rankings across variables. The city order from 30 to 1 is based on these scores.

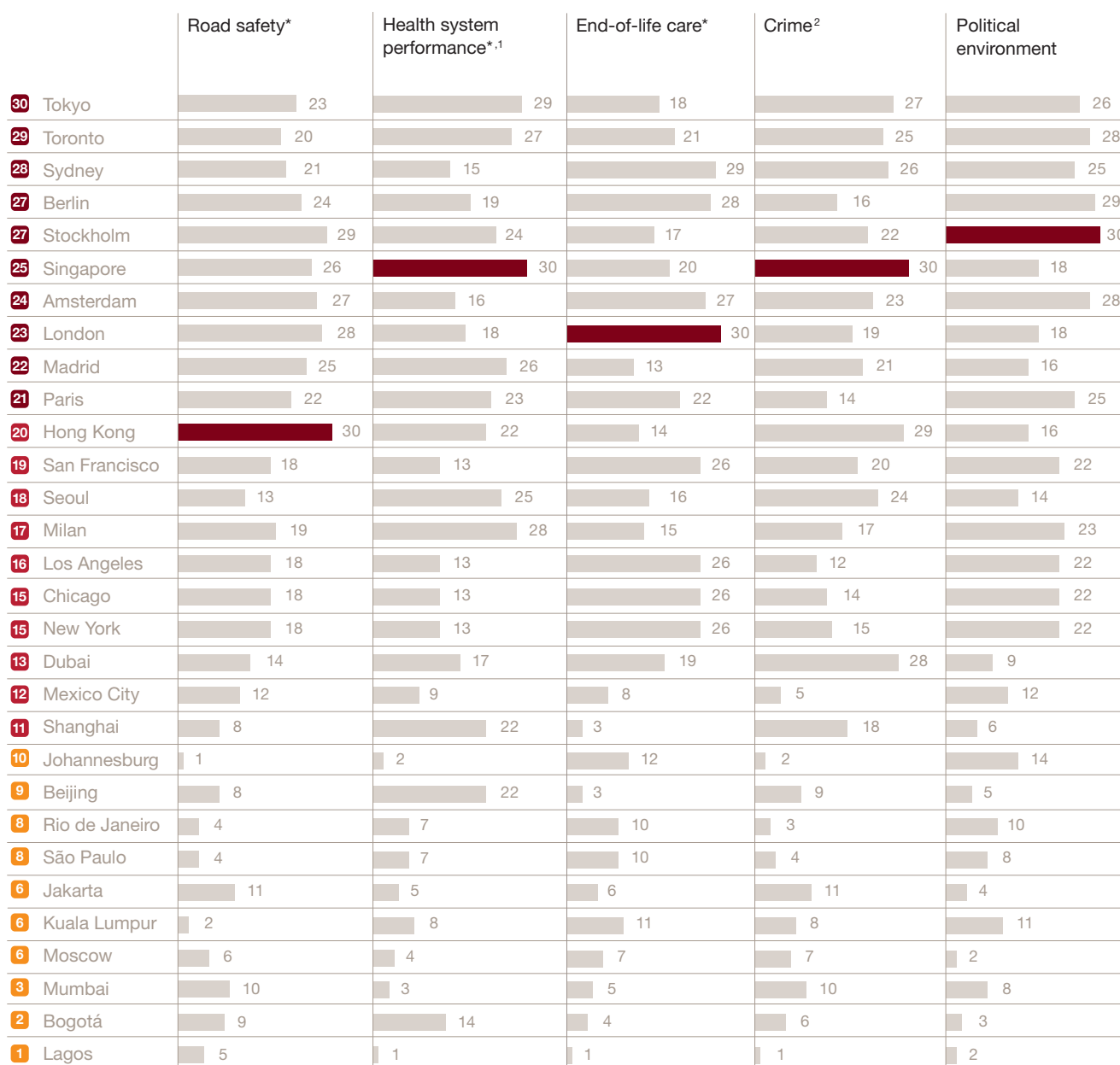
-  High
-  Medium
-  Low

 Highest rank in each indicator































1. The kilometers of mass transit track for every 100 square kilometers of developed and developable land area within the city's strict municipal boundaries.
2. Average wages are factored to reflect the amount of time an average citizen has to work to be able to buy a single rail ticket from the central business district (CBD) to the city boundary.
3. PwC employees in each of the firm's offices in the 30 cities were instructed: "On a scale from 1 to 10, where 1 is difficult and 10 is easy, please rate your commute to work." Data provided by the PwC employee survey conducted for the *We, the urban people* study.

Health, safety, and security

An advanced economy normally translates into advanced social security



Commentary is available in the full *Cities of Opportunity 7* report at www.pwc.com/cities.

Security and disease risk ³	Score
 30	153
 29	150
 24	140
 21	137
 15	137
 12	136
 13	134
 20	133
 26	127
 19	125
 11	122
 22	121
 25	117
 14	116
 23	114
 18	111
 17	111
 6	93
 28	74
 7	64
 27	58
 8	55
 9	43
 10	43
 5	42
 2	42
 16	42
 4	40
 3	39
 1	11

Each city's score (here 153 to 11) is the sum of its rankings across variables. The city order from 30 to 1 is based on these scores.

-  High
-  Medium
-  Low

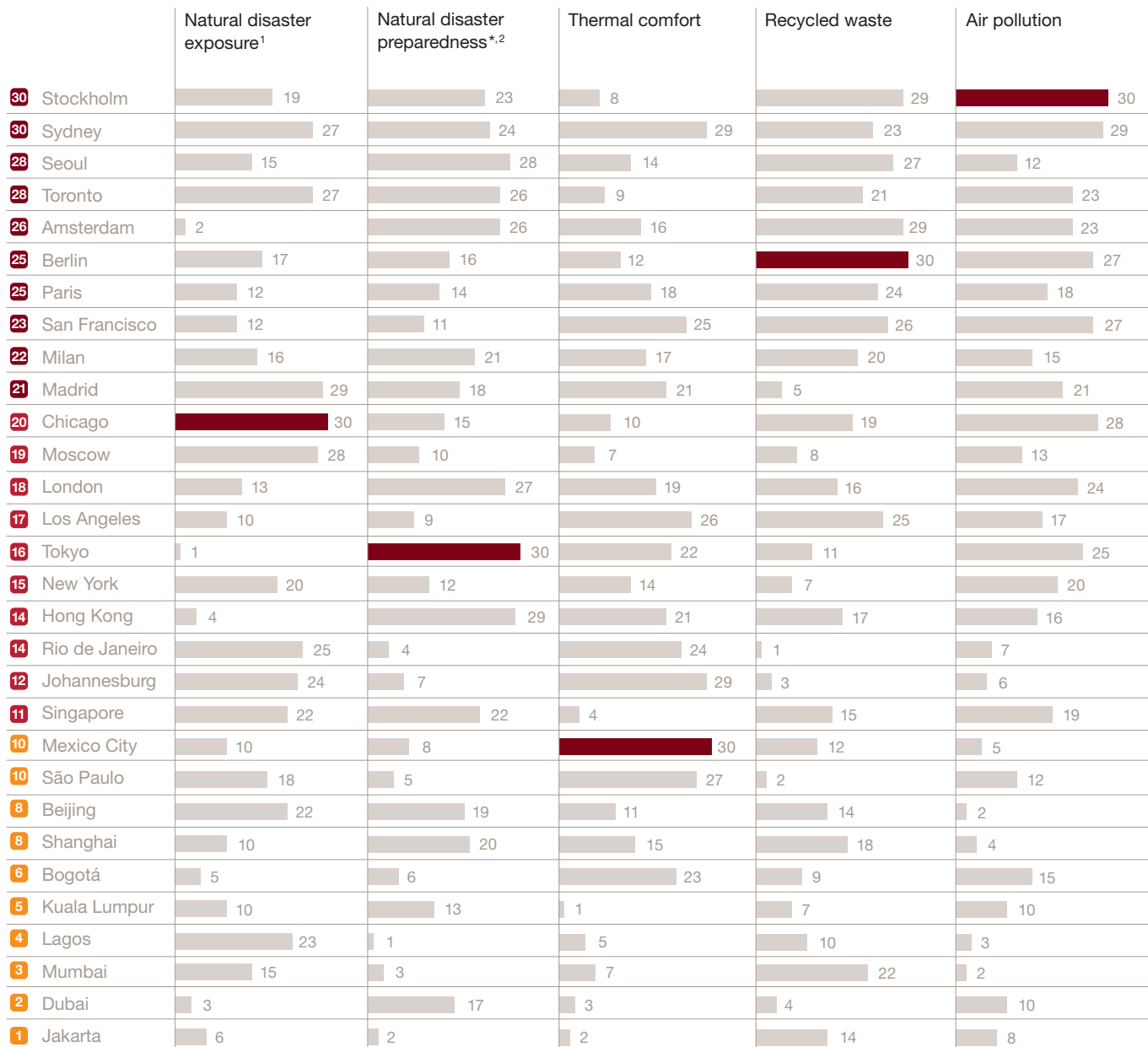
 Highest rank in each indicator

* Country-level data

1. Measurement of a country's health system performance made by comparing healthy life expectancy with healthcare expenditures per capita in that country, adjusted for average years of education (number of years of education is strongly associated with the health of populations in both mature and emerging countries).
2. Weighted combination of the Mercer *Quality of Living 2014* survey crime score (50%); intentional homicide rate per 100,000 of the city population (30%); and the Numbeo Crime Index, which is an estimation of the overall crime level in each city based on how safe citizens feel (20%).
3. A measurement of the potential effect of crises on economic output in each city, calculated by measuring the percentage of GDP at risk from a series of individual security and disease threats between 2015 and 2025. Nine particular threats were measured using data from the Lloyd's City Risk Index 2015–2025.

Sustainability and the natural environment

An urgent global issue gains greater focus



Commentary is available in the full *Cities of Opportunity 7* report at www.pwc.com/cities.

Public park space	Water-related business risk ³	Score
29	30	168
22	14	168
27	28	151
18	27	151
26	23	145
21	20	143
28	29	143
24	11	136
17	26	132
15	22	131
13	9	124
30	24	120
4	12	115
20	4	111
6	13	108
25	8	106
3	10	100
23	16	100
12	18	99
8	5	95
11	15	91
2	25	91
19	2	89
16	6	89
5	21	84
7	19	67
1	17	60
9	1	59
10	7	54
14	3	49

Each city's score (here 168 to 49) is the sum of its rankings across variables. The city order from 30 to 1 is based on these scores.

High
 Medium
 Low

Highest rank in each indicator

* Country-level data

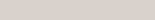

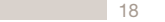
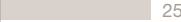
























































1. A measurement of the economic and people effect of river and coastal floods, earthquakes, windstorms, and tsunamis. The economic effect is measured by lost GDP output in the immediate aftermath of an event relative to the country's GDP. The people effect is both the potential for fatalities and casualties, as well as people who need to be evacuated and are unable to access their home or workplace (in the immediate aftermath of an event) as a proportion of the population of the city.
2. This measure considers whether the city has put in place early warning systems, made efforts to reduce the underlying risk factors, regularly conducts training drills, and implements strategies to increase public awareness. Fifty percent of the score is taken at a country level from the UNISDR's web platform, PreventionWeb, which has collated national progress reports on the implementation of the UN's 10 year plan to make the world safer from natural hazards, the Hyogo Framework for Action. Each city's average performance in the variables of public transport systems, health system performance, and operational risk climate are also factored into the disaster preparedness measure as the remaining 50%.
3. A measurement of water risks in a city related to quality, quantity, and regulatory risk using analysis data produced by the World Resources Institute with Aqueduct.

Demographics and livability





North America and Europe top performance in this indicator

	Entertainment and attractions ¹	Quality of living	Working age population	City brand ²	Relocation attractiveness ³
30 New York	28	15	8	29	29
30 Paris	29	27	14	26	26
28 London	30	16	9	28	30
27 Los Angeles	24	21	10	30	25
26 San Francisco	13	18	24	22	27
25 Amsterdam	18	24	20	27	15
24 Toronto	16	30	15	10	23
23 Berlin	26	25	11	9	19
22 Chicago	19	22	6	17	20
22 Stockholm	11	28	3	21	14
20 Hong Kong	8	23	23	25	21
19 Sydney	9	29	4	15	28
19 Tokyo	25	26	7	5	18
17 Madrid	23	20	5	18	22
16 Seoul	20	14	25	24	11
15 Mexico City	21	5	27	15	9
14 Singapore	5	18	18	16	24
13 Dubai	14	10	30	20	16
12 Moscow	27	12	16	19	5
11 Rio de Janeiro	15	8	12	23	13
10 Shanghai	17	9	29	3	12
9 Beijing	22	11	28	2	7
8 Milan	10	19	1	9	17
7 São Paulo	12	8	17	11	6
6 Kuala Lumpur	3	13	21	4	8
5 Bogotá	7	4	26	6	2
4 Johannesburg	4	8	22	7	10
3 Mumbai	2	3	19	13	4
2 Jakarta	6	2	13	12	3
1 Lagos	1	1	2	1	1

Commentary is available in the full *Cities of Opportunity 7* report at www.pwc.com/cities.

Senior wellbeing ^{*,4}	YouthfulCities ⁵ Index	Score
 26	 30	165
 18	 25	165
 20	 29	162
 26	 22	158
 26	 27	157
 27	 20	151
 29	 24	147
 28	 28	146
 26	 23	133
 30	 26	133
 12	 17	129
 19	 18	122
 22	 19	122
 17	 15	120
 9	 16	119
 14	 21	112
 21	 6	108
 16	 1	107
 5	 11	95
 7	 13	91
 11	 8	89
 10	 8	88
 13	 14	83
 7	 10	71
 15	 3	67
 8	 12	65
 2	 9	62
 4	 5	50
 3	 4	43
 1	 2	9

Each city's score (here 165 to 9) is the sum of its rankings across variables. The city order from 30 to 1 is based on these scores.

-  High
-  Medium
-  Low
-  Highest rank in each indicator

* Country-level data































1. A measure of the number of diverse attractions in a city, including the number of major sporting events a city hosts; the number of museums, performing arts venues, and culinary establishments; the number of international travelers and the number of sister city relationships as per the A.T. Kearney Global Cities Index.
2. *The Guardian* Cities global brand survey measures two aspects of a city's brand: its "assets"—attractions, climate, infrastructure (particularly transport), safety, and economic prosperity—and its "buzz," a combination of social media (Facebook likes and Twitter sentiment analysis) and media mentions.
3. PwC employees in each of the firm's offices in the 30 cities were instructed: "Based on the other 29 cities in *Cities of Opportunity*, please rank the top three cities that you would like to work in most." Data provided by the PwC employee survey conducted for the *We, the urban people* study.
4. Using the Global AgeWatch Index, this variable highlights which countries are doing best for their older populations and how this links with policies toward pensions, health, education, employment, and the social environment in which older people live.
5. The YouthfulCities Index analyzes the largest cities around the world from a unique youth perspective to rank them as best suited for young people aged 15–29. It looks at how youth live, work, and play in their urban setting in order to examine how cities are serving their youth.

Economic clout

London reinforces its top spot, as Madrid advances to turn the spotlight on Europe

	Number of Global 500 headquarters	Employment growth ¹	Financial and business services employment	Attracting FDI	Productivity
30 London	28	22	28	28	23
29 New York	26	25	22	24	29
28 Beijing	30	15	26	26	8
27 San Francisco	13	29	25	5	30
26 Madrid	21	27	20	17	14
25 Sydney	17	23	19	20	19
24 Shanghai	24	5	15	29	10
23 Paris	28	3	27	22	24
22 Singapore	13	24	12	30	16
21 Amsterdam	17	9	30	16	20
21 Stockholm	13	12	24	5	26
19 Dubai	4	19	4	27	22
19 Hong Kong	19	14	10	25	17
19 Kuala Lumpur	8	28	13	11	12
19 Toronto	21	17	23	15	18
15 Milan	8	13	29	13	21
15 Tokyo	29	4	9	19	25
13 Seoul	25	6	14	15	13
12 Los Angeles	4	21	11	3	28
11 Chicago	17	11	18	1	27
10 Mumbai	22	8	3	18	1
9 Mexico City	17	18	5	10	11
8 Jakarta	13	20	2	8	7
7 Moscow	23	2	16	24	9
6 Johannesburg	4	26	21	7	5
5 Berlin	8	7	17	13	15
5 Lagos	4	30	1	2	2
3 São Paulo	19	1	8	21	6
2 Bogotá	8	16	7	6	3
1 Rio de Janeiro	13	10	6	9	4

Commentary is available in the full *Cities of Opportunity 7* report at www.pwc.com/cities.

Rate of real GDP growth ²	Score
 23	152
 16	142
 30	135
 24	126
 20	119
 18	116
 28	111
 6	110
 12	107
 9	101
 21	101
 22	98
 13	98
 26	98
 4	98
 7	91
 5	91
 15	88
 17	84
 8	82
 29	81
 19	80
 27	77
 2	76
 11	74
 10	70
 25	64
 1	56
 14	54
 3	45

Each city's score (here 152 to 45) is the sum of its rankings across variables. The city order from 30 to 1 is based on these scores.

-  High
-  Medium
-  Low

 Highest rank in each indicator

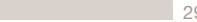
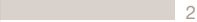
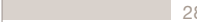

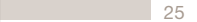
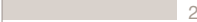



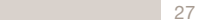
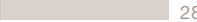
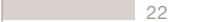





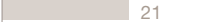
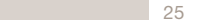







































































1. Annual growth rate of employment in a city, 2014–2016.
2. GDP annual growth rate 2014–2016 in real terms expressed in 2015 US\$.

Ease of doing business

Four years and two editions later, Singapore and Hong Kong are still at the top

	Ease of starting a business** ¹	Resolving insolvency**	Ease of entry: Number of countries with visa waiver*	Number of foreign embassies and consulates	Level of minority shareholder protection** ²
30 Singapore	29	18	29	18	29
29 Hong Kong	27	15	28	21	30
28 London	20	21	25	30	28
27 Toronto	30	23	13	13	26
26 Stockholm	22	19	19	23	14
25 Paris	23	17	14	29	23
24 New York	15	28	11	19	19
23 Seoul	25	24	27	24	21
22 Los Angeles	16	28	11	14	19
21 Kuala Lumpur	26	11	30	20	27
20 Chicago	17	28	11	9	19
19 Berlin	8	29	21	26	8
18 San Francisco	18	28	11	6	19
17 Amsterdam	24	22	24	3	4
16 Sydney	28	20	6	11	5
15 Tokyo	10	30	15	27	14
14 Madrid	11	16	17	22	15
13 Milan	19	13	18	16	21
12 Johannesburg	13	10	20	1	23
11 Dubai	14	3	7	6	10
10 Mexico City	12	14	16	15	7
9 Bogotá	9	12	26	7	24
8 Moscow	21	5	5	25	3
7 Beijing	6	9	3	28	2
6 São Paulo	1	7	24	10	14
5 Rio de Janeiro	2	7	24	6	14
4 Shanghai	7	9	3	8	2
3 Mumbai	3	1	3	12	26
2 Jakarta	4	4	12	17	10
1 Lagos	5	2	4	2	7

Commentary is available in the full *Cities of Opportunity 7* report at www.pwc.com/cities.

Operational risk climate*	Workforce management risk	Tax efficiency ³	Score
 29	 29	 28	209
 30	 25	 29	205
 20	 27	 23	194
 27	 28	 22	182
 27	 22	 27	173
 18	 18	 21	163
 25	 30	 11	158
 13	 15	 7	156
 25	 26	 14	153
 15	 13	 9	151
 25	 24	 14	147
 19	 17	 18	146
 25	 23	 14	144
 25	 21	 20	143
 29	 19	 17	135
 18	 16	 4	134
 16	 14	 19	130
 12	 10	 5	114
 11	 8	 24	110
 15	 20	 30	105
 9	 5	 26	104
 11	 2	 8	99
 2	 4	 25	90
 9	 12	 16	85
 6	 9	 6	77
 6	 7	 10	76
 9	 11	 16	65
 4	 6	 3	58
 4	 3	 2	56
 1	 1	 1	23

Each city's score (here 209 to 23) is the sum of its rankings across variables. The city order from 30 to 1 is based on these scores.

 High
 Medium
 Low

 Highest rank in each indicator

* Country-level data

** Based on most populous city































1. Data are based on regulations relevant to the life cycle of a small- to medium-sized domestic business. It is assumed that the minimum time required for each procedure is one day. Although procedures may take place simultaneously, they cannot start on the same day.
2. The Strength of Minority Investor Protection Index is the average of indices that measure transparency of transactions, liability for self-dealing, and shareholders' ability to sue officers and directors for misconduct.
3. Combination of the number of tax payments and the time required to comply by businesses during their second year of operation. Data provided by PwC UK from *Paying Taxes 2016*; taxes are accurate for the year ended 31 December 2014. The *Paying Taxes 2016* report can be found at <http://www.pwc.com/gx/en/paying-taxes/>.

Cost

Mature cities can be as competitive on costs as emerging ones, but the price of global allure can be high

	Corporate total tax rate	Personal tax ¹	Cost of business occupancy	Cost of living	Purchasing power
30 Johannesburg	26	22	30	25	14
29 Toronto	28	11	27	12	23
28 Los Angeles	20	7	21	18	30
27 Berlin	13	9	29	16	27
26 Dubai	30	30	15	17	13
26 Kuala Lumpur	21	21	23	26	8
24 Chicago	17	5	28	13	26
23 Madrid	11	14	24	19	17
22 Bogotá	1	27	26	29	7
21 Jakarta	25	29	18	28	2
20 São Paulo	3	25	16	21	12
19 Singapore	29	17	8	5	22
18 Seoul	23	26	12	11	11
17 Hong Kong	27	28	2	14	16
16 Amsterdam	19	1	25	8	19
16 Sydney	14	10	11	2	28
14 Mexico City	9	19	22	27	5
13 San Francisco	18	7	14	6	29
13 Lagos	22	18	13	20	2
11 Mumbai	8	23	17	30	3
11 Stockholm	12	4	19	7	20
9 Rio de Janeiro	2	25	10	22	10
8 Milan	6	2	20	10	15
7 Tokyo	10	16	5	9	18
6 New York	16	3	9	3	25
5 London	24	13	1	1	21
4 Moscow	15	20	4	15	9
4 Paris	7	8	7	4	24
2 Shanghai	5	15	6	23	6
1 Beijing	4	12	3	24	4

Commentary is available in the full *Cities of Opportunity 7* report at www.pwc.com/cities.

Affordability of rent ²	Score
 22	139
 25	126
 29	125
 30	124
 14	119
 20	119
 27	116
 28	113
 17	107
 1	103
 23	100
 18	99
 15	98
 8	95
 19	91
 26	91
 5	87
 10	84
 9	84
 2	83
 21	83
 11	80
 24	77
 12	70
 13	69
 7	67
 3	66
 16	66
 6	61
 4	51

Each city's score (here 139 to 51) is the sum of its rankings across variables. The city order from 30 to 1 is based on these scores.

-  High
-  Medium
-  Low

 Highest rank in each indicator

1. The personal tax data reflect the average employee effective tax rate across manager, assistant, and support staff levels in each city economy. The employee effective tax rates were generated by PwC UK using data supplied for *Paying Taxes 2016*. Taxes are accurate for year ended 31 December 2014. The *Paying Taxes 2016* report can be found at <http://www.pwc.com/gx/en/paying-taxes/>.
2. A measure of the affordability of rental accommodation in a city, calculated by offsetting the monthly rental cost of a 120m² apartment against a city's average wages. Rental prices were sourced from the Global Property Guide. Where the cost of a 120m² apartment was not available, the closest equivalent was used.

Key to the variables

Affordability of public transport

The affordability of the longest mass transit rail trip from a city's boundary to the central business district (CBD), calculated by using a city's average hourly wage to determine the amount of time a citizen needs to work to be able to buy a single ticket. The cost of a bus trip is used in cities where there are no rail systems.

Affordability of rent

A measure of the affordability of rental accommodation in a city, calculated by offsetting the monthly rental cost of a 120m² apartment against a city's average wages. Rental prices were sourced from the Global Property Guide. Where the cost of a 120m² apartment was not available, the closest equivalent was used.

Air pollution

Combination of measures of particulate matter 10 micrometers (PM10) outdoor air pollution levels from the World Health Organization (WHO) and the Numbeo Pollution Index of overall pollution in each city. The WHO's Public Health and Environment database provides annual mean concentrations of PM10 in diameters or less, reflecting the degree to which urban populations are exposed to this fine matter. The Numbeo Pollution Index is generated via survey-based data. Numbeo attributes the biggest weight to air pollution, then to water pollution/accessibility as the two main pollution factors. A small weight is given to other pollution types.

Airport connectivity

A measure of the number of routes operating from the airports servicing a city as identified by World Airport Codes. A greater weight is given to international destinations, but domestic routes are also included so as not to penalize countries with larger land areas.

Airport to CBD access

A measure of the ease of using public transit to travel between a city's central business district and the international terminal of its busiest airport in terms of international passenger traffic. Cities are separated into categories according to whether a direct rail link exists: if so, the number of transfers required; and if not, whether there is a public express bus route to the airport. Cities with direct rail links are preferred to those with express bus services. Cities with rail links with the fewest transfers are ranked higher than those with more. Within categories, cities are ranked against one another according to the cost of a single one-way, adult weekday trip and the length of the trip, with each factor weighted equally.

Attracting FDI

Combined variable ranking the number of greenfield (new job-creating) projects plus the total US\$ value of greenfield capital investment activities in a city that are funded by foreign direct investment (FDI). Data cover the period from January 2005 through December 2014 provided by fDi Intelligence.

Broadband quality score

Based on millions of recent test results from Pingtest.net, this global broadband index from Ookla compares and ranks consumer broadband connections around the globe. Our overall broadband index score encompasses the following weighted metrics that were collated over a six-month period to generate an average: upload speed (40%), download speed (40%), quality of connection (10%), and value/cost (10%).

City brand

The *Guardian* Cities global brand survey measures two aspects of a city's brand: its "assets"—attractions, climate, infrastructure (particularly transport), safety, and economic prosperity—and its "buzz," a combination of social media (Facebook likes and Twitter sentiment analysis) and media mentions. The assets and buzz elements were both given a score out of 10; the numbers were then added to produce a total score.

Corporate total tax rate

The corporate total tax rate measures the amount of taxes and mandatory contributions payable by the businesses in the second year of operation, expressed as a share of commercial profits. The corporate total tax rate is designed to provide a comprehensive measure of the cost of all the taxes a business bears. Data provided by PwC UK from *Paying Taxes 2016*; taxes are accurate for the year ended 31 December 2014. Some cities that were not included in the *Paying Taxes 2016* study were calculated separately by our PwC local office using the through-the-cycle methodology. The *Paying Taxes 2016* report can be found at <http://www.pwc.com/gx/en/paying-taxes/>.

Cost of business occupancy

Annual gross rent divided by square feet of Class A office space. Gross rent includes lease rates, property taxes, and maintenance and management costs. Data produced by CBRE Global Office Rents in US\$.

Cost of living

A relative measure of the price of consumer goods by location, including groceries, restaurants, transportation, and utilities. The Consumer Price Index measure does not include accommodation expenses such as rent or mortgage. Figures provided by Numbeo.

Crime

Weighted combination of the Mercer *Quality of Living 2014* survey crime score (50%); intentional homicide rate per 100,000 of the city population (30%); and the Numbeo Crime Index, which is an estimation of the overall crime level in each city based on how safe citizens feel (20%).

Digital security

This variable measures a city's levels of digital security based on factors such as dedicated cyber security teams (input) and the frequency of identity theft (output). Input metrics measured are privacy policy, citizen awareness of digital threats, public-private partnerships, level of technology employed, and dedicated cyber security teams. Output metrics are frequency of identity theft, percentage of computers infected, and percentage with Internet access. Data are produced by the Economist Intelligence Unit's Safe Cities Index 2015.

Ease of commute

PwC employees in each of the firm's offices in the 30 cities were instructed: "On a scale from 1 to 10, where 1 is difficult and 10 is easy, please rate your commute to work." Data provided by the PwC employee survey conducted for the *We, the urban people* study.

Ease of entry: Number of countries with visa waiver*

Number of nationalities able to enter the country for a tourist or business visit without a visa. Excludes those nationalities for whom only those with biometric, diplomatic, or official passports may enter without a visa.

Ease of starting a business**

Assessment of the bureaucratic and legal hurdles an entrepreneur must overcome to incorporate and register a new firm. Accounts for the number of procedures required to register a firm; the amount of time in days required to register a firm; the cost (as a percentage of per capita income) of official fees and fees for legally mandated legal or professional services; and the minimum amount of capital (as a percentage of per capita income) that an entrepreneur must deposit in a bank or with a notary before registration and up to three months following incorporation. Assessment scores gathered from *Doing Business 2015* report, the World Bank Group. U.S. cities were differentiated from each other using the *United States Small Business Friendliness Survey* by Thumbtack.com in partnership with Kauffman Foundation.

Employment growth

2014–2016 annual growth rate of employment in a city. Data provided by Oxford Economics.

End-of-life care*

Ranking of countries according to their provision of end-of-life care. The Quality of Death Index by the Economist Intelligence Unit assesses the availability, affordability, and quality of palliative care for adults in 80 countries around the world. The index scores countries across 20 indicators grouped in five categories: palliative and healthcare environment, human resources, affordability of care, quality of care, and community engagement. These indicators are grouped into qualitative and quantitative categories and are normalized to form an overall index score.

Entertainment and attractions

Cultural experience from the A.T. Kearney Global Cities Index is measured by the number of diverse attractions in a city, including the number of major sporting events a city hosts; the number of museums, performing arts venues, and culinary establishments; the number of international travelers; and the number of sister city relationships.

Entrepreneurial environment*

The Global Entrepreneurship and Development Index measures the 3A's of entrepreneurial development: attitudes, aspirations, and activity. The index was created by the Global Entrepreneurship and Development Institute to help provide better understanding of economic development by analyzing the contextual nature of business formation, expansion, and growth.

Financial and business services employment

The number of jobs in financial and business services activity as a share of total employment in the city. Financial services includes banking and finance, insurance and pension funding, and activities auxiliary to financial intermediation. Business services includes a mix of activities across the following subsectors: real estate and renting activities; information technology and computer related; research and development; architectural, engineering, and other technical activities; legal, accounting, bookkeeping, and auditing activities; tax and consultancy; advertising; professional scientific and technical services; and business services where not elsewhere classified. Data provided by Oxford Economics.

Health system performance*

Measurement of a country's health system performance made by comparing healthy life expectancy with healthcare expenditures per capita in that country, adjusted for average years of education (years of education is strongly associated with the health of populations in both developed and developing countries). PwC Global Healthcare team adapted methodology from the WHO discussion paper "Comparative efficiency of national health systems: cross-national econometric analysis".

Hotel rooms

Count of all hotel rooms within each city.

Housing

Measure of availability, diversity, cost, and quality of housing, household appliances, and furniture, as well as household maintenance and repair. This measure is based on the Mercer *Quality of Living 2014* survey. Tied cities were differentiated by looking at the annual percentage change in house prices.

ICT usage

Ericsson's Networked Society City Index 2014 measures the performance of 40 cities from two perspectives: their maturity in information and communications technology (ICT) and triple bottom line, specifically sustainable urban development in a connected society. The ICT usage score is based on three variables—technology use, individual use, and public and market use. Within technology use, the following metrics were analyzed: mobile phone subscriptions per 100 habitants, number of smartphones per capita, percentage with a computer at home, and number of tablets per capita. Within individual use, the following metrics were considered: Internet usage as a percentage of the population and social networking penetration. Within public and market use, the following metrics were analyzed: open data and web presence, and electronic and mobile phone payments.

Incoming/outgoing passenger flows

Total number of incoming and outgoing passengers, including originating, terminating, transfer, and transit passengers in each of the major airports servicing a city. Transfer and transit passengers are counted twice. Transit passengers are defined as air travelers coming from different ports of departure who stay at the airport for brief periods, usually one hour, with the intention of proceeding to their first port of destination (includes sea, air, and other transport hubs).

Innovation Cities Index

The 2thinknow Innovation Cities Index is composed of 445 cities selected from 1,540 cities based on basic factors of health, wealth, population, and geography. The selected cities had data extracted from a city benchmarking data program on 162 indicators. Each of the benchmarking data was scored by analysts using best available qualitative analysis and quantitative statistics. (Where data were unavailable, national or state estimates were used). Data were then trend balanced against 21 global trends. The final index had a zeitgeist (analyst confidence) factor added and the score reduced to a three-factor score for cultural assets, human infrastructure, and networked markets. For city classification, these scores were competitively graded into five bands (Nexus, Hub, Node, Influencer, Upstart). The top 33% of Nexus and Hub (and selected Node cities of future interest) final graded scores were ranked by analysts based on trends over two to five years. A Node ranking is considered globally competitive.

Intellectual property protection*

Leading business executives' responses to the question in the World Economic Forum's *Global Competitiveness Report 2014–15* that asks, "In your country, how strong is the protection of intellectual property, including anti-counterfeiting measures?" [1 = extremely weak; 7 = extremely strong]. The 2014 edition of the survey captured the opinions of more than 14,000 business leaders in 148 economies between February and June 2014.

International association meetings

A measure combining both the number of international association meetings per city in 2014 and the compound annual growth rate (CAGR) from 2009–2014. The meetings measured take place on a regular basis and rotate between a minimum of three countries. Figures provided by the International Congress and Convention Association.

International tourists

Annual international tourist arrivals for 100 cities collected by Euromonitor International. Euromonitor's figures include travelers who pass through a city, as well as actual visitors to the city.

Internet access in schools*

Leading business executives' responses to the question in the World Economic Forum's *Global Competitiveness Report 2014–15* that asks, "In your country, how widespread is Internet access in schools?" [1 = nonexistent; 7 = extremely widespread] The 2014 edition of the survey captured the opinions of more than 14,000 business leaders in 148 economies between February and June 2014.

Level of minority shareholder protection**

Measurement of the strength of minority shareholder protection against misuse of corporate assets by directors for their personal gain. The Strength of Minority Investor Protection Index is the average of indices that measure transparency of transactions, liability for self-dealing, and shareholders' ability to sue officers and directors for misconduct. Assessment scores gathered from *Doing Business 2015*, the World Bank Group.

Libraries with public access

Number of libraries within each city that are open to the public divided by the total population and then multiplied by 100,000.

Licensed taxis

Number of officially licensed taxis in each city divided by the total population and then multiplied by 1,000.

Major construction activity

Major construction activity is composed of three equally weighted measures: the number of planned and under construction buildings in the Emporis database; the number of properties sold and recorded by Real Capital Analytics' database; and construction employment from Oxford Economics. The Emporis database is the count of planned and under construction buildings categorized as a high rise, skyscraper, low rise, hall, or stadium; the number of properties sold is based on the number of properties valued at more than \$10 million, recorded between February and July 2015; and construction employment is taken as a percentage of total employment.

Mass transit coverage

Ratio of kilometers of mass transit track to every 100 square kilometers of the developed and developable portions of a city's land area. A city's developable land area is derived by subtracting green space and governmentally protected natural areas from total land area.

Math/science skills attainment*

Top performers' combined mean scores on the math and science components of the Program for International Student Assessment (PISA), an Organisation for Economic Co-operation and Development (OECD) assessment of 15-year-olds' academic preparedness. Top performers are defined as those students who achieved in the top two proficiency levels (Level 5 and Level 6) on the math and science portions of the test. Comparable examinations are used wherever possible to place cities not included in the OECD assessment.

Mobile broadband speed

Based on millions of recent cellular test results from Ookla Speedtest iOS and Android apps, this index compares and ranks cellular upload and download speeds around the globe. Each city receives a score based on the rolling mean speed in megabits per second over the previous 30 days. Only tests taken within 300 miles of the server are eligible for inclusion in the index. Data were collected and averaged over a three-month period in 2015.

Natural disaster exposure

A measure of a city's exposure to natural disaster risk, calculated by PwC's actuarial and forensics practice using data from Swiss Re's CatNet GDP Loss Index and the People Risk Index. This variable measures the economic and people effect of river and coastal floods, earthquakes, windstorms, and tsunamis. The economic effect is measured by lost GDP output in the immediate aftermath of an event relative to the country's GDP. The people effect is both the potential for fatalities and casualties, as well as people who need to be evacuated and are unable to access their home or workplace (in the immediate aftermath of an event) as a proportion of the population of the city. The indices are derived from Swiss Re's Mind the risk study (http://www.swissre.com/rethinking/climate_and_natural_disaster_risk/Mind_the_risk.html), results of which are available at CatNet (http://www.swissre.com/clients/client_tools/about_catnet.html).

Natural disaster preparedness*

This measure takes into account each city's disaster preparedness. Using a method developed by PwC's actuarial and forensics practice, each city receives a score based on its preparedness. This measure considers whether the city has put in place early warning systems, made efforts to reduce the underlying risk factors, regularly conducts training drills, and implements strategies to increase public awareness. Fifty percent of the score is taken at a country level from the UNISDR's web platform,

PreventionWeb, which has collated national progress reports on the implementation of the UN's 10-year plan to make the world safer from natural hazards, the Hyogo Framework for Action. Each city's average performance in the variables of public transport systems, health system performance, and operational risk climate are also factored into the disaster preparedness measure to make up the remaining 50%.

Number of foreign embassies and consulates

Number of countries that are represented by an embassy, consulate, high commission, deputy high commission, or representative office in each city. Figures sourced from EmbassyPages.com.

Number of Global 500 headquarters

Number of Global 500 headquarters located in each city, as per the Fortune Global 500 list.

Operational risk climate*

Quantitative assessment of the risks to business profitability in each of the countries. Assessment accounts for present conditions and expectations for the coming two years. The operational risk model considers 10 separate risk criteria: security, political stability, government effectiveness, legal and regulatory environment, macroeconomic risks, foreign trade and payment issues, labor markets, financial risks, tax policy, and standard of local infrastructure. The model uses 66 variables, of which about one-third are quantitative. Data produced by the Economist Intelligence Unit's Risk Briefing.

Percent of population with higher education

Number of people who have completed at least a university-level education divided by the population aged 15+. A university-level education is set equivalent to a bachelor's degree or higher from a US undergraduate institution.

Personal tax

The personal tax data reflect the average employee effective tax rate across manager, assistant, and support staff levels in each city economy. The employee effective tax rates were generated by PwC UK using data supplied for *Paying Taxes 2016*. Taxes are accurate for year ended 31 December 2014. The *Paying Taxes 2016* report can be found at <http://www.pwc.com/gx/en/paying-taxes/>.

Political environment

Measure of a nation's relationship with foreign countries, internal stability, law enforcement, limitations on personal freedom and media censorship. Data are from the Mercer *Quality of Living 2014* survey.

Productivity

Productivity is calculated by dividing GDP in 2015 US\$ by employment in the city. Data provided by Oxford Economics.

Public park space

Proportion of a city's land area designated as public recreational and green spaces to the total land area. Excludes undeveloped rugged terrain or wilderness that is either not easily accessible or not conducive to use as public open space.

Purchasing power

Domestic purchasing power is measured by an index of net hourly wages (where New York = 100), excluding rent prices. Net hourly wages are divided by the cost of the entire basket of goods and services, excluding rent. The basket of goods relates to 122 goods and services. Data sourced from *UBS Prices and Earnings 2015*.

Quality of living

Score based on more than 30 factors across five categories: socio-political stability, healthcare, culture and natural environment, education and infrastructure. Each city receives a rating of either acceptable, tolerable, uncomfortable, undesirable, or intolerable for each variable. For qualitative indicators, ratings are awarded based on the Economist Intelligence Unit analysts' and city contributors' judgments. For quantitative indicators, ratings are calculated based on cities' relative performances on a number of external data points. Data sourced from the Economist Intelligence Unit's livability ranking.

Rate of real GDP growth

2014–2016 GDP annual growth rate in real terms expressed in 2015 US\$. Data provided by Oxford Economics.

Recycled waste

Percentage of municipal solid waste diverted from landfill. This includes, but is not limited to, recycling and captures other methods such as waste-to-energy.

Relocation attractiveness

PwC employees in each of the firm's offices in the 30 cities were instructed: "Based on the other 29 cities in *Cities of Opportunity*, please rank the top three cities that you would like to work in most." Data provided by the PwC employee survey conducted for the *We, the urban people* study.

Resolving insolvency**

This topic identifies weaknesses in existing bankruptcy law and the main procedural and administrative bottlenecks in the bankruptcy process. Assessment scores gathered from *Doing Business 2015*, the World Bank Group.

Road safety*

A count of the estimated number of road deaths in each country per 100,000 inhabitants. Raw figures are calculated by the World Health Organisation based on 2013 survey data and are published in the Global Status Report on Road Safety 2015.

Security and disease risk

An analysis of the potential effects of crises on economic output in each city, calculated by measuring the percentage of GDP at risk from a series of individual health and security threats between 2015 and 2025. The nine threats measured were cyber attack, market crash, nuclear accident, oil price shock, sovereign default, terrorism, power outage, human pandemic, and plant pandemic. Data are taken from the Lloyd's City Risk Index 2015–2025.

Senior wellbeing*

The Global AgeWatch Index presents a unique snapshot of the situation of older people in 96 countries. It highlights which countries are doing best for their older populations and how this links with policies toward pensions, health, education, employment, and the social environment in which older people live. The overall score takes account of income security, capability, enabling environment, and health status of the over 60s.

Software development and multimedia design

Combination of scores for each city in *fDi* magazine's Best Cities for Software Development and Best Cities for Multimedia Design Centres. Both *fDi* indices weight a city's performance 70% based on the quality of the location and 30% based on the cost of the location. The Software development index is based on an assessment of 120 quality competitiveness indicators. These indicators include availability and track record in ICT, availability of specialized skills professionals such as scientists and engineers, access to venture capital, R&D capabilities, software experts, quality of ICT infrastructure, and specialization in software development. The multimedia design centre rankings are based on an assessment of 120 quality competitiveness indicators, including the size of the location's leisure and entertainment sector, its specialization and track record, information technology infrastructure, quality of life, and skills availability.

Tax efficiency

Combination of the number of tax payments and the time required to comply by businesses during their second year of operation. The tax payments element reflects the total number of taxes and contributions paid, the method of payment, the frequency of payment, the frequency of filing, and the number of agencies involved for the case-study company. Time to comply measures the time taken to prepare, file, and pay three major types of taxes (corporate income taxes, value-added taxes, and labor taxes). Data provided by PwC UK from *Paying Taxes 2016*; taxes are accurate for the year ended 31 December 2014. The *Paying Taxes 2016* report can be found at <http://www.pwc.com/gx/en/paying-taxes/>.

Thermal comfort

A thermal comfort score was created for each city by calculating the average deviation from optimal room temperature (72 degrees Fahrenheit). January, April, July, and October heat indices were calculated for each city using an online tool that integrates average high temperature and corresponding relative evening humidity during each month. A final thermal comfort score was derived by first taking the difference between a city's heat index for each month and optimal room temperature and then averaging the absolute values of these differences.

Traffic congestion

Measure of traffic congestion and congestion policies for each city scored on the level of congestion, as well as the modernity, reliability, and efficiency of public transport. Assessment based on the Mercer *Quality of Living 2014* survey. Tied cities were differentiated using the ease of commute variable.

Water-related business risk

Water risks in a city related to quality, quantity, and regulatory risk. Quality risks are defined as the exposure to changes in water quality that may impact industrial production systems, resulting in the need for further investment or an increase in the operational costs of water treatment. Risks related to quantity are defined as the exposure to changes in water quantity (e.g., droughts or floods) that may impact a company's direct operations, supply chains, and/or logistics. Regulatory risk refers to the unpredictability of regulations within the business environment. These risks arise when an unexpected change in water-related law or regulation increases a business's operating costs, reduces the attractiveness of an investment, or changes its competitive landscape. Data produced by the World Resources Institute with Aqueduct.

Workforce management risk

Ranking based on staffing risk in each city associated with recruitment, employment, restructuring, retirement, and retrenchment. Risk was assessed based on 30 factors grouped into five indicator areas: demographic risks associated with labor supply, the economy, and the society; risks related to governmental policies that help or hinder the management of people; education risk factors associated with finding qualified professionals in a given city; talent development risk factors related to the quality and availability of recruiting and training resources; and risks associated with employment practices. A lower score indicates a lower degree of overall staffing risk. Rank scores sourced from the 2013 People Risk Index produced by Aon Consulting.

Working age population

Proportion of a city's population aged 15–64 to the total population of the city.

World Top 100 Airports

Each city receives a score based on the ranking of that city's top airport in the World's Top 100 Airports ranking, compiled by Skytrax. The World Airport awards are based on survey questionnaires completed by more than 13 million airline customers between May 2014 and January 2015 across 550 airports worldwide. The survey evaluates travelers' experiences across different airport service and performance indicators from check-in, arrivals, transfers, shopping, security and immigration, to departure at the gate.

World university rankings

The *Times Higher Education* World University Rankings 2014–2015 powered by Thomson Reuters are the only global university performance tables to judge world-class universities across all of their core missions—teaching, research, knowledge transfer, and international outlook. The top university rankings employ 13 carefully calibrated performance indicators to provide the most comprehensive and balanced comparisons available, which are trusted by students, academics, university leaders, industry, and governments.

YouthfulCities Index

A global database that measures, compares, and ranks 55 cities across 20 urban attributes using a total of 101 indicators. The indicators consist of primary and secondary data that Urban Decoders (a globally dispersed team of young urban researchers) collect locally and submit using collaborative, cloud-based research workbooks. The YouthfulCities Index is an ambitious collaborative effort to analyze the largest cities around the world from a unique youth perspective to rank them as best suited for young people aged 15–29. It looks at how youth live, work, and play in their urban setting in order to examine how cities are serving their youth. It asks how youth can be better integrated and engaged in their cities.

* Country-level data

** Based on most populous city

For more information

On media inquiries...

Megan DiSciullo (US)
megan.disciullo@pwc.com
+1 312 298 2203

Rowena Mearley (Global)
rowena.j.mearley@us.pwc.com
+1 646 313 0937

Andrea Plasschaert (Global)
andrea.plasschaert@ch.pwc.com
+41 58 79 29 123

On research...

Sabrina McCotter
sabrina.c.mccotter@uk.pwc.com
+44 (0) 2890 415598

Russell A. Donaldson
russell.a.donaldson@uk.pwc.com
+44 (0) 2890 415194

On business implications...

Hazem Galal
Cities & Local Government Sector
Global Leader
hazem.galal@ae.pwc.com
+971 (4) 3043393

Yumiko Noda
Cities Solution Centre
yumiko.y.noda@jp.pwc.com
+81 (3) 3546 8512

Rollie Quinn
Global Leader, Government
& Public Services
rollie.quinn@pwc.com
+1 703 762 7252

Peter Raymond
US Leader, Capital Projects
and Infrastructure
peter.raymond@us.pwc.com
+1 703 918 1580

Contributors

Strategic direction

Brendan Dougher
Hazem Galal
John Sviokla

Project direction

William Sand,
communications
and operations
william.k.sand@us.pwc.com
+1 646 471 4470

Sabrina McCotter, research
sabrina.c.mccotter@uk.pwc.com
+44 (0) 2890 415598

Core team

PwC
Cristina Ampil
Russell Donaldson
Yana Goot
Margareta Irenaeus
Ryo Ishii
Rachael McBrien
Sabrina McCotter
Colin McIlheney
Hidetomo Nagata
Lisa Ocasio
Peter Pappas
David Patterson
Christian Regnaudot
William Sand
Ciara Shufflebottom
Greg M. Smith

Economics

Ulster University Economic
Policy Centre:^{*}
Neil Gibson
Mark Magill

Design

Lily Leong
Karen Montgomery
Beata Rutkowski

^{*} UUEPC is an economic policy institute working independently of PwC to support *Cities of Opportunity*.

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