**Safe Cities Index 2019**

**Safe Cities Index 2019**

Urban security and resilience in an interconnected world

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**About the report**

The Safe Cities Index 2019 is a report from The Economist Intelligence

Unit, sponsored by NEC Corporation. The report is based on the

third iteration of the index, which ranks 60 cities across 57 indicators

covering digital security, health security, infrastructure security and

personal security.

The index was devised and constructed by Vaibhav Sahgal and Divya

Sharma Nag. The report was written by Paul Kiestra and edited by Naka

Kondo and Chris Clague. Findings from the index were supplemented

with wide-ranging research and in-depth interviews with experts in the

field. Our thanks are due to the following people (listed alphabetically

by surname) for their time and insights:

l Siddharth Agarwal, director, Urban Health Resource Centre

l Alioune Badiane, president, The Urban Think Tank Africa (TUTTA),

Senegal

l Thomas Bollyky, senior fellow, Global Health, US Council on Foreign

Relations

l Gregory Falco, cyber research fellow, Stanford University

l Emmanuel Gregoire, deputy mayor, City of Paris

l Lord Bernard Hogan-Howe, former commissioner, London

Metropolitan Police

l Ede Ijjasz-Vasquez, senior director, Social, Urban, Rural and

Resilience Global Practice, World Bank

l Elizabeth Johnston, executive director, European and French Forums

for Urban Security

l Yuriko Koike, governor, Tokyo

l Victor Lam, chief information officer, Government of Hong Kong

l Esteban Leon, chief of risk reduction unit and head of the city

resilience profiling programme, UN-Habitat

l Fumihiko Nakamura, vice-president, Yokohama National University

l Adie Tomer, leader, Metropolitan Infrastructure Initiative, Brookings

Institution

l Gino Van Begin, secretary-general, ICLEI

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**Executive summary**

Humanity is a predominantly urban species, with over 56% of us living in cities. By 2050 68% will

do so, reflecting a speed of urbanisation even faster than previously predicted. This process is

occurring most visibly in developing countries, some of which struggle to deal with the extent

of change. Indeed, the challenges of urbanisation, if unmet, can entail substantial human and

economic risks. On the other hand, if they are effectively addressed, the growth of cities may

become an essential part of how emerging economies find a way to catch up to those in more

developed countries and how humanity as a whole creates more sustainable ways to live.

Thus, urban management will play a fundamental role in defining the quality of life of most

human beings in the coming years. A key element of this will be the ability of cities to provide

security for their residents, businesses and visitors. Accordingly, The Economist Intelligence

Unit, sponsored by NEC Corporation, maintains the Safe Cites Index (SCI)—a detailed

benchmarking tool that measures a wide range of security inputs and results.

The SCI has always reflected the multifaceted nature of urban safety, with indicators

divided into four distinct pillars: digital, infrastructure, health and personal security. The

2019 version (SCI2019)—which this report accompanies the release of—benefits from a major

revision designed to better measure “urban resilience”. This concept—the ability of cities

to absorb and bounce back from shocks—has had an increasing influence on thinking in

urban safety over the last decade, especially as policymakers worry about the implications

of climate change. Rather than trying to create a fifth distinct pillar of security, the index

now measures new areas within the other four of particular relevance to resilience such

as disaster-risk informed development policies.

The key findings from the expanded and updated SCI this year include:

l **Tokyo again comes first overall, and Asia-Pacific cities make up six of the top ten, but**

**geographic region does not have a statistical link with results.** As it did in the previous

SCI, Tokyo has the highest overall score in our index. Other cities in the top ten are Singapore

(2nd), Osaka (3rd), Sydney (5th), Seoul (tied 8th) and Melbourne (10th). Two European cities are

in this group, Amsterdam (4th) and Copenhagen (tied 8th), while two from America complete

it, Toronto (6th) and Washington, DC (7th). However, a closer look at the important correlates

of security, discussed below, found city safety is not related to global region: Tokyo, Singapore

and Osaka lead because of their specific strengths, not because they happen to be in Asia.

l **The results in individual index pillars show the importance of getting the basics right.**

Leo Tolstoy famously wrote, “All happy families are alike: each unhappy family is unhappy in its

own way.” A look at the top five cities in each pillar—digital, health, infrastructure and personal

security—yields a similar message. In each area, leading cities got the basics right, be it easy

access to high-quality healthcare, dedicated cyber-security teams, community-based police

patrolling or disaster continuity planning. Even among the leaders, the weaknesses of those

not in first place tended to vary from city to city. Those who want to improve need to get the

basics in place and then consider their own specific situations.

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Looking at the index results as a whole provides a number of key insights into urban security:

l **Despite having many elements, city safety is indivisible.** The different kinds of security

covered by the index require distinct interventions, often by different agencies or actors,

such as health systems for medical care and police for public order. Amid this diversity,

though, statistical analysis of the SCI2019 results shows that performance in each of the

pillars correlates very closely with that in every other. In short, cities tend to do well, middling

or poorly across every security pillar rather than having good results in one and lagging in

others. This is consistent with expert commentary that, rather than representing clearly

distinct fields, different kinds of safety are thoroughly intertwined and mutually supportive.

Service planning and provision must take this into account. Technological investments

for infrastructure, for example, can bring health benefits, while enhanced cyber-security

will protect the ability of the city to provide every kind of security, not just protection of

digital systems.

l **The SCI2019 results are not evenly spread but have a large number of cities clustered**

**at the top, with the rest showing much more variation in scores.** Just 10 points separate

the overall scores of the top 24 cities, while the following 36 are over 40 points apart. This

does not mean that the differences in the leaders’ group are unimportant. Instead, on a scale

that can measure every index city, the large group of top cities are much more similar to each

other than to those lagging behind.

l **Higher income sets apart those with better results, but in ways that are less than**

**obvious.** The index scores correlate strongly with average income in the cities. In part

this reflects the need to invest sometimes substantial amounts in certain areas essential

to security, such as high-quality infrastructure or advanced healthcare systems. The more

surprising contribution to this correlation is that, across our index, those cities with less wealth

also tend to lack policy ambition. As one interviewee told us, the biggest challenges facing

Sub-Saharan African cities reflect a lack of effective planning and management. Low-hanging

(or at least relatively low-cost) fruit exist, which all cities that have not already done so should

attempt to harvest. Doing so requires focus and perseverance.

l **Transparency matters as much as wealth to urban security.** Levels of transparency in

cities, as measured by the World Bank’s Control of Corruption metric, correlated as closely

as income with index scores. Correlation does not guarantee causation, but interviewed

experts stressed the many ways that transparency and accountability are essential in every

pillar of urban security, from building safer bridges to developing the trust needed for relevant

stakeholders to share information on cyber-attacks. Well-governed, accountable cities are

safer cities.

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l **Transparency and a new understanding of the elements of urban safety are essential**

**to resilience.** Those parts of our index most directly related to resilience indicate that,

as with safety more generally, higher incomes are associated with better preparedness.

This is unsurprising: technologically advanced infrastructure, for example, if appropriately

deployed, can be an important contributor to resilience. In this case, though, transparency

and accountability seem to be of even greater importance: a poorly governed city will almost

never be resilient.

Although not able to offer a general prescription for resilience, our research points to

a number of key elements, including joint planning by all relevant stakeholders, both

governmental and non-governmental, to prepare for shocks; a new understanding of

infrastructure that uses a city’s natural assets as tools to enhance its ability to absorb

shocks; and the importance of promoting social connectedness among citizens in creating

communities that will work together in a crisis.

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**Introduction: Why urban safety**

**matters to us all**

**A disorderly transition toward ever-greater urbanity**

Humanity is a predominantly urban species, having become so a little

over a decade ago according to UN Population Division data. And it is

becoming even more so: the 56% of the world’s population who live in

cities today will rise to 68% by 2050.1

More than simply where most humans live, cities are where we do

business, producing an outsized proportion of economic output

because of a greater efficiency than rural areas. New Climate Initiative,

a think-tank, estimated that in 2015 urban areas in total created 85% of

the world’s GDP while generating only 71% to 76% of greenhouse gas

emissions.2 Accordingly, the success or failure of cities will define the

quality of human life in the years ahead.

This may seem like old news: urbanisation has been occurring for many

decades, and for centuries in some regions. Familiarity with the longterm

narrative, however, should not obscure the current challenge’s

novelty. First, as Adie Tomer, who leads the Metropolitan Infrastructure

Initiative at the Brookings Institution, a think-tank, notes, “We have

never seen cities on this scale in human history. Managing populations of

15-plus million is something new.”

UN data back him up. As late as 2005, only Tokyo had more than 20m

residents. Today, nine cities do, and by 2030 that number should have

reached 14. Beyond the megacities, the challenge is even more daunting:

today’s 30 largest cities are expected to add 45m residents between 2020

and 2025, but those sized from 1-5m, because of their greater number,

will have aggregate population growth of nearly 100m. Gino Van Begin,

secretary-general of ICLEI, Local Governments for Sustainability, a

local-government network, observes those “citizens will all need energy,

water, jobs, education, food, mobility, housing [and other essentials].”

Overall, numbers tell only part of the story. Urbanisation is as uneven

and disorderly as it is substantial.

On the one hand, the population shift toward cities is largely complete

in developed countries: all of Australasia, Northern and Western Europe,

the US and Canada, for example, are already more than 80% urban. More

1 Data on urban populations of regions and populations for specific cities are, unless otherwise indicated, from United Nations Population Division,

*World Urbanisation Prospects*, 2018 or Economist Intelligence Unit calculation based on those data.

2 *Seizing the Opportunity*, 2015.

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generally in wealthier states, over the next ten

years the urban proportion of the population

will stay largely flat, typically rising by 1-2%

across that entire period. In some Japanese

cities, such as Tokyo and Osaka, little inward

migration combined with low birth rates will

mean a decrease in the total population. Amid

the relative safety and order of such places, it is

easy to look with equanimity on

the world’s ongoing urbanisation.

The challenges are far more pressing

elsewhere. The urbanisation of the early 21st

century is a phenomenon of the developing

world, which already has 25 of the world’s 30

largest cities. In particular, the speed of growth

within the increasing number of emerging

mega-cities is historically rapid, in some cases

unprecedented. Thomas Bollyky, senior fellow

for Global Health at the US Council on Foreign

Relations, notes that during their respective

fastest decades of growth, London saw an

increase of just under 100,000 residents per

year and New York City 220,000. By contrast,

he says, over the past ten years Dhaka grew

by roughly 450,000 people annually and New

Delhi by 620,000.3

Going beyond the largest cities, over the

next decade the countries and regions with

the fastest annual relative rise in the urban

proportion of the population will include

China (1.4% per year), India (1.4%), and Sub-

Saharan Africa (1.2%). In absolute terms, the

change will be particularly visible in the first

of these, as its percentage growth starts from

a bigger numerical base: already more than

half of China’s population live in cities. In that

country alone, during the next ten years, urban

populations in aggregate will expand by 143m

people, or roughly 13%.

If anything, the best demographic estimates

may be having trouble keeping up with the

speed of urbanisation. In 2014 and 2018 the

UN Population Division projected the likely

increase in the number of urban residents

between 2020 and 2030. During that four-year

period, demographers increased their earlier

estimates for China, India and Sub-Saharan

Africa by 10% to 15%.

For specific cities, this will mean the already

very large challenges are now expected to be

even bigger. New Delhi city planners in 2014, for

example, could expect to need to address the

requirements of 6.7m more residents between

2020 and 2030. Now, the likeliest figure is 8.7m.

Those arriving to join the burgeoning

populations of developing world cities

frequently find conditions far from easy.

As Siddharth Agarwal, director of the Urban

Health Resource Centre, an Indian non-

**Growth in number of urban**

**residents 2020-30 (2014**

**estimate, in thousands)**

**Growth in number of urban**

**residents 2020-30 (2018**

**estimate, in thousands)**

China 124,498 142,771

India 112,312 124,243

Sub-Saharan Africa 185,942 207,495

3 See also, Thomas Bollyky, *Plagues and the Paradox of Progress: Why the World is Getting Healthier in Worrisome Ways*, 2018.

**Figure 1**

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government organisation (NGO), points out,

“in the most rapidly growing cities, the urban

disadvantaged, most of whom provide lowcost

services, represent the fastest expanding

segment of the population. Without these lowwage

workers, living behind urban glamour,

the city’s sheen, infrastructure and services

cannot grow.” All too often, these individuals

lead precarious lives. In China, for example,

240m people, or more than one in six of the

total population, live in cities outside of their

legal province of registration.4 This “floating

population”, lacking a right even to stay where

they are—let alone access to various healthcare

and other local assistance schemes—typically

live with poor employment, social and housing

conditions.5 They also make up many of the

quarter of China’s urban population who live

in informal settlements. Outside of China,

the proportion in slums can be higher still: in

New Delhi for example, the world’s second

largest city, 49% of residents are in informal

settlements, and in Lagos it is over half.

It is, however, too easy to see urbanisation

as a looming disaster inflicting widespread

neo-Dickensian squalor on much of humanity.

Certainly, the unstructured, accelerating

growth of developing world cities raises the

spectre of vast challenges that, if unmet,

could bring substantial human misery.

Simultaneously, though, it holds out the

prospect of a much more hopeful future.

Experts interviewed for this study stress the

importance of the latter. Alioune Badiane—

president of The Urban Think Tank Africa

(TUTTA) based in Senegal—explains regarding

his region that “some years ago, people thought

urbanisation was something evil. Now it is seen

as one of the key ingredients which can help

the African continent leapfrog economically.”

He adds that even amid the obvious, ongoing

need large numbers of city dwellers still have

for basic services, progress is obvious. “Every

day, the situation is improving. Urbanisation is

spurring development,” he adds. Looking more

globally, Mr Bollyky sees similar possibilities.

“Urbanisation is a positive thing,” he says.

“No country has become wealthy without

urbanising first. There are challenges to be

addressed, but urbanisation itself should not

be regretted.”

This is not simply whistling in the dark: even

the unprecedented speed of growth in today’s

developing world megacities in itself is a sign

of hope. The expansion of urban populations

in 19th century Europe and the US came

largely from inward migration, as death rates

limited the natural increase of city populations

through birth. Today, despite the substantial

number of new arrivals to urban areas across

the developing world, most urban population

growth comes from babies being born in these

cities and surviving.6

Urbanisation has already shaped the developed

world and is redefining developing countries. It

can be a blessing, a curse, or both in individual

locations and for human beings as a whole. Its

effect depends on how well urban governments

and residents manage the challenges, both

those common to all cities and specific to

particular locations. This study looks at perhaps

the most fundamental element of urban

management: the ability to provide safety.

4 “Floating Population,” Table 2-3, *China Statistical Yearbook*, 2018.

5 Zai Liang et al, “Changing Patterns of the Floating Population in China during 2000-2010,” *Population Development Review*, 2014.

6 Remi Jedwab et al., “Demography, Urbanization and Development: Rural Push, Urban Pull and...Urban Push?” *World Bank Policy Research Working Papers*,

No. 7333, 2015.

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**The many faces of security**

**The Economist Intelligence Unit’s**

**Safe Cities Index 2019**

Given urban security’s importance, The

Economist Intelligence Unit, sponsored by NEC

Corporation, maintains a regularly updated

index to assess the relevant strengths and

weaknesses of leading cities worldwide. This

publication accompanies the release of the

SCI2019, its third edition, which covers 60 major

urban areas.

But, for a city, what does “safe” mean? Rules

of thumb can provide a useful starting point

in framing an answer. Mr Badiane notes that

“in any city where you can often see a woman

walking alone at night, you can bet that is a

safe city.” On one level, this statement seems

a simple one about personal security, in

particular a low likelihood of violent attack.

Looking deeper, though, quickly brings up more

issues. Walking alone at night also requires

infrastructure, including places to walk where

one is unlikely to be hit by vehicles and lighting

that not only deters violence but also lets our

pedestrian see where she is going. Similarly,

unhealthy levels of air pollution or a lack of

public health education, which mean fewer

people see the value of walking, could take our

notional pedestrian off the street. Finally, Mr

Badiane’s scene would seem far less safe were

the contactless debit cards in our pedestrian’s

purse charged by someone with a hidden RFC

reader walking in the other direction.

Safety then, even when it appears simple, is

multifaceted. Accordingly, our index scores

draw on 57 distinct factors, or indicators,

some of which in turn aggregate multiple data

points. The environmental policy indicator,

for example, looks at: whether or not a

municipal environment department exists

and, if so, the extent of its remit; whether the

city has recently conducted an environmental

review and, if so, the breadth of its coverage;

and how publicly accessible environmental

information is. The indicators also balance

breadth and detail, covering areas as far apart

as perceptions of corruption and the extent of

internet access.

The indicators fall into four broad categories,

or pillars: personal, infrastructure, health and

digital security. Within each pillar, the relevant

indicators are grouped into inputs of safety,

such as policies or personnel dedicated to

some aspect of security, and outcomes,

which is anything from air pollution levels to

crime rates.7

Put simplistically, outputs measure how safe a

city currently is, while the inputs indicate which

cities are doing the right things to enhance

safety. Both are essential to understanding the

security situation. Not only will policy likely

enhance safety-related outcomes in the future,

but they may also be essential to preserving

them in the present. As Victor Lam, Hong

Kong’s government chief information officer,

says of digital security, “we say we are well

protected, but who knows? There are bound to

be incidents. There are attacks every day. We

have to be ready to respond very quickly.” Not

surprisingly, the overall input and output scores

correlate closely.

7 For details of the scoring of the indicators and pillars, as well as, in particular, some important caveats describing the limitations of how these data are

used, please see the Appendix at the end of this study.

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**Digital security**

Inputs

• Privacy policy

• Citizen awareness of digital threats

• Public-private partnerships

• Level of technology employed

• Dedicated cyber-security teams

Outputs

• Risk of local malware threats

• Percentage of computers infected

• Percentage with internet access

**Infrastructure security**

Inputs

• Enforcement of transport safety

• Pedestrian friendliness

• Disaster management/business continuity plan

Outputs

• Deaths from natural disasters

• Road traffic deaths

• Percentage living in slums

• Number of attacks on facilities/infrastructure

• Institutional capacity and access to resources

• Catastrophe insurance

• Disaster-risk informed development

• Air transport facilities

• Road network

• Power network

• Rail network

• Cyber-security preparedness

**Health security**

Inputs

• Environmental policies

• Access to healthcare

• No. of beds per 1,000 population

• No. of doctors per 1,000 population

• Access to safe and quality food

• Quality of health services

Outputs

• Air quality (PM 2.5 levels)

• Water quality

• Life expectancy years

• Infant mortality

• Cancer mortality rate

• No. of biological, chemical, radiological

weapons attacks

• Emergency services in the city

**Personal security**

Inputs

• Level of police engagement

• Community-based patrolling

• Available street-level crime data

• Use of data-driven techniques for crime

• Private security measures

• Gun regulation and enforcement

• Political stability risk

• Effectiveness of the criminal justice system

• Hazard monitoring

Outputs

• Prevalence of petty crime

• Prevalence of violent crime

• Organised crime

• Level of corruption

• Rate of drug use

• Frequency of terrorist attacks

• Severity of terrorist attacks

• Gender safety (female homicide)

• Perceptions of safety

• Threat of terrorism

• Threat of military conflict

• Threat of civil unrest

**SCI2019 pillars and indicators**

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**The rise of resilience and**

**enhancements to this year’s index**

Any index that measures over time needs

to evolve along with the field it covers. The

conventional wisdom among those involved

in urban safety increasingly holds that not

only do a wide variety of factors matter in this

field, but so too does their interaction. “A city

is composed of urban systems,” says Esteban

Leon, chief of the risk reduction unit and head

of the city resilience profiling programme at

UN-Habitat. This understanding of a city is

reshaping how an increasing number of urban

governments approach low-frequency, highrisk

events, whether involving acute disasters

or longer-term threats, notably climate change

and chronic social stresses.

Until recently, says Ede Ijjasz-Vasquez, senior

director of the World Bank’s Social, Urban,

Rural and Resilience Global Practice, shocks

to a city “have been seen from a sectoral

perspective: health emergencies have been

dealt with by the health services; floods by

drainage departments; refugees by housing

departments.” Now, though, many cities

are moving toward planning based around

“resilience”—a concept that moves away from

purely after-the-fact response to include

system-wide preparedness and risk reduction

as well. Mr Leon adds that “the evolution in

thinking toward resilience has been quite

steep in the last few years. Before we would

analyse disasters and challenges, but not from

the perspective of urban systems.” He uses the

analogy of the city as a healthy body. Any given

0

20

40

60

80

100

Fitted

0 20 40 60 80 100

Actual

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system might be able, or need, to contribute

in a different way to facing a diverse range of

negative events.

A lack of agreement on precisely what

resilience means reflects its novelty as a

working model. A recent literature review

found that some use the term to emphasise

how well a city responds after a disaster,

while others stress how well it absorbs shocks.

Similarly, some argue that the goal after

a shock should be to restore the situation

preceding the event as quickly as possible and

others to use the opportunity for improvement

over the preceding status quo.8

Although these distinctions have some policy

implications, in practice the basic concept

is clear. As Mr Ijjasz-Vasquez says of the

World Bank, “we are beginning to define

urban resilience as the ability of households,

communities and cities to bounce back.” This,

says Mr Leon, is “completely complementary to

urban security.”

Nevertheless, Elizabeth Johnston, executive

director of both the European and French

Forums for Urban Security, believes that

resilience is still not as integrated as it could

be in urban safety considerations. There

remains, she says, “a huge divide between

planning for natural and man-made disasters.

Cities have policies that are developed on

the preparedness for the latter but not

necessarily on climate change or, if they do

have such policies, they are not co-ordinated.

Only recently has terrorist preparedness

started to include natural disasters and vice

versa.” She adds that looking at these issues

together within the context of overall resilience

8 Adriana Sanchez et al. “The city politics of an urban age: urban resilience conceptualisations and policies,” *Palgrave Communications*,

is certainly “an emergent trend, but not

something ingrained” in urban governance.

Although discussions of resilience tend to focus

on preparedness for disaster, the benefits

are far wider: a resilient city has the ability to

perform when the world is watching. Yuriko

Koike, governor of Tokyo, explains that, as her

city welcomes the Rugby World Cup 2019™

and the Olympic and Paralympic Games Tokyo

2020, resilience matters not only for how it

enhances security but also for the improved

ability it gives the city to address the challenges

the many visiting fans and athletes might face

should a heatwave occur.

Previous editions of the SCI have included

indicators relevant to the danger of natural

and man-made shocks. In order to advance

thinking on resilience, we have bolstered the

number of indicators that deal with different

aspects of it. The 2019 index measures for the

first time things like the existence and speed

of city emergency services; the existence of a

disaster plan; the institutional capacity of those

tasked with disaster response; the availability

of disaster insurance; the ability to defend

infrastructure against cyber-attacks; and the

extent of hazard monitoring.

Although they come from different pillars, for

analysis later in this study, the resilience-related

indicators have been recombined into three

new categories:

• *Damage and threat multipliers:* damage

experienced from shocks—specifically

natural disasters and terrorism—as well

as city attributes that can exacerbate the

severity of shocks.

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**Damage and multipliers**

• Percentage of computers infected

• No. of biological, chemical, radiological

weapons attacks

• Deaths from natural disaster

• Percentage living in slums

• Number of attacks on facilities/infrastructure

• Frequency of terrorist attacks

• Severity of terrorist attacks

• Threat of terrorism

• Threat of military conflict

• Threat of civil unrest

**Relevant assets**

• Citizen awareness of digital threats

• Public-private partnerships

• Dedicated cyber-security teams

• Access to healthcare

• Quality of health services

• Emergency services in the city\*

• Air transport facilities\*

• Road network

• Power network

• Rail network\*

• Community-based patrolling

**Preparedness**

• Environmental policies

• Disaster management/business continuity plan

• Institutional capacity and access to resources\*

• Catastrophe insurance\*

• Disaster-risk informed development\*

• Cyber-security preparedness\*

• Hazard monitoring\*

\*New indicator for 2019.

**SCI2019 resilience categories**

• *Relevant assets:* the quality and extent

of general assets that are useful in the

event of a shock, such as different kinds

of infrastructure, healthcare, emergency

services and cyber-security awareness.

• *Preparation:* specific planning and

monitoring with an eye to preventing,

minimising or preparing for shocks.

The accompanying chart lists which indicators

have been included, as well as showing the new

indicators for 2019 that have been brought in

specifically to understand resilience better.

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**Insights from the index**

**The SCI2019 results**

The complete scores are as follows:

1 Tokyo 92.0

2 Singapore 91.5

3 Osaka 90.9

4 Amsterdam 88.0

5 Sydney 87.9

6 Toronto 87.8

7 Washington, DC 87.6

=8 Copenhagen 87.4

=8 Seoul 87.4

10 Melbourne 87.3

11 Chicago 86.7

12 Stockholm 86.5

13 San Francisco 85.9

14 London 85.7

15 New York 85.5

16 Frankfurt 85.4

17 Los Angeles 85.2

=18 Wellington 84.5

=18 Zurich 84.5

20 Hong Kong 83.7

21 Dallas 83.1

22 Taipei 82.5

23 Paris 82.4

24 Brussels 82.1

25 Madrid 81.4

26 Barcelona 81.2

27 Abu Dhabi 79.5

28 Dubai 79.1

29 Milan 78.1

30 Rome 76.4

31 Beijing 70.5

32 Shanghai 70.2

33 Santiago 69.8

34 Buenos Aires 69.7

35 Kuala Lumpur 66.3

36 Istanbul 66.1

37 Moscow 65.8

38 Kuwait City 64.5

39 Riyadh 62.5

40 Mexico City 61.6

41 Rio de Janeiro 60.9

42 Sao Paulo 59.7

43 Manila 59.2

44 Johannesburg 58.6

=45 Lima 58.2

=45 Mumbai 58.2

=47 Bangkok 57.6

=47 Ho Chi Minh City 57.6

49 Baku 56.4

50 Quito 55.3

51 Bogota 55.1

52 New Delhi 55.0

53 Jakarta 54.5

54 Casablanca 53.5

55 Cairo 48.6

56 Dhaka 44.6

57 Karachi 43.5

58 Yangon 41.9

59 Caracas 40.1

60 Lagos 38.1

Average 71.2

1 Tokyo 94.4

2 Singapore 93.1

3 Chicago 92.9

4 Washington, DC 92.2

=5 Los Angeles 91.4

=5 San Francisco 91.4

7 Dallas 91.3

8 New York 91.1

9 Toronto 90.6

10 London 90.2

=11 Melbourne 89.4

=11 Osaka 89.4

=11 Sydney 89.4

14 Amsterdam 89.0

15 Copenhagen 87.3

16 Stockholm 85.5

17 Seoul 84.7

18 Zurich 80.8

19 Wellington 80.2

20 Paris 80.0

21 Frankfurt 78.9

22 Hong Kong 78.8

23 Taipei 77.0

=24 Abu Dhabi 74.1

=24 Dubai 74.1

26 Brussels 74.0

27 Milan 72.5

=28 Barcelona 69.2

=28 Madrid 69.2

30 Rome 67.5

31 Buenos Aires 65.0

32 Santiago 64.6

33 Istanbul 61.9

34 Johannesburg 60.2

35 Mexico City 58.4

36 Beijing 58.1

37 Shanghai 57.4

38 Riyadh 56.5

39 Kuwait City 56.4

40 Bangkok 56.2

41 Bogota 54.7

42 Quito 54.5

43 Kuala Lumpur 54.4

44 Rio de Janeiro 52.7

45 Manila 52.1

46 Baku 51.7

=47 Mumbai 51.0

=47 New Delhi 51.0

49 Lima 49.8

50 Sao Paulo 49.4

51 Casablanca 44.9

52 Karachi 43.1

53 Caracas 42.9

54 Moscow 42.8

55 Jakarta 42.3

56 Lagos 42.2

57 Dhaka 41.9

58 Cairo 40.7

59 Ho Chi Minh City 40.2

60 Yangon 27.8

Average 67.2

1 Osaka 88.5

2 Tokyo 87.5

3 Seoul 85.2

=4 Amsterdam 81.6

=4 Stockholm 81.6

6 Frankfurt 81.2

7 Washington, DC 81.1

8 Singapore 80.9

9 Zurich 80.8

10 Taipei 80.2

=11 Copenhagen 79.8

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=13 Brussels 79.3

=13 Melbourne 79.3

15 Paris 78.7

16 London 78.0

17 Toronto 77.4

18 San Francisco 77.2

19 Chicago 77.1

=20 Madrid 76.1

=20 New York 76.1

22 Dallas 75.9

23 Los Angeles 75.8

24 Barcelona 75.2

25 Rome 75.1

26 Milan 74.9

27 Hong Kong 73.2

28 Wellington 72.9

29 Abu Dhabi 71.8

30 Moscow 71.5

31 Dubai 70.5

32 Buenos Aires 69.8

33 Beijing 68.0

34 Shanghai 67.5

35 Kuwait City 64.8

=36 Rio de Janeiro 64.7

=36 Sao Paulo 64.7

=38 Kuala Lumpur 64.4

=38 Santiago 64.4

40 Mexico City 64.1

41 Baku 64.0

42 Riyadh 62.9

43 Istanbul 61.7

44 Lima 60.7

45 Bangkok 59.9

46 Quito 59.4

47 Bogota 59.1

48 Manila 56.6

49 Ho Chi Minh City 56.3

50 Mumbai 55.8

51 New Delhi 54.6

52 Johannesburg 53.2

53 Jakarta 51.7

54 Casablanca 50.0

55 Caracas 48.1

56 Cairo 46.1

57 Dhaka 45.1

58 Yangon 42.3

59 Karachi 39.0

60 Lagos 34.1

Average 68.0

1 Singapore 95.3

2 Copenhagen 93.6

3 Hong Kong 91.9

4 Tokyo 91.7

5 Wellington 91.5

6 Stockholm 91.3

7 Osaka 91.1

8 Toronto 90.8

9 Amsterdam 89.4

10 Sydney 89.1

11 Abu Dhabi 88.9

12 Dubai 88.6

13 Zurich 87.8

14 Frankfurt 87.7

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16 Melbourne 86.8

17 Brussels 86.3

18 Madrid 86.2

19 Barcelona 86.0

20 Taipei 85.8

21 Paris 85.2

22 London 84.3

=23 Shanghai 84.0

=23 Washington, DC 84.0

25 Beijing 83.9

26 Chicago 83.8

=27 Dallas 83.3

=27 San Francisco 83.3

29 Milan 82.4

30 New York 82.2

31 Kuala Lumpur 81.8

32 Los Angeles 81.3

33 Kuwait City 80.4

34 Rome 79.8

35 Santiago 79.4

36 Ho Chi Minh City 78.7

37 Mumbai 76.2

38 Riyadh 75.9

39 Moscow 75.3

40 Manila 74.7

41 New Delhi 73.6

42 Buenos Aires 72.9

43 Jakarta 71.7

44 Casablanca 69.5

45 Lima 69.3

46 Rio de Janeiro 68.4

47 Sao Paulo 67.5

48 Istanbul 65.2

49 Baku 63.7

50 Johannesburg 63.2

51 Mexico City 62.3

52 Bangkok 61.8

53 Cairo 59.3

54 Quito 57.5

55 Dhaka 57.4

56 Bogota 52.8

57 Yangon 52.3

58 Karachi 45.9

59 Caracas 42.1

60 Lagos 38.7

Average 77.0

1 Singapore 96.9

2 Osaka 94.5

3 Barcelona 94.4

4 Tokyo 94.3

5 Madrid 94.2

6 Frankfurt 93.7

=7 Melbourne 93.5

=7 Sydney 93.5

9 Wellington 93.2

10 Washington, DC 93.1

11 Chicago 93.0

=12 New York 92.5

=12 Toronto 92.5

14 Seoul 92.4

15 Los Angeles 92.2

16 Amsterdam 92.0

17 San Francisco 91.7

18 Hong Kong 91.1

19 London 90.4

20 Copenhagen 89.0

21 Brussels 88.9

22 Zurich 88.5

23 Stockholm 87.5

24 Taipei 87.1

25 Paris 85.9

=26 Abu Dhabi 83.2

=26 Dubai 83.2

28 Rome 83.1

29 Milan 82.8

30 Dallas 81.9

31 Istanbul 75.8

32 Moscow 73.6

33 Beijing 72.1

34 Shanghai 72.0

35 Buenos Aires 71.2

36 Santiago 71.0

37 Kuala Lumpur 64.7

38 Mexico City 61.5

39 Johannesburg 57.8

40 Rio de Janeiro 57.7

41 Sao Paulo 57.2

42 Kuwait City 56.4

43 Ho Chi Minh City 55.4

44 Riyadh 54.8

45 Bogota 53.9

46 Manila 53.6

47 Lima 53.0

48 Bangkok 52.5

49 Jakarta 52.3

50 Mumbai 50.0

51 Quito 49.9

52 Casablanca 49.6

53 Cairo 48.2

54 Baku 46.3

55 Karachi 46.1

56 Yangon 45.3

57 New Delhi 40.7

58 Lagos 37.4

59 Dhaka 34.2

60 Caracas 27.3

Average 72.5

1 Tokyo 92.0

2 Singapore 91.5

3 Osaka 90.9

4 Amsterdam 88.0

5 Sydney 87.9

6 Toronto 87.8

7 Washington, DC 87.6

=8 Copenhagen 87.4

=8 Seoul 87.4

10 Melbourne 87.3

11 Chicago 86.7

12 Stockholm 86.5

13 San Francisco 85.9

14 London 85.7

15 New York 85.5

16 Frankfurt 85.4

17 Los Angeles 85.2

=18 Wellington 84.5

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20 Hong Kong 83.7

21 Dallas 83.1

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25 Madrid 81.4

26 Barcelona 81.2

27 Abu Dhabi 79.5

28 Dubai 79.1

29 Milan 78.1

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32 Shanghai 70.2

33 Santiago 69.8

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35 Kuala Lumpur 66.3

36 Istanbul 66.1

37 Moscow 65.8

38 Kuwait City 64.5

39 Riyadh 62.5

40 Mexico City 61.6

41 Rio de Janeiro 60.9

42 Sao Paulo 59.7

43 Manila 59.2

44 Johannesburg 58.6

=45 Lima 58.2

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=47 Bangkok 57.6

=47 Ho Chi Minh City 57.6

49 Baku 56.4

50 Quito 55.3

51 Bogota 55.1

52 New Delhi 55.0

53 Jakarta 54.5

54 Casablanca 53.5

55 Cairo 48.6

56 Dhaka 44.6

57 Karachi 43.5

58 Yangon 41.9

59 Caracas 40.1

60 Lagos 38.1

Average 71.2

1 Tokyo 94.4

2 Singapore 93.1

3 Chicago 92.9

4 Washington, DC 92.2

=5 Los Angeles 91.4

=5 San Francisco 91.4

7 Dallas 91.3

8 New York 91.1

9 Toronto 90.6

10 London 90.2

=11 Melbourne 89.4

=11 Osaka 89.4

=11 Sydney 89.4

14 Amsterdam 89.0

15 Copenhagen 87.3

16 Stockholm 85.5

17 Seoul 84.7

18 Zurich 80.8

19 Wellington 80.2

20 Paris 80.0

21 Frankfurt 78.9

22 Hong Kong 78.8

23 Taipei 77.0

=24 Abu Dhabi 74.1

=24 Dubai 74.1

26 Brussels 74.0

27 Milan 72.5

=28 Barcelona 69.2

=28 Madrid 69.2

30 Rome 67.5

31 Buenos Aires 65.0

32 Santiago 64.6

33 Istanbul 61.9

34 Johannesburg 60.2

35 Mexico City 58.4

36 Beijing 58.1

37 Shanghai 57.4

38 Riyadh 56.5

39 Kuwait City 56.4

40 Bangkok 56.2

41 Bogota 54.7

42 Quito 54.5

43 Kuala Lumpur 54.4

44 Rio de Janeiro 52.7

45 Manila 52.1

46 Baku 51.7

=47 Mumbai 51.0

=47 New Delhi 51.0

49 Lima 49.8

50 Sao Paulo 49.4

51 Casablanca 44.9

52 Karachi 43.1

53 Caracas 42.9

54 Moscow 42.8

55 Jakarta 42.3

56 Lagos 42.2

57 Dhaka 41.9

58 Cairo 40.7

59 Ho Chi Minh City 40.2

60 Yangon 27.8

Average 67.2

1 Osaka 88.5

2 Tokyo 87.5

3 Seoul 85.2

=4 Amsterdam 81.6

=4 Stockholm 81.6

6 Frankfurt 81.2

7 Washington, DC 81.1

8 Singapore 80.9

9 Zurich 80.8

10 Taipei 80.2

=11 Copenhagen 79.8

=11 Sydney 79.8

=13 Brussels 79.3

=13 Melbourne 79.3

15 Paris 78.7

16 London 78.0

17 Toronto 77.4

18 San Francisco 77.2

19 Chicago 77.1

=20 Madrid 76.1

=20 New York 76.1

22 Dallas 75.9

23 Los Angeles 75.8

24 Barcelona 75.2

25 Rome 75.1

26 Milan 74.9

27 Hong Kong 73.2

28 Wellington 72.9

29 Abu Dhabi 71.8

30 Moscow 71.5

31 Dubai 70.5

32 Buenos Aires 69.8

33 Beijing 68.0

34 Shanghai 67.5

35 Kuwait City 64.8

=36 Rio de Janeiro 64.7

=36 Sao Paulo 64.7

=38 Kuala Lumpur 64.4

=38 Santiago 64.4

40 Mexico City 64.1

41 Baku 64.0

42 Riyadh 62.9

43 Istanbul 61.7

44 Lima 60.7

45 Bangkok 59.9

46 Quito 59.4

47 Bogota 59.1

48 Manila 56.6

49 Ho Chi Minh City 56.3

50 Mumbai 55.8

51 New Delhi 54.6

52 Johannesburg 53.2

53 Jakarta 51.7

54 Casablanca 50.0

55 Caracas 48.1

56 Cairo 46.1

57 Dhaka 45.1

58 Yangon 42.3

59 Karachi 39.0

60 Lagos 34.1

Average 68.0

1 Singapore 95.3

2 Copenhagen 93.6

3 Hong Kong 91.9

4 Tokyo 91.7

5 Wellington 91.5

6 Stockholm 91.3

7 Osaka 91.1

8 Toronto 90.8

9 Amsterdam 89.4

10 Sydney 89.1

11 Abu Dhabi 88.9

12 Dubai 88.6

13 Zurich 87.8

14 Frankfurt 87.7

15 Seoul 87.5

16 Melbourne 86.8

17 Brussels 86.3

18 Madrid 86.2

19 Barcelona 86.0

20 Taipei 85.8

21 Paris 85.2

22 London 84.3

=23 Shanghai 84.0

=23 Washington, DC 84.0

25 Beijing 83.9

26 Chicago 83.8

=27 Dallas 83.3

=27 San Francisco 83.3

29 Milan 82.4

30 New York 82.2

31 Kuala Lumpur 81.8

32 Los Angeles 81.3

33 Kuwait City 80.4

34 Rome 79.8

35 Santiago 79.4

36 Ho Chi Minh City 78.7

37 Mumbai 76.2

38 Riyadh 75.9

39 Moscow 75.3

40 Manila 74.7

41 New Delhi 73.6

42 Buenos Aires 72.9

43 Jakarta 71.7

44 Casablanca 69.5

45 Lima 69.3

46 Rio de Janeiro 68.4

47 Sao Paulo 67.5

48 Istanbul 65.2

49 Baku 63.7

50 Johannesburg 63.2

51 Mexico City 62.3

52 Bangkok 61.8

53 Cairo 59.3

54 Quito 57.5

55 Dhaka 57.4

56 Bogota 52.8

57 Yangon 52.3

58 Karachi 45.9

59 Caracas 42.1

60 Lagos 38.7

Average 77.0

1 Singapore 96.9

2 Osaka 94.5

3 Barcelona 94.4

4 Tokyo 94.3

5 Madrid 94.2

6 Frankfurt 93.7

=7 Melbourne 93.5

=7 Sydney 93.5

9 Wellington 93.2

10 Washington, DC 93.1

11 Chicago 93.0

=12 New York 92.5

=12 Toronto 92.5

14 Seoul 92.4

15 Los Angeles 92.2

16 Amsterdam 92.0

17 San Francisco 91.7

18 Hong Kong 91.1

19 London 90.4

20 Copenhagen 89.0

21 Brussels 88.9

22 Zurich 88.5

23 Stockholm 87.5

24 Taipei 87.1

25 Paris 85.9

=26 Abu Dhabi 83.2

=26 Dubai 83.2

28 Rome 83.1

29 Milan 82.8

30 Dallas 81.9

31 Istanbul 75.8

32 Moscow 73.6

33 Beijing 72.1

34 Shanghai 72.0

35 Buenos Aires 71.2

36 Santiago 71.0

37 Kuala Lumpur 64.7

38 Mexico City 61.5

39 Johannesburg 57.8

40 Rio de Janeiro 57.7

41 Sao Paulo 57.2

42 Kuwait City 56.4

43 Ho Chi Minh City 55.4

44 Riyadh 54.8

45 Bogota 53.9

46 Manila 53.6

47 Lima 53.0

48 Bangkok 52.5

49 Jakarta 52.3

50 Mumbai 50.0

51 Quito 49.9

52 Casablanca 49.6

53 Cairo 48.2

54 Baku 46.3

55 Karachi 46.1

56 Yangon 45.3

57 New Delhi 40.7

58 Lagos 37.4

59 Dhaka 34.2

60 Caracas 27.3

Average 72.5

1 Tokyo 92.0

2 Singapore 91.5

3 Osaka 90.9

4 Amsterdam 88.0

5 Sydney 87.9

6 Toronto 87.8

7 Washington, DC 87.6

=8 Copenhagen 87.4

=8 Seoul 87.4

10 Melbourne 87.3

11 Chicago 86.7

12 Stockholm 86.5

13 San Francisco 85.9

14 London 85.7

15 New York 85.5

16 Frankfurt 85.4

17 Los Angeles 85.2

=18 Wellington 84.5

=18 Zurich 84.5

20 Hong Kong 83.7

21 Dallas 83.1

22 Taipei 82.5

23 Paris 82.4

24 Brussels 82.1

25 Madrid 81.4

26 Barcelona 81.2

27 Abu Dhabi 79.5

28 Dubai 79.1

29 Milan 78.1

30 Rome 76.4

31 Beijing 70.5

32 Shanghai 70.2

33 Santiago 69.8

34 Buenos Aires 69.7

35 Kuala Lumpur 66.3

36 Istanbul 66.1

37 Moscow 65.8

38 Kuwait City 64.5

39 Riyadh 62.5

40 Mexico City 61.6

41 Rio de Janeiro 60.9

42 Sao Paulo 59.7

43 Manila 59.2

44 Johannesburg 58.6

=45 Lima 58.2

=45 Mumbai 58.2

=47 Bangkok 57.6

=47 Ho Chi Minh City 57.6

49 Baku 56.4

50 Quito 55.3

51 Bogota 55.1

52 New Delhi 55.0

53 Jakarta 54.5

54 Casablanca 53.5

55 Cairo 48.6

56 Dhaka 44.6

57 Karachi 43.5

58 Yangon 41.9

59 Caracas 40.1

60 Lagos 38.1

Average 71.2

1 Tokyo 94.4

2 Singapore 93.1

3 Chicago 92.9

4 Washington, DC 92.2

=5 Los Angeles 91.4

=5 San Francisco 91.4

7 Dallas 91.3

8 New York 91.1

9 Toronto 90.6

10 London 90.2

=11 Melbourne 89.4

=11 Osaka 89.4

=11 Sydney 89.4

14 Amsterdam 89.0

15 Copenhagen 87.3

16 Stockholm 85.5

17 Seoul 84.7

18 Zurich 80.8

19 Wellington 80.2

20 Paris 80.0

21 Frankfurt 78.9

22 Hong Kong 78.8

23 Taipei 77.0

=24 Abu Dhabi 74.1

=24 Dubai 74.1

26 Brussels 74.0

27 Milan 72.5

=28 Barcelona 69.2

=28 Madrid 69.2

30 Rome 67.5

31 Buenos Aires 65.0

32 Santiago 64.6

33 Istanbul 61.9

34 Johannesburg 60.2

35 Mexico City 58.4

36 Beijing 58.1

37 Shanghai 57.4

38 Riyadh 56.5

39 Kuwait City 56.4

40 Bangkok 56.2

41 Bogota 54.7

42 Quito 54.5

43 Kuala Lumpur 54.4

44 Rio de Janeiro 52.7

45 Manila 52.1

46 Baku 51.7

=47 Mumbai 51.0

=47 New Delhi 51.0

49 Lima 49.8

50 Sao Paulo 49.4

51 Casablanca 44.9

52 Karachi 43.1

53 Caracas 42.9

54 Moscow 42.8

55 Jakarta 42.3

56 Lagos 42.2

57 Dhaka 41.9

58 Cairo 40.7

59 Ho Chi Minh City 40.2

60 Yangon 27.8

Average 67.2

1 Osaka 88.5

2 Tokyo 87.5

3 Seoul 85.2

=4 Amsterdam 81.6

=4 Stockholm 81.6

6 Frankfurt 81.2

7 Washington, DC 81.1

8 Singapore 80.9

9 Zurich 80.8

10 Taipei 80.2

=11 Copenhagen 79.8

=11 Sydney 79.8

=13 Brussels 79.3

=13 Melbourne 79.3

15 Paris 78.7

16 London 78.0

17 Toronto 77.4

18 San Francisco 77.2

19 Chicago 77.1

=20 Madrid 76.1

=20 New York 76.1

22 Dallas 75.9

23 Los Angeles 75.8

24 Barcelona 75.2

25 Rome 75.1

26 Milan 74.9

27 Hong Kong 73.2

28 Wellington 72.9

29 Abu Dhabi 71.8

30 Moscow 71.5

31 Dubai 70.5

32 Buenos Aires 69.8

33 Beijing 68.0

34 Shanghai 67.5

35 Kuwait City 64.8

=36 Rio de Janeiro 64.7

=36 Sao Paulo 64.7

=38 Kuala Lumpur 64.4

=38 Santiago 64.4

40 Mexico City 64.1

41 Baku 64.0

42 Riyadh 62.9

43 Istanbul 61.7

44 Lima 60.7

45 Bangkok 59.9

46 Quito 59.4

47 Bogota 59.1

48 Manila 56.6

49 Ho Chi Minh City 56.3

50 Mumbai 55.8

51 New Delhi 54.6

52 Johannesburg 53.2

53 Jakarta 51.7

54 Casablanca 50.0

55 Caracas 48.1

56 Cairo 46.1

57 Dhaka 45.1

58 Yangon 42.3

59 Karachi 39.0

60 Lagos 34.1

Average 68.0

1 Singapore 95.3

2 Copenhagen 93.6

3 Hong Kong 91.9

4 Tokyo 91.7

5 Wellington 91.5

6 Stockholm 91.3

7 Osaka 91.1

8 Toronto 90.8

9 Amsterdam 89.4

10 Sydney 89.1

11 Abu Dhabi 88.9

12 Dubai 88.6

13 Zurich 87.8

14 Frankfurt 87.7

15 Seoul 87.5

16 Melbourne 86.8

17 Brussels 86.3

18 Madrid 86.2

19 Barcelona 86.0

20 Taipei 85.8

21 Paris 85.2

22 London 84.3

=23 Shanghai 84.0

=23 Washington, DC 84.0

25 Beijing 83.9

26 Chicago 83.8

=27 Dallas 83.3

=27 San Francisco 83.3

29 Milan 82.4

30 New York 82.2

31 Kuala Lumpur 81.8

32 Los Angeles 81.3

33 Kuwait City 80.4

34 Rome 79.8

35 Santiago 79.4

36 Ho Chi Minh City 78.7

37 Mumbai 76.2

38 Riyadh 75.9

39 Moscow 75.3

40 Manila 74.7

41 New Delhi 73.6

42 Buenos Aires 72.9

43 Jakarta 71.7

44 Casablanca 69.5

45 Lima 69.3

46 Rio de Janeiro 68.4

47 Sao Paulo 67.5

48 Istanbul 65.2

49 Baku 63.7

50 Johannesburg 63.2

51 Mexico City 62.3

52 Bangkok 61.8

53 Cairo 59.3

54 Quito 57.5

55 Dhaka 57.4

56 Bogota 52.8

57 Yangon 52.3

58 Karachi 45.9

59 Caracas 42.1

60 Lagos 38.7

Average 77.0

1 Singapore 96.9

2 Osaka 94.5

3 Barcelona 94.4

4 Tokyo 94.3

5 Madrid 94.2

6 Frankfurt 93.7

=7 Melbourne 93.5

=7 Sydney 93.5

9 Wellington 93.2

10 Washington, DC 93.1

11 Chicago 93.0

=12 New York 92.5

=12 Toronto 92.5

14 Seoul 92.4

15 Los Angeles 92.2

16 Amsterdam 92.0

17 San Francisco 91.7

18 Hong Kong 91.1

19 London 90.4

20 Copenhagen 89.0

21 Brussels 88.9

22 Zurich 88.5

23 Stockholm 87.5

24 Taipei 87.1

25 Paris 85.9

=26 Abu Dhabi 83.2

=26 Dubai 83.2

28 Rome 83.1

29 Milan 82.8

30 Dallas 81.9

31 Istanbul 75.8

32 Moscow 73.6

33 Beijing 72.1

34 Shanghai 72.0

35 Buenos Aires 71.2

36 Santiago 71.0

37 Kuala Lumpur 64.7

38 Mexico City 61.5

39 Johannesburg 57.8

40 Rio de Janeiro 57.7

41 Sao Paulo 57.2

42 Kuwait City 56.4

43 Ho Chi Minh City 55.4

44 Riyadh 54.8

45 Bogota 53.9

46 Manila 53.6

47 Lima 53.0

48 Bangkok 52.5

49 Jakarta 52.3

50 Mumbai 50.0

51 Quito 49.9

52 Casablanca 49.6

53 Cairo 48.2

54 Baku 46.3

55 Karachi 46.1

56 Yangon 45.3

57 New Delhi 40.7

58 Lagos 37.4

59 Dhaka 34.2

60 Caracas 27.3

Average 72.5

16 Safe Cities Index 2019

Urban security and resilience in an interconnected world

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Four boxes across the following pages look

more closely at the individual pillar results. The

rest of the discussion in the main text focuses

on insights for cities from the overall picture—

an area that has received less attention in

previous SCI reports.

**The top five:**

1. Tokyo

2. Singapore

3. Chicago

4. Washington, DC

5 = Los Angeles

5 = San Francisco

**What these leaders have in common:** all

get full marks on every digital security input

indicator. As a result, they have low levels of

infection by computer viruses and malware.

**Where they differ:** the only thing that sets

these cities apart is the percentage of residents

with internet access, which ranges from 76% in

Los Angeles and San Francisco to 91% in Tokyo.

**Of interest:** getting security right before

expanding access seems to be the best

approach. Kuwait City has the highest level

of internet access (98%), but weaknesses in

privacy policy, citizen awareness of cybersecurity,

and dedicated cyber-security teams

help explain how between 20% and 30% of the

city’s computers are infected and its low score

on the presence of malware.

**Digital security**

**The top five:**

1. Osaka

2. Tokyo

3. Seoul

4 = Amsterdam

4 = Stockholm

**What these leaders have in common:** these

leaders get the basics right, scoring well—

including often getting full marks—for areas like

healthcare access and quality, safe food, water

and air, and speed of emergency services.

**Where they differ:** a key difference is the much

higher number of beds per head in the Asian

cities in this list compared with European ones.

Given similarities in terms of healthcare access

and quality, this may reflect differing medical

cultures rather than a fundamental weakness in

Amsterdam or Stockholm.

**Of interest:** healthcare outcomes reflect the

disease burden as much as quality of health

systems: four of these cities score around 70 out

of 100 for cancer mortality, and Amsterdam does

much worse. The top cities on this indicator,

those from Arab states, benefit from fewer cases

of cancer rather than a superior ability to deal

with those that arise.

**Health security**

17 Safe Cities Index 2019

Urban security and resilience in an interconnected world

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**The top five:**

1. Singapore

2. Osaka

3. Barcelona

4. Tokyo

5. Madrid

**What these leaders have in common:** Again,

good policy is essential to become a leader in this

pillar, with every one of the top five scoring full

marks for their continuity management plans,

pedestrian friendliness, institutional capacity

and disaster-risk informed development.

**Where they differ:** Beyond first place

Singapore, the other cities have a mixed record

on the quality of their infrastructure. Although

none do poorly—the worst is Osaka’s 22nd place

for its air travel links—each of these four lags

behind leading peers in at least one area.

**Of interest:** infrastructure is the area that sees

the widest variations in scores—and therefore

the greatest possibility for improvement.

Singapore’s 96.9 points is the highest figure for

any city in an individual pillar and Caracas’ 27.3

the lowest.

**Infrastructure security**

**The top five:**

1. Singapore

2. Copenhagen

3. Hong Kong

4. Tokyo

5. Wellington

**What these leaders have in common:** They

are strong on personal security inputs, with

all scoring between 92 and 96 points out of

100. In particular, each gets full marks for the

policing-related indicators: level of engagement,

community-based patrolling and use of datadriven

techniques.

**Where they differ:** those trying to reach the

top of this pillar face different challenges. For

Hong Kong and Tokyo, corruption and organised

crime are still a problem, although they are

typically better than in most other index cities.

For Wellington, the most visible weakness in the

index is illegal drug use, for which it comes 56th.

**Of interest:** citizens don’t look at policies but

at results. The index’s perceptions of safety

score correlates closely with levels of violent

and petty crime, but shows no statistical link to

input scores.

**Personal security**

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At this overall level, the 2019 leader, for the

third time running, is Tokyo, with a broad array

of strengths. It ties for first place on indicators

as diverse as low crime levels (both violent and

petty), infrastructure designed to withstand

natural shocks, and low risk of computer

malware. Meanwhile, its lowest pillar score is

still a very respectable fourth place (for both

infrastructure and personal safety). Mr Tomer

is not unusual in noting that “by many

accounts, Tokyo is one of the world’s best

run cities.” Governor Koike, adds that safety

has been a long-term, leading focus of the

metropolitan government for many years, and

that Tokyo has not finished its innovation in

this area (see box).

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*The Economist Intelligence Unit: Tokyo has come first in The*

*Economist Intelligence Unit’s Safe Cities Index in 2015, 2017 and*

*now again in 2019. Why do you think Tokyo has been so successful?*

**Governor Koike:** Given that earthquakes are endemic to Japan

and we are also witnessing major climate change around the

world, it is utterly critical that Tokyo protects residents and the

city from natural disasters. To do so, we have pursued a range

of reforms, both on the infrastructure and the intangible side,

expending a large budget. Tokyo’s having received high acclaim as

a safe city results in part from the steady and consistent way we

have pushed forward these initiatives over the years.

*The Economist Intelligence Unit: Where are some of the city’s*

*largest current efforts around safety and resilience?*

**Governor Koike:** Last year, we had heavy rains. Flooding and

water damage caused many incidents involving landslides and

the loss of human lives in Japan. Tokyo is surrounded by several

rivers, so there are also infrastructural concerns to consider in

such situations.

We therefore created a vast underground reservoir. It is quite

a cost-intensive project, but if you take into account the much

greater cost of flood damage—including loss of life and assets—as

well as the need to rebuild thereafter, taking preventive measures

is ultimately more cost-effective.

Another issue is the profusion of utility poles around Tokyo. We are

moving forward to bury these. The tangle of cables is not attractive,

and they can topple in earthquakes, impeding rescue vehicles. As

for infrastructure including buried objects like old water pipes, we

have to take various measures to replace them or shore them up.

*The Economist Intelligence Unit: Recent research indicates that*

*social connections and voluntary action play a major role in*

*enhancing the safety of a city. What is Tokyo doing to respond to*

*this insight?*

One idea is that of “self-help, mutual help and public assistance.”

The hope is that residents should take the initiative to help

themselves when needed. And they should then work together to

help others. The administration should be there to provide backup.

In terms of self-help, we are promoting the use of rescue kits that

residents can have on hand for emergencies, including spare

water, rations, portable toilet equipment and the like for use in

flooding, earthquakes, or other disasters. Mutual help refers to

local residents practicing and training together and considering

how to provide relief for, and by themselves in the event of an

earthquake. Public assistance is what we in the administration

do, as discussed earlier, such as projects to reduce the impact of

flooding, and to educate the public on disaster prevention.

We recently developed something called *Tokyo My Timeline*. This

functions as a kit and contains equipment to prepare for a flood.

This presents a timeline of response efforts to review: when flooding

or sudden heavy rains occur, what to do, in what order. Children

use stickers in this handbook to learn, as though playing a game,

what the right response is. This kit is designed to help residents

learn independently how a proper response should be carried out.

Teaching this in schools is effective, because the children go home and

share what they learned with their family, which helps disseminate

the information further. This is just one of several booklets we are

distributing to help people know what to do in the event of a disaster.

This is just one of several booklets we are distributing to help

people know what to do in the event of a disaster.

Beyond disaster response, each region in Tokyo has spent many

years developing fire departments both at the administrative level,

through the Fire and Disaster Management Agency, and through

volunteer firefighters’ groups. This allows local residents to be aware

of the location of thesources of water and practice to a high degree of

precision using hoses to draw water in the event of a fire. Sometimes

they have local contests to further refine their skills, with the volunteer

groups and agency working together to greatly increase local safety.

**Q&A with a city leader—Yuriko Koike, governor, Tokyo**

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Along with Tokyo, other Asia-Pacific cities, as

in the past, dominate. Singapore and Osaka

come second and third, while Sydney and

Melbourne also make the top ten. Although

Hong Kong has dropped out of this group

since 2017, Seoul has joined it, coming tied

for eighth. Rounding out the leaders are two

from Europe, Amsterdam and Copenhagen,

and two from North America, Toronto and

Washington, DC.

It would be wrong, though, to argue from

these results that geography, or accompanying

cultural differences, have a clear effect on

urban safety outcomes. After controlling

for other factors that strongly correlate

with our overall and pillar results, which are

discussed below, a city’s region did not have

any statistically significant relationship with

SCI2019 performance. Tokyo, Singapore and

Osaka are not safer because they happen to

be in Asia, but because of the specific urban

environments their residents and officials

have built.

**Safety is indivisible**

Going beyond the winners and losers in the

index tables, a wider look at the results yield

several key insights for policymakers and urban

stakeholders. These begin with the nature of

city safety itself.

As discussed above, different kinds of safety

are relevant even when walking down the

street. At first sight, the most obvious thing

about these different kinds of security is that

they rely on different providers: someone

might call the police for a personal security

issue, say, but a doctor for health security.

The scores in the four index pillars, though,

turn out to be closely correlated. Just how

intertwined different kinds of security

are is “definitely not commonly or widely

understood” among the public or policymakers

notes Ms Johnston.

A look at the overall standings shows that the

ranking of any given city in a particular pillar

tends not to vary greatly from its ranking in

other pillars. In other words, cities tend to

be similarly good, mediocre or poor across

all aspects of safety rather than leaders

in one area and laggards in another. The

accompanying graph, comparing the overall

scores for personal and health security, shows

just how closely these are related, suggesting

that we simply go to the police for one and the

doctor for the other is too simplistic.

This statistical link is no accident. In London,

for example, the UK’s Mental Health Crisis

Care Concordat results, among other things,

in police working with other appropriate

agencies to get the best care for individuals

experiencing a mental health crisis, who might

previously simply have been arrested if they

had threatened the safety of others. However,

Lord Bernard Hogan-Howe, recently retired as

commissioner of London’s Metropolitan Police,

explains that one reason for fewer deaths from

violence or accidents in many cities, quite

apart from improvements in policing or other

services, is better emergency healthcare.

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0

10

20

30

40

50

60

70

80

90

100

0 10 20 30 40 50 60 70 80 90 100

Fitted Actual

The personal-health safety link is the rule,

not the exception. Infrastructure scores also

correlate closely with those of other pillars.

This is a connection that Mr Tomer notes

“is pretty typical that folks miss”, except

in obvious cases of massive infrastructure

failure. Fumihiko Nakamura, vice-president of

Yokohama National University in Japan, points

out that urban infrastructure shapes lifestyles,

including things as basic as whether one walks

or drives to work. As a result, “infrastructure

either propels, or detracts from, one’s health”,

and therefore the health security of many

citizens. Similarly, note several interviewees,

the design of public places can have a

substantial impact on the personal safety of

those using them.

Perhaps the most underappreciated—and

therefore particularly noteworthy—connection

is that between digital security and other

fields. Gregory Falco, cyber research fellow at

Stanford University, observes that “digital and

physical security are very closely entwined.

Nevertheless, it is hard for citizens and

governments to align the two things.”

The index data make the connection

abundantly clear. As the three charts show, our

digital security scores correlate closely with

those of the other pillars.

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0

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70

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0 10 20 30 40 50 60 70 80 90 100

0

10

20

30

40

50

60

70

80

90

100

0 10 20 30 40 50 60 70 80 90 100

0

10

20

30

40

50

60

70

80

90

100

0 10 20 30 40 50 60 70 80 90 100

Fitted Actual

Fitted Actual

Fitted Actual

Correlation does not prove causation, and

the relationship between different kinds of

security goes both ways. Nevertheless, part of

the connection is a frequent reliance of other

pillars on digital security. Mr Falco notes that

the operational technologies behind much of

the “urban critical infrastructure that makes

life function are vulnerable to attack, which

would carry immense economic and physical

consequences.” The health pillar is equally

reliant, as the WannaCry ransomware attack on

the UK’s National Health Service made all too

obvious, leading to the cancellation of 19,000

medical appointments from May 12th

to 19th, 2017.9

Mr Lam puts the importance of digital security

succinctly: “Everybody depends on data to

do business, so you have to make sure every

business continuity plan involves a plan for

IT systems to handle a disaster. Our cybersecurity

drills are related not just to digital

9 UK Department of Health and Social Care, *Securing cyber resilience in health and care: Progress Report*, October 2018.

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Technology plays an obvious role in digital security,

but new developments in artificial intelligence

(AI) and robotics are opening some intriguing new

possibilities in other pillars.

In healthcare, technological advances occur all the

time, but one of the most exciting fields currently

is the application of AI to data in order to improve

public health. This can enhance health security in

ways not previously possible and restricted only by

the imagination. At the national level, for example,

the use of rainfall forecasts, population density

data and other relevant information has helped aid

agencies to predict cholera outbreaks in Yemen

with over 90% accuracy, allowing them to engage

in prevention and pre-position supplies.10 At the

urban level, Las Vegas uses AI to analyse Twitter

posts in order to greatly improve the effectiveness

of its restaurant health inspections.11

Adie Tomer, who leads the Metropolitan

Infrastructure Initiative at the Brookings Institution,

sees the use of smart technology as a way to

improve infrastructure capacity and safety as well.

“These days, the easiest wins come from focusing

on operational improvements, ideally through

new data inputs.” He cites automating water

pipe maintenance as a much less expensive way

to improve capacity and reliability than building

out new capacity. Similarly, smart transportation

solutions have great potential to improve the

use of existing roads: in Moscow, the adoption of

intelligent traffic and parking management reduced

congestion by over 20%, despite an increase in

car ownership.12

Personal security is also seeing innovation.

One of the more intriguing is Dubai’s new robot

police officers. These will patrol malls and tourist

locations. In many ways they have the kind of

capacity that would already be available on a

mobile phone app, such as the ability to get safety

information, report crimes, speak directly with

human police through voice communication

and pay fines. However, not everyone, especially

tourists, is likely to have downloaded such an app,

making the placement of these robots in public

places valuable. Moreover, these police robots

will also be collecting information—on traffic

congestion in the first instance. Although likely

to be expensive in the initial development stage,

these new officers may prove to be cost effective.

Dubai hopes that they will allow the reassignment

of existing human police to areas where the latter’s

efforts would be more valuable.13

The robots, though, point to an important issue

of technology deployment. Robocops have the

potential to be used for repression as well as true

citizen safety. These AI engines and robots can be

very valuable tools to enhance urban security. It

will depend on how humans deploy them.

**New technology and non-digital security**

10 “How Met Office weather data is being used to predict cholera outbreaks,” *Daily Telegraph*, 29 August 2018

11 Adam Sadilek, “Deploying nEmesis: Preventing Foodborne Illness by Data Mining Social Media,” *AI Magazine*, March 2017.

12 McKinsey, “Building smart transport in Moscow,” *Voices on Infrastructure*, 2017; “Moscow,” *Tom-tom Traffice Congestion Index*, https://www.tomtom.com/

en\_gb/trafficindex/city/moscow, accessed 25 May 2019.

13 “Robot police officer goes on duty in Dubai,” *BBC News*, 24 May 2017.

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security but to business continuity and disaster

preparedness. These are all interrelated.”

Governor Koike agrees: “cyber-security

encompasses everything from corporations, to

power plants, to even outer space.” Accordingly,

it requires extensive stakeholder co-operation.

Technology, though, is not only a potential

vulnerability. Digital security can be a

selling point. Ms Johnston explains that the

Municipality of Rotterdam has invested heavily

in cyber-security not only for its own benefits

but so that its port—Europe’s busiest, with

all the infrastructure that entails—remains a

safe place to do business. Looking further, the

linkage between digital security and other kinds

reflects the important role that technology

itself can play in every index pillar (see box).

The message from the data is not that digital

security, or indeed technology, is the silver

bullet for urban safety. Instead, the index

results indicate that a safe city is one where

efforts by citizens, stakeholder groups and

authorities in a wide range of fields to reduce

and protect against various kinds of risks

mutually re-enforce to create a generally

secure environment. “Security is indivisible” is

a truism in international relations. It applies

equally to urban safety.

**What sets cities apart?**

A striking feature of the overall survey results,

and those within pillars, is the clustering of

results near the top. The accompanying spider

chart, which maps the results of the cities in

first, 20th, 40th and last place overall, shows

the relatively small point differences between

the top cities and the larger ones among those

finishing lower down.

**City comparison overview**

100

20

80

60

40

100

80

60

40

20

0

Tokyo Hong Kong Mexico City Lagos

Health security

Digital security

Overall score

Personal security

Infrastructure security

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This suggests that the differences between

cities near the top, however important, are

much smaller compared with those further

down the table. A closer analysis of the SCI2019

results indicates two key factors associated

with urban safety that explain this clustering.

The overall scores correlate very closely, and

independently, with income and transparency.

The accompanying chart shows the correlation

between the best fitting formula using both

variables compared with the real overall

scores. In other words, cities that have

achieved a certain standard of development

and governance tend—whatever their distinct

strengths and weaknesses—to achieve a high

basic level of security. Those that are less

developed or have weaker governance struggle

to reach this underlying degree of safety that

set apart this cluster of leaders.

**i. Wealth matters, but sometimes in**

**unexpected ways**

Every previous SCI report has remarked

that cities in high-income countries do

better on average than those in lower-income

states. In earlier years, apparent anomalies

existed: some cities in upper-middle-income

countries did better than certain others

in high-income countries. More localised

data, however, eliminate the apparent

problem, because the high-performing cities

in middle-income countries have markedly

higher per-head income than their national

figures. Across the board, overall SCI results

correlate extremely closely with income per

person in cities.14

One obvious explanation is that certain

elements of safety benefit from investment.

0 20 40 60 80 100

80

60

40

20

0

100

Fitted Actual

14 City income figures are based on Income Index figures reported for the relevant cities or their regions in the Radboud University Institute for

Management Research, “Subnational Human Development Index,” 2019 and, for Singapore, the Income Index figure reported in UNDP’s *Human*

*Development Reports*, “Singapore Profile,” 2018.

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Lord Hogan-Howe notes, for example, that

“you compromise on the cost of policing to

your danger. There is a level of investment

you have to make for a quality product.” He

elaborates that poorly paid officers face a

greater incentive to become corrupt, thereby

undermining the entire justice system. Similar

links exist in infrastructure, Mr Tomer explains,

many “capital investments are really expensive.

It is asking a lot to, say, just build a new train

line.” Indeed, robust budgets are an important

element of success in various SCI indicators,

such as doctors and hospital beds per head, or

the use of data analytics to fight physical and

cyber-crime.

The availability of resources for safety, however,

is only part of the story. A problem of at least

equal importance that our index data reveal is

that, where money is scarcer, so too is policy

ambition. City income per head correlates

very closely with the SCI aggregate index

input scores, which largely measure policy and

effort. This might be understandable if less

economically developed cities spent less on

the most expensive inputs. However, removing

the higher-cost ones mentioned above does

not affect the correlation. Those cities with less

money are not always spending some of what

they can afford in the field of security.

0 0.2 0.4 0.6 0.8 1.0

100

80

60

40

20

0

Fitted Actual

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Such results do not surprise Mr Badiane.

Speaking of Africa’s large cities, he says that

the main driver of insecurity is the extent of

informal settlements. This arises not from a

growing population per se, he adds, but poor

or insufficient planning. “It is not acceptable.

We have a lot to do, but the number one

priority is improved urban planning and better

city management.”

Nor do public policy initiatives that enhance

safety need to be expensive. Potential easy

wins exist in each SCI pillar. Regarding digital

security, Mr Falco says that the “most basic

steps don’t require capital but education and

time to create a cyber-security culture.” This

involves things as straightforward as locking

your computer when you leave the room

and not clicking on links from people you

don’t recognise. In health, adds Mr Bollyky,

along with challenges in developing country

cities, possible advantages also exist. In much

of Africa, for example, smoking is low by

global standards, while South-east Asia and

India still enjoy low obesity rates, at least

relative to Western nations. “To the extent

you can encourage healthier behaviours

early, you might still be able to head off some

of the worrisome outcomes that we see in

non-communicable diseases in developed

countries,” Mr Bollyky says.

Certain low-cost infrastructure adjustments

can also enhance safety. Mr Ijjaz-Vasquez

reports that in some places “painting lines on

a street does not cost a lot” but can reduce

accidents markedly, while making sure that

the police and ambulance use the same

terminology to describe accidents, which is not

the case everywhere, can make the response

far more effective. As for enhancing personal

security, many interviewees mention that

simply making sure public places are well-lit

and designed can work. Ms Johnston notes

that “the cost of some of the most effective

urban rehabilitation interventions that lead to

better security are limited,” and especially costeffective

when done to address the specific

practical needs of local residents.

Each one of these might seem small but, as

Mr Falco puts it, “enough quick wins will add

up.” Economic growth can help developing

world cities close the safety gap with wealthier

ones, but, first, many of the former must

decide to engage with the relevant issues more

energetically and creatively in the many places

where they can.

**ii. Transparency matters at least as**

**much as money**

The level of city government transparency—

measured using the World Bank’s national

Control of Corruption figures as a proxy—

correlates about as closely with the SCI scores

as does income per head.

Mr Badiane argues that transparency and

accountability matter more than income. He

recalls that when, 20 years ago, he helped

initiate a safer cities programme at UNHabitat,

“we started by designing it as a poverty

programme. We then realised that we were on

the wrong track. Security is a governance issue.”

As with wealth, some of the ways that

transparency, accountability and good

governance improve safety are obvious. Mr

Tomer notes that, given the cost of major

infrastructure, “almost all over the world, the

potential for bribes is high. If you don’t have

good governance, it is a perfect area to be

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corrupt.” The resultant corner cutting can prove

all too dangerous.

Other ways that safety and transparency

interact are less intuitive but equally important.

Dr Agarwal says that “good governance is more

crucial than aggregate wealth for improving

the equitable reach of any public goods and

services such as health and health security.” A

recent *Lancet* study shows the extraordinary

effect that this can have. It found that the

length of time a country had been a democracy

and the quality of its democratic experience

have a profound effect on certain aspects of

health. On average, a transition to democracy

from some other form of rule improves

HIV-free life expectancy by three years in the

subsequent decade compared with no political

change.15 Mr Bollyky, the lead author, explains

that the experience of democracy, presumably

through the long-term accountability it brings,

“ends up mattering more than does GDP for

success against certain [health challenges] such

as cardiovascular disease, cancer, car accidents

and tuberculosis.”

In the area of public order, transparency and

accountability also turn out to be a boon. Lord

Hogan-Howe notes that, over his 40-year

career, simple steps like installing closedcircuit

television cameras in police stations

and recording interviews with suspects have

raised the quality of police work substantially,

meaning that the public are better served.

“If you improve accountability in a way that

demonstrates integrity, that has a profound

effect” on community trust and therefore

15 Thomas Bollyky et al., “The relationships between democratic experience, adult health, and cause-specific mortality in 170 countries between 1980 and

2016: an observational analysis,” *Lancet*, 2019.

the ability of the police to protect citizens, he

adds. Ms Johnston agrees: “When police focus

on accountability, you see higher levels of

citizens reporting crime as well as supporting

and facilitating police work. There is a direct

correlation between being more transparent

and higher levels of security itself.”

Beyond specific examples, notes Mr Ijjaz-

Vasquez, “good transparency means more

access to information. The more citizens

understand the dangers they are facing,

the more they can make more appropriate

decisions at the household level, and make sure

the matter is a priority at the next election.”

Indeed, the information need not even come

from the governments of the cities involved,

so long as it is accessible. Mr Bollyky points to

the US Embassy in Beijing simply measuring

and publishing previously unrecorded air

pollution levels as an important impetus to

improvements there. Individuals can also

play a role in expanding transparency. The

mobile phone app Saftipin crowdsources

what it calls “safety audits” from female users,

which score a particular location on lighting,

openness, visibility, crowd, security, overall feel

and several other metrics. It then aggregates

these and combines them with other data to

recommend the safest routes between any two

points within the city. In New Delhi, Saftipin’s

first city, authorities also used the data to light

over 7,000 identified “dark spots”, and police

adjusted their patrolling to spend more time in

areas that were perceived as dangerous.

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**A look at SCI trends: Urban safety is**

**a marathon, not a sprint**

In specific circumstances, such as war, civil

unrest or natural disasters, which undermine

public order and destroy infrastructure,

city safety can decline rapidly. The SCI data,

however, indicate that it is much more

common for change to take time in the

field of urban safety. Direct comparisons of

scores between the 2017 and 2019 indexes are

impossible given the changes this year (see box

on Washington, DC). However, an in-house

analysis that compared what was the same

between the two years found little change in

the reported results. Moreover, many shifts

came from finding improved information

sources rather than observable change in

the cities themselves. This does not mean

improvements did not occur, simply that the

shifts were few and often small, or at least hard

to detect.

This comes as no surprise to experts consulted

for this study. As Mr Leon puts it, “building a

city is a permanent thing. Improvements can

take a long time.” The brakes on speed differ

with different kinds of security. They are most

obvious in infrastructure. This, Mr Tomer

explains, “operates on time lines that are longer

than typical human ones. If you are in London,

for example, as you go closer to the Roman

core, the right of way was laid out 2,000 years

ago.” Similarly, the water system relies on

tunnels dating to the 19th century. For better

health security, meanwhile, says Mr Bollyky,

“building out improved primary or preventative

care in developing world cities can be done a

lot faster than a citywide sewer system, but still

can’t be done overnight.”

Improving personal security also involves

some longer-term challenges, such as building

and maintaining trust with city residents.

This can take time but is essential. Lord

Hogan-Howe notes that “most crimes are

still solved by someone [in the community]

telling the police who did it.” Similarly,

notes Mr Lam, the stakeholder co-operation

needed for better digital security relies on

building trust. “Without it,” he warns, “you

will not be successful.”

Of course, some quick wins are possible. Mr

Ijjaz-Vasquez says that “things like improving

the lighting, cleanliness and security presence

in parts of a city can change situations in a

matter of weeks or months, as can cleaning

drainage facilities. Stopping informal

settlements in high-risk areas can take months

to years,” and greatly reduce the risks from

natural disasters.

Even doing this much, though, requires that

“cities think security is an important topic,”

Mr Ijjaz-Vasquez adds, not just in the abstract

but as part of the ongoing political agenda.

Maintaining this focus through subsequent

electoral cycles and amid the claims of myriad

political issues is the fundamental challenge

and the key to progress in both the short and

long term. What Dr Agarwal says of healthcare

and infrastructure applies across most aspects

of security: “Systems need to be invested in so

that they steadily reach the most vulnerable

and needy parts and populations of the city. It

takes perseverance.”

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Reports that track data across the years will, from

time to time, warn that methodological changes

make comparisons with previous data invalid. This

is the case for Safe Cities Index 2019 (SCI2019). A

close look at one example, Washington, DC, helps

show why.

At first, there appears to be signs of clear progress.

The city went from 80.4 points overall in 2017 to

87.6 in 2019, explaining its rise from 23rd to 7th

place among index cities. A comparison seems to

indicate visible gains, especially on pillar outputs.

Has the US capital become safer? Our data

cannot answer that for two reasons. First, we

are measuring some things in a new way, making

improvements on the previous methodology. The

most relevant cases of this are as follows:

• In 2017 the index looked at the number of

vehicle accidents per million inhabitants.

A review, however, found that the data

available from different cities was not mutually

comparable. Accordingly, in 2019 we switched

to road traffic deaths, for which more robust

information were available.

• The source used for identity theft figures

from 2017 itself warned this year that those

from the US were—because of that country’s

more stringent reporting requirements—

almost certainly unsafe to compare with those

in other countries. SCI2019 therefore replaced

this indicator with one measuring exposure

to malware.

**A look at what has, or has not, changed in Washington, DC**

2017 2019

Digital security outputs

Digital security inputs

Infrastructure security inputs

Health security inputs

Health security outputs

Personal security outputs

Personal security inputs

Infrastructure security outputs

100

80

60

40

20

100

80

60

40

20

0

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• Finally, in 2019 the SCI shifted from crude

rates of cancer death to ones standardised to

remove the impact of differences in population

age. These are generally considered the best

metric for international comparisons.

Washington, DC, scored substantially higher on

these better metrics: a relatively low number of

road traffic deaths yielded a 92.2 score, compared

with 0 last year because of a large number of

reported accidents; its 100 points in the malware

metric was noticeably higher than its 85.5 for

identity theft; and its 53 for age-standardised

cancer mortality, while only a mid-range score,

was much better than the 0 it got in 2017 for its

crude rate.

The addition of new, resilience-related indicators

also helped the city’s overall score. It earned 100

points for each of: emergency services in the

city; air transport facilities; institutional capacity

and access to resources; catastrophe insurance;

disaster-risk informed development; cybersecurity

preparedness; and hazard monitoring.

Finally, use of better data sources available in

2017, which our researchers did not find until

this year, led to big gains in the scores for the

number of hospital beds per head, public-private

partnerships for cyber-security, and the rate of

illegal drug use.

Two further factors impede calculation of a

precise numerical impact for these changes. First,

indicator weightings used to aggregate scores

have changed. Second, because so many scores

reflect the relative performance of urban areas,

the replacement of four 2017 cities with new ones

can have an impact: Lagos’ low life expectancy, for

example, changes the scale of that metric, driving

up the points given to other cities, even if their life

expectancy had not changed.

That said, adjusting the weighting of the scores in

each year’s index to remove all new indicators and

those that saw substantial change gives some idea

of the underlying shift in the security performance

of Washington, DC. The resultant overall scores

for 2017 and 2019 are less than two-thirds of a

point apart.

This does not mean that nothing has changed

in the city—only that the shifts that we have

measured consistently are slight. Washington, DC,

does better in SCI2019 than in the past because

our measures and methodology give a better

understanding of its strengths and weaknesses.

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*The Economist Intelligence Unit: Unlike some*

*other fields of urban security, digital risks can come*

*from anywhere. How should a city deal with the*

*international nature of the threat to digital security*

*and what practical challenges does it bring?*

**Victor Lam:** In Hong Kong, because we are quite

an open city, digital security threats come from

everywhere around the world. We have to put in

place multiple kinds of security measures so that

we are better protected. We have accordingly

adopted a very transparent approach. We

network with various operators in the city and last

year created a cross-sector information sharing

platform—Cybersechub.hk—to share intelligence.

Cities with fewer resources can also do similar

things. Information sharing need not entail a

large amount of resources and should be done

everywhere in the world.

We also put a heavy emphasis on raising awareness.

The WannaCry attack is a good example.

When it broke out, many cities encountered big

problems. When we came across the news of

what was happening in other cities—I remember

it was a Saturday morning—we immediately

communicated the information to our partners

including the Hong Kong Computer Emergency

Response Team (HKCERT) and the police force.

This helped raised public understanding.

We also issued a press statement, then a public

forum was held on the Sunday and, on Monday, I

took part in a press conference and conducted

several telephone interviews. Throughout, we

raised public awareness and published a lot of

alerts to government departments to ensure

they had taken appropriate measures. HKCERT

also offered a hotline for the public and small

businesses. Although WannaCry had a major effect

elsewhere, Hong Kong was quite well protected.

*The Economist Intelligence Unit: How do you expect*

*the threats to digital security to evolve over the next*

*few years?*

**Victor Lam:** The Internet of Things (IoT) will bring

big changes. At the moment, organisations more or

less focus on end-point security, but with so many

IoT devices the vulnerability will be extensive. We

have to ensure that we put enough emphasis on

their protection, especially IoT devices used for

infrastructure. We increased our emphasis on IoT

security recently and have asked HKCERT to step

up research into, and encouragement of, best

practice measures.

*The Economist Intelligence Unit: Although we look*

*at different domains of security separately in the*

*Safe Cities Index, what do you see as the key links*

*between digital security and other areas?*

**Victor Lam:** I fully agree that they are closely

related. Critical infrastructure security also

includes digital security. The importance of this link

will increase now that we are talking about smart

cities because in a smart city there will be much

more digitised critical infrastructure. For example,

**Q&A with a city leader—Victor Lam, government chief**

**information officer, Hong Kong**

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in Hong Kong we are installing smart lampposts

with numerous smart devices in place. If we do not

implement digital security protection in them from

the start, beginning with the design stage, it could

lead to substantial problems.

*The Economist Intelligence Unit: What are some of*

*the new initiatives that Hong Kong is engaged in to*

*improve digital security?*

**Victor Lam:** There are several aimed at making

the right interventions in the right places. To begin

with, for the public, a government initiative will

provide electronic ID free of charge starting from

[the] middle of next year, as a way to establish more

trust through secure identification.

Financial support is important so that smaller

organisations will be more willing to step up.

We have doubled the matching funds under the

Technology Voucher Programme to HK$400,000

to help them upgrade systems. These upgrades can

include better security.

Finally, for those with .hk domain registrations, we

are engaging the Hong Kong Internet Registration

Corporation, which manages that domain name. It

will now provide those using it with free technical

support on how to reduce vulnerability. Here, it is

a case of not doing it ourselves, but engaging the

right party to provide the right advice.

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**The SCI cities and resilience**

The SCI2019 includes new indicators

specifically related to resilience. These, when

combined with relevant indicators carried

forward from previous versions of the index,

paint a clear picture of how well index cities are

doing in this field.

**The challenge in aggregate**

Resilience is about avoiding, mitigating or

responding to potential shocks. By definition,

the events—including natural events or

technological accidents of disastrous

proportions, as well as man-made violence

from terrorism or war—are fortunately rare.

Otherwise, they would become part of normal

life and urban residents would adjust. For

example, except in extreme years, Venetians

have personal, neighbourhood and municipal

mechanisms to cope with their city’s regular

periods of *acqua alta* in winter; in most

other urban areas, knee-deep water in the

main square and central streets would be a

disastrous flood.

In recent years, the aggregate toll of shocks

on SCI cities has been much less than the

attention that such events receive. According

to data gathered for the index, on average

across the 60 cities during the last five years

natural disasters have killed about 1.7 people

per million population annually. That is roughly

a tenth the rate of female homicide in these

cities. The loss to terrorism is even lower.

The total number of deaths and injuries per

year over the past decade in all the SCI cities

combined is around 1,000—about half the

number killed annually in pedestrian accidents

in Cairo alone. This is not to minimise the pain

felt by those who lose loved ones to natural

and man-made disasters, but simply to put

the numbers into perspective with the other

challenges facing cities.

Developing resilience against such shocks

despite their relatively low toll is essential for

several reasons. First, as Lord Hogan-Howe

notes about terrorism, it is “rare. Each death in

a terrorist attack is a tragedy. However, many

more people are the victim of homicide each

year and around twice as many again die on

the roads. Terrorism is terrifying because it

is intended to be terrifying. People need to

be reassured. It falls into a category of risks

that cannot just be measured by the volume

of events.” He adds that, because of media

coverage, terrorism in any given city is likely to

be disconcerting to residents of other locations.

Similarly, although lacking the political intent,

news of tsunamis, earthquakes and floods

elsewhere remind those in other cities on

coasts, near fault lines or in low lying areas of

their vulnerability.

Second, although these are low-frequency

events, they are potentially very high impact.

For example, Mexico City has had fewer people

per head die from natural disasters than the

SCI average over the past decade—resulting

in its 92-point score on that indicator. During

the past century, though, it has suffered from

major earthquakes (over 7.0 on the Richter

scale) roughly once every 30 years. These can

be devastating: estimates for the number killed

in 1985 typically range from 10,000 to 40,000. In

such circumstances, a rapid, coherent response

can make all the difference.

Finally, concern is growing that the frequency

of adverse events will rise. In Mr Van Begin’s

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experience, “the impact of climate change

has become a huge driver for policymakers

at the urban level to act.” Mr Ijjaz-Vasquez

agrees: “The frequency and intensity of natural

disasters is moving to the fronts of minds of

citizens and local administrations. Cities are

getting more serious.”

The problem is deciding on what to prepare for.

Mr Ijjaz-Vasquez continues, “We know certain

things about climate change, but once you

move to the city level, uncertainty begins to be

very large. If you are preparing infrastructure

for the next 50 years, you know it may be

bad, but you don’t know how bad.” This is why

resilience emphasises the need for having

flexible assets available to address shocks and

plans to deal with them. As Mr Badiane puts it,

“Disasters: you cannot control them. The only

thing you can do is be ready.”

**Risk and readiness in the SCI:**

**Wealth and transparency redux**

The SCI does not have a specific resilience

score. Here, though, we recombine relevant

individual indicators into three useful

categories described in detail in a previous

section: damage and threat multipliers;

relevant assets; and preparation.

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**Damage and threat multipliers Relevant assets Preparation**

Copenhagen 98.6 Singapore 100.0 Washington, DC 99.5

Singapore 97.5 Tokyo 98.1 Amsterdam 99.2

Amsterdam 96.7 Chicago 95.6 Brussels 99.2

Osaka 96.4 Los Angeles 95.6 Singapore 99.2

Stockholm 96.0 New York 95.6 Los Angeles 98.9

Tokyo 94.6 Washington, DC 95.6 New York 98.9

Frankfurt 94.5 Hong Kong 93.0 Tokyo 98.9

Hong Kong 94.4 Taipei 92.7 Toronto 98.9

Zurich 94.2 San Francisco 92.6 Seoul 98.7

Chicago 94.1 Melbourne 92.4 Chicago 98.4

San Francisco 94.1 Osaka 92.4 Dallas 98.4

Dallas 93.7 Sydney 92.4 Osaka 98.4

Toronto 93.6 Toronto 92.4 San Francisco 98.4

Melbourne 92.9 Dallas 92.0 Melbourne 97.9

Sydney 92.9 Amsterdam 90.2 Sydney 97.9

Taipei 89.7 Paris 90.2 Wellington 97.9

Seoul 89.5 Seoul 89.9 Barcelona 97.4

Kuala Lumpur 88.9 London 88.8 Madrid 97.4

Madrid 88.9 Abu Dhabi 88.7 Frankfurt 94.8

Milan 87.8 Dubai 88.7 Hong Kong 84.9

Abu Dhabi 86.9 Stockholm 87.4 Copenhagen 84.1

Barcelona 86.9 Copenhagen 87.3 London 83.3

Dubai 86.9 Wellington 86.5 Taipei 81.3

London 86.9 Zurich 85.2 Paris 77.8

Kuwait City 86.7 Frankfurt 83.3 Stockholm 76.5

Buenos Aires 86.4 Brussels 82.6 Zurich 76.5

Washington, DC 86.4 Barcelona 81.6 Beijing 75.7

Los Angeles 85.7 Madrid 81.6 Shanghai 75.7

Santiago 85.3 Milan 76.7 Buenos Aires 69.8

Rome 85.1 Beijing 74.9 Milan 69.0

Beijing 84.8 Shanghai 74.9 Rome 68.8

Johannesburg 84.8 Rome 72.9 Abu Dhabi 67.7

Wellington 84.6 Santiago 70.2 Moscow 66.9

Brussels 84.2 Kuwait City 69.0 Dubai 66.7

Rio de Janeiro 83.1 Johannesburg 67.2 Kuala Lumpur 66.7

Shanghai 82.2 Mumbai 67.2 Santiago 61.5

Moscow 81.8 Kuala Lumpur 67.1 New Delhi 60.8

Mexico City 81.2 Riyadh 66.5 Lima 59.3

Riyadh 80.8 Buenos Aires 66.4 Rio de Janeiro 59.3

Sao Paulo 80.5 Istanbul 66.4 Sao Paulo 59.3

New York 79.1 Lima 66.1 Mumbai 57.9

Paris 79.1 New Delhi 64.6 Jakarta 57.4

Ho Chi Minh City 78.7 Rio de Janeiro 64.6 Istanbul 57.0

Casablanca 76.4 Moscow 61.7 Ho Chi Minh City 56.9

Lima 75.0 Mexico City 61.1 Manila 56.9

Baku 72.8 Sao Paulo 60.6 Dhaka 54.8

Manila 72.5 Bangkok 60.4 Johannesburg 52.6

Bogota 71.6 Jakarta 59.3 Karachi 51.7

Jakarta 71.4 Manila 58.2 Bangkok 51.1

Caracas 70.9 Quito 58.1 Casablanca 50.8

Quito 70.9 Ho Chi Minh City 54.6 Yangon 49.5

Mumbai 69.9 Karachi 54.0 Mexico City 45.5

Cairo 68.8 Baku 53.4 Kuwait City 44.6

New Delhi 68.6 Bogota 50.8 Riyadh 41.8

Istanbul 68.5 Cairo 50.1 Quito 33.6

Yangon 65.4 Casablanca 49.4 Bogota 25.0

Bangkok 64.1 Dhaka 40.8 Cairo 22.0

Lagos 63.4 Caracas 38.3 Lagos 20.6

Dhaka 48.0 Yangon 34.1 Baku 19.6

Karachi 30.4 Lagos 30.5 Caracas 19.3

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As noted above, the actual losses from shocks

over the past decade has been comparatively

small, so the damage and threat multiplier

score is an indication of relative rather than

absolute risk. Most cities nevertheless score

above 75 out of 100, which the SCI classifies

as very good. That said, the extent of damage

from shocks and the existence of particular

aggravating dangers decline markedly with

wealth. Developed cities are certainly not

immune to danger: Wellington, Paris, London

and New York have all seen major terrorist

atrocities in the past two decades. In San

Francisco and Los Angeles, “the Big One” is

the local euphemism for an expected large

eruption along the San Andreas Fault in the

coming years or decades. Nevertheless, the

greater risk from shocks appears to be in

the world’s emerging mega-cities such as

Karachi, Dhaka and Lagos. Mr Bollyky notes

that “many low- and middle-income cities face

the potential for catastrophic risk; they are

exposed to climate change and insecure in

health terms.”

Given this risk distribution, it is unfortunate that

income and transparency are also the correlates

of both having relevant assets in place.

0 20 40 60 80 100

100

80

60

40

20

0

Fitted Actual

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Turning to preparation, two facets of scores

there are particularly noteworthy. First is the

much wider disparity between the top and

bottom of the table than in other areas: 18

cities score over 95 points, while 23 fall below

60. Again, relative scores should not give the

wrong message. Mr Leon warns that no urban

area should be complacent: “We cannot say

that any city is completely prepared for what is

coming because we really don’t know what is

coming. All need to work toward resilience. If a

person wants to be physically fit, daily exercise,

a good diet and good sleep are necessary.

Similarly, if you want a healthy and resilient

city, permanent work on resilience building

is—and should be—a never ending exercise.”

Those scoring above 95, then, are not so much

perfectly prepared as doing far better than the

many cities at the other end of the scale.

Although income and transparency usually have

a similar significance in correlations elsewhere

in the SCI, income is statistically insignificant

here when transparency is factored in. The

implication is that a well-governed city, even

with constrained economic resources, can

make important progress on resilience.

0 -2 -1 0 1 2

100

80

60

40

20

0

Fitted Actual

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**Becoming more resilient**

A general guide to improving resilience, were

such possible, would be well beyond the scope

of this study. Instead, we offer insights from

experts for policymakers looking to address

the issue.

To begin with, good general infrastructure,

such as roads and buildings with a capacity

to cope with earthquakes or floods, certainly

can help. Professor Nakamura notes, for

example, that a key lesson that other countries

could learn from Japan’s experience with

natural disasters is the value of high-quality

civil engineering where needed. Even a single

project can have an important effect. Japan’s

technologically advanced Earthquake Early

Warning system almost certainly saved lives

by giving Tokyo residents around 80 seconds

of warning before the 2011 earthquake hit.

London, meanwhile, has not seen a major

flood since the completion of the Thames

Barrier. The benefits of better infrastructure

help explain some of the lower natural disaster

damage experienced in wealthier cities.

Such assets can require substantial capital

outlay. Governor Koike notes that, for cities,

this is a wise investment rather than an

expense. “When a disaster strikes and you

are unprepared, you realise truly how costly

the loss can be. Therefore, we believe that

preparedness is critical, in terms of doing

everything possible to take preventive

measures and be ready.”

This does not mean that developing world

cities cannot become more resilient, for two

reasons. First specific building-code regulations

or projects, however beneficial, are the result

of resilience, not its core. Second, much of

resilience preparation is not costly.

Efforts in this area need to begin with keeping

sustainability and resilience in mind when

setting policy. This can require creativity

and focus, especially for less well-off cities

acknowledges Mr Ijjaz-Vasquez. “If you don’t

have a lot of money, you need to find the best

actions to take to get the most for it. That is

not a trivial question. Is your big risk cholera in

a flood, or crime, or is the next big challenge

drought? Resilience can be technically difficult.”

Nevertheless, most initiatives are not

inherently expensive. Sometimes better

resilience involves not spending money in

certain ways, notes Mr van Begin. “In your

budget, if you have an item investing so

many dollars in creating lots of parking space

for individual cars rather than on increasing

use of public modes of transportation, that

is already an indication you may not be

on the right track.” More specific to shock

prevention, housing and residential planning

should keep the potential for disaster in mind.

Even something as basic as making sure

that “unregulated settlements do not grow

into areas that get flooded every year saves

everybody a lot of money by not having to deal

with a crisis,” says Mr Ijjaz-Vasquez. “It is not

expensive but an issue of paying attention.”

Unfortunately, only under half of index cities

(25)—all from high-income countries with

the exception of Beijing and Shanghai—take

disaster risk into account in urban planning.

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**“Only under half of index cities**

**(25)—all from high-income**

**countries with the exception**

**of Beijing and Shanghai—take**

**disaster risk into account in**

**their own city-level planning”**

Cairo

Riyadh

Lagos

Bogota

Caracas

Baku

Abu Dhabi

Bangkok

Buenos Aires

Casablanca

Dhaka

Dubai

Ho Chi Minh City

Istanbul

Jakarta

Johannesburg

Karachi

Kuala Lumpur

Kuwait City

Lima

Manila

Mexico City

Milan

Moscow

Mumbai

New Delhi

Paris

Quito

Rio de Janeiro

Rome

Santiago

Sao Paulo

Stockholm

Yangon

Zurich

Amsterdam

Barcelona

Beijing

Brussels

Chicago

Copenhagen

Dallas

Frankfurt

Hong Kong

London

Los Angeles

Madrid

Melbourne

New York

Osaka

San Francisco

Seoul

Shanghai

Singapore

Sydney

Taipei

Tokyo

Toronto

Washington, DC

Wellington

YES PARTIALLY NO

**Quantitative assessment**

0. No (disaster risk not been accounted for in either national economic

development plans, or in city-level urban planning)

1. Partially: only in the active national development/strategy(s)

2.Yes to both: accounted for in both the active national development

plan/strategy and in city-level urban planning (eg, through policies,

directives, urban development plans/strategies)

**Units**: score 0-2

**Year**: 2019

**Description**

Is disaster risk included and accounted for in:

a. active national development plan/s; and

b. city level urban planning/design?

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One element of paying attention to resilience

is ensuring, through joint planning for

preparedness, that all of the systems in a city

are co-ordinated. London is a good example

of what this looks like in practice. In Britain,

explains Lord Hogan-Howe, a legal requirement

exists for central and local government, as

well as other relevant stakeholders, to cooperate

in local committees established to

plan for possible emergencies. In London,

this committee meets once a quarter. The

biggest natural threat is flooding, so a specific

warning system and reaction capacity have

been developed should this occur. All key

stakeholders, not just paid emergency services

but also volunteers, also share a radio system

for use should disaster strike and they engage

in joint exercises to prepare. Based on the result

of such exercises, the committee considers any

necessary revisions to its standing contingency

plan. “On the whole, it is pretty well organised,”

says Lord Hogan-Howe, “but at the extremes

any society would be challenged.”

Better technology and more co-operative

planning as described here are essential, but

they are hardly new ideas. As the concept of

resilience develops, though, it is also pointing in

innovative directions.

One of the two biggest examples is a

major shift in thinking about the nature of

appropriate infrastructure. Mr Tomer reports

“a bit of a back-to-the-future element,” with

infrastructure ideally no longer fighting against,

or superimposing itself upon, nature. Instead,

cities should be asking “how do we use existing

natural infrastructure to our benefit.”16

Mr Ijjaz-Vasquez agrees that, increasingly,

cities interested in resilience are “making it a

priority to use nature and green assets to deal

with risks”—a particular consideration for cities

without money for huge projects. He cites the

example of Colombo in Sri Lanka. After floods

in 2010, a post-disaster assessment highlighted

the importance of existing natural wetlands

for rainwater absorption and overall flood

management. Unfortunately, Mr Ijjaz-Vasquez

explains, development had occurred or was

taking place in many of these areas. The city’s

urban plan therefore now calls for the mapping

and protection of wetlands. Meanwhile, to

maximise the benefits of this restriction on

development, Colombo has created two large

parks out of some of the protected areas so that

residents can use them for recreation during

the large majority of time that they are not

flooded. The parks are also used for educational

and awareness raising events involving city

residents, in order to illustrate the importance of

sustainable and integrated development of the

urban environment, and thereby to contribute

further to Colombo’s resilience.17 As Professor

Nakamura notes of infrastructure development

in general, it is not a binary choice between

development or non-development. “We always

need to find the right balance between the

nature that needs to be preserved and the

convenience that needs to be provided,” he says.

Just as the concept of resilient infrastructure is

evolving, so too is understanding of the kind of

co-operation required to deal with shocks. In

particular, cities are recognising the essential

importance of social resilience, which is the

16 For more in depth discussion of what this means in practice, see Earth Economics and 100 Resilient Cities, *Building Urban Resilience with Nature: A*

*Practitioner’s Guide to Action*, 2018; Steffen Lehmann, “Reconnecting with nature: Developing urban spaces in the age of climate change,” *Emerald Open*

*Research*, 2019.

17 See also Global Facility for Disaster Reduction and Recovery, “Urban Wetlands Management in Colombo: A new model for urban resilience,” 2018;

“Colombo’s wetlands float to top of flood prevention plan,” *Reuters*, 22 May 2018.

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ability of communities as a whole to work

together when necessary. Professor Nakamura

recalls that the number of casualties and

extent of damage arising from the 1995 Kobe

Earthquake and its aftermath differed markedly

between neighbourhoods. Extensive research

into these variances found that “the crucial

difference boiled down to whether the people

[in these areas] had day-to-day chit-chats

with their neighbours,” he says. “Were there

community events? Did neighbours know each

other’s faces and names? These sorts of things—

in other words, social capital—deeply impacted

how well they could, say, hold a rope together, or

pass water buckets from point A to point B.”

Kobe’s experience is not unusual. Research has

shown the crucial importance of social capital

in how well individuals, neighbourhoods and

cities weathered and recovered from crises

as diverse as the Paris heatwave of 2003,

Hurricane Katrina in the US, and the Japanese

tsunami of 2011.18 Even in so developed a

location as the wider metropolitan tri-state

area centred on New York City, these personal

links are crucial when a crisis occurs. In the

aftermath of Hurricane Sandy, those who

were most affected reported that they got the

majority of their help from family, friends and

neighbours.19 Technology can also help: studies

show that social media use increases, especially

among medium users, in the wake of a disaster

as people post data that may be key to others.20

Cities can take specific steps to enhance social

resilience, both specific and general. Paris has

examples of both. Officials can try to plug

particular holes where it may be lacking. In

the aftermath of the 2003 heatwave in Europe,

which killed nearly 15,000 in France alone,

Paris drafted response plans that include,

once a certain temperature is reached, having

health officers visit everyone on a register of

vulnerable individuals to see what assistance

they may need.21 More generally, notes Paris’s

deputy mayor, Emmanuel Gregoire, one reason

his city invests in addressing social inequalities

is “because, the more cohesive a community

is, the more it is able to face challenges and to

have a resilience strategy.”

Urban governments can also recognise

the importance of the community’s role

and integrate relevant groups within their

planning. As noted above, London’s emergency

exercises include representatives of voluntary

organisations. Lord Hogan-Howe stresses that

this is not tokenism. “It would be too expensive

to create the necessary capacity” to address a

crisis and then have it standing by unused for

most of the time. “Volunteers will keep us going

if these events occur.” Similarly, Mr Gregoire

explains that Paris’s resilience policy “represents

a large partnership with a lot of kinds of

collaborators—public organisations and the

state level, of course, but also inhabitants,

private companies, other organisations and

NGOs. It’s only if we work together that we will

be able to face these challenges.”22

Most important for resilience, however,is creating

the space to allow the ties of community to build

18 Richard Keller, *Fatal Isolation: The Devastating Paris Heat Wave of 2003*, 2015; N. Nirupama et al., “Role of social resilience in mitigating disasters,”

*International Journal of Disaster Resilience in the Built Environment*, 2015; Jeanne Leroy et al., “Vulnerability and social resilience: comparison of two

neighborhoods in New Orleans after Hurricane Katrina,” *E3S Web of Conferences: 3rd European Conference on Flood Risk Management*, 2016

19 Associated Press-NORCCenter for Public Affairs Research. “Resilience in the Wake of Superstorm Sandy: Research Highlights,” 2013.

20 Meredith Niles et al., “Social media usage patterns during natural hazards,” *PLOS One*, 2019.

21 “Canicule”, Government of Paris web site, accessed 2 May 2019.

22 The interview was conducted at the Urban 20 (U20) Mayor’s Summit / Urban Resilience Forum Tokyo (URF) in Tokyo on 21 May, 2019

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by themselves. Ms Johnston explains that cities

can contribute in two relatively simple ways.

One is focusing on quality-of-life issues, such as

neighbourhood cleanliness, lighting and whether

public services like urban transportation work.

This creates a virtuous circle: by giving people a

sense of safety, residents will be more willing to

go into public spaces, thereby making them safer

still. In this way, she says, “cities can have a direct

effect on renewing neighbourhoods.”

Similarly, Ms Johnston adds, urban officials

can play an important role in building social

cohesion and a sense of community “by creating

not only physical but social spaces.” This might

include sponsoring events or creating spaces

where families and groups of citizens can

meet safely to engage in sporting, cultural or

educational activities. In other words, the same

recipes for safety go a long way to encouraging

the social linkages that are the key to resilience.

Resilience, then, is not a separate category with

an occasional relationship to urban safety: the

two are intertwined.

*The Economist Intelligence Unit: Are there any*

*recent innovations in improving security in London*

*that you think would be of particular interest or*

*relevance to other cities?*

**Lord Hogan-Howe:** As I was leaving the Met,

we were giving 23,000 police officers body video.

It cost ￡9m and has an impact on collecting

evidence, but its biggest impact is that it holds

police to account on the street. Over the last 40

years that I’ve been with the police, many of the

changes for good have been driven by things

like CCTV in police holding areas and recorded

interviews. This is the next step.

Because of these changes, things have improved

immeasurably. Now I can’t remember any recent

case where police lied and lost a conviction. If you

improve accountability in ways that show provable

integrity, it is a real benefit. Over the years, this has

had a profound effect: complaints have dropped

by at least a half. These changes also enhance

the sense of the rule of law because if police are

trusted, the courts are too.

*The Economist Intelligence Unit: To what extent is*

*it possible to get in front of crime with prevention,*

*especially with data analytics, and how far is*

*policing in part inevitably reactive?*

**Lord Hogan-Howe:** Although we’ve always

claimed that there is a prevention strategy, I

don’t think it has been fully embedded. CCTV is

widespread in London and has let us have a 95%

murder clear-up rate. It is ubiquitous, though,

because we did not have a strategy when it was

being deployed. That reflected how society

appreciated the benefits of CCTV before it

perceived a threat to intrusion into privacy. That

said, Londoners’ experience of CCTV has been

broadly positive.

**Q&A with a city leader—Lord Bernard Hogan-Howe, former**

**commissioner, London Metropolitan Police**

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There are, for example, good preventative actions

around design in schools and public buildings, but

they are not as good as those for fire prevention.

In the same way, things like insurance have

incentivised good behaviour in preventing fire but

have not done [the] same around crime.

Public places can be designed to reduce crime

by making it harder to steal cars or engage in

burglaries—there are some good efforts to do

so but this could be embedded better. We can

control some drugs markets better because, when

they are distorted, you get more violence. A third

area is alcohol control: if that is not well monitored

you can get difficulties. Finally, young people are

disproportionately affected by crime and can learn

how not to be victims, but they have not been

incentivised to do so.

It is possible to have a structure to prevent crime,

but we can do more.

*The Economist Intelligence Unit: What lessons*

*might London’s experience of dealing with various*

*kinds of terrorists provide for other cities?*

**Lord Hogan-Howe:** At the point terrorists attack,

you have a problem. It is best to have a strong

strategy that stops it occurring. The UK strategy

is based on prevention, protection and pursuit.

First, we focus on stopping at the planning stage,

or protecting places where terrorists would likely

attack and, if they do get through, responding

accordingly. These are things you have to embed

in central and local governments. Success also

depends on the level of trust between the various

services. In the UK that has been excellent.

*The Economist Intelligence Unit: What are some of*

*the challenges in policing such an open and vibrant*

*city as London?*

**Lord Hogan-Howe:** There is a point of balance

you have to strike in a liberal democracy between

the rights of a citizen and the ability to intrude

in people’s privacy. Where this balance lies can

impact how effective your security services can

be. Any debate has to think about that: if you have

less intrusion, you may have more risk. Some really

safe countries are very intrusive and draconian,

but you have to decide if you want to live there. I

probably wouldn’t.

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**Conclusion**

Mr Bollyky says that “the future of global health is urban health.” Given

the growing number of people residing in cities and the ever-greater

influence they will have on how we as a species live, the future of day-today

global human security is, to a large degree, urban security.

Creating safe cities, however, is far from straightforward. Different kinds

of security intersect in any number of ways and shocks can reveal that

apparent safety has as much to do with luck covering over ignorance, as

it does any underlying level of protection. Throughout this study, drawing

on the results of the SCI2019, several broad themes keep reappearing

that are of relevance to urban policymakers seeking to enhance the

security of their cities:

• **Urban safety is both multi-faceted and indivisible:** a range of

different kinds of security go into someone being, let alone feeling,

safe. Accordingly, our index has four pillars, themselves composed

of multiple indicators. All are important to quality of life. Those

individuals tasked with protecting cities in any of these fields, though,

should understand the close links between kinds of security, which,

on the surface, seem quite distinct. Problems in any one area can

undermine other sorts of security quite quickly.

• **For safety, wealth is an asset, not a strategy:** richer urban

areas tend to be safer ones, but this does not result simply from

some notional purchase of security. Those cities with higher perhead

income are also more engaged with the issue, as shown by

more detailed policies even for areas where cost is not high. For

example, integrating disaster risk into urban planning need not

cost the earth—sometimes it simply means not developing in a

way that undermines natural protections against various dangers.

Nevertheless, such an approach will greatly enhance the safety

of a typical city resident over the long term. Those in less well-off

cities need to focus more on how they can, within the constraints

they face, enhance security. On the other hand, policymakers in

wealthier cities need to understand that they cannot afford to lose

the focus on safety, and increasingly resilience, amid the other

concerns they face.

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• **Transparency and accountability undergird safety:** safe cities

require good governance. For our overall SCI scores, transparency

is about as important as per-head income. For resilience, it is the

dominant correlate. In the absence of accountability, not only do

those charged with providing safety face greater temptations to

sacrifice it to their own private interests, but also ordinary citizens

are less willing to engage in even well-intentioned efforts to enhance

their security. Honest government also need not be expensive:

for several years, France and Barbados have had similar, usually

relatively good, scores in Transparency International’s Corruption

Perception Index, but the latter’s GDP per head is less than half that

of the former.

• **The provision of safety is a joint, even a social, activity:** urban

safety is a multi-faceted field requiring the mutual re-enforcement

of efforts from across a range of different security pillars. At a

minimum, this requires some form of integrated joint planning

and consideration of issues of common concern. More generally,

it involves the engagement of citizens, businesses and civil society

organisations in their own security in areas as diverse as living

healthy lifestyles, willingness to report crimes, and keeping their

computer systems virus free. When cities face extreme shocks, the

importance of social engagement inevitably proves crucial. Here,

policymakers should work on building trust with the population—in

part through transparency—and, even more important, creating the

opportunities for social bonding and civil society to flourish.

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**Appendix**

1 Tokyo

Rank City Score

0 20 40 60 80 100

94.4

2 Singapore 93.1

3 Chicago 92.9

4 Washington, DC 92.2

=5 Los Angeles 91.4

=5 San Francisco 91.4

7 Dallas 91.3

8 New York 91.1

9 Toronto 90.6

10 London 90.2

=11 Melbourne 89.4

=11 Osaka 89.4

=11 Sydney 89.4

14 Amsterdam 89.0

15 Copenhagen 87.3

16 Stockholm 85.5

17 Seoul 84.7

18 Zurich 80.8

19 Wellington 80.2

20 Paris 80.0

21 Frankfurt 78.9

22 Hong Kong 78.8

23 Taipei 77.0

=24 Abu Dhabi 74.1

=24 Dubai 74.1

26 Brussels 74.0

27 Milan 72.5

=28 Barcelona 69.2

=28 Madrid 69.2

30 Rome 67.5

31 Buenos Aires 65.0

32 Santiago 64.6

33 Istanbul 61.9

34 Johannesburg 60.2

35 Mexico City 58.4

36 Beijing 58.1

37 Shanghai 57.4

38 Riyadh 56.5

39 Kuwait City 56.4

40 Bangkok 56.2

41 Bogota 54.7

42 Quito 54.5

43 Kuala Lumpur 54.4

44 Rio de Janeiro 52.7

45 Manila 52.1

46 Baku 51.7

=47 Mumbai 51.0

=47 New Delhi 51.0

49 Lima 49.8

50 Sao Paulo 49.4

51 Casablanca 44.9

52 Karachi 43.1

53 Caracas 42.9

54 Moscow 42.8

55 Jakarta 42.3

56 Lagos 42.2

57 Dhaka 41.9

58 Cairo 40.7

59 Ho Chi Minh City 40.2

60 Yangon 27.8

**Digital security 2019**

Average: 67.2

\* =new cities

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1 Osaka

Rank City Score

0 20 40 60 80 100

88.5

2 Tokyo 87.5

3 Seoul 85.2

=4 Amsterdam 81.6

=4 Stockholm 81.6

6 Frankfurt 81.2

7 Washington, DC 81.1

8 Singapore 80.9

9 Zurich 80.8

10 Taipei 80.2

=11 Copenhagen\* 79.8

=11 Sydney 79.8

=13 Brussels 79.3

=13 Melbourne 79.3

15 Paris 78.7

16 London 78.0

17 Toronto 77.4

18 San Francisco 77.2

19 Chicago 77.1

=20 Madrid 76.1

=20 New York 76.1

22 Dallas 75.9

23 Los Angeles 75.8

24 Barcelona 75.2

25 Rome 75.1

26 Milan 74.9

27 Hong Kong 73.2

28 Wellington 72.9

29 Abu Dhabi 71.8

30 Moscow 71.5

31 Dubai\* 70.5

32 Buenos Aires 69.8

33 Beijing 68.0

34 Shanghai 67.5

35 Kuwait City 64.8

=36 Rio do Janeiro 64.7

=36 Sao Paulo 64.7

=38 Kuala Lumpur 64.4

=38 Santiago 64.4

40 Mexico City 64.1

41 Baku\* 64.0

42 Riyadh 62.9

43 Istanbul 61.7

44 Lima 60.7

45 Bangkok 59.9

46 Quito 59.4

47 Bogota 59.1

48 Manila 56.6

49 Ho Chi Minh City 56.3

50 Mumbai 55.8

51 New Delhi 54.6

52 Johannesburg 53.2

53 Jakarta 51.7

54 Casablanca 50.0

55 Caracas 48.1

56 Cairo 46.1

57 Dhaka 45.1

58 Yangon 42.3

59 Karachi 39.0

Lagos\*

\* =new cities

60 34.1

**Health security 2019**

Average: 68

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1 Singapore

Rank City Score

0 20 40 60 80 100

96.9

2 Osaka 94.5

3 Barcelona 94.4

4 Tokyo 94.3

5 Madrid 94.2

6 Frankfurt 93.7

=7 Melbourne 93.5

=7 Sydney 93.5

9 Wellington 93.2

10 Washington, DC 93.1

11 Chicago 93.0

=12 New York 92.5

=12 Toronto 92.5

14 Seoul 92.4

15 Los Angeles 92.2

16 Amsterdam 92.0

17 San Francisco 91.7

18 Hong Kong 91.1

19 London 90.4

20 Copenhagen\* 89.0

21 Brussels 88.9

22 Zurich 88.5

23 Stockholm 87.5

24 Taipei 87.1

25 Paris 85.9

=26 Abu Dhabi 83.2

=26 Dubai\* 83.2

28 Rome 83.1

29 Milan 82.8

30 Dallas 81.9

31 Istanbul 75.8

32 Moscow 73.6

33 Beijing 72.1

34 Shanghai 72.0

35 Buenos Aires 71.2

36 Santiago 71.0

37 Kuala Lumpur 64.7

38 Mexico City 61.5

39 Johannesburg 57.8

40 Rio de Janeiro 57.7

41 Sao Paulo 57.2

42 Kuwait City 56.4

43 Ho Chi Minh City 55.4

44 Riyadh 54.8

45 Bogota 53.9

46 Manila 53.6

47 Lima 53.0

48 Bangkok 52.5

49 Jakarta 52.3

50 Mumbai 50.0

51 Quito 49.9

52 Casablanca 49.6

53 Cairo 48.2

54 Baku\* 46.3

55 Karachi 46.1

56 Yangon 45.3

57 New Delhi 40.7

58 Lagos\* 37.4

59 Dhaka 34.2

Caracas

\* =new cities

60 27.3

**Infrastructure security 2019**

Average: 72.5

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1 Singapore

Rank City Score

0 20 40 60 80 100

95.3

2 Copenhagen\* 93.6

3 Hong Kong 91.9

4 Tokyo 91.7

5 Wellington 91.5

6 Stockholm 91.3

7 Osaka 91.1

8 Toronto 90.8

9 Amsterdam 89.4

10 Sydney 89.1

11 Abu Dhabi 88.9

12 Dubai\* 88.6

13 Zurich 87.8

14 Frankfurt 87.7

15 Seoul 87.5

16 Melbourne 86.8

17 Brussels 86.3

18 Madrid 86.2

19 Barcelona 86.0

20 Taipei 85.8

21 Paris 85.2

22 London 84.3

=23 Shanghai 84.0

=23 Washington, DC 84.0

25 Beijing 83.9

26 Chicago 83.8

=27 Dallas 83.3

=27 San Francisco 83.3

29 Milan 82.4

30 New York 82.2

31 Kuala Lumpur 81.8

32 Los Angeles 81.3

33 Kuwait City 80.4

34 Rome 79.8

35 Santiago 79.4

36 Ho Chi Minh City 78.7

37 Mumbai 76.2

38 Riyadh 75.9

39 Moscow 75.3

40 Manila 74.7

41 New Delhi 73.6

42 Buenos Aires 72.9

43 Jakarta 71.7

44 Casablanca 69.5

45 Lima 69.3

46 Rio de Janeiro 68.4

47 Sao Paulo 67.5

48 Istanbul 65.2

49 Baku\* 63.7

50 Johannesburg 63.2

51 Mexico City 62.3

52 Bangkok 61.8

53 Cairo 59.3

54 Quito 57.5

55 Dhaka 57.4

56 Bogota 52.8

57 Yangon 52.3

58 Karachi 45.9

59 Caracas 42.1

Lagos\*

\* =new cities

60 38.7

**Personal security 2019**

Average: 77

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0 20 40 60 80 100

1 Tokyo

Rank City Score

0 20 40 60 80 100

92.0

2 Seoul 87.4

3 New York 85.5

4 Beijing 70.5

5 Shanghai 70.2

6 Buenos Aires 69.7

7 Istanbul 66.1

8 Mexico City 61.6

59.7

59.2

58.2

57.6

55.0

54.5

48.6

44.6

43.5

9 Sao Paulo

10 Manila

11 Mumbai

12 Ho Chi Minh City

13 New Delhi

14 Jakarta

15 Cairo

16 Dhaka

17 Karachi

**Rankings by population: >15m**

Average: 63.8

1 Osaka

Rank City Score

0 20 40 60 80 100

90.9

2 London 85.7

3 Los Angeles 85.2

4 Paris 82.4

5 Moscow 65.8

6 Rio de Janeiro 60.9

7 Johannesburg 58.6

8 Lima 58.2

57.6

55.1

38.1

9 Bangkok

10 Bogota

11 Lagos\*

**10-15m**

Average: 67.1

\* =new cities

1 Singapore

Rank City Score

91.5

2 Toronto 87.8

3 Washington, DC 87.6

4 Chicago 86.7

5 Hong Kong 83.7

6 Dallas 83.1

7 Taipei 82.5

8 Madrid 81.4

81.2

62.5

41.9

69.8

66.3

9 Barcelona

10 Santiago

11 Kuala Lumpur

12 Riyadh

13 Yangon

**5-10m**

Average: 77.4

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1 Amsterdam

Rank City Score

0 20 40 60 80 100

88.0

2 Sydney 87.9

3 Copenhagen\* 87.4

4 Melbourne 87.3

5 Stockholm 86.5

6 San Francisco 85.9

7 Frankfurt 85.4

=8 Wellington 84.5

84.5

82.1

79.5

79.1

78.1

76.4

64.5

56.4

55.3

53.5

40.1

=8 Zurich

10 Brussels

11 Abu Dhabi

12 Dubai\*

13 Milan

14 Rome

15 Kuwait City

16 Baku\*

17 Quito

18 Casablanca

Caracas

\* =new cities

19

**<5m**

Average: 75.9

**I. Overview**

In 2015 The Economist Intelligence Unit

developed an index assessing the safety of

major cities across the globe, across four

domains: digital security, health security,

infrastructure security and personal security.

The SCI2015, sponsored by NEC Corporation,

was developed in response to critical concerns

surrounding urban and public safety.

Present UN estimates show that in 2018 a little

more than half of the world’s population are

living in urban areas and this number is bound

to rise, projected to reach 68% by 2050.23

This rapid rise in urban populations has caused

immense pressure on existing resources, often

giving way to an unruly urban sprawl. In light of

these trends, there are valid concerns around

the safety of these cities, be it the safety of

a city’s residents from terror attacks or from

road accidents.

23 https://www.un.org/development/desa/publications/2018-revision-of-world-urbanization-prospects.html

In this context, it is imperative that we

understand the landscape of public safety,

particularly in urban areas. To continue enhancing

our understanding of the current situation and

identify critical changes since the release of the

second edition in 2017, NEC Corporation has

sponsored a third edition of this research.

**II. Differences between the 2019**

**and the 2017 indexes**

The SCI was launched in 2015, ranking 50 cities

on 44 indicators across the four domains of

digital security, health security, infrastructure

security and personal security. In its second

edition in 2017, the index was expanded to

include more cities, ranking 60 cities based on

49 indicators in the same four domains.

In this third edition of the index (2019), the core

focus continues to be centred around digital

security, health security, infrastructure security

and personal security. The 2019 index ranks

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60 cities, on 57 indicators. In this edition,

The Economist Intelligence Unit has modified

the framework to increase focus on gauging

a city’s climate change or disaster risk

resilience/preparedness.

Due to the change in city coverage and

additional indicators, direct year-on-year

comparisons between cities are not possible.

Scores and rankings reflect the relative

performance of a city and should be considered

for the year in scope, especially due to changes

in methodology/indicators and cities in scope

in the 2019 edition.

**III. Change to list of cities**

The 2019 index includes four new cities, while

four cities have been removed from the 2017

sample. This keeps the total number of cities in

SCI2019 unchanged at 60.

**New cities added to the 2019 index Cities removed from the 2019 index**

Copenhagen

Dubai

Lagos

Baku

Athens

Jeddah

Doha

Tehran

**IV. New indicators or updated**

**indicators in the 2019 edition**

Globally, a rise in the number of extreme

weather events owing to climate change has

led to growing concern and awareness around

the impacts and differing city-level/disaster

risk preparedness. To address this growing

concern, the 2019 index includes four new

indicators related to disaster/climate-change

preparedness. Furthermore, new indicators

have been added to highlight changing global

trends, use stronger composite indicators

and broaden the coverage across benchmark

domains.

**Climate change indicators:**

**Domain New indicators**

Infrastructure • Institutional capacity and access to resources

• Catastrophe insurance

• Disaster-risk informed development

Personal • Hazard monitoring

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**Other indicator additions/updates:**

**Domain New indicators**

Digital • Risk of local threats

Health • Emergency services in the city

Infrastructure • Road traffic deaths

• Air transport facilities

• Road network

• Rail network

• Power network

• Cyber-security preparedness

Personal • Effectiveness of the criminal justice system

• Data-driven techniques for crime

**Changes to the framework:**

**Domain Previous Current New indicators**

Digital 8 8 • Added: Risk of local threats

Health 12 13 • Added: Emergency services in the city

Infrastructure 10 15 • Added: Air transport facilities

• Added: Rail network

• Added: Cyber-security preparedness

• Added: Institutional capacity and access to resources

• Added: Catastrophe insurance

• Added: Disaster-risk informed development

• Updated: Road traffic deaths

• Updated: Road network

• Updated: Power network

Personal 19 21 • Added: Effectiveness of the criminal justice system

• Added: Hazard monitoring

**V. Index domains**

Every city in the index is scored across input

and output performance within and across the

four domains. Each domain comprises between

eight and 21 indicators, which are divided

between inputs (capacity/preparednessdriven),

such as policy measures and access

to services or resources, and outputs

(performance-driven), such as air quality and

the prevalence of crime.

**Digital security** assesses the ability of urban

citizens to freely use the internet and other

digital channels without fear of privacy

violations or identity theft. On inputs, cities are

scored on their awareness of digital threats, the

level of technology employed and the existence

of dedicated cyber-security teams. On outputs,

the index measures the risk of local threats and

the estimated number of computers infected

with a virus. One indicator was replaced in this

domain (frequency of identity theft) with risk

of local threats with a view to use a stronger

dataset and remove inherent scoring biases

due to a paucity of data.

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**Health security** measures how cities fare in

terms of environmental policy (design and

implementation) as well as the level and quality

of healthcare available to residents. On inputs,

cities are scored based on their environmental

policies and the access to and quality of

healthcare services. Output indicators include

air and water quality, life expectancy, infant

mortality and other sub-indicators. One new

indicator covering emergency services in the

city was added to this domain of the indicator

framework in the 2019 methodological refresh

of the SCI.

**Infrastructure security** considers the

built physical environment, such as city

infrastructure and its vulnerability to disasters

and terrorist attacks. On inputs, the index takes

into account sub-indicators such as the quality

of infrastructure as well as the enforcement

of transport safety, while on outputs the

number of road traffic deaths is included,

as well as the number of terrorist attacks on

facilities and infrastructure. Three existing

indicator methodologies were refreshed, six

new indicators were added and one indicator

was removed from this domain of the indicator

framework in the 2019 version of the index.

**Personal security** considers how at-risk

citizens are from crime, violence, man-made

threats and natural disasters. Input indicators

in this domain take into account policies

and decisions such as the level of police

engagement, the use of data-driven crime

prevention, the overall political stability of

the country where each city is located and

new indicators to measure natural disaster

preparedness. On outputs, the index takes into

account the prevalence of petty and violent

crime, safety perceptions, threat of civil unrest

and new indicators assessing the effectiveness

of the criminal justice system.

**VI. Indicators**

The SCI2019 comprises 57 individual subindicators

(quantitative and qualitative).

**Quantitative indicators:** 17 of the index’s 57

indicators are based on quantitative data—for

example, the number of road traffic deaths per

million inhabitants.

**Qualitative indicators:** 40 of the 57 indicators

are qualitative assessments based on our

methodology—for example, The Economist

Intelligence Unit’s political stability risk scores.

**VII. Data sources**

A team of researchers collected data for the

index from February to April 2019. In addition

to data from The Economist Intelligence Unit,

which has produced a number of similar

indices that measure cities on liveability, the

cost of living, operational risk and various other

benchmarks, publicly available information for

the latest available year from official sources

has been used where applicable. Examples of

leading academic/published sources include

the World Health Organisation, Transparency

International, Kaspersky Lab and various others

(see table below). Where available, the data

used is city-specific; otherwise, proxies using

regional or national data were used instead.

**VIII. Indicator normalisation**

In order to be able to compare data points

across cities, as well as to construct aggregate

scores for each city, the project team had to

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first make the gathered data comparable.

To do so, the quantitative indicators were

normalised on a scale of 0-100 using a min-max

normalisation, where each score represents

standard deviation/s from the mean, with the

best performing city scoring 100 points and the

weakest performing city scoring 0.

Qualitative indicators were normalised as well.

In some instances, those scores were on a scale

of 0-100. In others, a scale of 1-5 was used, with

1 being the lowest or most negative score, and

5 being the highest or most positive score—

these were normalised in a similar manner to

quantitative indicators.

Other indicators were normalised on a two-,

three- or four-point scoring scale. For example,

the indicator “dedicated cyber-security teams”

was normalised as per the following guidelines:

a city with neither a national- nor city-level

cyber-security team scored 0; a city that had

only a dedicated national cyber-security team

scored 50; and when a city had a dedicated

city-level cyber-security team, it scored 100.

While normalised values (that is, a score of

0-100) allow for direct comparability with

other normalised indicator scores, min-max

scoring also leads to changes in scores from the

previous edition of the index, even without an

actual change in raw data-driven performance.

For example, in an indicator with normalised

scoring, if the score of the weakest performing

city is lower than that in the previous edition of

the index, the scores of other cities in scope will

be impacted regardless of actual (raw datadriven)

performance.

**IX. Index construction**

The index generates an aggregate score/

ranking across all underlying indicators. The

index is first aggregated by domain—creating a

score for each domain (for example, personal

safety)—and finally, overall, based on the

composite of the underlying domain scores.

To create the underlying domain scores, each

underlying indicator was aggregated according

to an assigned weighting. Sub-indicators are

all weighted equally, as are the four domains.

The tables at the end of this appendix contain

domain and indicator-level (outputs and

inputs) specifics (new or updated indicators

are highlighted in green).

**X. Some caveats**

To get the most value of SCI2019, its

limitations—inevitable in any model of a very

complex reality—should also be acknowledged.

First, we could include only information with

broadly comparable data available across all 60

cities. This constrained the choice of indicators.

For example, as discussed in the Washington,

DC, case study, a review made clear that such

figures no longer existed for vehicle accidents

and digital identity safety, leading to a selection

of new metrics.

A lack of urban-level data has also made

it necessary sometimes to rely on national

figures. In most cases this is unlikely to make

much difference but in others it could. We

needed to use country figures for the number

of doctors per head in New Delhi and Mumbai,

for example. Given India’s concentration of

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medical facilities in urban areas, this likely

understates the workforce for each city.

Next, in such an exercise, much data inevitably

comes from information gathered by others.

This potentially brings its own issues. For

example, Beijing and Shanghai’s prisoner

re-offending rates—taken from China’s

national figures—are the lowest in the SCI2019

and far ahead of most others. The Chinese

government insists that this reflects superior

rehabilitation by its prison system. Prisoner

rights campaigners in the country, however,

insist that it has much more to do with the

previous tendency of the state to detain some

recently released prisoners without charge

and send them to re-education through

labour (*laojiao*) camps. Living in a state similar

to imprisonment, it would be difficult for

these individuals to re-offend. The government

has officially closed the *laojiao* system,

but campaigners insist that other institutions

are playing the same role. Interrogating

every controversial datum, however,

would make it impossible to complete

our index and undermine the transparency

of its methodology.

Another issue is that some indicators measure

the existence of policies while their quality

may remain untested. The scope of a written

disaster plan, for example, is likely a sign that

it will work better, but the ultimate test will be

in response to a disaster. Fortunately, our cities

have not seen enough of those to be able to

make robust comparisons.

Finally, scores represent city-wide averages.

Conditions can vary widely within an urban

area, especially between wealthier and poorer

neighbourhoods. Again, the ideal should not

be the enemy of the good: a neighbourhoodfocused

index would be in equal parts unwieldy

to use and inexact in its details.

Too close a focus on the inevitable

imperfections and scoring judgement calls

of SCI2019, though, clouds the big picture.

The data are the most robust available and

the high correlation between individual pillar

inputs and outcomes indicates that the result

is more or less right.

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**1. Digital security**

**A. Inputs**

**Weight: 25%**

Indicator Unit Source

1.1.1. Privacy policy 1 – 5, 5 = strong policy DLA Piper Data Protection Laws of

the World; Economist Intelligence

Unit analysis

1.1.2. Citizen awareness of digital threats 0 – 3, 3 = very aware Economist Intelligence Unit analysis

1.1.3. Public-private partnerships 0 – 2, 2 = close partnerships Economist Intelligence Unit analysis

1.1.4. Level of technology employed 0 – 100, 100 = highest Economist Intelligence Unit analysis

1.1.5. Dedicated cyber-security teams 0 = none, 1 = national only, 2 =

national and city level

Economist Intelligence Unit analysis

**B. Outputs**

1.2.1. Risk of local threats (0-3), 0: low risk, 3: maximum risk Kaspersky Lab

1.2.2. Percentage of computers infected Scale 1 – 5, 5 = most Kaspersky Lab

1.2.3. Percentage with internet access % ITU

**2. Health security**

**A. Inputs**

**Weight: 25%**

Indicator Unit Source

2.1.1. Environmental policies 0 – 100, 100 = best Economist Intelligence Unit analysis

2.1.2. Access to healthcare 0 – 100, 100 = best EIU’s Liveability Rankings

2.1.3. No. of beds per 1,000 # World Bank; local data sources

2.1.4. No. of doctors per 1,000 # WHO; local data sources

2.1.5. Access to safe and quality food 0 – 100, 100 = best EIU’s Global Food Security Index

2.1.6. Quality of health services 1 – 5, 5 = best EIU’s Liveability Rankings

**B. Outputs**

2.2.1. Air quality PM 2.5 levels WHO

2.2.2. Water quality 0 – 100, 100 = best Economist Intelligence Unit analysis

2.2.3. Life expectancy Number of years World Bank; local data sources

2.2.4. Infant mortality Deaths per 1,000 live births World Bank; local data sources

2.2.5. Cancer mortality rate Age-standardised mortality rates per

100,000 - all cancers, both sexes, ages

0-69

IARC, WHO

2.2.6. Number of attacks using biological,

chemical or radiological weapons

Average annual attacks over the past

ten years

Global Terrorism Database

2.2.7. Emergency services in the city 0: No emergency services available,

or more than 1-hour for emergency

response time

1: An emergency response time of

between 10 minutes - 1 hour

2: An emergency response time of less

than 10 minutes

Economist Intelligence Unit analysis

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**3. Infrastructure security**

**A. Inputs**

**Weight: 25%**

Indicator Unit Source

3.1.1. Enforcement of transport safety 0 – 10, 10 = best WHO; Economist Intelligence Unit

analysis

3.1.2. Pedestrian friendliness 0 – 5, 5 = best Economist Intelligence Unit analysis

3.1.3. Disaster management/ business

continuity plan

1 – 5, 5 = best Economist Intelligence Unit analysis

**B. Outputs**

3.2.1.Deaths from natural disasters # / million / year, average of the last

five years

EM - DAT

3.2.2. Road traffic deaths # per million population WHO; local data sources

3.2.3. Percentage living in slums % of city population UN HABITAT; local data sources

3.2.4. Number of attacks on facilities/

infrastructure

Average annual attacks over the past

ten years

Global Terrorism Database

3.2.5. Institutional capacity and access to

resources

0-1, 1 = best Economist Intelligence Unit analysis

3.2.6. Catastrophe insurance 0: No; 1: Yes

(either at the national or sub-national

level)

Economist Intelligence Unit analysis

3.2.7. Disaster risk-informed development 0: No (disaster risk has not been

accounted in either national

economic development plans, or in

city-level urban planning)

1: Partially: only in the active national

development plan/strategy

2: Yes, to both: accounted for in both

the active national development

plan/strategy and in city-level urban

planning (eg, through policies,

directives, urban development plans/

strategies)

Economist Intelligence Unit analysis

3.2.8. Air transport facilities 0-4, 0 = best EIU's Operational Risk Model and

country-level research

3.2.9. Road network 0-4, 0 = best EIU's Operational Risk Model and

country-level research

3.2.10. Power network 0-4, 0 = best EIU's Operational Risk Model and

country-level research

3.2.11. Rail network 0-4, 0 = best EIU's Operational Risk Model and

country-level research

3.2.12. Cyber-security preparedness 0-4, 0 = best EIU's Operational Risk Model and

country-level research

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**4. Personal security**

**A. Inputs**

**Weight: 25%**

Indicator Unit Source

4.1.1. Level of police engagement 0 – 1, 1 = engagement plan, 0 = none Economist Intelligence Unit analysis

4.1.2. Community-based patrolling 0 – 1, 1 = yes, 0 = none Economist Intelligence Unit analysis

4.1.3. Available street-level crime data 0 – 1, 1 = yes, 0 = none Economist Intelligence Unit analysis

4.1.4. Use of data-driven techniques for

crime

0 – 2,

0 = none

1 = Partially: yes, they use data-driven

techniques but only to assist with

surveillance (or analysis)

2 = Yes: use of data-driven

technologies for both surveillance and

predicting crime

Economist Intelligence Unit analysis

4.1.5. Private security measures 0 – 1, 1 = yes, 0 = none Economist Intelligence Unit analysis

4.1.6. Gun regulation and enforcement 0 – 10, 10 = strict enforcement Gun Policy.org, Economist

Intelligence Unit analysis

4.1.7. Political stability risk 0 – 100, 0 = no risk Economist Intelligence Unit

Operational Risk Model

4.1.8. Effectiveness of the criminal justice

system

Quantitative data; in % points, ≤20%:

best score

Economist Intelligence Unit analysis

4.1.9. Hazard monitoring 0 = Neither

1: Only (a) a weather monitoring

system

2: Both a weather monitoring system

(a), and a multi hazard early warning

system (b)

World Meteorological Organization

**B. Outputs**

4.2.1. Prevalence of petty crime 1 – 5, 5 = high prevalence Economist Intelligence Unit

Liveability Rankings

4.2.2. Prevalence of violent crime 1 – 5, 5 = high prevalence Economist Intelligence Unit

Liveability Rankings

4.2.3. Organised crime 0 - 4, 4 = high risk rating Economist Intelligence Unit

Operational Risk Model

4.2.4. Level of corruption Scale 0 – 100, 100 = very clean Transparency International

4.2.5. Rate of drug use % of population estimated to be users UN Office on Drugs and Crime; Local

data sources

4.2.6. Frequency of terrorist attacks Average annual attacks over the past

ten years

Global Terrorism Database

4.2.7. Severity of terrorist attacks Average no. of wounded and killed

in terrorist attacks over the past ten

years

Global Terrorism Database

4.2.8. Gender safety (Female homicide

victims per 100,000)

# WHO; Local data sources

4.2.9. Perceptions of safety 0 – 100, 100 = perceived as most safe Numbeo

4.2.10. Threat of terrorism Rating 0 – 4, 0 = Intolerable, 4 =

Acceptable

Economist Intelligence Unit

Liveability Rankings

4.2.11. Threat of military conflict Rating 0 – 4, 0 = Intolerable, 4 =

Acceptable

Economist Intelligence Unit

Liveability Rankings

4.2.12. Threat of civil unrest Rating 0 – 4, 0 = Intolerable, 4 =

Acceptable

Economist Intelligence Unit

Liveability Rankings

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