The Economist Intelligence Unit

SAFE CITIES INDEX 2017

Security in a rapidly urbanising world

A report from The Economist Intelligence Unit

Sponsored by

NEC

CONTENTS

About the report 1

Executive summary 2

Introduction 5

Category 1: Digital security 8

Mobile devices become safety tools 12

Category 2: Health security 13

Category 3: Infrastructure security 17

Category 4: Personal security 21

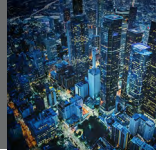
The economic toll of urban crime 25

Conclusion 26

Appendix 1: Index results 28

Appendix 2: Index methodology 32

© The Economist Intelligence Unit Limited 2017



ABOUT THE REPORT

The Safe Cities Index 2017 is a report from The Economist Intelligence Unit sponsored by NEC. The report is based on the second iteration of the index, which ranks 60 cities across 49 indicators covering digital security, health security, infrastructure security and personal security.

The index was devised and constructed by Chris Clague, Stefano Scuratti and Ruth Chiah. The report was written by Sarah Murray and edited by 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:

- Nathalie Alvarado, citizen security lead specialist, Inter-American Development Bank
- Alan Brill, managing director, Kroll Cyber Security
- David Buck, senior fellow, public health and inequalities, The King's Fund
- Elizabeth Johnston, executive director, European Forum for Urban Security and executive director, French Forum for Urban Security
- Dan Lewis, chief, Urban Risk Reduction Unit and head, City Resilience Profiling Programme, UN Habitat
- Mitchell Moss, professor of urban policy and planning, and director, Rudin Center for Transportation, New York University
- Robert Muggah, co-founder, Igarapé Institute
- Brian Nussbaum, assistant professor, Department of Public Administration and Policy, Rockefeller College of Public Affairs, State University of New York at Albany
- Michael Nutter, professor of professional practice in urban and public affairs, Columbia University
- Michael O'Hanlon, senior fellow in Foreign Policy, Brookings Institution
- Jacqueline Poh, chief executive officer, GovTech Singapore
- John Rossant, chairman, New Cities Foundation
- Ana Diez Roux, dean and professor of epidemiology, Dornsife School of Public Health, Drexel University
- Dan Smith, director, Stockholm International Peace Research Institute

© The Economist Intelligence Unit Limited 2017

EXECUTIVE SUMMARY

In many respects it's the very success of cities, in their role as global social and economic hubs, that makes them more vulnerable. As rural residents head for the city in developing countries—which for purposes here we define as non-OECD countries, with the exception of Singapore—and wealthy global capitals draw in international talent, vast demographic shifts are creating cities with previously unimagined population sizes. In 2016, there were 31 megacities—cities with more than 10m inhabitants. This is projected to rise to 41 by 2030.[1]

And size matters. While cities generate economic activity, the security challenges they face expand and intensify as their populations rise. These include growing pressure on housing supply (prompting the spread of slums) and services such as healthcare, transport, and water and power infrastructure.

Man-made risks are also growing. As tragic recent events in European cities such as London, Paris and Barcelona have demonstrated, high profile, wealthy urban centres are becoming targets for terrorist activities. And as income divides widen, growing inequalities can create tensions that contribute to violent outbursts such as the 2011 London riots.

Meanwhile, another major shift has come to the fore: the rapid deployment of digital technologies in pursuit of the so-called "smart city". The technologies no doubt bring benefits. As part of Internet of Things (IoT) technologies, sensors collect and wirelessly transmit data from physical objects, delivering new insights into city operations and permitting remote and more efficient management of infrastructure and services. Connecting apartments and office buildings to the electricity grid via smart meters, for example, delivers energy efficiency and cost savings.

And with the spread of closed-circuit televisions (CCTVs) and webcams around cities, technologies such as artificial intelligence and data analytics can greatly enhance the capabilities of law enforcement agencies to combat urban crime and terrorism.

Yet the rush to embrace smart city technologies also creates vulnerabilities if investments in digital technologies are not accompanied by commensurate investments in cyber security. Wealthy cities are making investments, albeit to varying degrees, but security often comes lower on the list of spending priorities for cities with already stretched finances.

The consequences of neglecting cyber security could be dire. For example, if hackers were to shut down the power supply, an entire city would

1 The World's Cities in 2016: Data Booklet, United Nations. Available at: http://www.un.org/en/development/desa/population/publications/pdf/urbanization/the_worlds_cities_in_2016_data_booklet.pdf

© The Economist Intelligence Unit Limited 2017

be left in chaos. This prospect is something city officials now need to plan against.

Cities are also defined by the complex, interlinked nature of their systems and infrastructure. This complexity has a bearing on safety. For example, experts are uncovering links between the quality of housing and the health of citizens. And while terrorist attacks are what make headlines, traffic accidents are a greater day-to-day danger for urban residents. Natural forces are also coming in to play as climate change poses new risks to cities, with extreme weather events becoming an even greater threat, as illustrated by the devastation Hurricane Harvey just delivered to Houston, Texas.

The 2017 Safe Cities Index retains the four categories of security from the 2015 version—digital, health, infrastructure and physical. However, we have added six new indicators and expanded the index to cover 60 cities, up from 50 in 2015.

The index's key findings include the following:

- **As in 2015, Tokyo tops the overall ranking.** The Japanese capital's strongest performance is in the digital security category while it has risen seven points in the health security category since 2015. However, in infrastructure security, it has fallen out of the top ten, to 12th.

- **In many cities, security is falling rather than rising:** With two exceptions (Madrid, which is up 13 points and Seoul, up six), cities tend to have fallen in the index since 2015 (for example, New York is down 11, Lima is down 13, Johannesburg is down nine, Ho Chi Minh City is down ten and Jakarta is down 13)

- **Asian and European cities remain at the top of the index:** Of the cities in the top ten positions in the overall index, four are East Asian cities (Tokyo, Singapore, Osaka and Hong Kong), while three (Amsterdam, Stockholm and Zurich) are European.

- **Asia and the Middle East and Africa dominate the bottom of the index:** Dhaka, Yangon and Karachi are at the bottom of the list. Of the ten cities at the bottom of the overall index, three are in South-east Asia (Manila, Ho Chi Minh City and Jakarta), two are in South Asia (Dhaka and Karachi) and two are in the Middle East and Africa (Cairo and Tehran).

- **Security remains closely linked to wealth but the scores of high-income cities are falling:** While cities in developed economies dominate the top half of the index (with the lower half dominated by cities in poorer countries), of the 14 cities in high-income countries, the security scores of ten have fallen since 2015.

- **Income is not the only factor governing city performance on security:** Most of the cities in the top ten of the index are high-income or upper middle-income cities. However, two high-income cities in the

© The Economist Intelligence Unit Limited 2017

Middle East (Jeddah and Riyadh) fall below position 40 in the index.

- **America's failing infrastructure is reflected in its cities' rankings:** No US city makes it into the top ten in this category and only San Francisco appears in the top 20. The top ten cities in this category are either in Europe (Madrid, Barcelona, Stockholm, Amsterdam and Zurich) or Asia-Pacific (Singapore, Wellington, Hong Kong, Melbourne and Sydney).

- **However, the US performs well in digital security:** Of the cities in the top ten in this category, four are North American (Chicago, San Francisco, New York and Dallas).

© The Economist Intelligence Unit Limited 2017

INTRODUCTION

In the two years since we published the inaugural Safe Cities Index, the world's urban population is estimated to have grown by more than 150m people, raising the total number of people living in cities to above 4bn. More than 90% of the increase in urbanisation over this period occurred in the developing world, where massive migration from rural areas has continued to accelerate. In the developed world, however, the size of most cities remained roughly the same, with some cities even beginning to shrink in those countries with ageing and declining populations.

The results of the 2017 Safe Cities Index, which now covers 60 cities, again show a sharp divide in overall levels of safety between the fast urbanising developing world and the

EXHIBIT 1: Safe Cities Index 2017 overall results

Average 72

1	Tokyo	89.80	21	New York	81.01	41	Moscow	63.99
2	Singapore	89.64	22	Taipei	80.70	42	Jeddah *	62.80
3	Osaka	88.87	23	Washington, DC	80.37	43	Delhi	62.34
4	Toronto	87.36	24	Paris	79.71	44	Lima	61.90
5	Melbourne	87.30	25	Milan	79.30	45	Mumbai	61.84
6	Amsterdam	87.26	26	Dallas *	78.73	46	Bogota *	61.36
7	Sydney	86.74	27	Rome	78.67	47	Riyadh	61.23
8	Stockholm	86.72	28	Abu Dhabi	76.91	48	Casablanca *	61.20
9	Hong Kong	86.22	29	Buenos Aires	76.35	49	Bangkok	60.05
10	Zurich	85.20	30	Doha	73.59	50	Johannesburg	59.17
11	Frankfurt	84.86	31	Kuala Lumpur *	73.11	51	Cairo *	58.33
12	Madrid	83.88	32	Beijing	72.06	52	Tehran	56.49
13	Barcelona	83.71	33	Athens *	71.90	53	Quito *	56.39
14	Seoul	83.61	34	Shanghai	70.93	54	Caracas *	55.22
15	San Francisco	83.55	35	Santiago	70.03	55	Manila *	54.86
16	Wellington *	83.18	36	Kuwait City	67.61	56	Ho Chi Minh City	54.33
17	Brussels	83.01	37	Rio de Janeiro	66.54	57	Jakarta	53.39
18	Los Angeles	82.26	38	Sao Paulo	66.30	58	Dhaka *	47.37
19	Chicago	82.21	39	Mexico City	65.52	59	Yangon *	46.47
20	London	82.10	40	Istanbul	65.23	60	Karachi *	38.77

* New cities

© The Economist Intelligence Unit Limited 2017

stagnant developed world. The top three cities in the index are unchanged from 2015, with Tokyo, Tokyo, Singapore and Osaka ranked first, second and third and still separated by mere tenths of a point. Likewise, the remainder of the top ten continues to be comprised of mainly Asian and European cities.

At the bottom of the Index is one of the ten new cities added in 2017: Karachi. Although it performs poorly across all of the categories, it was dragged down by a very low level of personal security (60th). This is a reflection of a number of factors, but the main reason is that among the cities in the index, it experiences by far the most frequent and most severe terrorist attacks. Jakarta, which ranked last in 2015, is 57th this year, pulled from the bottom by the addition of Karachi and other cities like Yangon and Dhaka.

In 2017 only one city in the developing world cracks the top half of the index, Buenos Aires, which places 29th, between two Middle Eastern cities, Abu Dhabi (28th) and Doha (30th). Two other Middle Eastern cities, Jeddah (42nd) and Riyadh (47th), are the worst performing of the 21 cities from the developed world, having scored below average in all of the four categories and particularly poorly in the infrastructure and personal security categories.

In the Asia-Pacific, Kuala Lumpur, another new addition to this year's index, is the top ranked city from a developing country, coming in 31st overall and just ahead of Beijing (32nd) and Shanghai (34th). Across the four categories, Kuala Lumpur ranks highest in personal security (24th), a result of strong scores in levels of drug use, gender safety and the threat of terrorist attacks, among others.

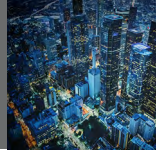
EXHIBIT 2: US cities' infrastructure security rankings and scores

OVERALL RANK	CITY	SCORE
17	San Francisco	91.21
21	New York	88.39
21	Los Angeles	88.27
27	Chicago	87.47
28	Washington, DC	82.38
34	Dallas	79.23

All the seven cities in North America are in the top half of the overall rankings but many underperform their developed country peers in key areas. New York, for example, ranks 31st in health security, with Dallas (29th) faring only slightly better. Dallas is also in the bottom half of the infrastructure security category, a category in which Chicago (27th) and Washington, DC (28th) are relatively weak as well. The decaying state of infrastructure in the US has long been a subject of debate in the country. The index shows that the debate has yet to translate into much action.

In general, while the Safe Cities Index measures relative rather than absolute safety, there does not appear to have been a vast improvement in

© The Economist Intelligence Unit Limited 2017



overall levels of safety since 2015. In parts of the developed world, particularly Europe, a series of terrorist attacks has affected personal security. At the same time, city governments in the developing world are still struggling to keep pace with the rapid expansion of their populaces, which is straining infrastructure and overwhelming health services and law enforcement, the extent to which it is even present.

That is not to say progress hasn't been made. At least in the developed world, more cities are devoting resources to digital security. Seoul, for one, improved its ranking in the category by 29 places by reducing the number of computers infected with viruses and the frequency of identity theft. But significant gaps in safety remain. In many instances, it's a matter of resources—financial, human and political. Yet in others, it's a question of understanding. The latter is easier to bridge and cities can start with identifying the problems and understanding how they've been solved elsewhere. The Safe Cities Index was designed to help policymakers address these and other issues. ■

© The Economist Intelligence Unit Limited 2017

CATEGORY 1: DIGITAL SECURITY

On a Saturday last November, riders using the light rail transit system in San Francisco were surprised to find that they were unable to pay their fares.[2] Hackers had attacked the system's computers, encrypting all its data, and were demanding a ransom to return it. Although normal operations were restored the next day, this type of incident is bound to become more frequent. As "smart cities" connect their infrastructure to broadband Internet, wirelessly-enabled sensors, big data and analytics, they are becoming more vulnerable to cyber-attack if security measures are not widely implemented.

In this case, the consequences were merely a loss of revenue to the city, which allowed commuters to use the system free of charge for a day while systems were restored. They could have been more dramatic. "Had it been the computer systems [rather than the payment system] that control the trains, you would have had commuting in the Bay Area grind to a halt," says Brian Nussbaum, assistant professor, Rockefeller College of Public Affairs at the State University of New York at Albany, whose research topics include cyber security and terrorism.

Had the attack occurred on a weekday, and had it attacked the computer systems, thousands of workers would have been left stranded or unable to get to work, children unable to get to school and family carers unable to visit their relatives. An attack on the power grid would have been even more devastating, affecting every city service, from banking and telecommunications to food supply chains and healthcare services.

John Rossant, chairman of the Paris-based New Cities Foundation, an international non-profit organisation, sees the potential for increases in digital threats as cities embrace smart city technologies. "More and more cities are moving towards open digital platforms," he says. "That is good, but it leaves you open to cyber-attacks, and these can be serious because you're talking about water supply, transport and electricity grids."

This means smarter cities may be more exposed than others, says Mitchell Moss, professor of urban policy and planning and director of New York University's Rudin Center for Transportation. "The more data is centralised, the more available it is to be penetrated," says Professor Moss, a former adviser to New York City mayor Michael Bloomberg. "So ironically, cities that have multiple communications systems and highly disaggregated networks are going to be much less vulnerable."

There is evidence that cities in some parts of the world are responding to digital threats. In the

2 Wired: https://www.wired.com/2016/11/sfs-transit-hack-couldve-way-worse-cities-must-prepare/

© The Economist Intelligence Unit Limited 2017

EXHIBIT 3: Digital security, top 10, bottom 10

Average 66.2

TOP 10		
1	Tokyo	88.40
2	Singapore	86.84
3	Chicago	86.75
4	Amsterdam	85.79
5	Hong Kong	85.77
6	Toronto	85.33
7	Los Angeles	85.12
7	San Francisco	85.12
9	New York	84.95
10	Dallas *	84.65

BOTTOM 10		
51	Moscow	49.03
52	Bangkok	44.44
53	Cairo *	43.29
54	Karachi *	43.22
55	Tehran	39.88
56	Ho Chi Minh City	39.78
57	Yangon *	39.07
58	Dhaka *	38.33
59	Manila *	36.61
60	Jakarta	36.60

* New cities

index, Asian and North American cities perform well on digital security. Three of the top ten in this category are in Asia (Tokyo, Singapore and Hong Kong) and six (Chicago, Toronto, San Francisco, Los Angeles, New York and Dallas) in North America.

For others, the response to cyber threats has been to establish dedicated units within the police force, as is the case in Hong Kong, which ranks fifth in the digital security category of the index. In 2015, the city established the Cyber Security and Technology Crime Bureau to strengthen its capabilities in areas such as digital forensics and technology crime prevention.[3]

In some cases, global events have prompted an increased investment in cyber security. In Japan, for example, the government is stepping up its efforts to counter cyber threats and protect critical infrastructure ahead of the Tokyo Olympics and Paralympics in 2020.[4]

Boosting long-term capacity to respond to digital threats is a priority for other cities, as well. In August, Los Angeles (which shares seventh place with San Francisco in the digital security category) launched the first city-based cyber lab in the US. Run as a public-private partnership, the lab will analyse cyber-attacks and hacking attempts on city networks as they occur and disseminate information on these as a means of helping businesses and residents secure their networks and devices.[5]

London, which ranks 24th in digital security, has nevertheless created an innovative partnership between the Mayor of London, the Metropolitan Police Service and the City of London Police to operate the London Digital

3 Hong Kong, The Facts, The Police, July 2016. Available at: https://www.gov.hk/en/about/abouthk/factsheets/docs/police.pdf
4 Foreign Press Center Japan: http://fpcj.jp/en/assistance-en/briefings_notice-en/p=55298/ and SIP: http://www8.cao.go.jp/cstp/panhu/sip_english/cybersecurity.pdf
5 LA Mayor: https://www.lamayor.org/mayor-garcetti-launches-nation%E2%80%99s-first-city-based-cyber-lab

© The Economist Intelligence Unit Limited 2017

Security Centre. The centre offers training and education programmes, security and digital footprint assessments to businesses.[6]

Efforts are underway in other cities to bolster their capabilities. In the index, 17 have increased their score since 2015. Notable among them is Chicago, which has risen by 12 places in the Index rankings as result. The city is home to several leading cyber security firms and in January its mayor, Rahm Emanuel, announced the launch of a new cyber security training initiative.[7] Developed by the Department of Defense in partnership with City Colleges of Chicago, the training is designed to increase the supply of professionals able to secure critical computer networks in the public and private sectors.

As a result of these and other initiatives, some cities have risen in the index in this category since 2015. Melbourne, for example, has risen ten points, Seoul 16 points and Istanbul nine points. However, income levels appear to drive the relative performance of cities on digital security. In the index, four of the five cites at the bottom of this category—Ho Chi Minh City, Yangon, Dhaka and Manila—are low-income cities. These cities often lack technology skills and competing challenges such as tackling infectious diseases and poverty can push cyber security lower on the list of priorities.

Yet, even for relatively wealthy cities, a lack of resources hampers their ability to implement sufficient countermeasures, according to Professor Nussbaum. "The real question is the tier below these large global cities," he says. "The NYPD [New York Police Department] has 35,000 police officers, which is almost three times the size of the FBI, so they have the capacity to specialise and work on these things in ways that even the top 20 cities in terms of population don't."

Latin American cities perform poorly, with Buenos Aires 23rd and Rio de Janiero and Sao Paolo sharing 49th place. "Brazil is one of the top sites for cybercrime in the world," says Robert Muggah, co-founder of the Igarapé Institute,

EXHIBIT 4: Rising up, falling down: Largest gains, largest losses in digital security

CITY	MOVES UP (RANKING)	MOVES UP (SCORE)
Seoul	16	21.5
Chicago	12	17.4
Melbourne	10	16.9
Istanbul	9	18.4
Barcelona	7	13.2
Frankfurt	7	17.6

CITY	MOVES DOWN (RANKING)	MOVES DOWN (SCORE)
Abu Dhabi	-24	-10.4
Mumbai	-24	-10.0
Santiago	-21	-6.4
Jakarta	-17	-8.4
Delhi	-16	-5.2
Ho Chi Minh	-14	-5.5

Note: please see appendix for discussion of index comparisons.

6 London Digital Security Centre: https://londondsc.co.uk/#aboutus
7 City Colleges of Chicago: http://www.ccc.edu/news/Pages/CCC-Cyber-Security-Training.aspx

© The Economist Intelligence Unit Limited 2017

an independent think-tank focused on security, justice and development challenges in Brazil, Latin America and Africa. "That has to do with the fact that internet banking came to Brazil quite early. So you have [a] sophisticated hacking community in Brazil."

And, he argues, cities in developing countries are generally more exposed to cyber threats because of the rate at which they have adopted digital technology. "In the global south one of the challenges is you have a population group where most people are not particularly sensitive to the threat so you don't have good digital hygiene among citizens," he says, using the term for such acts as regularly changing passwords, downloading security patches when they become available and avoiding suspicious emails, among others. "And the speed with which these economies have transitioned into digital and online banking has not been accompanied by the same security precautions as in mature economies."

So while technology allows developing countries to leapfrog traditional steps on the development path—in this case by moving from brick-and-mortar financial institutions to Internet banking—the case of Latin American suggests it can result in citizens becoming more exposed to fraud and theft.

However, even in cities in mature economies, municipal leaders may be rushing to adopt technology at the expense of cyber security considerations, says Mr Nussbaum. "They're doing this with relatively little investment upfront," he says. "The cities that do this well don't feel the need to be a first mover and don't necessarily go with the cheapest model because that [model] almost never accounts for security."

He advises maintaining low-tech back up capabilities. "During the cyber-attack on the Ukrainian electric grid [in December 2015], part of the reason it was less damaging than it could have been was the fact that the utilities had the ability to dispatch people into the field and physically restart [the] system," he says. "So having that manual backup is very important."

Alan Brill, senior managing director at Kroll Cyber Security, argues that cities should consider appointing or hiring chief information security officers (CISOs) responsible for cyber security. And for smaller cities that cannot afford such an executive, there are other options. "If you got together with town councils, school boards and fire district boards, together you might be able to share [the services of] a person from a security organisation," he says.

Regardless of how they achieve it, Mr Brill believes that protecting citizens from cyber threats is a key responsibility for municipal governments. "If a city is serious about going to the next level in being a smart city, as part of that it has to pledge to its citizens that it's not going to ignore security and that cyber security is one of the fundamental cornerstones of the entire process." ■

© The Economist Intelligence Unit Limited 2017

Mobile devices become safety tools

While digital technology has created new threats to urban operations, in the hands of city residents, it can also be harnessed to shore up safety and security. Thanks to the innovations of app developers and the ubiquity of mobile devices, citizens can now increase their individual safety and play a key role in contributing to community safety and crime detection.

Often it is extreme levels of violence that have prompted new mobile services. For example, as armed robberies and gunfights have proliferated in Rio de Janeiro (at position 38 in the personal safety category of the index), developers have produced apps that use eyewitness accounts, media and police reports to track in real-time where gun battles are occurring. Created by Amnesty International and local researchers, Fogo Cruzado (Cross Fire), is an app that provides citizens information about where gunfire is taking place. Another app, Onde Tem Tiroteio (Where are the Firefights), offers a similar service.[8]

Similarly, it was growing violence against women in Delhi, particularly the gang rape of a 23-year-old medical student on a Delhi bus, that prompted Elsa D'Silva, a former airline executive who left the industry to focus on women's issues, to work with her co-founders on developing the Safecity app,[9] through which women in the city can exchange stories of harassment and upload photos or videos to provide details of where, when and what happened.[10]

Meanwhile, some apps don't only help individuals protect themselves and their peers, but also contribute to solving crimes. In the US, amber alerts—child abduction emergency alerts—allow state and local authorities to send abduction bulletins to mobile phone users who can, if they have any relevant information, send the authorities images, locations and phone numbers. As of February 2017, a total of 868 children had been successfully recovered through the system.[11]

8 Brazil apps track gunfire as Rio de Janeiro violence spikes, Reuters, July 4, 2017. Available at: https://www.reuters.com/article/us-brazil-security-app-idUSKBN19P2C3
9 Safecity.in: http://safecity.in/externalpages/about.html
10 Can the Safecity app make Delhi safer for women? The Guardian, August 15, 2015. Available at: https://www.theguardian.com/cities/2015/aug/13/can-the-safecity-app-make-delhi-safer-for-women
11 US Department of Justice: https://www.amberalert.gov/

© The Economist Intelligence Unit Limited 2017

CATEGORY 2: HEALTH SECURITY

As they look to protect their citizens, another priority for policymakers is to ensure that their cities offer adequate access to healthcare, whether that is provision of emergency services and hospitals or the operation of social care services. However, cities also need to deliver a healthy urban environment in the form of traffic management schemes, the provision of green spaces and other measures.

While many aspects of health provision come at a price, income levels are not always the driving force behind the extent to which cities keep their residents healthy. Of the top ten performing cities in the health security category, only two (Tokyo and Zurich) are high-income cities; and some high-income cities perform poorly, such as Doha, which ranks 45th.

In general, poorer cities struggle to deliver adequate health services. Of the bottom ten cities in this category, nine are either low-income cities (Mumbai, Yangon, Dhaka and Karachi) or low-middle income cities (Johannesburg, Quito, Caracas, Jakarta and Cairo).

For cities with ageing populations, technology can help manage urban health and wellbeing more efficiently and at a lower cost. In Singapore

EXHIBIT 5: Top 10, bottom 10 in health security

Average 69.2

TOP 10		
1	Osaka	87.15
2	Tokyo	85.63
3	Frankfurt	84.06
4	Zurich	83.39
5	Seoul	82.72
6	Sydney	81.80
7	Brussels	81.41
8	Paris	81.35
9	Melbourne	81.34
10	Stockholm	79.94

BOTTOM 10		
51	Casablanca *	58.52
52	Johannesburg	57.71
53	Quito *	57.46
54	Caracas *	56.72
55	Mumbai	55.74
56	Jakarta	54.40
57	Cairo *	52.28
58	Yangon *	45.79
59	Dhaka *	45.59
60	Karachi *	39.92

* New cities

© The Economist Intelligence Unit Limited 2017

(ranked 13th in the health category of the index), elderly residents can live independently for longer thanks to technology that remotely monitors their health. Using web-enabled sensors, the Elderly Monitoring System tracks daily activities, detecting falls or abnormally long periods of inactivity and sending alerts.[12]

Given the links between violence and mental illness, health services have a role to play when it comes to preventing urban violence. While many factors—criminal, tribal, social, cultural and environmental—lie behind violence, studies have linked mental health and violence. The HCR-20, a set of professional guidelines to violence risk assessment, identifies four of the 20 risk factors as directly related to mental illness and/or personality disorder.[13]

"There are interesting links between the health sector and security when thinking about mental health and the services that can be provided around that," says Elizabeth Johnston, executive director of the European Forum for Urban Security. And while helping mentally ill people manage their condition, health professionals can also identify at-risk individuals. "A lot of cities are developing schemes for professionals to exchange information if it's beneficial to security while also respecting individual rights," says Ms Johnston, who is also and executive director of the French Forum for Urban Security.

However, when it comes to health services, the challenge for municipal authorities is that while they often have control of spending and policies on crime prevention, transport and infrastructure, responsibility for healthcare tends to fall into the hands of state authorities or national governments. In London, for example, responsibilities are divided between the mayor's office, local authorities, the National Health System and the recently introduced Sustainability and Transformation Partnership programme, which develops health proposals around the needs of different population areas. "In terms of the organisations, the money flows, and who reports to who, that's hugely complex," says David Buck, senior fellow, public health and inequalities at the King's Fund, a think-tank focused on healthcare in England.

Nevertheless, municipal leaders can still have an impact on health, particularly given the fact that the link between health and security extends beyond simply mending broken bones or healing the sick to implementing preventive measures. One important means of improving urban health is ensuring residents have ccess to healthy food. This is not always easy. Many neighbourhoods in American cities, for example, are "food deserts", places where the only nutrition available comes from fast food restaurants or the junk food sold in convenience stores. In the index, under the indicator for access to safe and quality food, European cities perform well, while North American cities all rank outside of the top 20.

Some US cities are making efforts to turn the tide. New York City is among them. It has put in place measures to support urban farming

12 Intellectual Property Intermediary (under Singapore's Ministry of Trade and Industry): https://www.ipi-singapore.org/technology-offers/elderly-monitoring-system-ems
13 Mental Illness, Personality Disorder and Violence: A Scoping Review, The Offender Health Research Network, 2012. Available at: http://www.ohrn.nhs.uk/OHRNResearch/MIviolence.pdf

© The Economist Intelligence Unit Limited 2017

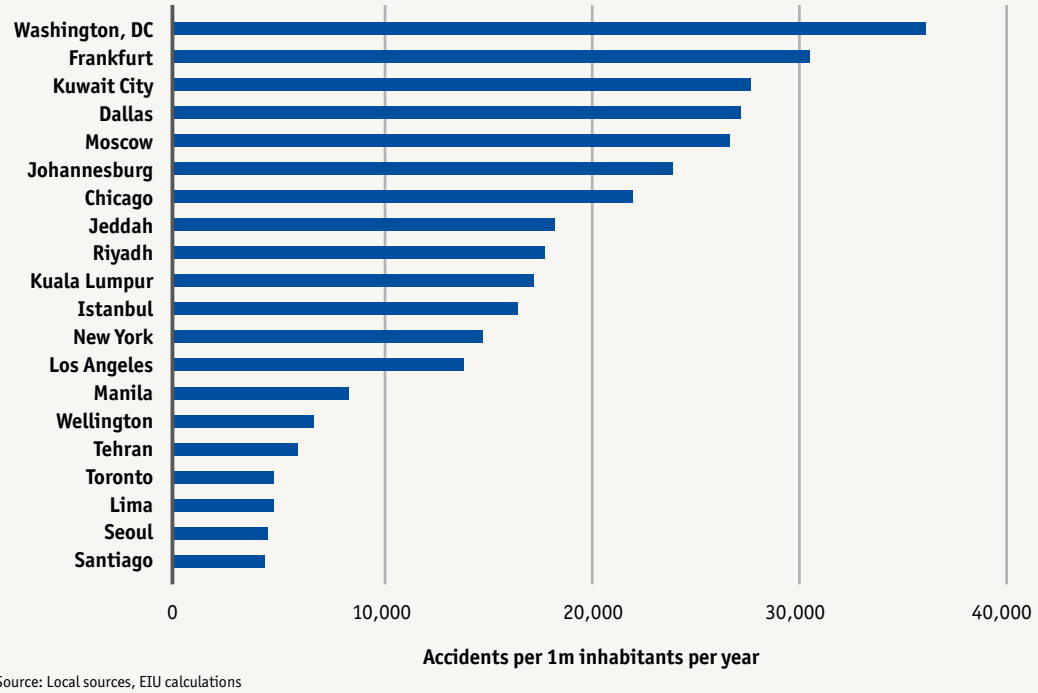
with, for example, the New York City Housing Authority's Garden and Greening Programme providing technical assistance and other resources to public housing residents.[14]

In addition to such schemes, legislative action is often required, since zoning restrictions and permitting prices can hamper the growth of urban farming. For example, Chicago (at position 27 in this category of the index) has recently adopted changes to its zoning ordinance to permit the establishment of urban farms in parts of the city.[15]

Ensuring that the city has adequate walking and green spaces is another way of increasing fitness and health, preventing traffic accidents and improving air quality so as to lower the risk of conditions such as cardiovascular disease. "And there's more and more evidence that green space, if it's accessible and high quality, is protective of mental health," says Mr Buck.

The way a city is designed can also help prevent accidents. "One indicator that's really important is injury mortality—particularly traffic-related mortality," says Ana Diez Roux, dean and professor of epidemiology at Drexel University's Dornsife School of Public Health. "That's something that varies across cities. But, particularly in developing countries,

EXHIBIT 6: Rate of vehicular accidents



Source: Local sources, EIU calculations

14 NYC.gov: http://www1.nyc.gov/site/foodpolicy/help/urban-growing-and-gardening.page
15 City of Chicago: https://www.cityofchicago.org/city/en/depts/dcd/supp_info/urban_agriculturefaq.html

© The Economist Intelligence Unit Limited 2017

some of the rates of traffic related mortality are extraordinarily high."

Somewhat counter-intuitively, nine of the ten cities receiving the highest scores in the indicator tracking the frequency of vehicular accidents are in the developing world, the exception being Athens. Fewer cars on the road—and thus fewer opportunities for accidents—is the likely explanation, but under-reporting of accidents is probably a contributing factor, as well.

In fact, while terrorism has been gaining much attention as an urban risk, vehicle fatalities, at 1.2m in 2015, far outweigh deaths from terrorist attacks—at 30,000 the same year.[16]

The layout and design of a city affects health in other ways, too. "There are elements of the physical environment that are conducive to active transportation," says Professor Diez Roux. "That is, things like walkability, which has to do with pedestrian friendliness (as opposed to car friendliness). And public transportation, which is related to air quality and relates to chronic diseases."

Mr Buck agrees. "It's not going to solve everyone's health problems but there are ways to design cities [to improve health] through housing, transport, green space and increasing cycling," he says.

For the world's new master-planned cities, there is the advantage of creating infrastructure and services from scratch, enabling them to incorporate urban health and wellbeing considerations in the planning process. In South Korea, for example, Songdo, a high-tech city commissioned in 2001 and built on reclaimed land near Seoul, is planned around a central park allowing all residents to walk to offices in the business district. Walkable neighbourhoods and cycling routes promote healthy lifestyles.[17]

When it comes to urban policymaking, there is increasing recognition that cities need to be able to at least shape healthcare strategies, if not assume control over certain aspects of it. In the UK, for example, a project called DevoManc in Greater Manchester is designed to hand over more decision making to local authorities. In addition, in London (19th in this category of the index) a collaboration called Healthy London Partnership (which includes clinical commissioning groups, London councils, the City of London, the Mayor of London, NHS England and Public Health England) has been designed to explore whether bringing decision making and resources closer to local populations can improve healthcare in the city.[18] "Some of the directors of public health in England are more closely aligned with their local authority chief executives than they used to be," says Mr Buck. "So there's increasingly a sense of cities taking more control." ■

16 Brookings, "Securing global cities: Best practices, innovations, and the path ahead", March 16. Available at: https://www.brookings.edu/wp-content/uploads/2017/03/fp_201703_securing_global_cities.pdf
17 Alexandra Lich a, Songdo and Sejong: master-planned cities in South Korea, 2015. Available at https://halshs.archives-ouvertes.fr/halshs-01216229/document
18 London.gov: https://www.london.gov.uk/what-we-do/health/london-health-and-care-devolution/what-health-and-care-devolution-means-london

© The Economist Intelligence Unit Limited 2017

CATEGORY 3: INFRASTRUCTURE SECURITY

In June 2017, images of the deadly inferno that killed an estimated 80 people in Grenfell Tower, a residential block in West London, shocked the world. As local authorities came under criticism for failing to protect residents of the low-income housing block, the fire's devastation served as a reminder that cities have a responsibility to secure the safety of buildings, roads, bridges and other physical infrastructure.

Financial resources might seem a powerful determinant of the ability to do this, but the index reveals that the wealthiest cities are not always those that are delivering the best infrastructure security. This is particularly true in the US, where politicians from both parties have long argued for the need to ramp up investment in infrastructure. Of the top ten cities in this category of the index, none are in the US. And for Washington DC and Dallas (both high-income cities), infrastructure security represents their weakest performance in the index.

Riyadh, a high-income city, is 54th in this category of the index, down 14 points since 2015, possibly reflecting government spending cuts in the wake of the fall in oil prices in recent years.

Nevertheless, in general, affluence appears to drive infrastructure security. All the cities in

EXHIBIT 7: Top 10, bottom 10 in infrastructure security

Average 78.2

TOP 10		
1	Singapore	97.05
2	Madrid	96.76
3	Barcelona	96.59
4	Stockholm	96.18
5	Wellington *	96.13
6	Amsterdam	96.05
7	Hong Kong	96.04
7	Melbourne	96.04
9	Sydney	95.73
10	Zurich	95.71

BOTTOM 10		
51	Mumbai	59.12
52	Delhi	58.49
53	Caracas *	58.42
54	Riyadh	56.88
55	Johannesburg	55.06
56	Manila *	52.89
57	Quito *	52.03
58	Yangon *	48.58
59	Karachi *	40.11
60	Dhaka *	38.42

* New cities

© The Economist Intelligence Unit Limited 2017

the top ten in this category of the index (Singapore, Madrid, Barcelona, Stockholm, Wellington, Amsterdam, Hong Kong, Melbourne, Sydney and Zurich) are either high- or upper-middle income cities.

Meanwhile, the lowest part of the list is dominated by lower-income cities—Mumbai, Delhi, Manila, Yangon, Karachi and Dhaka all feature in the bottom ten in this category. Globally, massive amounts of investment will be required to upgrade old infrastructure. However, even when sufficient funds are spent on urban infrastructure, its resilience depends on the quality of operations, says Dan Lewis, chief of the Urban Risk Reduction Unit at UN Habitat. "Any infrastructure functions directly as a consequence of who manages it," says Mr Lewis, who is also head of the City Resilience Profiling Programme at UN Habitat. "In some places, the infrastructure is poor but governance, management and regulatory frameworks are good. In other cases, you have good infrastructure but limited management capacity."

Cities have competing spending demands when considering infrastructure investment. "There's a synergistic effect where if you have a strong economy in a city, you have a stronger tax base so you can pay for hospitals and schools and infrastructure," says Michael O'Hanlon, a senior fellow in foreign policy at the Brookings Institution, a US think-tank, and author of the 2017 report, Securing Global Cities. "But if you have wonderful schools and hospitals but you don't have good infrastructure and strong police forces, then your economic growth may not proceed."

In developing countries, the rapid expansion of urban populations is also putting pressure on infrastructure, particularly as young people leave rural areas and head for the city. Of the world's 47 fastest-growing cities, six are in Africa and 40 in Asia (with 20 in China). Slums and other unplanned urban developments are expanding, often in areas that lack basic services such as water and sanitation systems. "The idea of the city being the source of wealth, or perceived source of wealth, will continue to drive urbanisation and, when badly managed, the proliferation of informal settlements," says Mr Lewis.

Urban populations are growing in both low-income and wealthy economies. In 2016, 512 cities had at least 1m residents, a figure expected to increase to 662 by 2030.[20] "The intensification of the urbanisation process, the overcrowding, the inequality and services provided or not provided—these are huge issues that can feed into social and political instabilities," says Dan Smith, director of the Stockholm International Peace Research Institute, which this year hosts the second Stockholm Security Conference, titled "Secure Cities in an Insecure World". The sheer volume of people using city services creates safety and security risks, says Mr Smith. He cites the pressure on transportation systems during rush hour. "At that point, people are jammed together and how do you ensure safety and security?"

19 The World Cities Report 2016, Urbanization and Development: Emerging Futures, UN Habitat. Available at: https://unhabitat.org/un-habitat-launches-the-world-cities-report-2016/
20 The World's Cities in 2016: Data Booklet, United Nations. Available at: http://www.un.org/en/development/desa/population/publications/pdf/urbanization/the_worlds_cities_in_2016_data_booklet.pdf

© The Economist Intelligence Unit Limited 2017

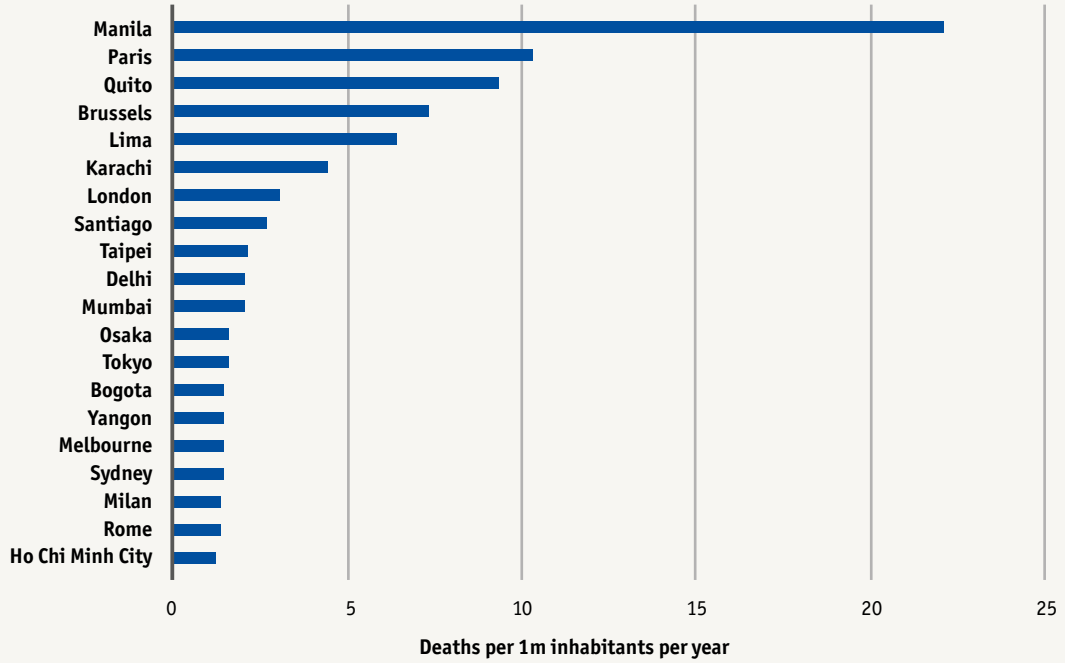
The infrastructure challenge is exacerbated in developing countries by the lack of planning skills. While the UK has 38 planners per 100,000 citizens, in Nigeria the figure is 1.44, according to UN Habitat, while in India it is 0.23[21] (both Indian cities in the index, Delhi and Mumbai, are in the bottom ten in the infrastructure security category).

Meanwhile, climate change is presenting greater threats to urban infrastructure as the severity and frequency of hurricanes, floods, high winds and other extreme weather events increases, from the 2011 floods in Thailand to Hurricane Sandy in New York and New Jersey in 2012 and, most recently, Hurricane Harvey in Houston, Texas.

These events are costly in both human and financial terms. Research led by the World Bank and the OECD forecast that average flood losses worldwide will rise from $6bn a year in 2005 to $52bn a year by 2050. Exacerbated by rises in sea levels and sinking land, flood damage for large coastal cities could run into $1trn a year worldwide if cities fail to take measures to adapt.[22]

"When you consider that two-thirds of the world's cities are coastal, there is this question

EXHIBIT 8: Deaths from natural disasters



Source: EM-DAT, EIU calculations

21 UN Habitat: http://wcr.unhabitat.org/quick-facts/
22 Future flood losses in major coastal cities, December 2012. Available at: http://www.nature.com/nclimate/journal/v3/n9/full/nclimate1979.html cites on the World Bank website at: http://www.worldbank.org/en/news/feature/2013/08/19/coastal-cities-at-highest-risk-floods

© The Economist Intelligence Unit Limited 2017

of rising sea levels," says Mr Muggah. "This is going to be an enormous challenge not only in terms of prevention but expanding from a culture of prevention to adaptation and risk mitigation."

The good news for cities is that if climate-driven changes are posing new threats to urban infrastructure, nature itself can be harnessed in adapting to these threats. So-called "green infrastructure"—including permeable pavements, planter and green roofs—can be used to soak up storm water before it inundates the city. Cities can take measures to incentivise these investments. Washington DC, for example, has made it mandatory for construction firms to incorporate such features in buildings in some parts of the city. In places where this is not feasible, storm water retention credits can be purchased from developers in areas that are not covered by the mandate but that have invested in sustainable projects.[23]

Green infrastructure can even start to reverse the effects of climate change. A simulation study in Toronto, for example, predicted that if half the city's roof surfaces were green, irrigated roofs, it would reduce temperatures across the entire city by 1-2 degrees Celsius.[24]

Developments in smart city technology can also enhance infrastructure security. With sensors monitoring critical service networks, cities can reduce consumption of water and energy and can also remotely track the integrity of these networks to detect and fix problems far earlier than when relying on traditional human monitoring.

These technologies are even protecting low-lying urban infrastructure from flooding. In the Netherlands, the Rijkswaterstaat, the national water authority, is working with Deltares, an independent institute for applied research, to develop "smart dykes" in which embedded sensors transmit real-time reports that could allow repairs to be conducted more quickly or to evacuate residents well in advance of flooding.[25]

Technology is also helping citizens play a role in infrastructure security. As part of its smart city investments, Seoul (at 25th position in the infrastructure category of the index), has developed technology allowing anyone encountering damage such as broken walls or potholes in roads to report it to city officials using their smartphone by registering their location and uploading photos and descriptions of the damage. They can then check the status of remedial work.[26] ■

23 DC.gov: https://doee.dc.gov/service/stormwater-retention-credit-trading-eligibility-requirements
24 Performance of Green Roof Systems, National Research Council, Canada, Report No. NRCC-47705, Toronto, Canada, 2005. Available at: http://nparc.cisti-icist.nrc-cnrc.gc.ca/eng/view/object/?id=a3f06fba-bf23-4b72-a2e9-881eafda6613
25 YaleEnvironment360, To Control Floods, The Dutch Turn to Nature for Inspiration, February 2013. Available at: http://e360.yale.edu/features/to_control_floods_the_dutch_turn_to_nature_for_inspiration
26 Smart Seoul Status & Strategies, Shin Jong-woo, Director, Information Planning Division Seoul Metropolitan Government, slide 8. Available at: https://seoulsolution.kr/sites/default/files/gettoknowus/Smart%20Seoul%20Status%20%26%20Strategies%20for%20e-Government_201604.pdf

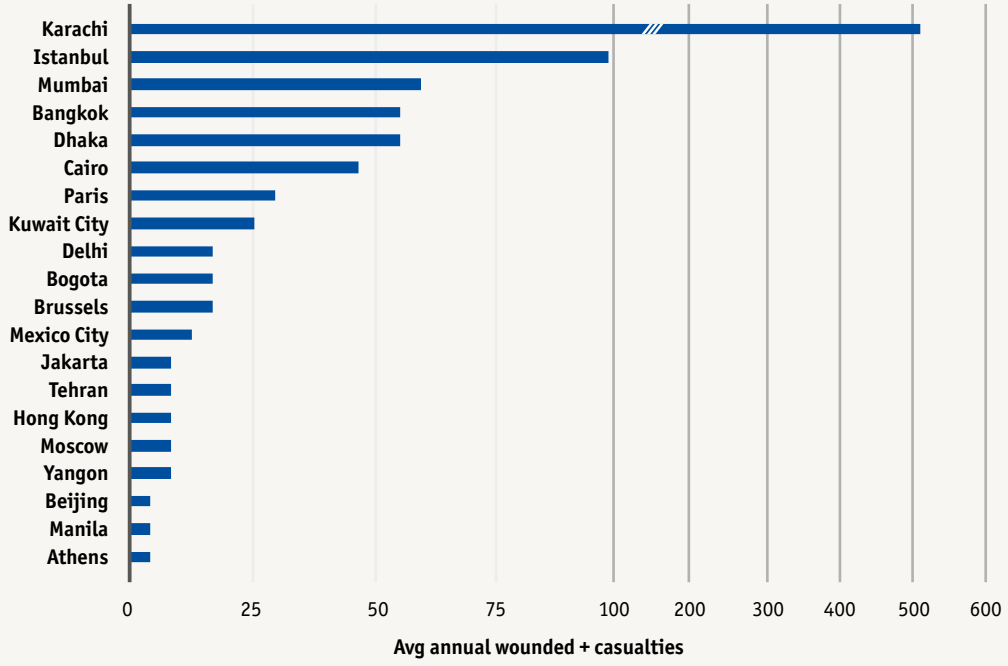
© The Economist Intelligence Unit Limited 2017

CATEGORY 4: PERSONAL SECURITY

When a van mowed down pedestrians on Barcelona's Las Ramblas in August 2017, was the latest in a spate of similar terrorist acts across Europe, from the vehicle attack in Nice to those in London, including one on Westminster Bridge, near the UK Parliament. Shocking as these events are, the number of deaths from terrorism is far fewer than those from urban crime and other forms of violence—globally deaths from terrorist attacks numbered 30,000 in 2015, while deaths from homicide were 440,000.[27]

Asia is home to some of the world's safest cities when it comes to personal security. Five of the top-performing cities in this category—Singapore, Osaka, Tokyo, Taipei and Hong Kong—are Asian, two of them in Japan. Here, values appear to play a role. "It's natural that Asian cities would come up at the top, particularly in Japan—there's a cultural component to it," says

EXHIBIT 9: Frequency and severity of terrorist attacks



Source: Global Terrorism Database, EIU calculations. Figures are the average of 2007 - 16.

27 Brookings, "Securing global cities: Best practices, innovations, and the path ahead", March 16. Available at: https://www.brookings.edu/wp-content/uploads/2017/03/fp_201703_securing_global_cities.pdf

© The Economist Intelligence Unit Limited 2017

Mr Rossant. In Tokyo, for example, citizens last year handed in a record ¥3.67b in lost money, according to the city's Metropolitan Police Department, with roughly three-quarters of that being returned to its rightful owners.[28]

Despite the relatively low number of deaths it causes, terrorism is a growing worry for cities. In the index, every region has at least one city at the top of the indicator tracking the frequency of terrorist attacks, from European cities such as Barcelona and Amsterdam to American, Asian and Middle Eastern cities.

"Cities are the most densely populated areas, so a terrorist would want to be where people are, rather than setting off bombs in the middle of a field," says Michael Nutter, professor of professional practice in urban and public affairs at Columbia University and former mayor of Philadelphia. "And they know they're going to get maximum media coverage in a city environment."

While the number of deaths from terrorism is low compared to other causes such as crime and traffic accidents, events can have an unsettling effect on a city. "Terrorist attacks have led to a sense of threat to social cohesion," says Ms Johnston. "And we've seen an increase in hate crimes and tensions between groups in society."

The balancing act for urban planners is protecting against such attacks while allowing the free movement of people around the city. "It's the whole discussion about how far we can go and what we can do in securing city centres so that large numbers of people can continue to carry on using them," says Mr Smith. "And there's some pretty good thinking about what kinds of physical barriers can be put in place and what should not be put in place."

Physical protections, if well-designed, do not necessarily need to turn the city into a fortress. As well as introducing bollards (posts

EXHIBIT 10: Top 10, bottom 10 table in personal security

Average 74.4

TOP 10		
1	Singapore	94.94
2	Wellington *	92.28
3	Osaka	91.59
4	Tokyo	91.57
5	Toronto	91.52
6	Taipei	90.02
7	Hong Kong	89.75
8	Melbourne	88.52
9	Stockholm	87.93
10	Amsterdam	87.42

BOTTOM 10		
51	Jakarta	59.24
52	Tehran	59.18
53	Moscow	58.00
54	Johannesburg	57.65
55	Bogota *	55.66
56	Quito *	55.41
57	Yangon *	52.43
58	Ho Chi Minh City	50.53
59	Caracas *	47.36
60	Karachi *	31.85

* New cities

28 This May Be the World's Most Honest City, Bloomberg Markets, March 17, 2017. Available at: https://www.bloomberg.com/news/articles/2017-03-14/this-may-be-the-world-s-most-honest-city

© The Economist Intelligence Unit Limited 2017

installed on streets to control road traffic), other elements of urban infrastructure and street furniture (objects and equipment installed along streets and roads) can be turned into a means of protection. Anything from an information kiosk to a bench, a parking metre, a newsstand and a bus shelter can be hardened to act as a shield against vehicle attacks.

The top ten cities in this category of the index— Singapore, Wellington, Osaka, Tokyo, Toronto, Taipei, Hong Kong, Melbourne, Stockholm and Amsterdam— are all high-income or upper-middle income cities.

Yet in cities across all regions, youth violence is a problem, particularly in areas where youth unemployment is high. The World Bank has identified a group of "youth at risk" who, because they are exposed to inequality, poverty and exclusion, are prone to, among other things, risky behaviour such as crime, violence and substance use.[29]

Meanwhile, cities in Latin America and the Caribbean are currently suffering what the World Bank calls "a challenge of epidemic proportions", with an average of 400 homicides taking place each day in these countries, or four every 14 minutes.[30] "Latin America has the highest rates of homicide in the world," says Mr Muggah. "We estimated that 43 of the 50 most violent cities are in Latin America and 25 of those are in Brazil."

This is reflected in the index, with Latin American cities performing poorly in the personal security indicator. Santiago, Chile ranks 36th, followed by the Brazilian cities of Sao Paulo and Rio de Janeiro, ranked 37th and 38th respectively. Mexico City is even lower, at 45th, followed by Lima, Peru (48th), Bogota, Colombia (55th) and Quito, Ecuador (56th). Unsurprisingly, given the current political unrest and widespread hunger in Venezuela, Caracas is second to last in this category of the index, at 59th.

While policymakers in Latin America are struggling to find solutions to urban violence, cities do have an increasing number of tools at their disposal to combat acts of crime. Technology is one of them. Street lighting, for example, is increasingly being used as a means of crime prevention. Lampposts, seemingly simple as they are, can in fact be used to monitor everything from power consumption to pollution levels, traffic lights and parking spaces; sensors installed on the posts can also detect changes in noise levels that might indicate incidences of crime or civil unrest.

Meanwhile, CCTV continues to prove a powerful crime-prevention tool for many cities. "If you look at London or Tokyo, they have ubiquitous CCTV deployments," says Mr Rossant of the New Cities Foundation.

When CCTV or webcams are matched with artificial intelligence technologies such as facial recognition, gait analysis and behaviour detection, criminal behaviour or unusual activity can be detected and reported as it happens, allowing cities to quickly deploy an emergency response. In China, the police force is working with technology companies to develop these

29 Supporting Youth at Risk A Policy Toolkit for Middle Income Countries, World Bank, 2008. Available at: http://documents.worldbank.org/curated/en/514781468175152614/pdf/437050WP0ENGLI1YouthAtRisk01PUBLIC1.pdf
30 Urban Violence: A Challenge of Epidemic Proportions September 6, 2016, World Bank. Available at: http://www.worldbank.org/en/news/feature/2016/09/06/urban-violence-a-challenge-of-epidemic-proportions

© The Economist Intelligence Unit Limited 2017

capabilities so that it can track the behaviour and movements of individuals.[31]

As a result of these new capabilities, as well as the growth of terrorist incidents and the rise of urban populations, the surveillance technology market is growing rapidly. IHS Markit predicts that in the professional market, shipments of HD CCTV cameras will increase to nearly 29m units globally in 2017, up from fewer than 0.2m units in 2012.[32] And while London is well known for its mass surveillance cameras, in China's cities deployment of the technology has been rapidly increasing. In 2015, the official People's Daily newspaper announced that "every corner" of Beijing was covered with a video surveillance camera.[33]

However, policymakers must tread carefully when it comes to surveillance technologies or risk a backlash from urban residents who may worry about its use for profiling or simply that their every move is being watched by Big Brother. In the US, for example, the American Civil Liberties Union has instigated a programme called Community Control Over Police Surveillance to prevent city police departments from establishing surveillance systems without input from citizens or local elected officials.[34]

Verifiable success in crime prevention can also help to earn buy-in from citizens. The PolCam network of tens of thousands of police cameras positioned throughout Singapore, for example, has helped solve more than 1,000 cases since its inception in 2012, according to the government. "The result," says Jacqueline Poh, CEO of GovTech, a statutory board under the Prime Minister's office, "is that there is a certain high-level of public acceptance and, in fact, enthusiasm for the police camera network."

In addition to technology, design plays a role in urban security. Professor Nutter refers to three Rs—restaurants, retail and residential. "You can make an area safer by animating it with people, with businesses and with activity," he says. "When you do that and add something that often goes unnoticed—like good lighting—it is critical to public safety."

Sometimes, even the most violent, crime-ridden cities can turn things around with a combination of strategies. Often cited in this respect is Medellín, Colombia which supplemented counter-crime and counter-narcotics strategies with efforts to promote social cohesion and investments in urban renewal, including public transport, libraries and community centres. "One of the things that worked there was a partnership between the municipal and the federal government," says Mr O'Hanlon. "So you can pay for it by divvying up the burden at different levels of government."

A holistic approach will be needed to tackle urban crime and violence in Latin American, says Nathalie Alvarado, citizen security lead specialist at the Inter-American Development Bank. Given that crime and violence arise for a variety of reasons—from inter-personal attacks to drug trafficking—she argues that an integrated approach is essential. "The control part is important," she says. "But we also have to look at the root causes." ■

31 "China seeks glimpse of citizens' future with crime-predicting AI", *Financial Times*, July 23, 2017. Available at: https://www.ft.com/content/5ec7093c-6e06-11e7-b9c7-15af748b60d032 Top Video Surveillance Trends for 2017, IHS Markit. Available at: https://cdn.ihs.com/www/pdf/TEC-Video-Surveillance-Trends.pdf
33 Beijing police have covered every corner of the city with video surveillance system, People's Daily, October 5, 2015. Available at: http://en.people.cn/n/2015/1005/c90000-8958235.html
34 ACLU: https://www.aclu.org/issues/privacy-technology/surveillance-technologies/community-control-over-police-surveillance?redirect=feature/community-control-over-police-surveillance

© The Economist Intelligence Unit Limited 2017

The economic toll of urban crime

While the human toll of crime, violence, and vandalism is heavy, it's worth noting that the economic toll is significant, too. Moreover, the two factors are part of a negative feedback loop, as physical damage and lost revenue leave cities with even fewer resources with which to tackle violence and crime.

A study of eight US cities by the Center for American Progress found that in 2010 murder, rape, assault and robbery led to more than $42bn in direct costs, including the costs of police and criminal justice institutions, victims' medical expenses and lost income for both victims and perpetrators once arrested and convicted.[35] These forms of violence can also have an impact on property values and, by extension, city revenues, according to the same study. It estimated, for example, that if murders in Boston were to drop by 25%, housing values would increase by $11bn, thereby expanding revenues from property taxes.

High levels of urban crime also lead to increases in the cost of living for residents, as this pushes up the prices of home insurance. Tenants and homeowners feel the need to install and maintain security lights, fences and sophisticated security devices such as security cameras and CCTV. While such costs affect individual urban residents, ultimately they disadvantage entire cities, some of which may not be able to attract skilled workers and, as a result, may lower their ability to secure investment from businesses.

This is a challenge facing Johannesburg, which ranks 54th in the personal security category of the index. According to the World Economic Forum's Global Competitiveness Report 2015–2016, crime and theft are seen as highly problematic when it comes to doing business in the city. In the report, the two issues ranked sixth among the 16 most problematic factors for doing business in South Africa. In Switzerland and Singapore, they ranked second to last.[36]

Beyond their responsibility to urban residents, therefore, municipal authorities have other incentives to combat urban crime and violence—the need for healthy tax revenue streams and the pressure to maintain the competitiveness of the city. For cities in Latin America, in the midst of a wave of crime and violence, the price of this disruption is high. "It imposes a huge cost on the economy," says Ms Alvarado. "We have a recent study that shows that for Latin America, crime and violence costs countries an average of 3% of GDP a year, which is around $261bn [for the region]."

She says that the costs occur not only in expenditure on police forces and judicial systems but in terms of revenues not earned, such as the foregone income of working-age people who were murdered or are imprisoned and cannot contribute to the economy, and the money spent by business in security. Most damaging, Ms Alvarado argues, is the impact on young people. "They are the future of these countries," she says. "So for us crime and violence are more than security concerns—they are development challenges."

35 Center for American Progress, The Economic Benefits of Reducing Violent Crime, 2012: https://cdn.americanprogress.org/wp-content/uploads/issues/2012/06/pdf/violent_crime.pdf
36 The Global Competitiveness Report 2015–2016, World Economic Forum, 2015. Available at: http://www3.weforum.org/docs/gcr/2015-2016/Global_Competitiveness_Report_2015-2016.pdf

© The Economist Intelligence Unit Limited 2017

CONCLUSION

While municipal leaders must focus on a number of factors when investing in city security, many of them are linked. For example, cyber-attacks can disrupt systems such as the city's power and water supply, making digital security critical to infrastructure security. The resilience and quality of such physical infrastructure, in turn, influence the prevalence of chronic conditions such as respiratory disease, as well as the level of traffic-related injury and mortality that takes place in the city, and thus health security.

Urban authorities, therefore, need to tackle city security using a holistic approach. This is not always easy, given entrenched departmental silos between different municipal agencies in many cities. With stretched financial resources, urban leaders may find themselves having to make tough decisions between competing demands such as health, policing and cyber security investments.

Priorities may vary from region to region. For example, while improvements in road infrastructure and transportation systems could reduce injury and death in many African cities, Latin American cities need to focus on fighting crime and violence. Meanwhile, in Europe, these issues are less pressing than the need to address mass migration and youth unemployment, both of which pose threats to social cohesion.

However, across all cities, the need for a more integrated approach is only set to increase as shifting demographics—from population growth to migration patterns—and climate change risk put increasing pressure on urban infrastructure and economic and social systems.

As cities grow in size the potential for catastrophic breakdowns will only increase, whether from the meltdown of a nuclear plant, a natural disaster or attacks from criminal networks or terrorist groups.

However, despite the growing risks, cities have plenty of tools at their disposal when it comes to increasing urban safety and security. Technology can enhance the efficiency of urban infrastructure and improve crime detection. Empowered with apps, citizens can become valuable stakeholders, contributing to everything from crime reduction to the monitoring of pollution levels.

Today, the issue of urban security goes beyond the concerns of municipal leaders and urban residents. Cities are becoming the powerhouses of the global economy, with the world's top 600 cities now producing 60% of global GDP.[37] Moreover, more than half of the world's population now lives in urban areas, with this figure expected to rise to 60% by 2030.[38]

37 The World Cities Report 2016, Urbanization and Development: Emerging Futures, UN Habitat. Available at: https://unhabitat.org/un-habitat-launches-the-world-cities-report-2016/
38 SDGs" http://www.un.org/sustainabledevelopment/cities/

© The Economist Intelligence Unit Limited 2017

It is not surprising, therefore, that one of the 17 United Nations Sustainable Development Goals (SDGs)—adopted by 193 UN member states in 2015 to protect the planet and end poverty by 2030—focuses on cities. What Goal 11 recognises is that sustainable development cannot be achieved without successful urban communities; and a key element in this success will be building cities that are safe and secure. ■

© The Economist Intelligence Unit Limited 2017

APPENDIX 1: INDEX RESULTS

DIGITAL SECURITY 2017

Average: 66.2

1	Tokyo	88.40	13	Stockholm	82.81	25	Milan	73.29	37	Riyadh	60.86	=49	Rio de Janeiro	51.96
2	Singapore	86.84	14	Osaka	82.11	26	Rome	71.62	38	Quito *	60.65	=49	Sao Paulo	51.96
3	Chicago	86.75	15	Washington DC	80.88	27	Paris	70.37	39	Santiago	60.57	51	Moscow	49.03
4	Amsterdam	85.79	16	Frankfurt	80.50	28	Abu Dhabi	68.77	40	Kuwait City	60.17	52	Bangkok	44.44
5	Hong Kong	85.77	17	Brussels	79.96	29	Johannesburg	66.28	41	Lima	59.78	53	Cairo *	43.29
6	Toronto	85.33	18	Seoul	78.42	30	Kuala Lumpur *	66.17	42	Shanghai	59.42	54	Karachi *	43.22
=7	Los Angeles	85.12	19	Zurich	77.98	31	Taipei	65.98	43	Caracas *	58.39	55	Tehran	39.88
=7	San Francisco	85.12	20	Wellington *	74.80	32	Jeddah *	65.86	44	Casablanca *	57.37	56	Ho Chi Minh City	39.78
9	New York	84.95	=21	Barcelona	74.44	33	Beijing	65.38	45	Bogota *	54.62	57	Yangon *	39.07
10	Dallas *	84.65	=21	Madrid	74.44	34	Doha	64.02	=46	Delhi	54.61	58	Dhaka *	38.33
11	Melbourne	83.32	23	Buenos Aires	74.14	35	Athens *	61.94	=46	Mumbai	54.61	59	Manila *	36.61
12	Sydney	82.96	24	London	73.36	36	Istanbul	61.71	48	Mexico City	53.69	60	Jakarta	36.60

** = new cities*

HEALTH SECURITY 2017

Average: 69.2

1	Osaka	87.15	13	Singapore	79.72	25	Moscow	72.59	37	Bangkok	66.64	49	Manila *	60.12
2	Tokyo	85.63	14	Taipei	79.23	26	Los Angeles	72.26	38	Riyadh	66.13	50	Delhi	59.65
3	Frankfurt	84.06	15	Madrid	78.69	27	Chicago	71.78	39	Bogota *	65.37	51	Casablanca *	58.52
4	Zurich	83.39	16	Barcelona	78.54	28	Mexico City	70.79	40	Rio de Janeiro	64.80	52	Johannesburg	57.71
5	Seoul	82.72	17	Milan	76.72	29	Dallas *	70.27	41	Kuwait City	63.81	53	Quito *	57.46
6	Sydney	81.80	18	Rome	76.38	30	Shanghai	69.92	42	Sao Paulo	63.74	54	Caracas *	56.72
7	Brussels	81.41	19	London	76.06	31	New York	69.73	43	Jeddah *	63.56	55	Mumbai	55.74
8	Paris	81.35	20	Buenos Aires	74.84	32	Wellington *	69.51	44	Tehran	62.96	56	Jakarta	54.40
9	Melbourne	81.34	21	Athens *	74.57	33	Abu Dhabi	68.54	=45	Doha	62.60	57	Cairo *	52.28
10	Stockholm	79.94	22	San Francisco	74.15	34	Beijing	67.63	=45	Istanbul	62.60	58	Yangon *	45.79
11	Toronto	79.84	23	Washington DC	73.38	35	Santiago	67.17	47	Lima	62.48	59	Dhaka *	45.59
12	Amsterdam	79.79	24	Hong Kong	73.29	36	Kuala Lumpur *	67.15	48	Ho Chi Minh City	61.29	60	Karachi *	39.92

** = new cities*

© The Economist Intelligence Unit Limited 2017

INFRASTRUCTURE SECURITY 2017

Average: 78.2

1	Singapore	97.05	13	London	93.44	25	Seoul	87.93	37	Beijing	74.49	49	Jakarta	63.32
2	Madrid	96.76	14	Toronto	92.75	26	Taipei	87.59	38	Shanghai	74.30	50	Jeddah *	61.74
3	Barcelona	96.59	15	Rome	92.31	27	Chicago	87.47	39	Mexico City	72.98	51	Mumbai	59.12
4	Stockholm	96.18	16	Abu Dhabi	91.36	28	Washington DC	82.38	40	Kuwait City	71.66	52	Delhi	58.49
5	Wellington *	96.13	17	San Francisco	91.21	29	Athens *	82.05	41	Istanbul	70.79	53	Caracas *	58.42
6	Amsterdam	96.05	18	Milan	90.36	30	Doha	81.72	42	Bogota *	69.79	54	Riyadh	56.88
=7	Hong Kong	96.04	19	Paris	89.90	31	Santiago	81.35	43	Bangkok	68.33	55	Johannesburg	55.06
=7	Melbourne	96.04	20	Brussels	88.56	32	Rio de Janeiro	79.53	44	Cairo *	68.00	56	Manila *	52.89
9	Sydney	95.73	21	New York	88.39	33	Sao Paulo	79.44	45	Casablanca *	66.27	57	Quito *	52.03
10	Zurich	95.71	22	Los Angeles	88.27	34	Dallas *	79.23	46	Ho Chi Minh City	65.73	58	Yangon *	48.58
11	Osaka	94.61	23	Frankfurt	88.16	35	Kuala Lumpur *	78.12	47	Lima	64.47	59	Karachi *	40.11
12	Tokyo	93.59	24	Buenos Aires	87.99	36	Moscow	76.36	48	Tehran	63.95	60	Dhaka *	38.42

** = new cities*

PERSONAL SECURITY 2017

Average: 74.4

1	Singapore	94.94	13	Doha	86.04	25	New York	80.98	37	Sao Paulo	70.08	49	Bangkok	60.80
2	Wellington *	92.28	14	Madrid	85.61	=26	Beijing	80.76	38	Rio de Janeiro	69.85	50	Jeddah *	60.05
3	Osaka	91.59	15	London	85.52	=26	Dallas *	80.76	39	Manila *	69.83	51	Jakarta	59.24
4	Tokyo	91.57	16	Seoul	85.34	28	Shanghai	80.07	40	Cairo *	69.75	52	Tehran	59.18
5	Toronto	91.52	17	Barcelona	85.28	29	Abu Dhabi	78.95	41	Athens *	69.03	53	Moscow	58.00
6	Taipei	90.02	18	Washington DC	84.82	30	Mumbai	77.89	42	Buenos Aires	68.41	54	Johannesburg	57.65
7	Hong Kong	89.75	19	San Francisco	83.74	31	Paris	77.23	43	Dhaka *	67.15	55	Bogota *	55.66
8	Melbourne	88.52	20	Zurich	83.72	32	Milan	76.83	44	Istanbul	65.84	56	Quito *	55.41
9	Stockholm	87.93	21	Los Angeles	83.40	33	Delhi	76.61	45	Mexico City	64.62	57	Yangon *	52.43
10	Amsterdam	87.42	22	Chicago	82.84	34	Kuwait City	74.82	46	Casablanca *	62.63	58	Ho Chi Minh City	50.53
11	Frankfurt	86.70	23	Brussels	82.09	35	Rome	74.39	47	Riyadh	61.04	59	Caracas *	47.36
12	Sydney	86.46	24	Kuala Lumpur *	81.02	36	Santiago	71.02	48	Lima	60.87	60	Karachi *	31.85

** = new cities*

© The Economist Intelligence Unit Limited 2017

RANKINGS BY POPULATION

> 15 MILLION

Average: 66.22

1	Tokyo	89.80
2	Osaka	88.87
3	Seoul	83.61
4	New York	81.01
5	Buenos Aires	76.35
6	Beijing	72.06
7	Shanghai	70.93
8	Sao Paulo	66.30
9	Mexico City	65.52
10	Delhi	62.34
11	Mumbai	61.84
12	Cairo *	58.33
13	Manila *	54.86
14	Ho Chi Minh City	54.33
15	Jakarta	53.39
16	Dhaka *	47.37
17	Karachi *	38.77

** = new cities*

10 - 15 MILLION

Average: 70.22

1	Los Angeles	82.26
2	London	82.10
3	Paris	79.71
4	Rio de Janeiro	66.54
5	Istanbul	65.23
6	Moscow	63.99
7	Lima	61.90
8	Bangkok	60.05

5 - 10 MILLION

Average: 75.39

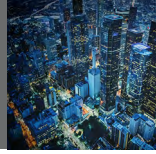
1	Singapore	89.64
2	Toronto	87.36
3	Hong Kong	86.22
4	Madrid	83.88
5	Barcelona	83.71
6	Chicago	82.21
7	Taipei	80.70
8	Washington DC	80.37
9	Kuala Lumpur *	73.11
10	Santiago	70.03
11	Bogota *	61.36
12	Riyadh	61.23
13	Johannesburg	59.17
14	Tehran	56.49

< 5 MILLION

Average: 75.08

1	Melbourne	87.30
2	Amsterdam	87.26
3	Sydney	86.74
4	Stockholm	86.72
5	Zurich	85.20
6	Frankfurt	84.86
7	San Francisco	83.55
8	Wellington *	83.18
9	Brussels	83.01
10	Milan	79.30
11	Dallas *	78.73
12	Rome	78.67
13	Abu Dhabi	76.91
14	Doha	73.59
15	Athens *	71.90
16	Kuwait City	67.61
17	Jeddah *	62.80
18	Casablanca *	61.20
19	Quito *	56.39
20	Caracas *	55.22
21	Yangon *	46.47

© The Economist Intelligence Unit Limited 2017



© The Economist Intelligence Unit Limited 2017

APPENDIX 2: INDEX METHODOLOGY

Overview

In 2015, The Economist Intelligence Unit developed an index assessing the safety of some of the world's leading cities across four domains: digital security, health security, infrastructure security and personal security. The Safe Cities Index 2015, sponsored by NEC, was developed in response to critical concerns surrounding urban and public safety.

With UN estimates showing that more than half of the world's population was living in urban areas in 2016,[39] it has become more urgent to understand the landscape of public safety, particularly in urban areas. To gain a better understanding of the current situation and identify critical changes since the release of the 2015 index, NEC has sponsored a second edition of this research.

Differences between the 2017 index and the 2015 index

Although the core focus of the index on digital security, health security,infrastructure security and personal security remains, the 2017 index also includes new indicators on man-made threats such as indicators about terrorism and civil unrest. New data and refinements to existing indicators were also included. The 2015 index ranked cities based on 43 indicators in four domains; the 2017 version ranks 60 cities based on 49 indicators in the same four domains.

Change in city coverage and indicators means that the 2015 and 2017 indexes are not always fully-comparable.

Change to list of cities

The 2017 index includes 14 new cities, while four cities have been removed from the 2015 sample. The changes in the list of cities were to provide a more diverse mix of cities from both the income and geographic perspective.

NEW CITIES ADDED TO THE 2017 INDEX		
Athens	Bogota	Cairo
Caracas	Casablanca	Dallas
Dhaka	Jeddah	Karachi
Kuala Lumpur	Manila	Quito
Wellington	Yangon	

CITIES REMOVED FROM THE 2017 INDEX		
Guangzhou	Montreal	Shenzhen
Tianjin		

39 http://www.un.org/en/development/desa/population/publications/pdf/urbanization/the_worlds_cities_in_2016_data_booklet.pdf

© The Economist Intelligence Unit Limited 2017

New indicators related to man-made threats

The 2017 Index includes six new indicators related to man-made threats. The inclusion addresses the growing concern surrounding terrorism, as well as current issues such as civil unrest and conflict.

DOMAIN	PREVIOUS	CURRENT	NEW INDICATORS
Health	11	12	• Number of attacks using biological, chemical or radiological weapons
Infrastructure	9	10	• Number of attacks on facilities/ infrastructure
Personal	15	19	• Severity of terrorist attacks • Threat of terrorism • Threat of military conflict • Threat of civil unrest

Update to existing indicators

Updated data sources were used to score the indicators. New data sources were used in some cases—for example, the indicator on the level of corruption. For the following indicators, the definitions were revised to accommodate limitations on data quality and availability:

DOMAIN	INDICATOR	REVISION
Health	Access to healthcare	The definition was revised to focus on the availability of healthcare, to avoid overlap with the existing indicator on the quality of healthcare
Personal	Gender safety	The indicator for gender safety was changed from the number of rape cases to female homicide victims. This is to address issues on underreporting of sexual violence crimes as well as differing definitions of rape. Homicide tends to be less underreported, and the focus on female victims also captures gender safety issues.
Personal	Organised crime	The definition was revised from criminal gang activity to the risk of organised crime. This is to address data update issues as well as to reduce overlap with existing indicators on the prevalence of petty crime and violent crime.

© The Economist Intelligence Unit Limited 2017

Index categories

Every city in the index is scored across the four domains. Each domain comprises between three and 12 sub-indicators, which are divided between inputs, such as policy measures and access to services, and outputs, 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 the input side, cities are scored on their awareness of digital threats, the level of technology employed and the existence of dedicated cyber security teams. On the output side, the index measures the frequency of identity theft and the estimated number of computers infected with a virus.

Health security measures how cities maintain the natural environment as well as the level and quality of care available. On the input side, cities are scored based on their environmental policies and access to and quality of healthcare services. Output indicators include air and water quality, life expectancy as well as infant mortality among other sub-indicators. A new sub-indicator focusing on the number of chemical, biological and radiological attacks on a city was also included to incorporate the impact of terrorism on urban health systems.

Infrastructure security considers the built physical environment, such as city infrastructure and its vulnerability to disasters and terrorist attacks. On the input side, the index takes into account sub-indicators such as the quality of infrastructure as well as the enforcement of transport safety, while on the output side the number of vehicular accidents and pedestrian deaths are included, as well as number of terrorist attacks on facilities and infrastructure.

Personal security considers how at risk citizens are from crime, violence and other man-made threats. 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 and the overall political stability of the country where each city is located. On the output side, the index takes into account the prevalence of petty and violent crime, safety perceptions, as well as new sub-indicators assessing the threat of civil unrest, military conflict and terrorism.

Indicators

The index comprises 49 individual sub-indicators. They fall into two categories: quantitative and qualitative.

Quantitative indicators: Eighteen of the index's 49 indicators are based on quantitative data—for example, the frequency of vehicular accidents per year per million inhabitants.

Qualitative indicators: Thirty-one of the indicators are qualitative assessments of a city's safety—for example, the scores for political stability risk and the quality of infrastructure.

© The Economist Intelligence Unit Limited 2017

Data sources

A team of researchers collected data for the index from June to August 2017. In addition to data from The Economist Intelligence Unit, which has produced a number of similar indices that measure cities on liveability, risk and other issues, publicly available information for the latest available year from official sources has been used where applicable. Primary sources include the World Health Organization, 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.

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 first make the gathered data comparable. To do so, the quantitative indicators were normalised on a scale of 0-100 using a min-max calculation, where the score is the standard deviation from the mean, with the best city scoring 100 points and the worst 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 the quantitative indicators.

Other indicators were normalised as a two, three or four-point rating. For example, "dedicated cyber security teams" was normalised so that neither a national- or city-level cyber security team scored 0, a national team only scored 50, and a city-level team scored 100.

While using normalised values (that is, a score of 0–100) allows for direct comparability with other normalised indicator scores, min-max scoring also leads to changes in scores from the 2015 Index, even without a change in actual performance. For example, in an indicator with normalised scoring, if the score of the worst-performing city is lower than that of the previous index, the scores of other countries will be affected regardless of actual performance.

Index construction

The index is an aggregate score of all the underlying indicators. The index is first aggregated by domain—creating a score for each domain (for example, personal security)—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 main indicator domains.

© The Economist Intelligence Unit Limited 2017

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. Frequency of identity theft	%	Gemalto Breach Level Index; Economist Intelligence Unit analysis
1.2.2. Percentage of computers infected	Scale 1 – 5, 5 = most	Kaspersky Lab
1.2.3. Percentage with internet access	%	ITU

© The Economist Intelligence Unit Limited 2017

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	Economist Intelligence Unit City Liveability Index
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	Economist Intelligence Unit analysis
2.1.6. Quality of health services	1 – 5, 5 = best	Economist Intelligence Unit City Liveability Index
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	Years, the longer, the better	World Bank; Local data sources
2.2.4. Infant mortality	Deaths per 1,000 births	World Bank; Local data sources
2.2.5. Cancer mortality rate	Deaths per 100,000	WHO
2.2.6. Number of attacks using biological, chemical or radiological weapons	Average annual attacks over the past ten years	Global Terrorism Database

© The Economist Intelligence Unit Limited 2017

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. Quality of road infrastructure	1 – 5, 5 = best	Economist Intelligence Unit City Liveability Index
3.1.4. Quality of electricity infrastructure	1 – 5, 5 = best	Economist Intelligence Unit City Liveability Index
3.1.5. Disaster management/ business continuity plan	1 – 5, 5 = best	Economist Intelligence Unit analysis
B. OUTPUTS		
3.2.1. Deaths from natural disasters	# / million / yr, average of the last five years	EM - DAT
3.2.2. Frequency of vehicular accidents	# / million / yr	Local data sources
3.2.3. Frequency of pedestrian deaths	# / million / yr	WHO; Local data sources
3.2.4. Percentage living in slums	%	UN HABITAT; Local data sources
3.2.5. Number of attacks on facilities/ infrastructure	Average annual attacks over the past ten years	Global Terrorism Database

© The Economist Intelligence Unit Limited 2017

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 – 1, 1 = yes, 0 = none	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	Free Existence Gun Rights Index
4.1.7. Political stability risk	0 – 100, 0 = no risk	Economist Intelligence Unit Operational Risk Model
B. OUTPUTS		
4.2.1. Prevalence of petty crime	1 – 5, 5 = high prevalence	Economist Intelligence Unit City Liveability Index
4.2.2. Prevalence of violent crime	1 – 5, 5 = high prevalence	Economist Intelligence Unit City Liveability Index
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 number 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 City Liveability Index
4.2.11. Threat of military conflict	Rating 0 – 4, 0 = Intolerable, 4 = Acceptable	Economist Intelligence Unit City Liveability Index
4.2.12. Threat of civil unrest	Rating 0 – 4, 0 = Intolerable, 4 = Acceptable	Economist Intelligence Unit City Liveability Index

© The Economist Intelligence Unit Limited 2017

The world leader in global business intelligence

The Economist Intelligence Unit (The EIU) is the research and analysis division of The Economist Group, the sister company to The Economist newspaper. Created in 1946, we have over 70 years' experience in helping businesses, financial firms and governments to understand how the world is changing and how that creates opportunities to be seized and risks to be managed.

© The Economist Intelligence Unit Limited 2017

Whilst every effort has been taken to verify the accuracy of this information, neither The Economist Intelligence Unit Ltd. nor the sponsor of this report can accept any responsibility or liability for reliance by any person on this report or any of the information, opinions or conclusions set out herein.

The Economist Intelligence Unit

LONDON
20 Cabot Square
London
E14 4QW
United Kingdom
Tel: (44.20) 7576 8000
Fax: (44.20) 7576 8500
E-mail: london@eiu.com

NEW YORK
750 Third Avenue
5th Floor
New York, NY 10017, US
Tel: (1.212) 554 0600
Fax: (1.212) 586 0248
E-mail: newyork@eiu.com

HONG KONG
1301 Cityplaza Four
12 Taikoo Wan Rd
Taikoo Shing
Hong Kong
Tel: (852) 2585 3888
Fax: (852) 2802 7638
E-mail: hongkong@eiu.com

SINGAPORE
8 Cross Street
#23-01 PWC Building
Singapore 048424
Tel: (65) 6534 5177
Fax: (65) 6428 2630
E-mail: singapore@eiu.com

GENEVA
Rue de l'Athénée 32
1206 Geneva Switzerland
Tel: (41) 22 566 2470
Fax: (41) 22 346 9347
E-mail: geneva@eiu.com