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Smart Cities
Defining the trend, describing
the transition

Contents

Urbanization and the growth of **"megacities"**

Ancient Rome could be described as the world's first 'megacity' with a population of more than 4 million people, according to the Augustine census. Moreover, through its planned infrastructure and services, it helped define how cities could operate and be structured. Today, there are 33 megacities (now defined as urban areas with over 10 million residents) globally, and the U.N. has projected that this figure will grow to 43 within the next decade.[1] These estimates place the vast majority of the new megacities in emerging markets.

Exhibit 1:
Growth rates of urban areas by size class
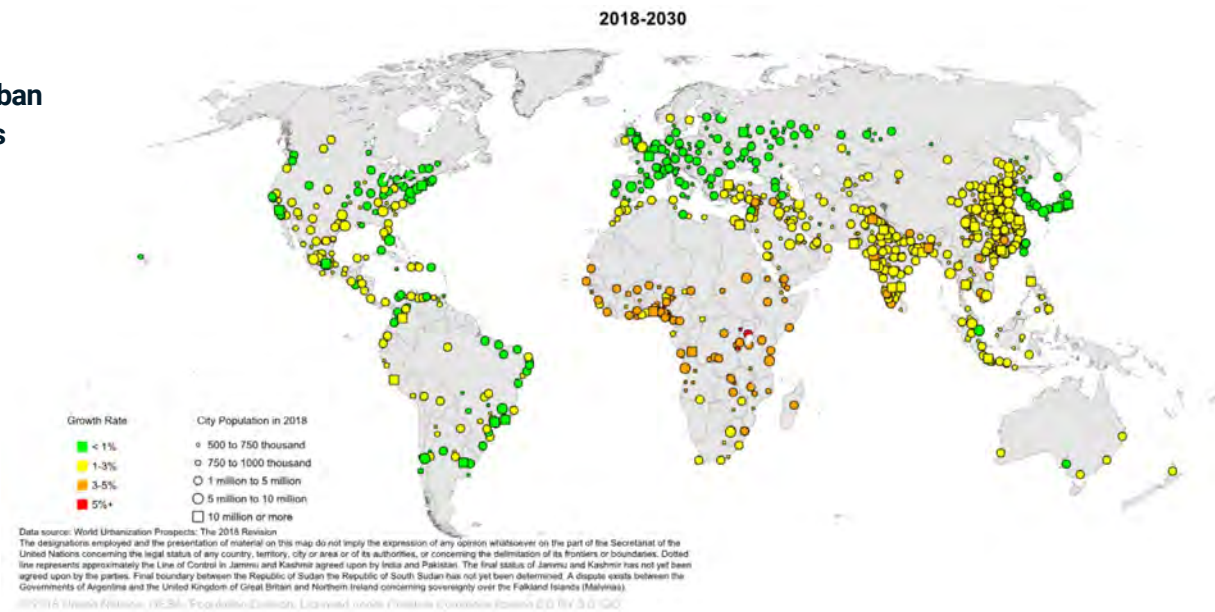
Source: U.N., World Urbanization Prospects: The 2018 Revision

Against a backdrop of accelerating urbanization and new city development, there has been a parallel growth in the number of companies seeking to develop solutions that may support the efficient and sustainable operation of a city in a technologically 'smart' way. The emphasis is on the everyday services and activities that facilitate the growth of a city, improve its citizens' quality of life and address key challenges inherent with any influx of new residents and activities into an urban area including:

» Environmental issues: pollution, noise, water supply, energy production, etc.

» Land-related issues: pressure on land and housing, management of effective land use and urban sprawl

» Public health concerns: mortality, infection control, sanitation and food safety

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1   U.N., World Urbanization Prospects: The 2018 Revision

Studies have shown that to curtail such potentially negative effects, cities should limit their population growth rate to 1% p.a. However, developing countries, in particular, have experienced significantly higher rates.[2]

Exhibit 2:
Urbanization in Shenzen, China:
1950, 2000 and 2018

Source: Creative Commons

Over 150 cities around the world have officially adopted a 'Smart City' strategy, but this number is likely to be a conservative estimate, depending on what can be included in such a declaration.[3] Rankings abound, but London, Barcelona, Helsinki, Singapore, Paris and Amsterdam are often found in most of the top-10 lists.[4] IESE Business School's Cities in Motion Index ranks London highly for its international outreach and 'smart' approach to human capital (although it states that it lacks in social cohesion).[5]
A rival business school, IMD, in turn ranks Singapore and Zurich as "AAA" smart cities, praising both for their mobility solutions, governance and health and safety relative to their peers. Notably, this study placed a strong focus on a city's ability to create "better lives for all citizens."[6]

2   https://worldpopulationhistory.org/urbanization-and-the-megacity/

3   https://www.rolandberger.com/en/Media/Smart-City-Index-Vienna-and-London-lead-the-worldwide-ranking.html

4   https://media.iese.edu/research/pdfs/ST-0509-E.pdf?_ga=2.83640084.383737381.1574780427-336190173.1574780427

5   https://media.iese.edu/research/pdfs/ST-0509-E.pdf

6   https://www.imd.org/smart-city-observatory/smart-city-index/

What is a 'smart city'?

In our view, it is too simplistic to reduce the complex notion of a smart city to a city rankings-based exercise or a consultant's high-level take on futurology. The notion of a smart city may be regarded by some investors as a megatrend with potential to drive social and economic change. Such investors would therefore want to map the key high-level ideas to investable securities.

In 'Smart Cities, Smart Mobility,' Lukas Neckermann (2017) compared a smart city to a living organism and defined it as follows:

> **One that combines its data, its resources, its infrastructure and its people to continually focus on improving liveability. A Smart City is an aggregation of power and creativity, but also a body of data and live analysis. It has a soul; it sets goals and shares its passion. And if a Smart City can so be equated with a human, smart mobility is a city's circulatory system.**

Drilling down further, in 2018, McKinsey developed a framework with eight domains (not equally sized) where smart technologies can support such urban expansion in their view.[7] Namely security, healthcare, mobility, energy, water, waste, economic development and housing, and engagement and community.

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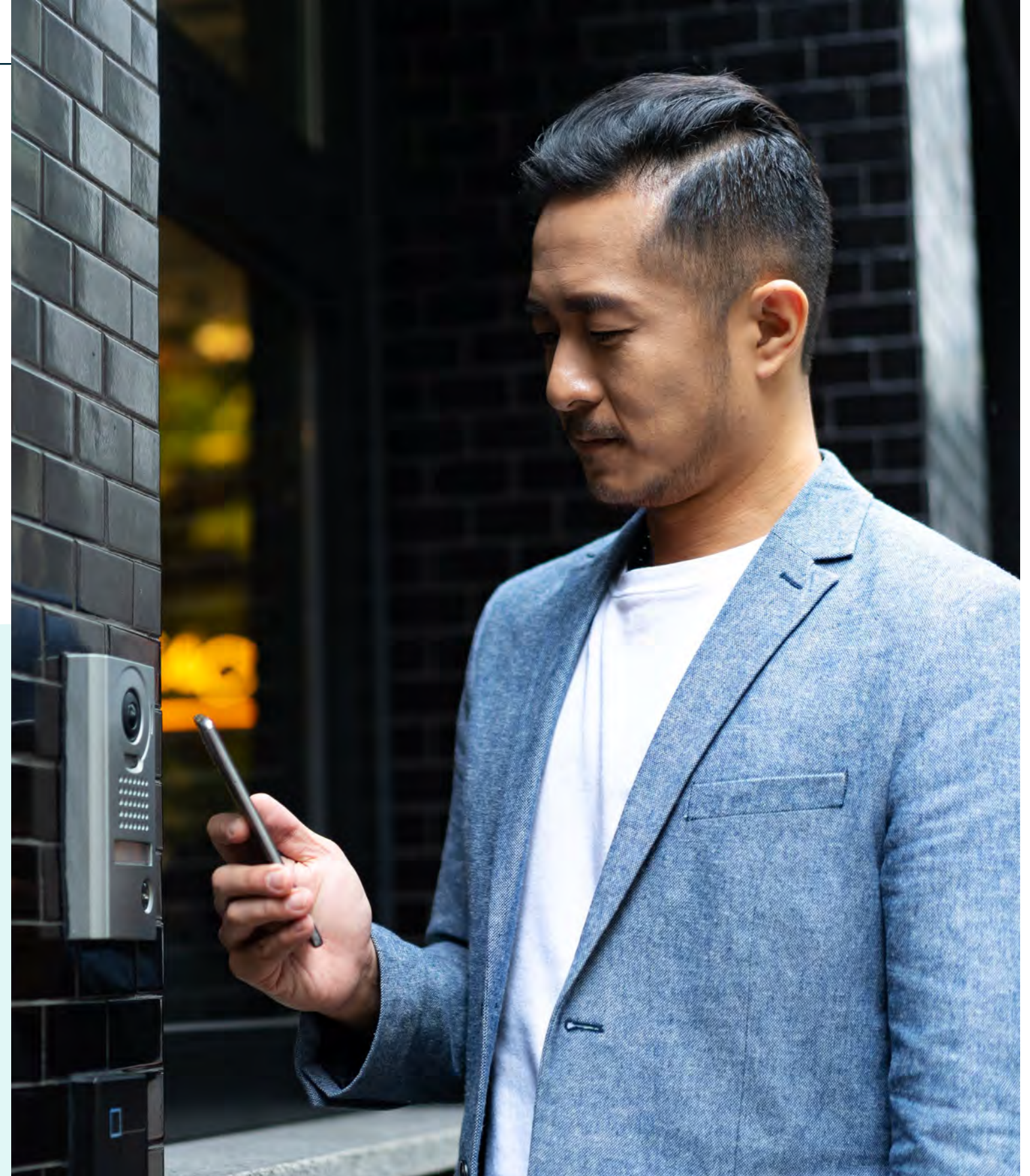
7   https://www.mckinsey.com/~/media/mckinsey/industries/capital projects and infrastructure/our insights/smart cities digital solutions for a more livable future/mgi-smart-cities-full-report.ashx

Smart cities:
Three sectors in focus

Development of 'green' and 'connected' buildings is a central element of the smart city idea. Hence this plausibly pulls the real estate, infrastructure and construction industries into the eligible universe of a smart cities index. Globally, several cities have begun to mandate or create clear incentives for zero net-energy buildings,[8] vehicle-charging infrastructure[9] in every new build, and even solar panels on the roof[10] of every new home, such as in the case of California from 2020. Other potential initiatives focus on connecting homes to the data grid (internet of things, IoT) and the energy grid: energy use and consumer behavior could then be monitored to improve the user experience, increase uptime and lower costs.[11]

A second industrial activity often linked to smart city development is the shift toward renewable energy. In many cases, the cost of renewable energy generation – wind, solar and geothermal – has already fallen to lower than traditional methods – coal, oil, gas and nuclear – at the utility scale.[12] The prospect of generating power close to the point of use reduces potential transmission losses and cost. Of course, as part of this trade-off, a grid-level solar array is more efficient than rooftop production, but equally local implementations may be developed more easily within an urban environment.[13]

The third element to flag here is transport and mobility. This is a transversal sector, as it is also relevant to the development of technology, telecommunications, automotive, energy and infrastructure (e.g., parking and roads). This element is therefore a focus for many smart city initiatives, because it is not only the 'circulatory system' of the urbanized ecosystem but also a sector wherein policy decisions may lead to tangibly addressing specific challenges — such as related to pollution, congestion, security and employment — in the short term.

Finally, communication services companies are not always considered part of the primary sector for smart cities' development — perhaps because some only consider them as enablers of smart city solutions. According to Accenture, 5G technology is an enabler for the new generations of sensors and monitoring that would help ensure public safety and responsiveness to issues.[14] Moreover, the transversal impact of communications can be observed in, for example, how Softbank has joined up with Toyota to launch an IoT company, Monet Technologies, which seeks to provide data analysis, logistics and autonomous mobility services for urban environments.[15]

8   https://ipeec.org/upload/publication_related_language/pdf/766.pdf

9   https://www.mckinsey.com/industries/automotive-and-assembly/our-insights/charging-ahead-electric-vehicle-infrastructure-demand

10   https://www.latimes.com/business/realestate/hot-property/la-fi-solar-mandate-20181214-story.html

11   For example, as offered to customers by Duke Energy: https://internetofbusiness.com/duke-energy-smart-grid/.

12   https://www.irena.org/publications/2019/May/Renewable-power-generation-costs-in-2018

13   https://thegreenergroup.com/news/solar-valley-city-china/

14   https://www.accenture.com/t20170222T202102__w__/us-en/_acnmedia/PDF-43/Accenture-5G-Municipalities-Become-Smart-Cities.pdf

15   https://global.toyota/en/newsroom/corporate/26434644.html

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