Thriving amid turbulence: Imagining the cities of the future

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Preface

The world faces unprecedented rates of urban expansion. According to the United Nations, 55 percent of the global population currently lives in cities. By 2050, that number is expected to reach 68 percent, which means an additional 2.5 billion people will reside in urban areas. China's cities alone will be home to a staggering 900 million people.

Although cities may appear to be in a state of continuous expansion, their population growth has historically occurred in cycles. Innovations have generally addressed the challenges posed by rising populations, only to be replaced by new hurdles. For example, the early 20th century invention of the automobile has addressed some of the difficulties associated with long commutes. However, as cities are increasingly designed to accommodate cars instead of people, sedentary lifestyles have become common and health issues proliferate.

New and complex issues are emerging, and today's cities are likely on the cusp of the largest global economic transformation to date. As governments steer cities into the future, they would be well advised to consider the following:

• Talent, technology, climate, and globalization will be key shapers of the city context.

• Citizen well-being will be the metric of success

• Cities and residents must collaborate to shape the initiatives that matter.

This discussion paper explores four major forces shaping today's cities - from resource stresses to increasing internationalization - and lays out a 14-point vision for thriving cities of the future. The challenges at hand are daunting and complex, and navigating them will be no easy task. We hope this discussion articulates the elements that will define long-term success for city leaders and provides a useful aspiration as they steer their communities into the future.

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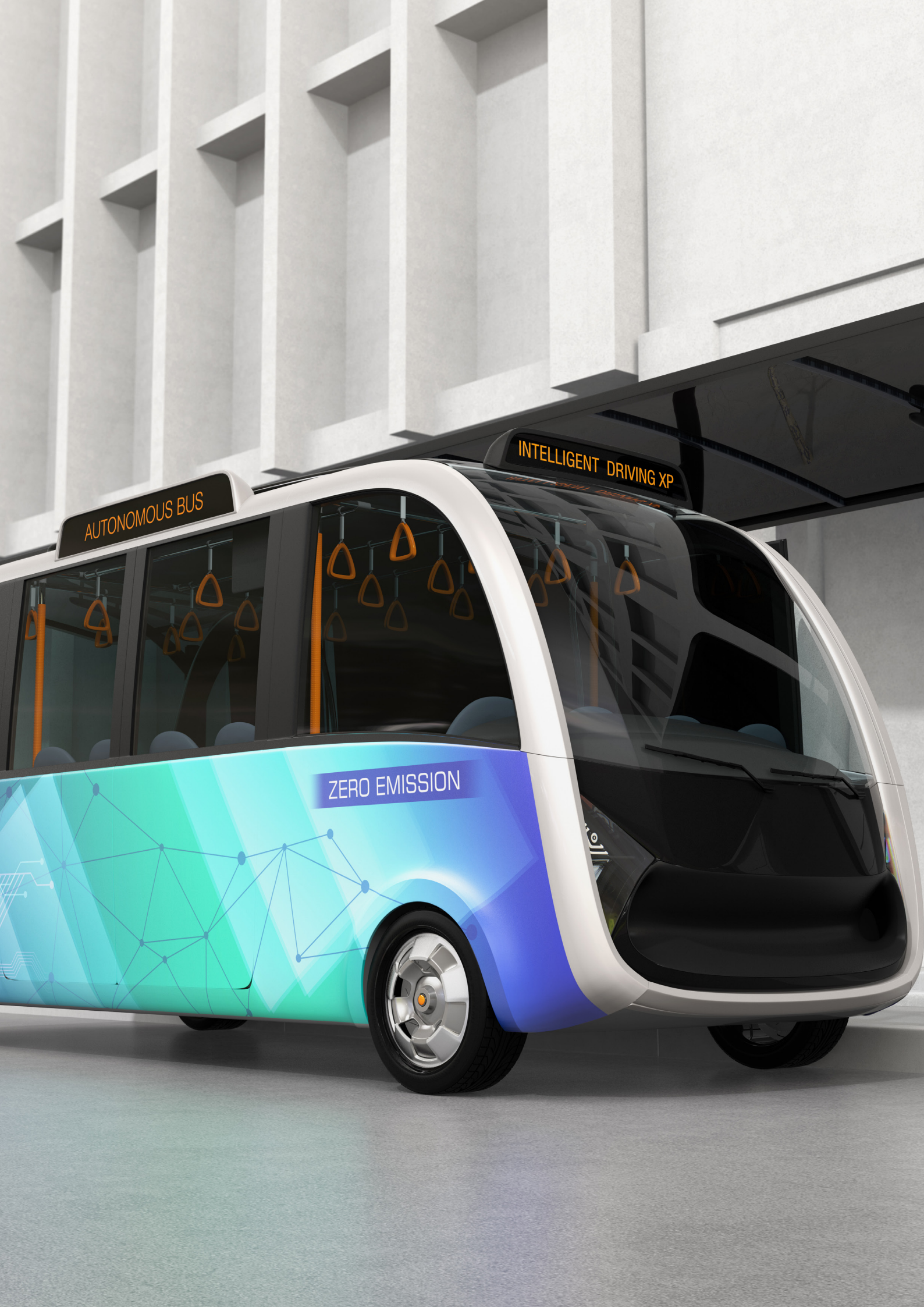
Thriving amid turbulence: Imagining the cities of the future

Four forces shaping cities

The world is undergoing its most dynamic era of change. Four forces are poised to have an outsized impact on the way cities evolve: the competition for talent, an increasingly connected world, the Anthropocene age, and technology's ever-expanding role.

## 1. The competition for talent

Population changes are, in our view, going to have a dramatic impact on the competition for talent in urban areas.

From 2000 to 2012, rising populations were the key driver of urban growth. Approximately 60 percent of the GDP growth of large cities was rooted in an expanding population, while the remaining 40 percent was due to rising per capita income. Cities are now, however, feeling the effects of a double demographic shift. First, the pace of urban migration is decreasing in many regions. Second, global population growth is declining, due to declining fertility rates and an aging population (Exhibit 1).

EXHIBIT 1

Population growth in cities is poised to decline as the transition from rural to urban areas runs its course and populations age

Regions by their urbanization and share of population over 65 years of age over time [1]
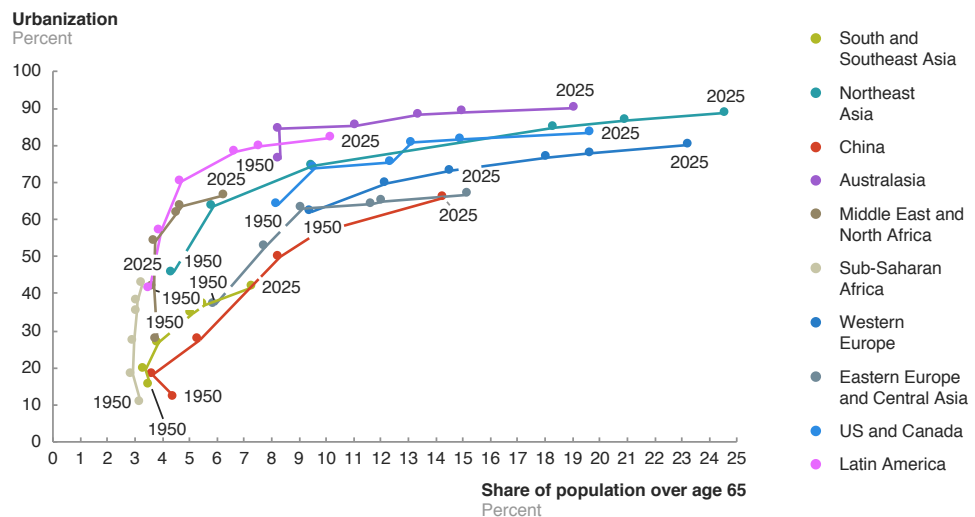
1 Data include 180 countries.

SOURCE: World urbanization prospects: The 2014 revision, UN Population Division, Population series, Urban and total population data, July 2014; World population prospects: The 2015 revision, UN Population Division, Department of Economic and Social Affairs (zero migration scenario), July 2015; McKinsey Global Institute analysis

The impact of these demographic shifts on cities is related to their shift from rural to urban contexts. In Europe and the United States, which experienced the shift in the 18th and 19th centuries, 80 to 85 percent of the population now resides in cities. China's population, by contrast, is about halfway through the shift, with city dwellers constituting roughly 50 percent of the overall population. In India, which is currently in an even earlier stage of the shift, only about 20 percent of the population lives in cities.

As the transition from rural to urban areas plays out and as populations age, the number of

young adults (those between 15 and 29 years of age) will decline. By 2025, more than 60 percent of large cities in developed regions and 47 percent in developing regions will have fewer young adults than they do today. According to our survey of more than 1,500 cities across developed and developing countries, the average age of residents currently ranges from 23 years in Shillong, India to 48 years in Punta Gorda, Florida.

As the number of young adults declines, the competition for talent will intensify. And, while cities must attract businesses that will expand the number of jobs, they will also need to create vibrant, livable environments that draw high-caliber talent.

2. An increasingly connected world

Over the past two decades, migration has blurred geographic boundaries. While some cities are already cosmopolitan, others are actively developing policies and infrastructure to attract foreigners.

Dubai is currently the world's most cosmopolitan city, with foreign born residents making up 83 percent of its population (Exhibit 2). Its residents come from more than 200 countries and speak more than 140 different languages. Following Dubai is Brussels, with a population that is 62 percent foreign born; its inhabitants hail from approximately 140 countries and speak 86 different languages.

EXHIBIT 2

A dozen cities have populations in which at least a quarter of the residents are foreign born[1]

1 Data include 180 countries.
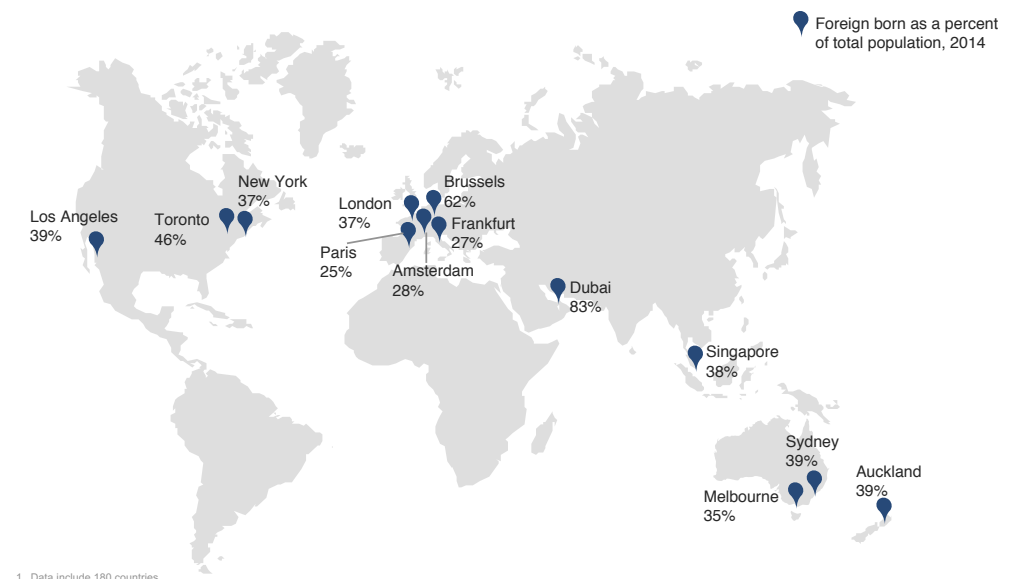
The blurring of these boundaries has important economic consequences. McKinsey estimates that global flows (of goods, services, assets, and people) contribute between $250 billion and $450 billion every year to global GDP, that is, 15 to 25 percent of total global output. Developed economies, by virtue of being more connected, see up to 40 percent more GDP benefit than developing countries.

The McKinsey Global Institute Connectedness Index ranks countries on the intensity and global share of total flows of goods, services, finance, people, and data and communication. Germany tops the overall list for connectedness, Hong Kong is second, and the US is third. Some emerging economies, such as Brazil, China, India, Morocco, and Saudi Arabia, are rapidly becoming more connected. The increase in knowledge-intensive flows as a result of digitization, which are quickly gaining dominance over capital labor flows, will continue to open up a wealth of business opportunities.

Cities can act as key nodes in these global flows, spurring the creation of high-quality jobs and economic output. Only six major cities – Dubai, London, Hong Kong, New York, Singapore, and Tokyo – are major hubs for all types of flows. This suggests there are significant opportunities for other cities as well.
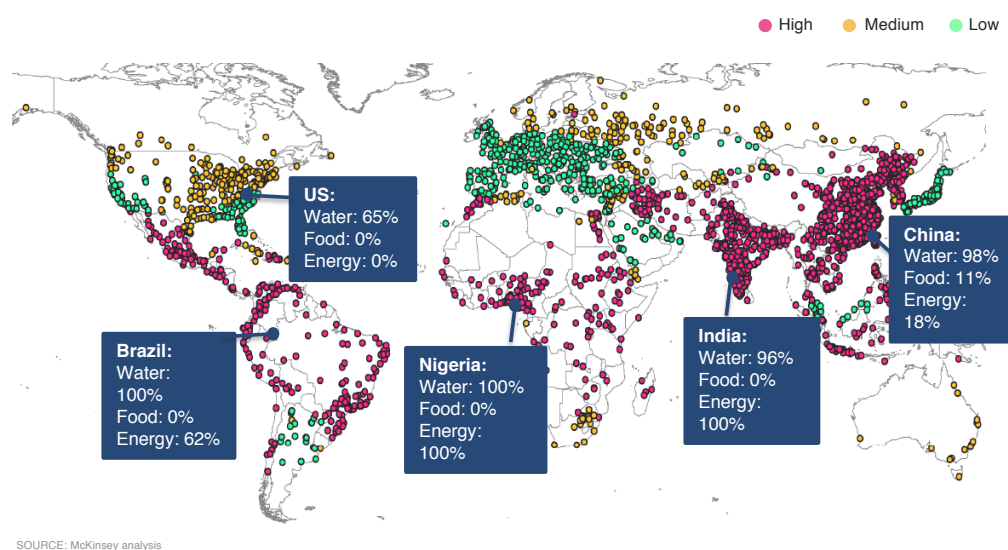
3. The Anthropocene age

When it comes to resources, urban growth has significantly increased risk for cities worldwide. McKinsey's research of more than 2,600 global cities finds that cities are vulnerable to three types of resource stress:

Chronic. Persistent stress on water, energy, and food supplies, which is endemic in certain parts of the world, is spreading rapidly. By 2030, the demand for water is forecast to drastically outstrip supply in several cities in India, China, Africa, and the Americas. By 2025, many cities across the developing world are also likely to suffer from insufficient energy supply, due to a projected increase in demand, as well as low access to electricity (Exhibit 3).

EXHIBIT 3

Many global cities will face chronic resource stresses by 2025

● High   ● Medium   ● Low

US:
Water: 65%
Food: 0%
Energy: 0%

China:
Water: 98%
Food: 11%
Energy: 18%

Brazil:
Water: 100%
Food: 0%
Energy: 62%

Nigeria:
Water: 100%
Food: 0%
Energy: 100%

India:
Water: 96%
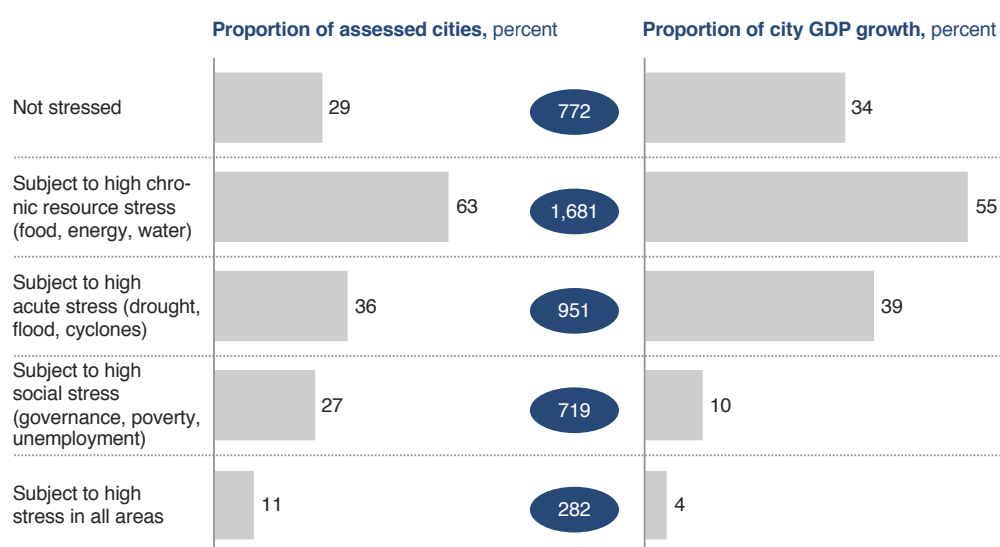Food: 0%
Energy: 100%

SOURCE: McKinsey analysis

Acute. This type of stress results from exposure to weather-related events, and is concentrated in Asian cities as well as coastal cities in the Americas. Notably, coastal China is at risk of floods and hurricanes, while northern India is vulnerable to floods and droughts. The Pacific coast of Latin America is exposed to floods, and the coastal US must contend with both hurricanes and floods.

Social. Social stress can result from poor governance, excessively rapid urbanization, unequal wealth distribution, and youth unemployment. As GDP grows, social stress appears to be declining in the large majority of cities.

Roughly two-thirds of the cities we analyzed worldwide are at risk for at least one of these stresses (Exhibit 4):

EXHIBIT 4

Cities are vulnerable to three chief types of stress[1]

	Proportion of assessed cities, percent		**Proportion of city GDP growth,** percent
Not stressed	29	772	34
Subject to high chronic resource stress (food, energy, water)	63	1,681	55
Subject to high acute stress (drought, flood, cyclones)	36	951	39
Subject to high social stress (governance, poverty, unemployment)	27	719	10
Subject to high stress in all areas	11	282	4

SOURCE: McKinsey analysis
1 McKinsey research of more than 2,600 cities globally

Three trends are likely to intensify the impact of these stresses:

Growing frequency of acute stresses. The number of natural disasters is on the rise. The total number of natural disasters that occurred between 2010 and 2014 is similar to that from between 1980 and 1991, a period nearly three times longer. As a result, food and water shortages have intensified.

Compounding effect of multiple stresses. The intensification of acute stresses comes at a time when cities are also facing more severe chronic challenges. As chronic and social stresses grow, they are pushing low-income groups into slums and informal settlements vulnerable to floods, landslides, and other natural disasters.

Contagiousness of stresses. Increasing global interconnectedness means that cities are more vulnerable to remote events than they have been in the past. Stress in one part of the world, like a political conflict, can generate ripple effects in the form of asylum seekers and supply chain interruptions.

4. Technology's ever-expanding role
Disruptive technologies have the potential to transform the way cities currently operate (Exhibit 5).

EXHIBIT 5

12 potentially economically disruptive technologies

1 **3-D printing**
Additive manufacturing techniques to create objects by printing layers of material based on digital models

2 **Advanced materials**
Materials designed to have superior characteristics (e.g., strength, weight, conductivity) or functionality

3 **Next-generation genomics**
Fast, low-cost gene sequencing, advanced big data analytics, and synthetic biology ("writing" DNA)

4 **Advanced oil and gas exploration and recovery**
Exploration and recovery techniques that make extraction of unconventional oil and gas economical

5 **Renewable energy**
Generation of electricity from renewable sources with reduced harmful climate impact

6 **Energy storage**
Devices or systems that store energy for later use, including batteries

7 **Mobile internet**
Increasingly inexpensive and capable mobile computing devices and Internet connectivity

8 **Automation knowledge work**
Intelligent software systems that can perform knowledge work tasks involving unstructured commands and subtle judgments

9 **The Internet of Things**
Networks of low-cost sensors and actuators for data collection, monitoring, decision making, and process optimization

10 **Cloud technology**
Use of computer hardware and software resources delivered over a network or the internet, often as a service

11 **Advanced robotics**
Increasingly capable robots with enhanced senses, dexterity, and intelligence used to automate tasks or augment humans

12 **Autonomous and near-autonomous vehicles**
Vehicles that can navigate and operate with reduced or no human intervention

SOURCE: McKinsey Global Institute analysis

These technologies are catalyzing various global trends, which include:

The sharing revolution. The growing use of digital platforms and willingness of consumers to use mobile apps have catalyzed the development of the sharing economy, with peer-to-peer business models and shared entrepreneurial enterprises becoming more common. Urban mobility — ride sharing, public bicycle sharing, and smart parking — is just one area that has undergone a major transformation. Between 2013 and 2025, sharing sectors like mobility and real estate financing are expected to grow much faster than more traditional, non-sharing sectors. Sharing economy revenues are projected to grow roughly 35 percent per year, around ten times faster than the broader economy. The UK and France have more than 50 sharing economy organizations.

Smarter cities. After a decade of experimentation, smart cities are also entering a new phase. Although digital solutions are only one of the tools needed to make a city great, they are the most powerful and cost-effective additions seen in many years. According to the McKinsey Global Institute, digital solutions could improve some quality-of-life indicators by as much as 30 percent. Real-time crime mapping, for instance, utilizes statistical analysis to highlight patterns, while predictive policing goes a step further, anticipating crime to head off incidents before they occur. Another example of these solutions are Internet of Things sensors on existing infrastructure systems which can help crews fix problems before they turn into breakdowns and delays.

Circular economy. Cities today operate within a global economic system based on the linear "take-make-dispose" model of production and consumption. Technology could enable cities to transition to a circular economy where products are designed to last and

resources are treated as precious. Digital technologies will make it possible to radically increase virtualization, dematerialization, transparency on product use and material flows, as well as feedback-driven intelligence. At the same time, these technologies will enable the collection and analysis of data on materials, people, and external conditions. For these reasons, digital technologies are critical for identifying the challenges of material flows in cities, pinpointing the key areas where structural waste occurs, and determining viable long-term solutions.

Yet digital technologies also pose a significant threat: data breaches. According to Gemalto's 2017 Breach Level Index report, approximately 4 million data records were compromised every hour during the first half of 2017. Identity theft was the most frequent type of data breach.

A vision for cities of the future

The city of the future must meet the needs of its residents. Yet in surveying residents of 25 major cities, McKinsey finds that a fifth of those cities fall short of delivering satisfaction. Respondents cited numerous inadequacies: crime, congestion, fire emergency response, waste management, active mobility options, police security, lack of basic utilities, public transit, as well as poor quality of housing and government services. Given the fierce competition for talent across cities, dissatisfied urbanites are likely to vote with their feet and leave for more attractive environments.

In order to succeed, city leaders must prioritize their residents' well-being, sustainability, and other basic needs. Successful cities of the future will present vibrant, fluid, and flexible ecosystems along the lines of the "live, work, and play" paradigm, building on new opportunities while mitigating risks and challenges.

EXHIBIT 6

Characteristics of the cities of the future

14 vision elements for cities of the future

14. Convenient access to a large variety of non-work pursuits
13. Accountable and efficient government services
12. Cutting-edge preventive care
11. Protection against man-made and natural hazards
10. No physical or virtual crime
9. Layered and instantly available community protocols
8. Inspiring landscapes and public spaces
7. Support for active lifestyles
6. Convenient access to affordable, healthy, and fresh food
5. A clean and zero wastage water supply chain
4. Pollution-free air, optimum ambient temperatures, and adequate exposure to sunlight
3. Zero to limited congestion
2. Flexible and environmentally sustainable
1. Work environment that attracts the best global talent

The best cities of the future will likely have the following characteristics (Exhibit 6):

1. **A work environment that attracts the best global talent.** With flexible work spaces and working hours, and convenience enabled through technology, the ideal city will have a multi-skilled economy fueled by people with the training and education needed to adapt to ever-changing work requirements.

2. **Flexible and environmentally sustainable.** With environments that leverage prefabricated, modular building materials and efficient construction techniques, cities will be net generators of energy and food.

3. **Zero to limited congestion.** A shift in traffic patterns will result from more active mobility, new approaches to work and working hours, sustainable mobility solutions like autonomous electric vehicles, an increase in the utilized capacity of vehicles (for example, through ride sharing), and the conscious design of material and goods flows.

4. **Pollution-free air, optimum ambient temperatures, and adequate exposure to sunlight.** It will be critical for urban design to feature a network of interconnected parks, gardens and green facades, architecture that makes the best use of wind and shade, and the increasing use of renewable energy.

5. **A clean and zero-wastage water supply chain.** Green power will fuel desalination and purification, and cutting-edge water management systems will operate at city and user levels.

6. **Convenient access to affordable, healthy, and fresh food.** High-yield urban and vertical farming made possible with the latest technologies, in concert with an optimized supply chain, will ensure people get top-quality food.

7. **Support for active lifestyles.** Designed like a gymnasium, the city will have car-free or car-lite neighborhoods connected with walkable and bikeable streets and public spaces.

8. **Inspiring landscapes and public spaces.** Designed purposefully and built at least partially by the residents themselves, these places will create a strong sense of community and emotional attachment.

9. **Layered and instantly available community protocols** will enable service provision and community interaction on a 24/7 basis.

10. **No physical or virtual crime.** Artificial intelligence-enabled surveillance of physical and virtual networks and a comprehensive and transparent public record system will make it possible to predict and preempt illegal activity while respecting privacy concerns.

11. **Protection against man-made and natural hazards.** An integrated system spanning climate sensors, core city infrastructure systems, and city agents will help safeguard cities from natural disasters and infrastructure failures.

12. **Cutting-edge preventive care.** Innovations like smart wearables, hygiene tools, smart homes, and state-of-the-art emergency response systems will make it possible to provide truly effective preventive care.

13. **Accountable and efficient government services.** Aided by distributed and technology-enabled delivery and a high degree of citizen participation, service performance will be benchmarked against service level agreements.

14. **Convenient access to a large variety of non-work pursuits.** Citizens will be able to easily partake in entertainment, sports, arts, culture, and spiritual events.

These characteristics by no means constitute a comprehensive description of the city of the future, nor do they represent the only path for building one. Rather, they are the characteristics that resonated the most across leading city thinkers and researchers, city leaders, and city planners who McKinsey surveyed. The hope is that these traits can help leaders of different cities develop detailed visions for their own specific context.

We have also deliberately not ranked the importance of these characteristics nor suggested what they might cost. Both will vary with the city and require significant contextual analysis to determine.

The way forward

Every city will have to design its own future journey in a way that reflects the unique constraints it faces. The actions pursued by city leaders, investors, key businesses, residents, and other constituents will depend on the city's level of maturity in a wide range of areas, including human centricity, infrastructure, political stability, technology interventions, citizen engagement, and safety. A three-pronged approach can help start the process:

1. **Understand and elevate citizen sentiment and feedback** to guide future efforts in the right direction. Citizen sentiment can be extracted from different sources and at multiple levels of granularity. Social media analyses, open data portals that highlight local problems, sensors that capture consumption patterns, third-party surveys, and official studies can help.

2. **Trigger "no-regret" initiatives for districts or neighborhoods** to generate a case for change and the momentum needed to achieve it. Although realizing the vision will require long-term focus, stakeholder alignment, as well as patient capital and resource deployment, city leaders should not hesitate to effect smaller change wherever possible. Building gardens and parks in high-density neighborhoods, improving walkability, setting up an e-government portal for select services, developing a public events calendar, and adopting technologies for security can spur meaningful change.

3. **Set the stage for an end-to-end effort** that will transform the city and its governance into an effective citizen-centric environment. It will be critical to establish a dedicated delivery unit focused on fact finding, option generation, and consensus building. The unit will need to understand the relative contribution of population and productivity to the city's GDP growth historically to set goals for global flows across goods, services, financials, and people. It will also be necessary to understand domestic and international migration trends, which will have a significant impact on the talent pool of the future. No less important, the unit will need to understand where the city is on the smart city journey. These are just a few of the areas cities will have to focus on to create transformative change.

□   □   □

Every city of the future will have unique characteristics, all of which will help contribute to urban well-being. In the face of increasing global turbulence, the city leaders that sustain growth will be those who recognize and celebrate each city's unique strengths.