ThoughtLab

In partnership with **HATCH**

Building a Future-Ready City

A roadmap for the next phase of urban transformation

Executive Summary

The road ahead for cities

Cities are in the throes of unprecedented change. Still reeling from the COVID-19 pandemic, they face social, economic, and climate disruptions that are radically altering the expectations and behaviors of citizens.

These expectations run the gamut: wider digital access to public services, medicine, and education; more sustainable and safer infrastructure, mobility, and living conditions; and greater inclusiveness, public health, and affordable housing.

Urban leaders around the world must quickly come to grips with these demands and develop action plans to become "future-ready." This means morphing into sustainable, inclusive, resilient, and safe metropolises—with new fit-for-purpose digital and physical infrastructure.

This is no easy task. Today's cities face severe skills shortages and budget constraints that make it difficult to keep up with the pace of change. They must contend with onerous political processes, changes in administrations, and regulatory and procurement complexity. These challenges are on top of the stresses—and crises—they face in their day-to-day operations. This paper sheds light on the road ahead and the speed bumps along the way.

Research methodology

To analyze how cities are future-proofing their urban environments, ThoughtLab and Hatch, a global engineering company, joined forces with a coalition of business, academic, and city leaders to conduct a global benchmarking study in 2022.

As part of the study, we surveyed senior officials in 200 cities representing 5% of the world population. In addition, we surveyed 2,000 citizens in 20 of these cities to assess how their perspectives aligned with those of urban leaders.

To gain qualitative insights, ThoughtLab interviewed city leaders about their plans and held meetings with a global cadre of urban experts.

❝ A future-ready city is characterized by being citizen-centric, with a clear vision and strategy. It is innovative and digitally transformed, as well as connected and highly collaborative."

Professor Joan E. Ricart, IESE Business School, Spain
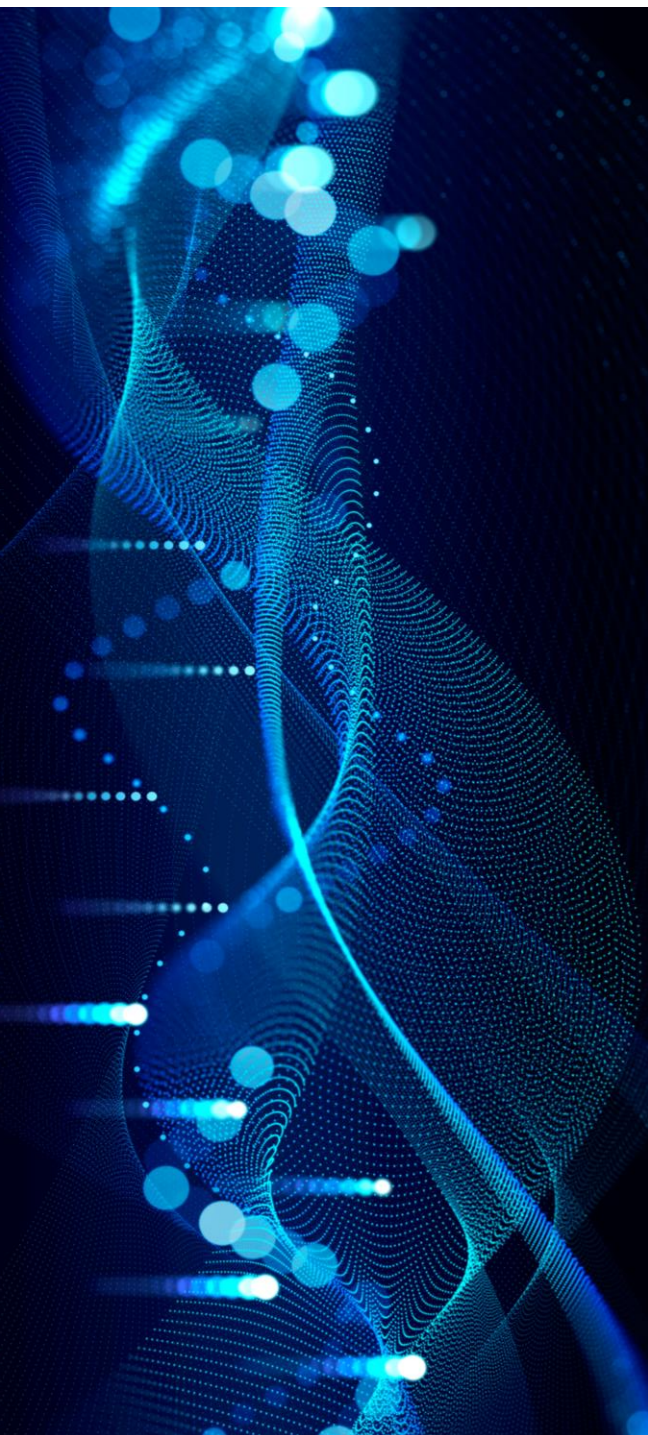
Cities in flux

City leaders and citizens agree that cities need to undergo transformative change. On average, urban leaders report rising expectations among citizens in 17 areas (out of 25 covered in the survey). These include better healthcare, education, and housing; greater digital access; improved infrastructure; and more action to protect the environment. More than half of citizens surveyed agree with much of this assessment, particularly regarding more access to online education, healthier ways to live in their city, and the ability to make digital payments.

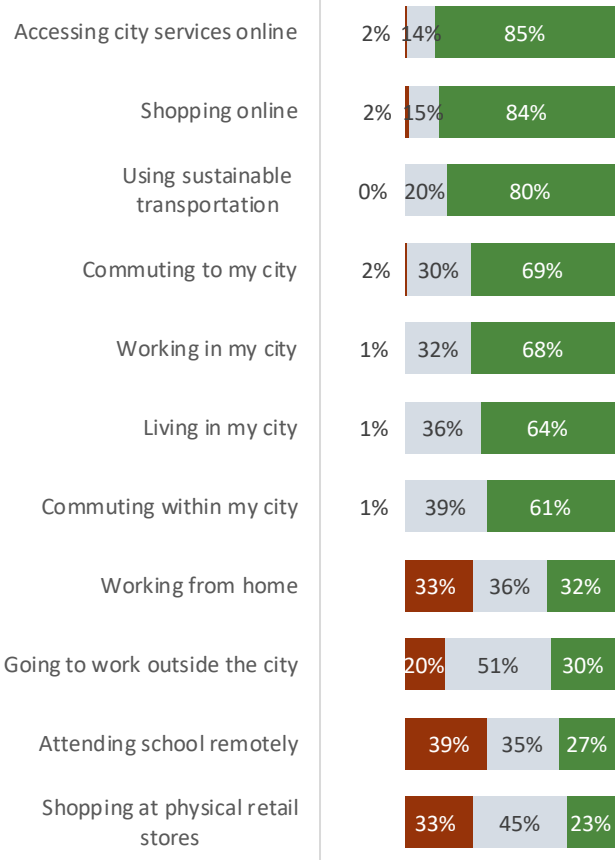**Where citizens say the pandemic has increased their expectations**

1	Greater access to online education
2	Healthier ways to live in my city
3	Digital payment for shopping
4	Digital payment for government services
5	Environmentally friendly transportation
6	Greater access to online government services
7	Greater access to telemedicine
8	Less congestion
9	Wider access to reliable connectivity
10	More action to protect environment
11	Greater access to education and training
12	Improved economic conditions

In which of the following areas has the pandemic and other recent trends raised your expectations?

Shifting citizen behaviors

City leaders expect citizen behaviors and activities to shift over the next five years. They foresee big jumps in online usage, both for shopping and using city services. They expect that citizens will use more environmentally friendly forms of transportation. They anticipate that citizens will return to work and live in cities, causing commuting between and within cities to increase.

How cities expect citizen activities to change

Activity	Decrease	Stay the same	Increase
Accessing city services online	2%	14%	85%
Shopping online	2%	15%	84%
Using sustainable transportation	0%	20%	80%
Commuting to my city	2%	30%	69%
Working in my city	1%	32%	68%
Living in my city	1%	36%	64%
Commuting within my city	1%	39%	61%
Working from home	33%	36%	32%
Going to work outside the city	20%	51%	30%
Attending school remotely	39%	35%	27%
Shopping at physical retail stores	33%	45%	23%

Do your city's plans anticipate that the following activities will increase, stay the same, or decrease over the next five years?

Key urban challenges

City leaders and citizens agree on the key urban challenges but rank them differently. Both groups believe that climate change is the greatest single problem for cities.

They concur that affordable housing, homelessness, and public health should be high on urban agendas. But citizens view inadequate infrastructure, income inequality, and, particularly, low trust in government, as bigger problems than cities.

> **The magnitude of the climate change challenge requires the mobilization of resources across multiple stakeholder groups. Ecosystems of partnerships will be crucial in driving progress, pooling resources, sharing knowledge and best practices, and scaling technology."**
>
> *Jeremy Kelly, Global Research Director, City Futures, JLL*

Ranking of biggest challenges over the next five years: city leaders vs. citizens

Challenge	City Rank	Citizen Rank
Climate change and pollution	1	1
Public health	2	6
Affordable housing and homelessness	3	2
Traffic congestion	**4**	**14**
Funding shortages/deficits	5	9
High crime and low public safety	6	5
Education and talent/skills gaps	7	10
Attracting/retaining businesses	**8**	**13**
Weak economic conditions	9	7
Inadequate infrastructure	**10**	**4**
Data security and privacy	11	11
Income inequality and inclusion	**11**	**3**
Inadequate public transportation	13	12
Shifts in urban population	14	15
Low trust in government	**15**	**8**

Which of the following are the biggest challenges your city will face over the next five years? Which of the following are the biggest challenges your city will face over the next five years?
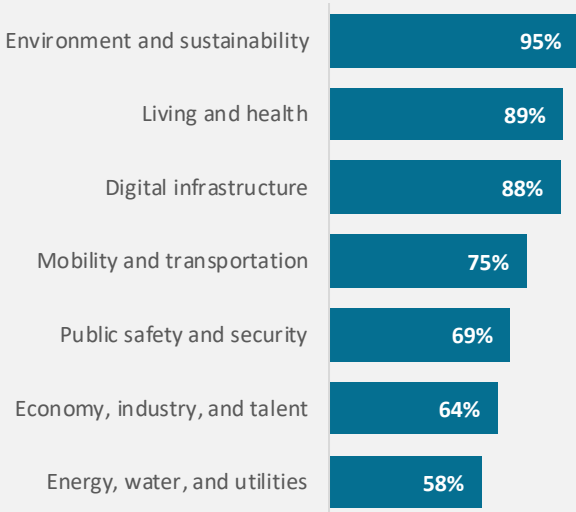
Becoming future-ready

Every city surveyed reported having a vision and action plan to become future-ready—a prerequisite for urban success. However, some plans are more comprehensive than others. Across cities, only 16% include all seven key urban domains (see chart below). These often are more advanced cities, such as Berkeley, Cardiff, Denver, Dubai, Hobart, Hong Kong, Perth, and Sapporo, which recognize the need for a broad-based, holistic approach.

On average, cities include between four and five of the seven domains in their plans. The domains most often included are environment, living and health, and digital infrastructure.

The study identified 44 future-ready cities among the 200 cities surveyed. To assess and rank the future-readiness of cities, the study investigated each city's progress on key elements of future-readiness, and the level of transformation they believed was needed across the seven urban domains.

Top 10 future-ready cities

1. Tokyo	6. Durham
2. Hangzhou	7. Aberdeen
3. Helsinki	8. Sapporo
4. Tallinn	9. Boulder
5. Taipei	10. Madrid

Domains included in plans

Domain	Percentage
Environment and sustainability	95%
Living and health	89%
Digital infrastructure	88%
Mobility and transportation	75%
Public safety and security	69%
Economy, industry, and talent	64%
Energy, water, and utilities	58%

Which of the following domains are included in your vision and action plan(s) to become a future-ready city?

Top 5 future-ready cities by region

North America: Boulder, Salt Lake City, Oklahoma City, Santa Clara, and Berkeley

Latin America: Belo Horizonte, Merida, Aracaju, Pachuca, and Bucaramanga

Europe: Helsinki, Tallin, Durham, Aberdeen, Madrid

Middle East & Africa: Dubai, Tel Aviv, Kigali, Manama, and Dammam

Asia Pacific: Tokyo, Hangzhou, Taipei, Sapporo, and Christchurch

12 areas of urban focus

Future-ready cities are most ahead of others in 12 urban areas. Three-quarters of future-ready cities have made significant progress in digital transformation and innovation, building resilience and agility, and using data to improve decision-making—compared to less than half of other cities.

Around three-quarters have also made considerable progress in adapting to citizen expectations around health and safety—which are overriding considerations in the wake of the pandemic. Future-ready cities also understand better than others the need to build trust and to empower citizens to drive change.

> **❝Our mayor doesn't want a smart city; he wants smart citizens—people who know how to use technology and value what it can do for them. We want our residents' quality of life to be improved by technology.❞**
>
> Wilfredo Gomez, Digital Transformation Officer, Bucaramanga, Colombia

Top 12 areas of future-readiness (good or very good progress)

Area	Future-ready	Other	Pt. difference
Drive digital transformation	77%	47%	+30
Build resilience and agility	75%	40%	+35
Use data for decision-making	75%	40%	+35
Adapt to citizen expectations	73%	38%	+35
Build trust and transparency	73%	64%	+9
Empower communities	70%	46%	+24
Build global economic links	68%	38%	+30
Ensure citizen safety & health	68%	42%	+26
Attract needed talent and skills	66%	45%	+21
Develop collaboration	66%	40%	+26
Build resource efficiencies	64%	40%	+24
Foster inclusiveness	64%	38%	+26

How much progress has your city made in addressing the following elements of a future-ready city?

What future-ready cities do differently

1 Extract more value from data

Future-ready cities extract greater value from data (84% vs. 76% of others). They also have made greater progress on using data to achieve their goals by domain (50% vs. 30%).

2 Nurture citizen engagement

Future-ready cities do more than others to develop new roles, such as CCOs and CCXOs, to nurture citizen engagement (52% vs. 44% of others). They also reach out more to stakeholders to demonstrate the value of a project (73% vs. 53%).

3 Partner more with business and government

Future-ready cities partner more with the business community and technology firms (75% vs. 69% of others) and consult more with government entities and jurisdictions outside of their cities (39% vs 31% for others).

4 Invest more in digital technology

Future-ready cities are more forward-looking with technology and understand the importance of digital twins to achieve their plans (66% vs. 50% of others). They also plan to spend more on digital infrastructure ($150 million vs. $93 million for others over the next five years).

5 Focus more on cybersecurity

Future-ready cities are better prepared for cyberattacks (86% well or very well prepared vs. 63% of others) and have made greater progress against cybersecurity frameworks like NIST. They also plan to spend more on cybersecurity over the next five years ($13.4 million vs. $9.7 million for others).

6 Making decisions more on their own

Future-ready cities have greater decision-making autonomy from national, state, and provincial control. On average, 36% of future-ready cities have significant or full fiscal, functional, personal, regulatory, and structural autonomy, vs. an average of 17% of other cities.

Drivers of change

The study identified six main mechanisms that cities use to implement their urban strategies and achieve better results:

1. Collaboration and partnerships

On average, cities prioritize collaboration and partnerships with eight types of organizations to achieve their social, environmental, and infrastructure goals. The top partners are financial institutions, technology firms, universities and research firms, public utilities, and other cities or city networks. More than others, future-ready cities favor financial institutions, businesses, and non-profits.

Future-ready cities give higher priority to certain partners vs. others

Type of partner	Future-ready	Others	Pt. difference
Financial institutions	86%	76%	**+10**
Companies/businesses	64%	55%	**+9**
Local non-profits	55%	49%	**+6**
Multilaterals	30%	26%	**+4**
Start-ups, tech firms	80%	77%	**+3**

Which of the following partnerships is your city prioritizing to meet its social, environmental, and infrastructure goals?

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2. Digital innovation

Seven out of 10 cities use digital innovation to make their cities both smarter and more sustainable. Most cities also appoint an executive to lead digital innovation and build the needed talent. One growing trend is to set up an innovation hub to promote the adoption of advanced technologies.

Where future-ready cities do better than others

Use digital innovation to drive sustainability

Build cybersecurity into digital solutions from the start

Make technology procurement effective

Ensure digital equity among citizens

Use written guide to oversee technology

Invest in making city metaverse-ready

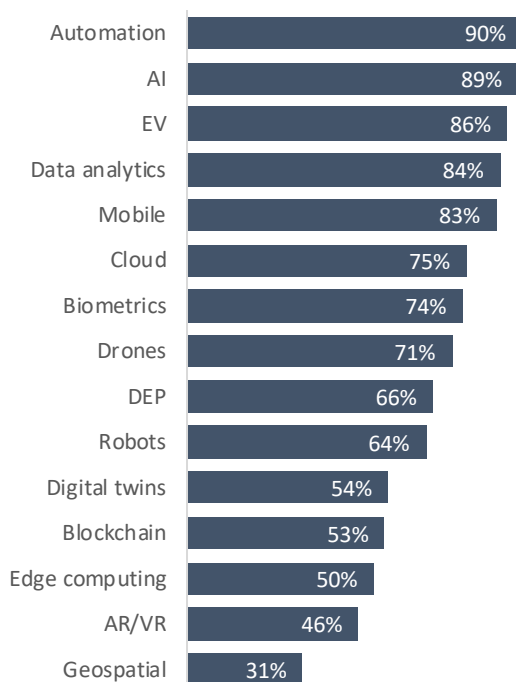*Which of the following statements do you agree with relating to your city's approach to digital innovation?*

> " **Metaverse Seoul is a virtual counterpart of our city. It allows people to experience Seoul anywhere, at any time, as long as they have devices."**
>
> In Dong Cho, First Vice Mayor, Seoul Metropolitan Government

3. Emerging technologies

Automation, AI, and electric vehicles top the list as cities move to a smarter, more sustainable future. Data analytics, mobile, cloud, biometrics, and drones will also play a central role. 67% of future-ready cities (vs. 54% of others) cite the importance of digital twins for achieving their plans.

Most important technologies for cities

Technology	Percentage
Automation	90%
AI	89%
EV	86%
Data analytics	84%
Mobile	83%
Cloud	75%
Biometrics	74%
Drones	71%
DEP	66%
Robots	64%
Digital twins	54%
Blockchain	53%
Edge computing	50%
AR/VR	46%
Geospatial	31%

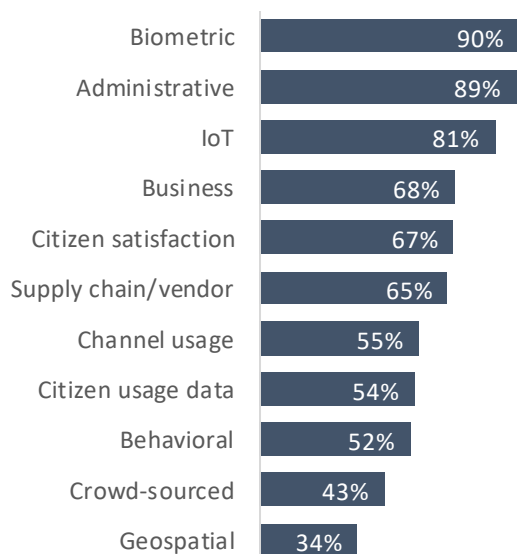*Which of the following technologies will be most important to help your city to achieve its future-ready plans?*

> " **Digital twins and simulators will help us understand the impacts of any modifications we make in energy, mobility, or any other infrastructure."**
>
> Barbara Pons, Commissioner of the 2020 Agenda, Barcelona City Council, Spain

4. Data analytics

Data is the lifeblood of cities. Not only are cities using more sources of data, but they are doing more to integrate, analyze, secure, and extract value from it. Future-ready cities do more than others--such as using it to make evidenced-based and real-time decisions and making data accessible across government departments or to the public.

Data used today to support operations

Type	%
Biometric	90%
Administrative	89%
IoT	81%
Business	68%
Citizen satisfaction	67%
Supply chain/vendor	65%
Channel usage	55%
Citizen usage data	54%
Behavioral	52%
Crowd-sourced	43%
Geospatial	34%

Which of the following types of data is your city actively using to support its operations?

5. Diversification of funding sources

Private-sector financing, government-based borrowing, and privatization of assets are the top three ways cities are funding their future. Funding through taxes, vendor financing, and new business models are not far behind. Government-based finance has become the main source of capital for environmental plans.

> **❝ Data has become our single source of truth. Through our data exchange platform and advanced data management system, we have brought together siloed data from different departments, such as social services, education, healthcare, and housing.❞**
>
> Bayan Konirbayev, Chief Digital Officer, Almaty, Kazakhstan

6. Citizen engagement and trust

Most city leaders in our survey see low trust in government as a lower-level challenge, but 36% of citizens see it as a major problem. Cities plan to build trust through improving communication, involving citizens in decision-making, and creating new roles like chief citizen officer. Future-ready cities focus more on developing new roles to nurture citizen engagement and demonstrating the value of a project to stakeholders.

How cities build citizen engagement

71% Increase communication in all forms

65% Provide one platform for citizen needs

57% Demonstrate the value of project

55% Engage stakeholders in goal setting

46% Set new roles like chief citizen officer

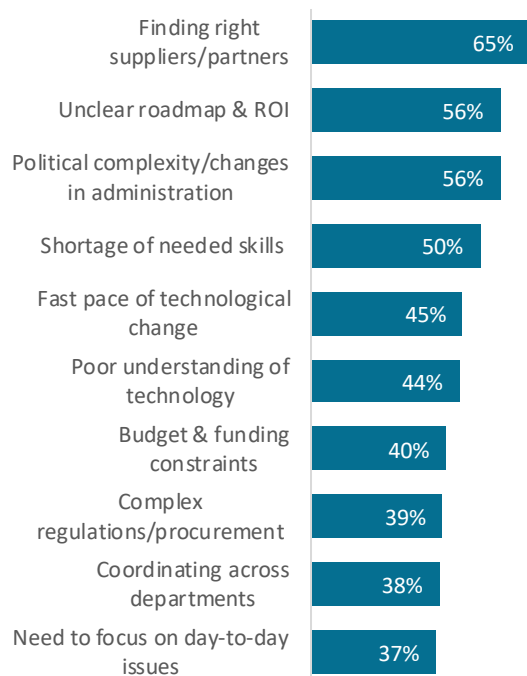**45%** Involve disadvantaged in goal setting

33% Use gamification and other incentives

Speed bumps on the way

For many cities, becoming future-ready is easier said than done. Cities face resource challenges such as unclear ROI, shortage of skills, and budget constraints; technology headaches such as finding the right suppliers and the pace of technology change; and political pain points around governance complexity and changes in administration.

Because of the progress they have already made, future-ready cities experience fewer of these challenges.

Most cities do not see cybersecurity as a trouble spot. In fact, about 7 out of 10 city officials believe that their cities are well prepared for cyberattacks.

But citizens have their doubts: Only 34% think their cities are well prepared for the digital era and the related risks, and only 43% believe their city has taken effective steps to protect data security and privacy.

Considering the slew of cities that have been hit by ransomware attacks since the start of the pandemic, citizens may have a more realistic point of view.

Top challenges to achieving future-ready plans

Challenge	%
Finding right suppliers/partners	65%
Unclear roadmap & ROI	56%
Political complexity/changes in administration	56%
Shortage of needed skills	50%
Fast pace of technological change	45%
Poor understanding of technology	44%
Budget & funding constraints	40%
Complex regulations/procurement	39%
Coordinating across departments	38%
Need to focus on day-to-day issues	37%

What are the main challenges your city faces in achieving its future-ready plans?

> **" The pandemic amplified the resilience goal and brought attention and extra funding from the federal level, making a much bigger impact than we could have with just city dollars. But it was certainly a challenge, after finishing all that community engagement, having to revisit our plan now that the world feels like a completely different place."**
>
> Mike Hess, Director of Future-Ready City Initiative, Orlando, FL

Urban investment plans

Despite the hurdles, our research shows that cities are ramping up their technology investments across all key urban domains. Cities intend to spend $422 million on average cumulatively over the next five years, or about $570 per citizen. Digital infrastructure will get the largest share of cities' cumulative spending, followed by energy, water, and other utilities, mobility and transport, and living and health.

Where cities are making their tech investments (% of total)
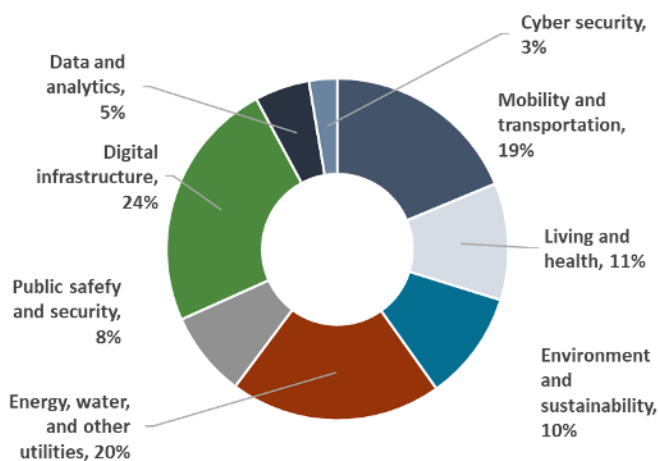
How much is your city planning to spend over the next five years (cumulatively) in US dollars on the following technologies to improve [domain name]?

Given their more ambitious plans, future-ready cities seek to spend an average of $300 more per citizen than do other cities.

They will outspend them across all the urban domains:

- *Digital infrastructure:* $205 per capita for future-ready cities vs. $105 for others

- *Energy, water, and other utilities:* $154 per capita for future-ready cities vs. $99 for others

- *Mobility and transportation:* $142 per capita for future-ready cities vs. $94 for others

- *Living and health:* $83 per capita for future-ready cities vs. $54 for others

- *Environment and sustainability:* $74 per capita for future-ready cities vs. $57 for others

- *Public safety and security:* $67 per capita for future-ready cities vs. $39 for others

Although climate change is the top challenge cited by cities and citizens, cities plan to allocate less tech investment to the environment than to some other domains. Given technology's ability to drive sustainability, the environment represents a huge opportunity for cities to invest in innovation locally to create jobs and build more sustainable, future-ready communities.

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Conclusion

Social, economic, and climate-related disruptions—all heightened by the pandemic—are transforming the expectations and behaviors of citizens. In response, cities are mapping out new plans to make their infrastructure and services fit for future purpose. To succeed, cities should focus on driving digital transformation and innovation; building resilience and agility; using technology and data to improve decision-making; adapting to citizen needs around health and safety; building trust and transparency; empowering communities and citizens; and building global economic, political and trade connections. But they cannot do it alone. Drawing on an ecosystem of partnerships, together with new funding alternatives and business models, will be essential for making their visions a reality.

Sponsors

ThoughtLab would like to give special thanks to our sponsors, which made this research possible.

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ThoughtLab is an innovative thought leadership and economic research firm providing fresh ideas and evidence-based analysis to help business and government leaders cope with transformative change. We specialize in analyzing the impact of technological, economic, and demographic shifts on industries, cities, and companies.

To learn more about ThoughtLab, visit:
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