# ESI THOUGHTLAB
*A leader in evidence-based research*

# Smarter Cities 2025

*Building a sustainable business and financing plan*

An interactive thought leadership report

ADVANCE ▷

# Our rigorous analytical approach

To start the project, ESI ThoughtLab conducted in-depth benchmarking surveys of government leaders in 136 cities around the world to understand their smart city perspectives, practices, and performance results.

To gain insight into the views of city stakeholders, we also conducted surveys of 750 business leaders and 2,000 residents in 11 representative cities with varying levels of economic development, social and geographic diversity, and smart city "maturity".

We then analyzed and correlated the statistical input from the governments, citizens, and businesses to understand the alignment in ways of thinking about smart cities. Drawing on the survey data and respected secondary sources, we then created micro- and macro-economic models to quantify the direct, indirect, and catalytic benefits of smart city investments in the 11 proxy cities, which could be extrapolated to cities with similar characteristics.

Throughout the research process, our distinguished advisory board of business and academic leaders provided valuable input on smart city practices and their impacts.

**Benchmarking surveys of urban leaders in 136 cities**

**In-depth surveys of businesses and citizens in 11 proxy cities**

**Research input from global advisory board of experts**

**Micro- and macro-economic modeling**
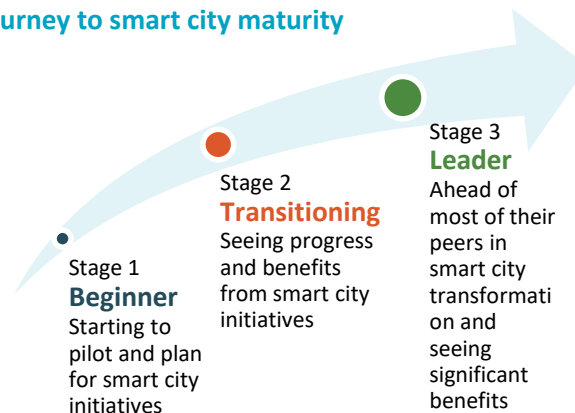
# Defining smart city maturity

The future economic and social success of cities will be determined by their ability to evolve as smart cities. By drawing on the latest technologies and capitalizing on data analytics, smart cities will be better equipped to solve urban problems, provide high-quality services, and drive sustainable growth.

As part of our benchmarking analysis, we calculated a "smart city maturity score" for each of the 136 cities, based on responses to key questions in the government survey about each of the 10 smart city "pillars" that we identified. The score was divided into four equally weighted components:
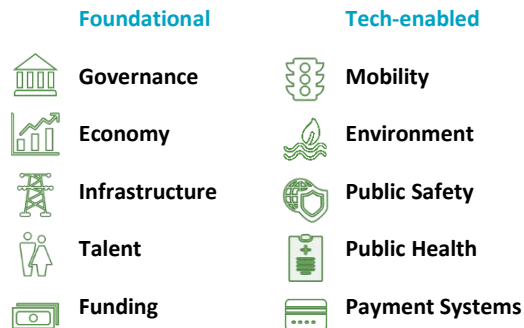
1.   Level of smart city investments

2.   Use of data analytics

3.   Application of smart technologies

4.   Self-rating on stage of smart city maturity

We arrived at an overall score by combining the normalized scores  for each pillar. Based on the scores, we stratified the cities into three categories: **beginner**, **transitioning**, and **leader**. We designated 11 proxy cities across maturity stages that could serve as representative cities for our deep-dive analysis.

## Journey to smart city maturity

Stage 1
**Beginner**
Starting to pilot and plan for smart city initiatives

Stage 2
**Transitioning**
Seeing progress and benefits from smart city initiatives

Stage 3
**Leader**
Ahead of most of their peers in smart city transformation and seeing significant benefits

## Across 10 pillars of smart city success

**Foundational**

Governance

Economy

Infrastructure

Talent

Funding

**Tech-enabled**

Mobility

Environment

Public Safety

Public Health

Payment Systems

# Cities by maturity classification

## Beginner

| | |
|---|---|
| Aberdeen | Jena |
| Alexandria | Kiev |
| Athens | Lagos |
| Bangkok | Lisbon |
| Bogota | Mexico City |
| Brantford | Milan |
| Bratislava | Monaco |
| Burlington | Nairobi |
| Cairo | New Orleans |
| Casablanca | Ostrava |
| Columbus | Panama City |
| Czestochowa | Rēzekne |
| Detroit | Saint Petersburg |
| Doha | Sharjah |
| Galway | Skövde |
| Greater Belo Horizonte | Tampines |
| Houston | Vancouver |
| Hyderabad | Yangon |
| Istanbul | |

## Transitioning

| | | | | |
|---|---|---|---|---|
| Aarhus | Charlotte | Leeds | Nice | Tallinn |
| Abu Dhabi | Chennai | Lima | Ottawa | Tampa |
| Adelaide | Cincinnati | Los Angeles | Perth | Tampere |
| Amsterdam | Cork | Lyon | Philadelphia | Toronto |
| Atlanta | County Donegal | Macau | Phoenix | Valencia |
| Baltimore | Dubai | Madrid | Pittsburgh | Washington, DC |
| Barcelona | Dublin | Manchester | Prague | |
| Beijing | Dundee | Marseille | Raleigh | |
| Bengaluru | Durban | Melbourne | Reykjavik | |
| Berlin | Edmonton | Miami | Rio de Janeiro | |
| Birmingham | Geneva | Milton Keynes | Riyadh | |
| Brighton and Hove | Hamburg | Milwaukee | San Jose | |
| Bristol | Helsingborg | Montreal | Sao Paulo | |
| Brussels | Helsinki | Moscow | Seattle | |
| Budapest | Hong Kong | Mumbai | Seoul | |
| Buenos Aires | Johannesburg | Munich | Sheffield | |
| Calgary | Kansas | New Delhi | Singapore | |
| Cape Town | Karachi | New York | Stockholm | |
| Cardiff | Kuala Lumpur | Newcastle upon Tyne | Taipei | |

## Leader

| | |
|---|---|
| Boston | San Francisco |
| Chicago | Shanghai |
| Copenhagen | Sydney |
| Edinburgh | Tel Aviv |
| Gothenburg | Tokyo |
| London | Vienna |
| Oxford | Yinchuan |
| Paris | Zurich |
| Rome | |

# The Path to a Smart City Future

*"Ensuring your city has a digital strategy in place is key for a successful transformation. To be effective, city leaders need to ask if their digital city strategy is design-driven, value-led, politically endorsed, and if it delivers a viable ecosystem."*

- Jen Hawes-Hewitt, Global Cities Lead, Accenture

# Cities need to build a clear path to smart city transformation

The convergence of digitization, globalization, and demographic change is redefining the urban landscape and how people shop, work, travel and live. Businesses with a stake in the future of cities are fast developing innovative solutions to meet the new realities of urban life and digital commerce.

By making their cities smarter—not just in using technology but in all that they do—government leaders hope to drive competitiveness and growth, while making massive social, business and environmental improvements.

But without a clear playbook for the future, cities run the risk of falling behind their peers. The path will vary by city—depending on the issues it faces. The key challenge for urban leaders is incorporating the concerns of their stakeholders into a properly staged roadmap that will lead to the best results.

## Roadmap for smarter cities

**1 Assess stakeholder concerns**
Ensure alignment with stakeholders' priorities and give them input to gain their buy-in.

**2 Remove obstacles**
Cities are often held back due to political challenges, cybersecurity worries, inertia, or uncertain ROI.

**3 Fully leverage data**
Make sure you are gathering, analyzing, and integrating a wide array of data and making it accessible to stakeholders.

**6 Don't make cybersecurity an afterthought**
Most cities, especially smart city beginners, are not well prepared for cyberattacks. As cities become *smarter,* their risks multiply.

**5 Keep pace with digital innovation**
Make sure you don't fall behind on core technologies, like cloud, biometrics, and mobile apps, or emerging ones, such as AI, IoT, smart beacons, and chatbots.

**4 Lay the IT groundwork**
Install the broadband, shared architecture, and scalable systems, as well as the processes and standards, needed to support smart initiatives.

**7 Draw on digital ecosystems**
Cities can partner with technology providers and universities or outsource development and implementation.

**8 Invest wisely**
Benchmarked cities are allocating about 15% of their operating budgets and 17% of their capital budget to smart city programs.

# The Business Case for Smart Cities

*"The smartest cities will provide rich and diverse solutions to meet the growing demands of increasingly mobile city dwellers. A winning combination will see investments in systems that enable smart cities to combine great urban experiences with more efficient and sustainable management of their assets and scarce resources."*

- Mike Gedye, Executive Director, CBRE

# The 10 pillars of smart city transformation

Our research identified 10 smart city pillars that work together to drive benefits to local stakeholders. While urban leaders will vary their approaches based on the issues their cities face, the most successful cities create roadmaps that build on foundational and tech-enabled pillars. As part of our research, we asked government leaders, citizens and businesses to give us their views on these 10 pillars for smart city success. This section shows their ranking of priorities on a scale of 0-4.

0 = not a priority

1 = low priority

2= medium priority

3 = high priority

4 = very high priority



Tech-enabled pillars
- PAYMENTS
- PUBLIC HEALTH
- PUBLIC SAFETY
- ENVIRONMENT
- MOBILITY

Foundational pillars
- INFRASTRUCTURE
- FUNDING
- TALENT
- ECONOMY
- GOVERNANCE

# Smart city performance impact modeling

**ESI ThoughtLab economists created rigorous performance impact models for five key "pillars" of smart city development: mobility, environment, public safety, public health, and payment systems.**

The economic models draw on the following data:

1. Secondary data on the impacts of smart city investments.

2. City-specific government survey data on smart city practices.

3. City-level profile data (e.g. on population, income, transit ridership).

4. Primary data from the business and consumer surveys.

Using that data, ESI ThoughtLab also modeled the catalytic economic impacts of smart city initiatives using the National Institute of Economic and Social Research's highly respected global econometric model.

By measuring the direct, indirect, and catalytic benefits of smart city programs, our models allow us to estimate the impacts if each city were to become a smart city leader. By benchmarking cities according to their stages of smart city maturity, our economists are able to extrapolate the potential performance impact for other cities in similar stages of development.
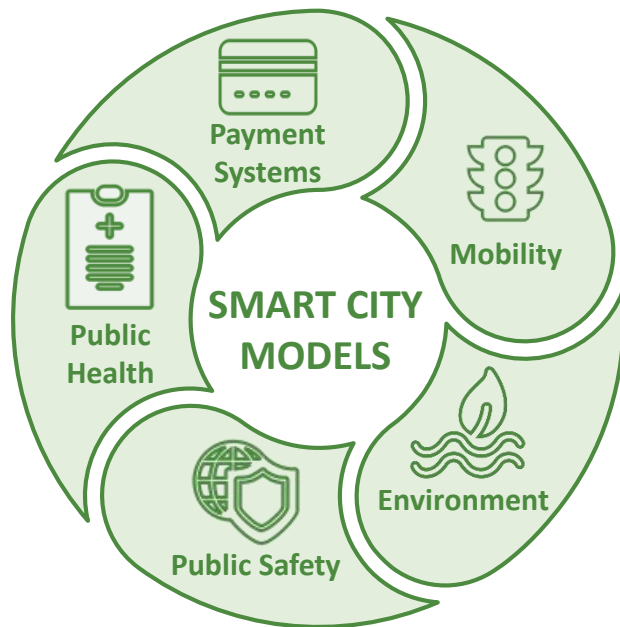


SMART CITY MODELS — Payment Systems, Mobility, Environment, Public Safety, Public Health

# Smart traffic signals reduce travel and pollution

A study by Carnegie Mellon University found that smart traffic signals could reduce overall travel time up to 25%, creating benefits not only reserved for those commuting, but for the city as a whole. In addition to saving time, fuel, and frustration for drivers, congestion reduction can cut pollution, increase productivity, and increase citizen satisfaction.

Cities that have not yet implemented smart traffic signals can potentially gain the largest per capita time savings. Potential savings is lower for more mature cities, which have already made progress on smart traffic signals.

**Total per capita personal time savings, in hours, from traffic reduction by maturity level**

9.7

4.7

2.0
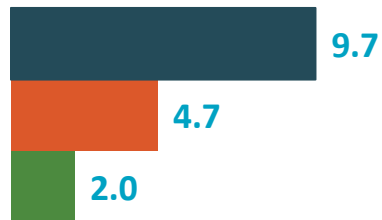
**Average annual per capita fuel savings**

3.3 gallons

1.9 gallons

0.6 gallons
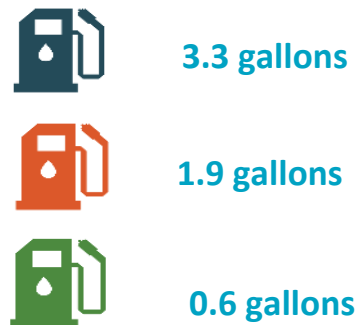
Traffic management maturity stage:  Beginner ● Transitioning ● Leader ●

# Mobile apps for transit data reduce wait times and increase satisfaction

Researchers from the City College of New York and Georgia Institute of Technology found that, in addition to decreasing actual and perceived waiting time, transit mobile applications can also increase ridership. It is estimated that a transit mobile application can increase ridership by an average of 6.92 trips per capita per year for beginning cities. More mature cities that already use some form of this technology can capture additional benefits through improvements in usage, accuracy, and functionality.

**Increased ridership: annual trips per capita per year**

6.92

4.83

3.95

**Time savings: travel hours saved per capita per year**

10.03

7.01

5.72

Public transportation maturity stage:  Beginner ● Transitioning ● Leader ●

# Smart grid integrated volt control's potential economic benefits

Integrated volt control capabilities from smart utility grids can help utilities more efficiently manage voltage on their distribution lines, allowing utilities to reduce the total energy used by citizens without any sacrifice in service or quality. A study by the Smart Grid Consumer Collaborative found that this technology can reduce voltage needed during peak demand hours by 3.25%, resulting in an overall total electricity reduction of 2.7% on average per year. Our model estimates that cities in the beginning stages of smart energy maturity would be able to realize a usage reduction per capita of $29.86 per year and a reduction in $CO_2$ emissions of 223 pounds per person per year.

**Total per capita energy savings by smart energy maturity level**

$29.86

$21.86

$9.16
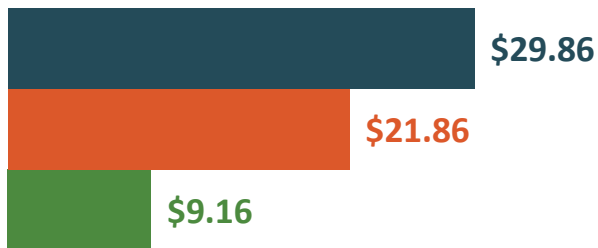
**$CO_2$ emissions reduction per capita by maturity**

223 lbs.

166 lbs.

70 lbs.

Energy management maturity stage:  Beginner ●  Transitioning ●  Leader ●

# Predictive policing reduces crime 5-10%

A recent study by researchers at UCLA found that predictive policing reduces both violent and property crimes. Our model shows that predictive policing reduces violent crimes by about 5% and property crimes by about 10% across all 136 benchmarked cities. On average, this reduction in crimes leads to a savings of $420.33 per capita throughout all cities. Cities just starting to embrace smart crime technologies will realize larger benefits than those cities that are more mature in their use. We estimate that beginning cities could cut overall crime costs by $529.60 per capita, including tangible costs to the victim, pain and suffering, and costs to the criminal justice system.

**Total per capita crime reduction savings by smart crime maturity level**
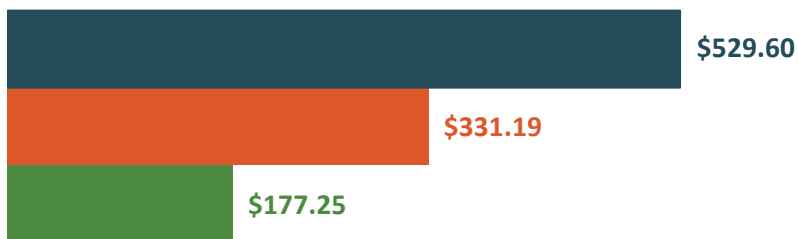
$529.60

$331.19

$177.25

**Total crime reduction**
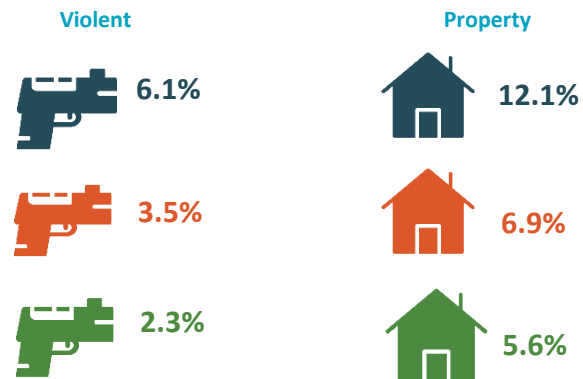
**Violent**

6.1%

3.5%

2.3%

**Property**

12.1%

6.9%

5.6%

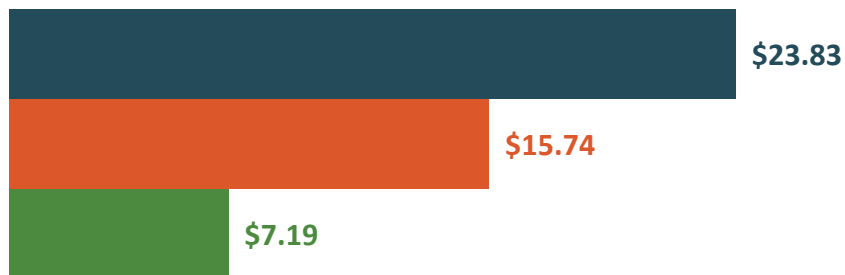Crime technologies maturity stage:    Beginner ⬤ Transitioning ⬤ Leader ⬤

# Telemedicine's potential economic benefits

Many countries are embracing telemedicine to manage chronic, non-infectious diseases such as COPD (chronic obstructive pulmonary disease), which is expected to be the world's third leading cause of death by 2030. It allows patients are able to manage their care remotely, without physically visiting their doctors, and practitioners are able to more easily monitor their patients' symptoms. A recent study prepared for the auditor general for Scotland found that using telemedicine for citizens with moderate to severe COPD can reduce costs by approximately 21%. We estimate that the adoption of telemedicine for COPD patients would result in an average cost savings of $23.83 per capita in cities not currently using any type of telemedicine; cities already using telemedicine to some extent can still capture additional benefits through expansion and improvements.

**Per capita healthcare savings from treating COPD through telemedicine**

$23.83

$15.74

$7.19

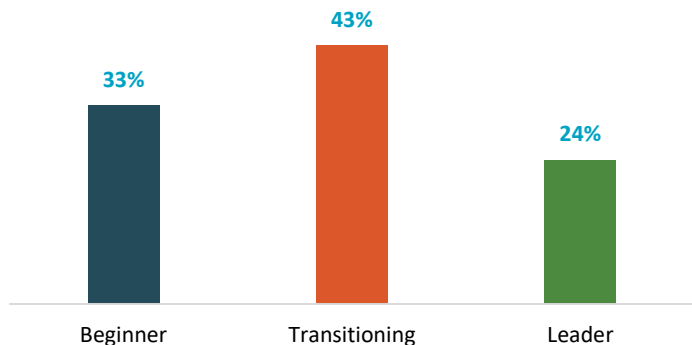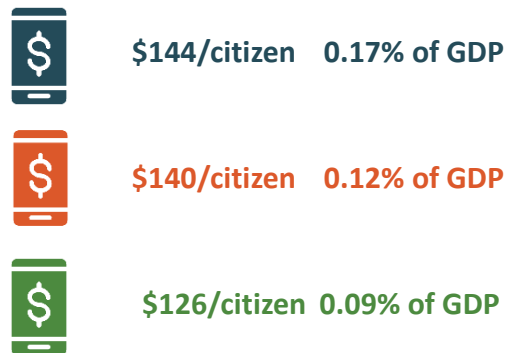Health technologies maturity stage:  Beginner ●  Transitioning ●  Leader ●

# Payment efficiency cost savings

According to our survey, nearly a third of cities are in the beginning stages of using smarter payments and another 43% are in the transitioning phase of using smarter payments. Our economic analysis found that cities in the beginning stages of smarter payment usage can see cost savings of 0.17% of GDP, or $144 per citizen; transitioning cities can unlock savings of 0.12% of GDP, or $140 per citizen; and leader cities can realize additional cost savings of 0.09% of GDP, or $126 per citizen.

## Smart payment maturity

| | 33% | 43% | 24% |
|---|---|---|---|
| | Beginner | Transitioning | Leader |

## Average payment efficiency cost savings by maturity

$144/citizen    0.17% of GDP

$140/citizen    0.12% of GDP

$126/citizen   0.09% of GDP

Beginner ● Transitioning ● Leader ●

**Q:** Which stage best describes your city's level of maturity for smart payments?
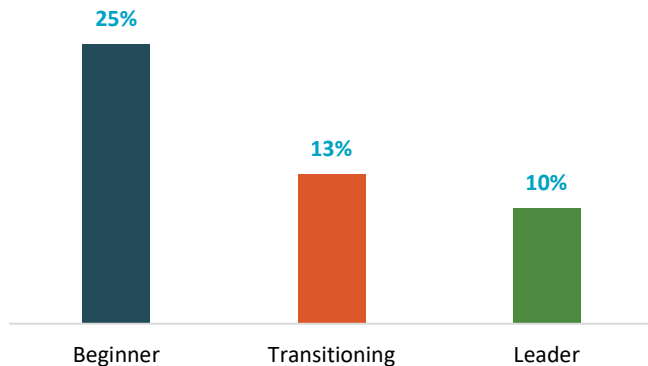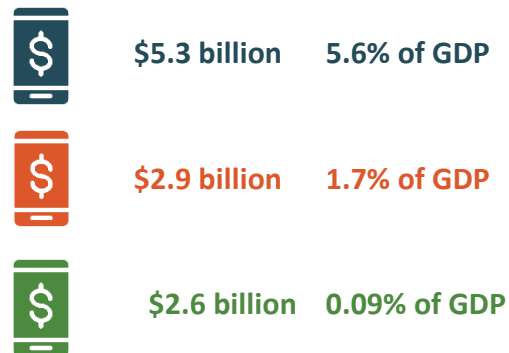
# Reduction in the shadow economy

The informal economy is comprised of two main components – (1) underground purchases that are undertaken to avoid taxation and (2) illegal activities, such as drug dealing, prostitution, and corruption. We estimate that in cities that are beginners in terms of smart payment usage, the average size of the shadow economy is 25% of GDP, in transitioning cities it is 13% of GDP, and in smart payment leader cities it is 10% of GDP.

Our economic analysis found that increases in smart payment maturity in beginner cities can reduce the size of shadow economy by an average of $5.3 billion per city, which is equal to 5.6% of GDP. In transitioning cities, the average reduction is $2.9 billion per city (1.7% of GDP) and in leader cities, the average reduction is $2.6 billion per city (0.9% of GDP).

## Shadow economy as percent of GDP

- Beginner: 25%
- Transitioning: 13%
- Leader: 10%

## Average shadow economy reduction by maturity

| | | |
|---|---|---|
| | $5.3 billion | 5.6% of GDP |
| | $2.9 billion | 1.7% of GDP |
| | $2.6 billion | 0.09% of GDP |

Beginner ● Transitioning ● Leader ●

# Smarter cities will reap major benefits for all stakeholders

As cities advance along the smarter city maturity curve, they are better able to reap the benefits of investments in new technologies and systems. With a sound governance structure, sufficient financing and talented workers, smarter cities are able to capitalize on investments in smart innovation to generate new revenue streams and cost efficiencies. At the same time, smarter cities increase economic activity and livability for citizens and businesses.

These investments trigger a virtuous cycle of economic growth by generating capital for new smart city investments, as well as an improved ability to attract businesses, residents, tourists, students, and talent. While cities see livability improvements as the main initial benefits from smart city investments, in three years, they expect economic and financial benefits to grow materially as the virtuous cycle gains momentum.
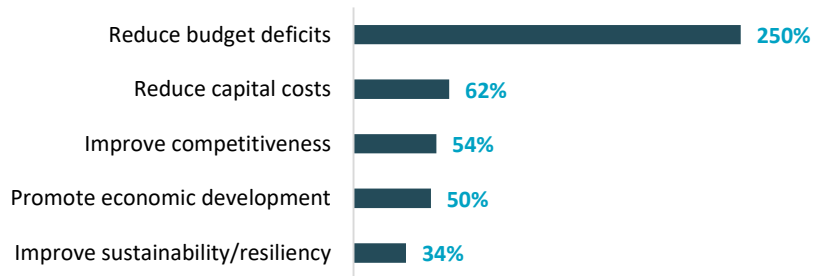
In the end, successful cities will morph into digitally-enabled hotbeds of innovation that will be a magnet for future talent, drive performance, and improve the human condition. Those cities that fail to keep up run risk falling even further behind the competition for capital, talent, and economic growth.

**Q:** What are the benefits that your city is gaining from its smart city investments?

### Top benefits realized now and expected by 2021

| Now | Three years |
|---|---|
| 1. Ensure safety and security | **1. Generate additional revenue** |
| 2. Improve infrastructure | 2. Improve infrastructure |
| **3. Generate additional revenue** | 3. Ensure safety and security |
| 4. Ability to adapt and innovate | 4. Ability to adapt and innovate |
| 5. Attract residents and tourists | 5. Citizen satisfaction with services |

### Fastest growing expected benefits

| | |
|---|---|
| Reduce budget deficits | **250%** |
| Reduce capital costs | **62%** |
| Improve competitiveness | **54%** |
| Promote economic development | **50%** |
| Improve sustainability/resiliency | **34%** |

# Top 10 smart city benefits

Smart city initiatives can generate a host of benefits— but views vary by stakeholder. For example, businesses first and foremost see smart programs raising productivity of city workers and their own employees, while attracting residents and tourists and providing better public services are the main benefits experienced by consumers.

Our research revealed five benefits that all stakeholders agree on: (1) safety and security, (2) economic competitiveness, (3) better public services, (4) increased productivity of businesses and residents, and (5) additional revenue.

**Q:** What benefits is your city now gaining from its smart city investments?

## Top 10 benefits of stakeholders in proxy cities, ranked in declining order

| Government | Citizens | Businesses |
|---|---|---|
| Productivity of businesses and residents | Attract residents and tourists | Productivity of city workers |
| Safety and security | Better public services | Productivity of businesses and residents |
| Attract residents and tourists | Attract business and private investment | Ability to adapt and innovate |
| Improve inclusiveness | Safety and security | Additional revenue |
| Economic competitiveness | Economic competitiveness | Economic competitiveness |
| Better public services | Ability to adapt and innovate | Greater satisfaction with government services |
| Improved infrastructure | Productivity of city workers | Better public services |
| Productivity of city workers | Productivity of businesses and residents | Safety and security |
| Additional revenue | Additional revenue | Improved inclusiveness |
| Attract business and private investment | Easier commute and access to services | Easier commute and access to services |

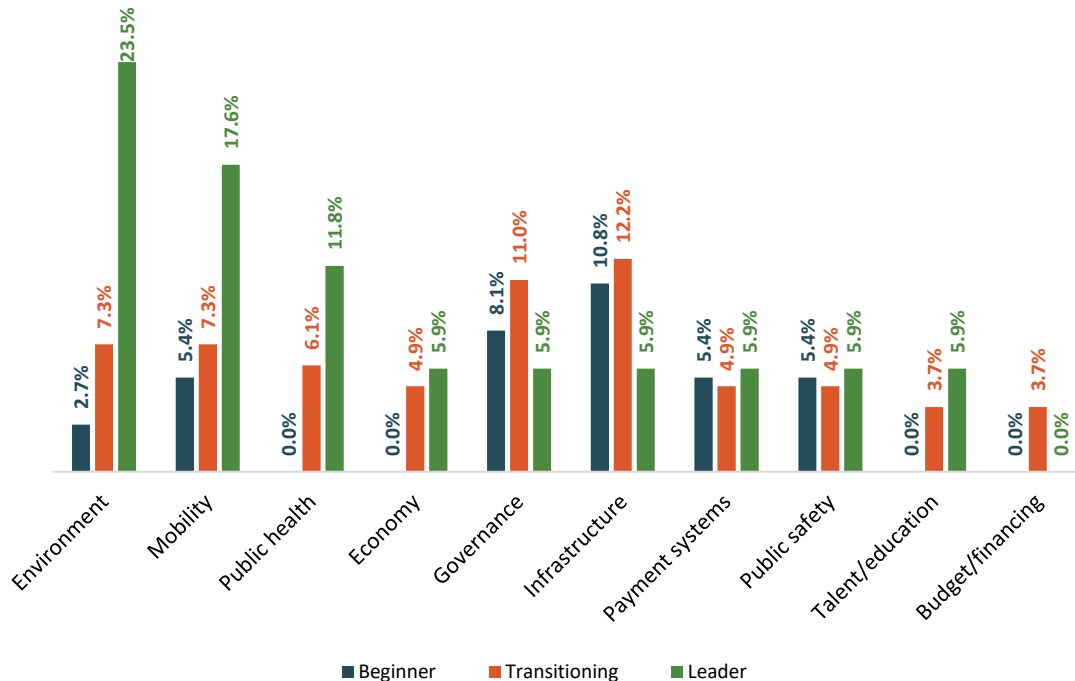# For leaders, environment, mobility, and health generate highest ROI

Leaders realize greater returns on investments across most smart city pillars. For example, about 24% have an ROI of over 7% on investments in environment, 18% have an ROI over 7% on mobility, and 12% have an ROI over 7% on public health.

Beginners and transitioning cities are more likely than leaders to see returns of over 7% on their investments in infrastructure and governance.

None of the beginners surveyed generate an ROI over 7% on public health, economy, talent, and funding--which reflects their lower commitment to these pillars.

**Q:** What level of return has your city realized on its smart city investments? (% citing large positive >7%)

## The ROI on investments in smart city pillars by maturity stage



| | Environment | Mobility | Public health | Economy | Governance | Infrastructure | Payment systems | Public safety | Talent/education | Budget/financing |
|---|---|---|---|---|---|---|---|---|---|---|
| Beginner | 2.7% | 5.4% | 0.0% | 0.0% | 8.1% | 10.8% | 5.4% | 5.4% | 0.0% | 0.0% |
| Transitioning | 7.3% | 7.3% | 6.1% | 4.9% | 11.0% | 12.2% | 4.9% | 4.9% | 3.7% | 3.7% |
| Leader | 23.5% | 17.6% | 11.8% | 5.9% | 5.9% | 5.9% | 5.9% | 5.9% | 5.9% | 0.0% |

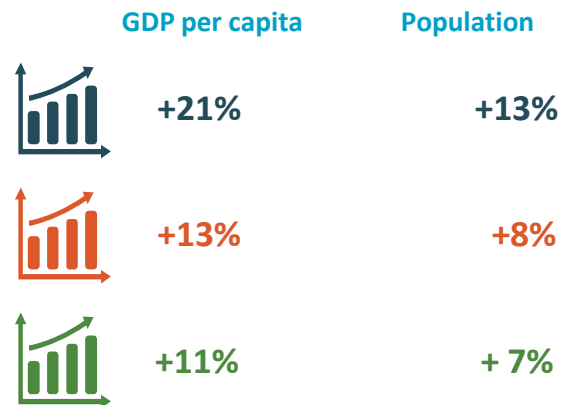■ Beginner  ■ Transitioning  ■ Leader

19

# Catalytic impacts

According to our survey, cities across the smart city maturity curve are expected to increase their smart city maturity over the next three years. The biggest increase will be from beginner cities, which will go from an average maturity score of 1.2 to 1.8. As illustrated in our research, smart cities benefits make them more attractive places for people to live and work and for businesses to locate, which will lead to a virtuous cycle of additional economic growth.  Our economic analysis found that on average the catalytic impacts associated with becoming a smarter city have the potential to increase GDP per capita by 21% and population growth by 13% over the next three to five years in beginning cities, if they are able to achieve their stated smart city plans.  Transitioning and leader cities can potentially see additional GDP per capita and population increases as well, if at a lower rate.

## Where will cities be in 3 years?



- Today
- 3 years
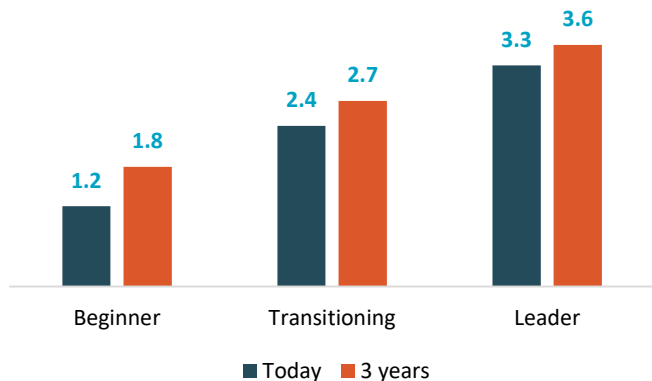
## Beginner cities will see the largest growth in GDP and population

| | GDP per capita | Population |
|---|---|---|
| | +21% | +13% |
| | +13% | +8% |
| | +11% | + 7% |

Beginner ⬤ Transitioning ⬤ Leader ⬤

# Calls to Action

# 10 actionable insights from our research

1. **Start with a vision and roadmap to your smart city future.** Without the right vision, plans, and resources in place, smart city programs will not reach their full potential—a piecemeal approach is all too common, and will prove ineffective in the long run. To develop this vision and roadmap, city governments should first assess and consider the concerns of citizen and business stakeholders to ensure alignment with their priorities and to get their buy in. According to Mark Saunders of Ferrovial, "City leaders need to match top-down initiatives with bottom-up sentiment to create sustainable value."

2. **Make sure you have a strong foundation.** Many beginner cities jump into digitally transforming areas such as mobility, public safety, and environment, before they lay down the foundational pillars, such as governance, economy, infrastructure, talent, and funding, which are vital to long-term smart city success. Talent, for example, is the lifeblood of smart cities, yet many cities are not doing enough to nurture the talent and skills needed for the digital age. Smart funding is often overlooked, although no smart city plan can be implemented without it. According to Amanda Clack, Head of Strategic Advisory at CBRE, "Future cities will only succeed by putting people at their heart; to interact with each other and their surroundings in a way that creates a true sense of place that combines governance, innovation, and culture."

3. **Put in place the needed infrastructure.** "In the age of the smart city, 'architecture' doesn't just mean physical buildings anymore—it means the 'technology architecture' that will optimize the myriad different 'smart' initiatives cities will have to make to be attractive to new waves of citizens," according to Ben Pring of Cognizant. "Cities of the future will have 'operating systems' that tie the physical and digital together." To accomplish this, cities will need fast and reliable fixed and mobile broadband, public WiFi, citywide data platforms, shared IT architecture, and scalable systems as well as the processes and standards to support smart initiatives. And remember, as cities go digital, the risk of cyberattacks and potential vulnerabilities multiply. Avoid making cybersecurity an afterthought by incorporating it in every step of your digital transformation plan.

# 10 actionable insights from our research

**4.  Keep pace with advanced technologies.** "In this age of rapidly changing technology," says Joseph Viscuso, SVP of Pennoni,  "constituents of cities around the world expect their leaders to provide platforms that will allow them access to these digital innovations." With Silicon Valley setting the digital pace, cities will need to embrace core technologies like cloud, biometrics, and mobile apps, as well as emerging ones, such as AI, IoT/sensors, smart beacons, geospatial technology, and chatbots. While blockchain, drones, augmented and virtual reality (AR/VR), AI, and V2X are now used by fewer than 1 out of 10 cities, these technologies will be skyrocketing in use over the next three years. Adopting these technologies is not only key to smart city initiatives, but to meeting the needs of constituents, and attracting the talent to advance your digital agenda.

**5.  Capitalize on data and analytics.** Data is the rocket fuel for smart city transformation. With IoT, social media, and direct engagement with citizens, cities have access to tremendous amounts of data. Harnessing it to create services that drive real value to the community is both an opportunity and a challenge. To meet that challenge, cities need to ensure they are gathering, analyzing, and integrating a wide array of data, including newer types such as data generated by IoT and AI. Making the data accessible to stakeholders is not only best practice, but it could provide a new revenue stream. But to succeed, cities clearly need to put in the proper safeguards to ensure citizen privacy and appropriate use. "To meet the growing demands of increasingly mobile city dwellers during their work and leisure, cities must smarten up their acts by devising data insights and automation to make these user journeys seamless and personalized," offers Mike Gedye of CBRE.

**6.  Develop digital ecosystems to facilitate your city's transformation.**  Smart city leaders realize they cannot do everything on their own, nor is it expedient or cost-effective**.** "The best and most sustainable way to implement social impact policy is for the public sector to partner with the private sector—which has a business interest in its success," says Miguel Gamiño Jr. of Mastercard. Indeed, the most successful cities find the right mix of internal teams and an external ecosystem of suppliers and partners, including technology vendors, consultants, and outsourcing providers. Building academic partnerships can help accelerate your innovation plans and give your city greater access to talent. Explore creative ecosystem approaches, such as revenue sharing, concession financing, and as-a-service models.

# 10 actionable insights from our research

7. **Make sure to budget enough**. A few scattershot investments are not enough to make important progress in becoming a smart city—it's vital to allocate sufficient funding from both the operating and capital budget. On average, we found that cities are allocating about 15% of their operating budgets and 17% of their capital budgets to smart city programs. However, leaders are spending more—about 20% of their capital budgets. To supplement public budgets and bond issues, consider using new funding tools, including social impact bonds and pay-for-success agreements. And some digital transformation projects will help with funding. "Finding money for innovation products is difficult, particularly in an era of shrinking budgets," says Susan O'Connor of Oracle. "Modernizing front- and back-office operations with the cloud can produce savings that will fund those critical programs."

8. **Invest in your city's multi-modal future.** With populations growing and congestion increasing, cities will need to diversify modes of transportation to include ride-sharing, car-sharing, bike-sharing, and other innovative approaches. But at the same time, smart cities must continue to maintain the efficiency and reliability of their public transportation to ensure it stays competitive with private-sector mobility options. Smart use of data, apps, road sensors, and other digital solutions can boost the performance of traditional transportation modes and raise ridership and revenue. "Mobility is a significant opportunity for city governments," says Mark Saunders of Ferrovial, "because it benefits multiple factors, including time savings and emissions improvements, as well as giving a boost to the local economy."

9. **Move to digital payments.** Smart cities are moving to a less-cash future: digital payments systems are essential for online and mobile access to city services, efficient mobility, and secure government transactions, and offer greater efficiency and improved record keeping, as well as reductions in theft, public-sector corruption, and shadow economy activity. In addition to using digital payments themselves, cities should offer incentives to the private sector to make the switch.

10. **Follow the leaders.** Cities should take inspiration from how leaders approach their smart city investments—starting with a roadmap and first getting the foundations in order, including a sound governance structure, sufficient financing, and incentives to attract talent. After getting their foundations in place, transitioning and leader cities can realize more significant returns through investments in environment, mobility, and public health. They can then tap into the virtuous cycle of economic growth to bring their city to new heights. "Cities should build on each other's progress and learn from each other's efforts," advises Miguel Gamiño Jr of Mastercard. "In facing similar challenges, cities have the opportunity to establish common goals and standards. Digital solutions make it possible for cities to make the journey to progress together."

# The latest research on smart city initiatives

ESI ThoughtLab has announced the launch of its 2019 smart city research initiative, *Building a Hyperconnected City: Business models, use cases, and benchmarks behind high performance.*
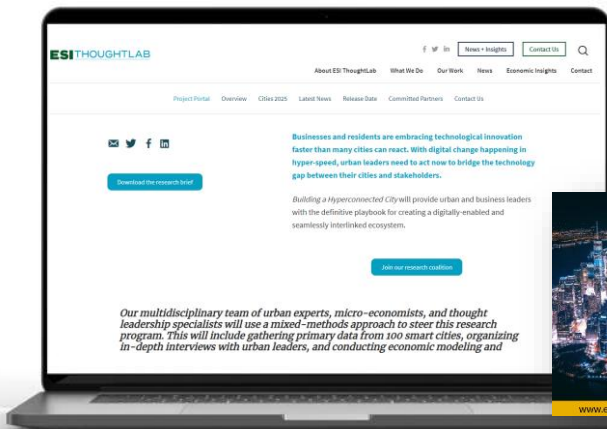
# Smarter Cities 2025

## *Building a sustainable business and financing plan*

Visit the Smarter Cities 2025 microsite to access the full suite of products produced for this research initiative.

### About ESI ThoughtLab

ESI 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.

ESI ThoughtLab is the thought leadership arm of Econsult Solutions, a leading economic consultancy with links to the academic community.

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