



Smart Cities World Trend Report

Where's the ROI?

How smart cities can
deliver social, economic
and environmental
benefits, providing a
three-dimensional return
on investment

ltron



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SmartCitiesWorld Trend Reports examine an emerging or growing trend in smart cities, highlighting progress so far and future potential, as well as spotlighting case studies from cities around the world.

In this report, we examine how smart cities can achieve a three-dimensional return-on-investment that delivers economic, environmental and social benefits.

Smart cities: The challenges and opportunities

A great deal is expected of our cities and communities in the decades ahead as their infrastructures come under continual pressure from expanding populations. The United Nations statistic predicting that two-thirds of the world's people will live in urban areas by 2050 is a much-used headline-grabber but its significance should not be under-estimated.

Cities have an opportunity to improve quality of life by addressing major local issues such as air and water quality, resource scarcity, traffic congestion and road safety as well as digital inclusion. Cities are also stepping up as key leaders in environmental sustainability, sitting on the frontline of climate change action.

If they are to achieve all of this, cities and communities must transform themselves into far more intelligent and agile organisations that can react and flex to the needs of citizens and businesses as well as respond to global demands and opportunities. As technology matures and new innovations emerge, cities and communities are empowered with even better solutions to become more efficient, sustainable and resilient.

In short, if they are to be judged as successful, smart communities must ensure they deliver a social, economic and environmental benefit, providing a three-dimensional return on investment (ROI).

Defining a vision for transformational change

Delivering a three-dimensional ROI is reliant on transformational change – not only in terms of technology but also how cities think and operate. They need to move away from the traditional siloed way of working and foster closer collaboration across key stakeholder groups. This requires both cultural change and modernisation to align towards a common vision for the long-term.

Cities now recognise that becoming a 'smart city' is not an end state, but rather a process, which enables an efficient and ongoing evolution of technical solutions across city services.



“The key is being able to balance strategic vision with a practical plan while bolstering public support.”

The key is being able to balance strategic vision with a practical plan that delivers near-term results while bolstering public support for more comprehensive investments in modernisation.

Building a flexible path forward

There is a huge amount of detail and complexity involved in building smarter organisations. With a plethora of technology vendors competing for mindshare, cities should have a structured, yet flexible process for evaluating solutions that do everything from streamlining administrative processes to protecting citizens from natural disasters such as earthquakes and flooding. It is a big ask for any city but the key to finding the right solution is as much to do with visionary leadership as choosing the right solution and partner.

Smart lighting, for instance, is often the starting point of a smart city journey because its cost- and energy-savings offer predictable return on investment. However, every city will have different priorities. Those that value sustainable transportation can start with electric vehicle (EV) charging. In areas where water scarcity is a top concern, communities may choose to start with smart water metering to help empower consumers with better information to manage use and reduce waste.

Multi-purpose platform

Whatever it may be, the investment in the initial smart city application must be viewed as part of a multi-purpose platform that enables the bigger picture modernisation initiative: something that is crucial to future smart city plans and achieving the three pillars of smart city success.

“Intelligent street lighting, for example, has proved to deliver social, economic and environmental benefits because the brighter, more efficient LEDs decrease energy cost, reduce carbon dioxide pollution, and improve safety on the roadways,” says Itai Dadon, global head of smart cities at Itron. “So it is a perfect example of how cities are delivering this three-dimensional return on investment.”

This report shows how cities can define a vision for modernisation and put in place the technology infrastructure and processes to achieve this. It makes the case for thinking big and starting small and draws on the experience of Guangzhou and Paris, which have used smart lighting networks as a springboard for broader smart city roll-outs.

There will always be fresh challenges and new questions to answer in the smart city space. What is certain is that no city will find all of the answers, nor all of the technology, from one provider. Communities need long-term flexibility, which requires an open ecosystem approach to continuous innovation and competition. This report also examines the importance of open standards, which are key to enabling a dynamic ecosystem of interoperable suppliers and technology innovators. Nevertheless, choosing the right partners from the start is crucial for both short- and long-term success.

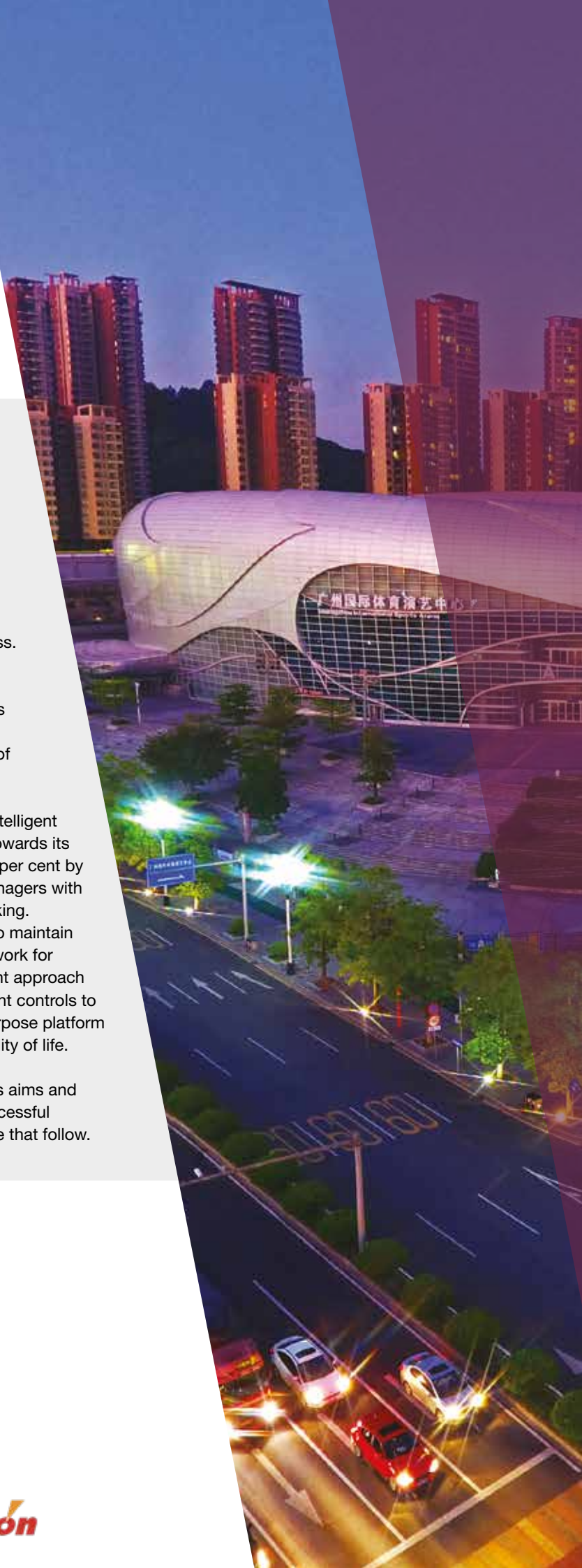
Transformation in action

Case studies

Every city has different demands and challenges. Fundamentally, transformation is about resourcefulness. That is, using innovative technologies that enable communities to do more while using less. In some cities, this may mean investing in smart water systems that help accurately track usage and minimise waste. Elsewhere, the priority may be accelerating adoption of carbon-free transportation.

Guangzhou in China is modernising its lighting with intelligent LED lighting systems to save energy and contribute towards its commitment to reduce carbon emissions by up to 45 per cent by the end of the decade. It also aims to provide city managers with tools for more informed and data-driven decision-making. Paris, known worldwide as “the City of Light” wants to maintain its traditional visual aesthetic while laying the groundwork for modern, digitally connected services. It took a different approach by retrofitting its existing lighting fixtures with intelligent controls to reduce energy consumption while creating a multi-purpose platform to encourage innovation and improve its citizens’ quality of life.

The following case studies show that whatever a city’s aims and ambitions, the right starting point is central to the successful roll-out of not just the initial application but all of those that follow.





Paris: A new economic model for smart cities

Case study

Project background and aims

Like all major cities around the world, using technology to increase operational efficiency is high on the City of Paris' agenda. It could be said, though, that the French capital began its smart city journey back in the 1660s when one of the measures put in place for making the city safer was installing lanterns on its streets. It later became one of the first major European cities to use gas lighting at scale, illuminating boulevards and monuments.

Although it originally earned its nickname as the City of Light or La Ville Lumière because of the leading role it had as a centre for education and ideas in the Age of Enlightenment, this has been reinforced over the years by its use of lighting to enhance its beauty and character. Hence any modernisation programme needs to preserve this aesthetic appeal as well as deliver tangible operational benefits.

EVESA is the organisation charged with delivering an ambitious lighting efficiency project which aims to cut lighting energy consumption by 30 per cent by 2020 compared to 2004 levels. It has responsibility for operating and maintaining the public lighting network, traffic lights and the illuminations of Paris 24 hours a day, seven days a week and works with a number of City of Paris directorates including the Directorate of Highways and Movements (DVD) and the Directorate of Green Spaces and Environment (DEVE).

In 2015, EVESA put an important foundation in place for Paris' 21st-century smart city efforts.

Starting point

The existing lighting system was old and no longer fit for purpose and streetlights and traffic lights in different areas of the city were not scalable, making it extremely difficult to manage new services. Working with Itron, EVESA developed a wireless IPv6 industrial IoT platform to connect above- and below-ground cabinet-based networked controllers and light poles for more than 200,000 street and traffic lights across the city.

This has given the city a single network to monitor and control its lighting as well as synchronise more than 1,500 traffic lights and light up around 330 monuments and squares. Streetlights can be remotely controlled and programmed using Itron's Streetlight Vision central management software, which provides a unified back-office system to manage connected lighting assets as well as additional assets in the future.

"The robust and resilient infrastructure provides strong continuity of service," explains Frédéric Galloo, chairman of EVESA. "If one of the boxes controlling the light goes, there is always another one that we can switch to."

Another benefit is that the city can dynamically adjust traffic lights in real-time to optimise traffic patterns and reduce congestion depending on the time of day. The flexibility and control offered by the system has also allowed the city to reduce light pollution in its gardens and other green areas at night by scheduling power off.

Evolution

The deployment has given Paris a mesh canopy under which it can deploy a range of other smart city applications and, since roll-out, EVESA has experimented with a number of technologies as part of its mission to help the City of Paris become more sustainable, drive innovation, and enhance quality of life for residents.

These advanced use cases include smart parking, smart water metering, environmental monitoring for noise and air pollution, as well as electric vehicle (EV) charging via the light poles. EVESA is deploying a working proof-of-concept of the EV charging in the 7th District of Paris.

“Each time we want to experiment with a new application, we can plug it into the network very easily,” says Galloo, who adds that having such a robust and secure network helps to make the case for the roll-out of other applications. “If you have a good product and good ideas you can more easily convince people of what can be achieved and where you can add value.”

“Each application is also an opportunity to amortise the investment in the canopy.”

Confronting challenges

Galloo believes that rolling out smart city applications requires a new way of thinking and a new more collaborative approach to managing cities. “It does involve changing habits and behaviours, and departments need to work more closely than they have before.”

One of the ways the organisation has succeeded in securing the ear of the directorate’s leadership teams is via an economic model it has developed with Itron. This ensures each new use case involves no additional cost for the city and must be an effective means of reducing cost and in some cases can be turned into a revenue opportunity. “Each new service must be financed by a return on investment,” says Galloo.

He adds: “If we imagine the case of EV charging, the operator can invest in the equipment and sell the service to the EV driver. It costs nothing to the city. Moreover, the city gets revenue from the operator because they are using an EV charging box on the light pole. This also delivers environmental benefits.”

Measuring success

Remote control of lighting, dimming and replacement LEDs has already provided Paris with a 35 per cent reduction in energy costs over the past eight years. Beyond tangible cost-savings, the EV charging model will be a good example of three-dimensional ROI because it provides a revenue opportunity for the city, helps to reduce carbon emissions and boosts biodiversity, and provides a beneficial service to the driver.

Future roadmap

EVESA will continue to experiment and roll out smart applications with smart parking one of the next to be deployed in the 15th district of the city. It is also working on a smart irrigation pilot to water the city’s many parks and gardens. Currently, treated water is used for watering in many areas and Paris wants to reduce the consumption and therefore the operating cost of this. EVESA is working on a green light pole to create an ‘island of freshness’ to fight the summer heat and which would harvest rainwater.

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Guangzhou Development Zone: From the Silk Road to fast-growing hub

Case study

Project background and aims

The city of Guangzhou on southern China's Pearl River Delta is an important industrial, political and economic centre. The country's third-largest city and capital of the Guangdong Province has evolved from its ancient trading port and Silk Road origins to become a growing technology, transport and trade hub.

In 1984, the Guangzhou Development Zone was established in the eastern part of the city as one of the first of a group of state-level economic and technological development zones. It is home to more than 20,000 tech businesses and more than 2,000 high-tech enterprises. The output value of high-tech products from the Zone amounts to 256 billion yuan, which accounts for 78 per cent of the city's output value. It is also fast becoming one of China's smart city pioneers.

To further support the development of the hub, Guangzhou Development Zone's government is implementing a range of smart applications to address several urban challenges. Its objectives are to provide city managers with tools to support data-driven and better decision-making as well as to more accurately monitor operations and undertake trend analysis.

Starting point

The starting point of the journey was a smart lighting project in 2017, which involved replacing more than 20,000 high-pressure sodium (HPS) lamps in the district. The legacy lamps were slow to turn on, consumed a lot of energy, were high-temperature, noisy and had a short service life. The initial project also aligned with Guangzhou's commitment to reduce its carbon emissions by up to 45 per cent by the end of the decade.

Itron worked with the Guangdong Rongwen Energy Technology group (Rongwen), one of China's largest smart LED streetlight providers and operators on the project.

Rongwen has deployed nearly 150,000 smart LED streetlights in two districts in Guangzhou as part of the city's smart lighting projects. As well as 70,000-80,000 deployed via the Itron Mesh network in Guangzhou Development Zone, there are around 80,000 in Zengcheng District.

The city utilises Itron's Streetlight Vision central management software, which provides a single system to seamlessly manage multiple third party devices and networks.

To date, 6,000 smart LED streetlight poles with 13 lights in each pole have been deployed, giving a total of around 80,000 smart end-points. Lights are connected via Itron's multi-application industrial IoT platform, which empowers the city to easily connect new smart devices and enable advanced use cases in the future.

**“The internal
challenge is to
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effective control”**

Evolution

The project quickly grew beyond smart lighting, with Guangzhou using the smart poles as mounting locations for a number of different sensing devices to improve city-level management, including environmental sensors, noise sensors, pedestrian counters, smart cameras and other intelligent devices. In addition, electric vehicle (EV) chargers, wi-fi, outdoor speakers, SOS button and LED displays are also mounted on the smart pole and monitored through a city platform to provide data to support decision-making.

Confronting challenges

While smart city projects will inevitably bring challenges around system integration, Itron and Rongwen worked together to efficiently and seamlessly integrate all types of smart devices from different providers through a single platform, including the connectivity fabric as well as the management software that will ultimately provide the city with a single interface to manage connected assets.

“The internal challenge is to achieve fast integration, effective control monitoring and event processing for all types of smart devices,” says Amber Wang, director of global business development, Rongwen Energy, who added that the companies also had to manage the external challenges that come from collaborating with a number of different departments. Arguably, these can be more significant than the technical ones in many cities.

The government agencies involved in the project include the Huangpu District Housing and Urban-Rural Development Bureau, the Guangzhou Development Zone Construction and Transportation Bureau, the District Public Security Bureau, the District Water Affairs Bureau, the District Development and Reform Bureau, and the Guangzhou Economic and Technological Development Zone Power Supply Bureau.

“The project requires confirming the needs of each government agency,” says Wang. She adds: “In the early stage, a large number of interviews, organisation and coordination, resource allocation and specific applications were required to understand the needs of various management departments.”

Measuring success

As well as cost- and energy-savings the Guangzhou Development Zone has five “dimensions” on which it will judge future success of the smart technology: green energy conservation; new smart city application inventions; public safety; citizen experience; and city management.

Following the lighting modernisation programme, overall illumination has increased by 20 per cent and the project has delivered 75 per cent energy-savings.

Maintenance costs have also reduced with real-time monitoring of the status of various municipal facilities ensuring that faults can be detected in a far more timely way. Maintenance teams are alerted to problems and can more effectively troubleshoot and resolve issues, greatly accelerating restoration times and reducing the overall cost of ongoing maintenance for the lighting system by 28 per cent.

Future roadmap

In future, the city’s objectives include using 5G for smart road planning and construction. Wang said that the city plans to leverage the full coverage of 5G and smart road-side units, combined with edge computing capabilities, and use the smart light poles as the core carrier to build smart road networks that reduce traffic congestion, as well as provide a foundational network for future autonomous vehicles.





What can we learn from other cities?

Think big, but start small to demonstrate ROI and gain stakeholder support

As Guangzhou and Paris prove, smart cities can begin in a single department, driven by the city's near-term operational priorities but, in the long-run, these initiatives extend into much broader smart city deployments. Smart lighting is a mature technology and is frequently described as the “low-hanging fruit” of smart city applications, because its proven cost- and energy- savings make it easier to form a robust business case than other applications.

According to a report and benchmarking survey by the Northeast Group and CityLab, commissioned by Itron and other smart technology providers, cities implementing smart streetlights achieve energy savings of up to 80 per cent with the average at 66 per cent. The US cities included in the benchmarking exercise had either completed or were in the latter stages of completing their LED and/or streetlight conversions.

In most cases, operation and maintenance (O&M) savings alone were sufficient to justify the cost of projects, says the report, especially in cities where the local utility does not pass along savings from reduced energy usage (either from dimming or LED luminaires).

Dan Evans, senior director of smart city product management, Itron, stresses the importance of lower maintenance and reduced truck rolls when it comes to bringing immediate savings to cities. “The labour of the truck roll is the biggest cost the city has to deal with above and beyond paying for energy,” he says, explaining that while previously cities relied on citizens telling them there was a fault with a particular streetlight, now maintenance teams are automatically alerted to any problems via smart controllers in cabinets.

Streamlining operations

Cities that are routinely impacted by extreme weather events will see even greater benefits from streamlining operations and maintenance costs. For example, severe storms can cause widespread outages, so it's essential that lighting operators can have the information they need to restore service as quickly as possible.

“When a light goes out, the field crews will be able to get information about the actual luminaires, such as wattage, which enables them to go out on the street with the right part and solve the issue first time,” he adds. “This is a key learning and one of the drivers of installing a smart lighting infrastructure.”

In theory, the first smart city application that is rolled out should pave the way technically and financially for others to follow. This is borne out by the experiences of Guangzhou and Paris with smart lighting installation putting in place a wireless mesh canopy which was used for other applications.

Lighting the way to a safer city

Copenhagen is aiming to be carbon neutral by 2025. The city is deploying a multi-purpose industrial IoT platform to deploy smart city applications that can reduce energy waste, improve safety on the roadways and encourage carbon-free transportation.

The starting point for its smart city transformation began, in part, through more efficient and networked street lighting systems supported by Itron.

In this city of 600,000 inhabitants, nearly half of commuter trips are taken by bicycle. As this number is expected to rise, increasing the safety of the trip is paramount. One application uses a fusion of intersection-based occupancy sensors and light controls to sense an approaching cyclist and provide extra light as they cross vehicle intersections. This, combined with other applications that leverage smart traffic signals, such as the bike 'green wave' system, can help cyclists avoid red traffic lights and

inform them of the quietest or fastest route to their destination.

Copenhagen is now experimenting with advanced lighting optimisation solutions to unlock efficiencies from area lights on footpaths in local parks. Each light is fitted with a sensor internally and an urban control node. When motion is detected, each light increases in brightness from five per cent to 100 per cent (the system instructs the first light in both directions to do so). It further instructs the previous two lights in each direction to dim to 50 per cent. Where a path splits, both routes are lit when a person passes the light at the fork. Each light is fitted with a sensor internally and an urban control node. When motion is detected, each light increases in brightness from five per cent to 100 per cent (the system instructs the first light in both directions to do so). It further instructs the previous two lights in each direction to dim to 50 per cent. Where a path splits, both routes are lit when a person passes the light at the fork.

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Evans describes this as an "early-stage market" with many cities still assessing what application they should roll out next. "We see everything from gunshot detection in cities where public safety is an issue to traffic departments who are trying to get a handle on the causes of congestion," he says. "They are trying to quantify what the problem looks like and want to make data-driven decisions before they start applying fixes or addressing it in some other manner."

He adds that with the canopy or underlying smart infrastructure in place, the cost of enabling subsequent applications will also be reduced, which wouldn't be the case if a city started with a single-purpose solution to address one of its immediate challenges. "So because the network canopy is already in place it improves the ROI of the second, third and fourth applications."





As EVESA demonstrates in the Paris case study, it is possible to establish an economic model that ensures each new use case involves no extra cost to the city but is an effective means of reducing cost, and in some cases earning revenue for the city, as well as amortising the initial investment in the network infrastructure.

There is another overriding reason why starting with a robust and resilient foundation and building upwards is recommended – because such platforms tend to have high levels of cyber-security built in.

“We are talking about connecting critical infrastructure to serve tens of millions of people,” says Dadon. “Security cannot be an afterthought; it needs to be integral so smart cities can be built securely from the ground up.”

Set the organisation up for success

Enterprises around the world are undergoing digital transformation programmes to compete in the digital economy and ensure they are fit for the future. This involves major change management and in some cases, transforming the culture of the company to ensure it is ready to embrace technology. And cities are no different.

Similarly, in the corporate world, some leaders have been accused of absolving their responsibility and seeing such transformation as the domain of the IT function. Lack of leadership and having the wrong culture is one of the chief reasons digital transformation programmes fail to deliver.

Cities need to heed a similar warning and ensure that an executive-level is put in place with responsibility for executing the overarching mission. They will also be able to take a more holistic view of the long-term smart city aims. While an application such as smart street lighting is supported by a robust business case, the siloed way of working that traditionally exists in cities makes it challenging for multiple departments to gain the benefit of a shared investment in a multi-purpose IoT platform.

The trend in recent years of creating roles such as chief innovation, technology, or sustainability officers who assemble their own team is a major step in the right direction. Similarly, the involvement of mayors and their offices or governors in the case of state-wide initiatives is increasingly important. “Leaders need to look at projects with the right lens and assess how they can leverage a smart lighting network, for example, across the city for other use cases,” says Evans. “Traditionally, because many cities operate in silos and each make their own decisions and have their own reasons for doing things, they won’t necessarily think about other departments.”



**“If city leaders
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Top level buy-in

Evans adds that Itron sees a part of its role as helping to ensure smart city goals are getting the ear of the senior leadership team. Failure to do so risks perpetuating the siloed approach to smart cities that will cost them far more in the medium- and long-term.

“City leaders need to understand that if they look at it as a platform decision to be made and deployed across the city, county or province, the gains will be far greater. And they need to drive this message through to the silos.”

As highlighted in Guangzhou, managing the complex set of relationships when working with multi government agencies and departments and understanding each stakeholder’s needs is an extremely important part of a smart city implementation.

Government departments can’t always be expected – or have the time and resources – to assess and understand the possible correlations and impact of their individual smart city projects. Providers who understand the technology and who have experience of implementing it in other cities around the world must, therefore, recognise the important role they have in such conversations and share knowledge and experience from other deployments.

Three-dimensional ROI

Smart city applications are about delivering cost, energy, time, and other tangible savings that go straight to a community’s bottom line, but they must also factor in “softer” benefits that may mean more to citizens. Guangzhou is a good example of this, putting in place a broad set of performance metrics which include improved citizen experience and accelerating the pace of innovation of new smart city applications.

This thinking lies at the heart of delivering the three pillars of smart city success: social, economic and environmental benefits.

What should be highlighted in any smart city discussion is that with the right starting point for the city, one smart city benefit can lead to another and positively impact the city’s balance sheet, citizen’s quality of life and the environment.

“In Copenhagen, for example, where Itron technology has helped to achieve up to 76 per cent of savings on the energy bill of the streetlights, it has also allowed them to significantly reduce their carbon footprint and better lighting improves public safety,” says Dadon.

Itron technology also enables the Danish capital to use dynamic lighting, which utilises motion sensors to detect oncoming traffic and adjust lighting levels in

real-time to illuminate the roadways for pedestrians and cyclists.

Dadon adds: “Cities can invest money in areas that bring economic benefits but also see a rise in improvement levels when it comes to the environment or citizen’s quality of life. Diverting investment into one area to address a city’s priorities doesn’t mean that the others suffer.”

Similarly, investing in traffic-counting technology to reduce congestion will have a positive impact on citizen wellbeing and stress levels as well as the environment because of the reduction in carbon emissions.

Flexibility is key

Cities know it isn’t realistic to think they are going to find all of their smart city technology from one supplier, just as providers know they can’t supply a city with everything they need for their smart city journey.

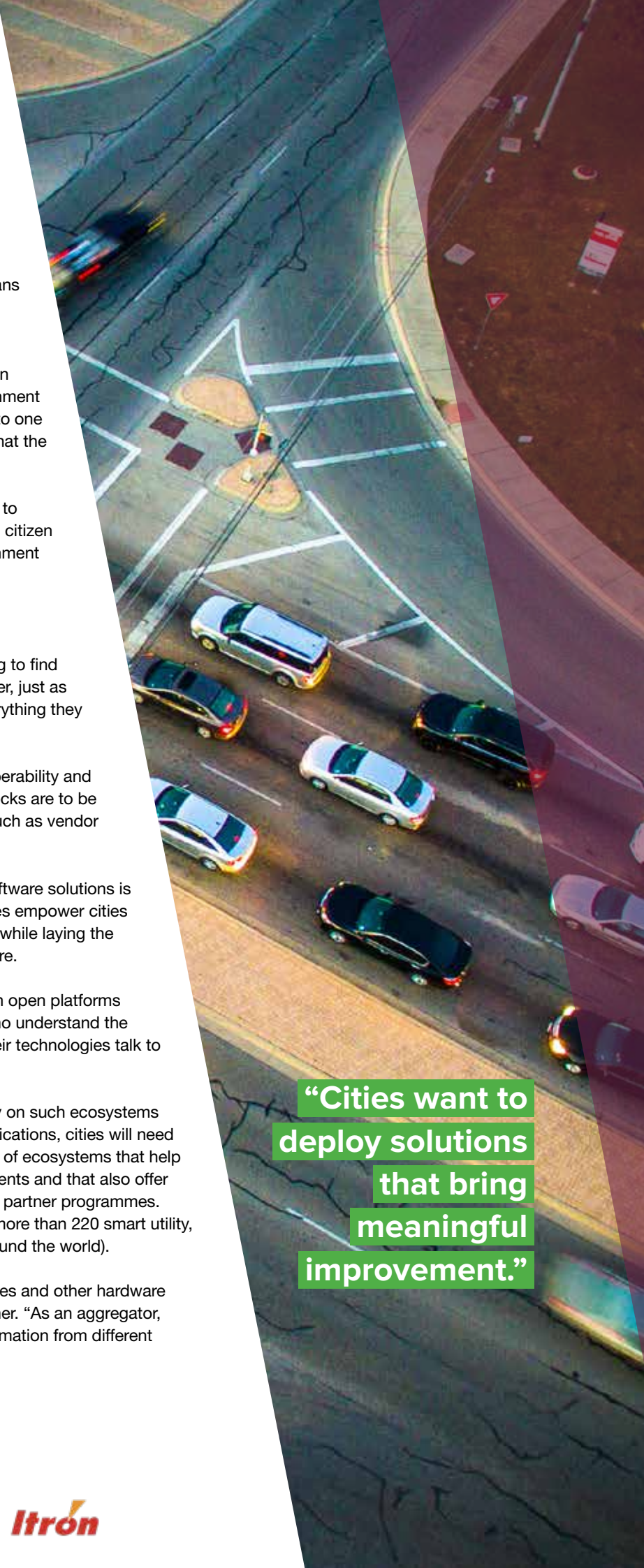
There is still work to be done in areas like interoperability and open standards if some of the smart city roadblocks are to be removed. And concerns remain around issues such as vendor lock-in from proprietary systems.

Interoperability across devices, networks and software solutions is essential and open standards-based technologies empower cities to choose solutions from best-of-breed vendors while laying the foundations for continuous innovation in the future.

The key is building in flexibility from the start with open platforms and partnering with an ecosystem of vendors who understand the importance of working together and ensuring their technologies talk to each other.

Indeed, the smart city space will increasingly rely on such ecosystems and with further proliferation of devices and applications, cities will need companies such as Itron to act as an aggregator of ecosystems that help them to find the right solutions for their requirements and that also offer seamless connectivity through go-to market and partner programmes. (Itron has a go-to-market partner ecosystem of more than 220 smart utility, smart city, and strategic technology partners around the world).

Realising three-dimensional ROI hinges on devices and other hardware as well as software being able to talk to each other. “As an aggregator, we need to help cities ensure they can take information from different



“Cities want to
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that bring
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improvement.”





applications and turn it into meaningful insight that will make real performance improvements and enhance the experience of residents and visitors” says Evans.

“And cities will have an even greater opportunity to deliver advanced applications when they can combine smart devices from multiple vendors to deliver an integrated solution.”

The importance of open standards

As well as interoperability between connected devices, it was also recognised that there was a need for a common language for the central management of software (CMS) interfaces. TALQ has created the Open Smart City Protocol, which provides a flexible data model that can be used by a wide variety of sectors for a range of use cases such as smart lighting, smart parking, smart waste, environmental data collecting and waste collection.

More and more vendors are starting to integrate the Open Smart City Protocol into their smart lighting and smart city products.

“Cities want to deploy solutions that bring meaningful improvement,” says Evans. “For instance, a smart camera can be used to optimise traffic signals but also to direct drivers to available parking spots.

“Standards will continue to play a vital role in delivering on this promise.”

Empowering innovators

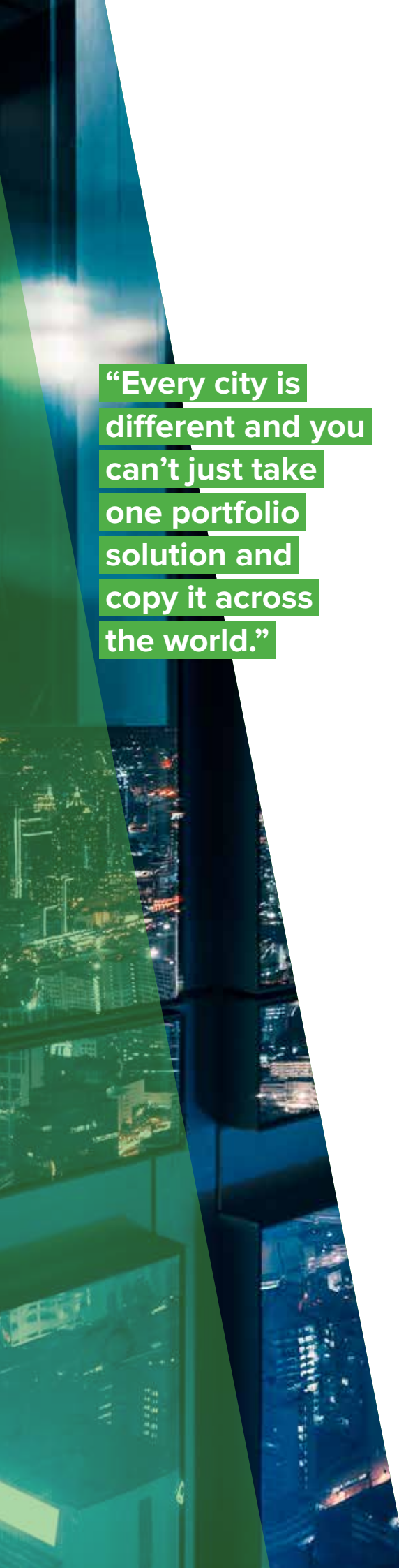
No city can afford to stand still and as well as continually assessing what technology is available and evaluating its benefits, it is also important to encourage innovation.

The smart city world has no shortage of accelerators and boot camps to help start-ups develop their products but turning great ideas into practical and scalable solutions for cities can still be a challenge. The answer is to bring innovators into the ecosystem and to help them work directly on city challenges with real-world tools.

Leveraging Itron’s suite of standards-based developer tools, cities can empower innovators to easily prototype a wide range of hardware and software-based IoT solutions.

This is what Itron aims to do with its Smart City Challenge, which was launched last year. It enables cities and technology innovators to work together to solve problems and improve citizen wellbeing.

For the first challenge, Glasgow asked for solutions to help improve the experience of residents during highly populated events while elevating the city’s profile as a cultural destination for tourists.



“Every city is different and you can’t just take one portfolio solution and copy it across the world.”

The winning solution from Noesis features cost-effective acoustic sensors to address noise pollution and mitigate traffic. Noesis proposes deploying sensors on lampposts in areas with anticipated noise pollution from events and related traffic to identify, localise and quantify noise.

A distributed network of noise sensors gathers highly reliable and accurate data, including noise source, location, sound profile and power level. With this data, Glasgow could have unprecedented visibility to acoustic data around event venues to reduce noise pollution. The acoustic sensors could be upgraded over-the-air to support future use cases such as traffic management and public safety.

Meanwhile, London wants to improve river safety as well as address public health priorities. The city wanted solutions to protect citizens by identifying entries into the river, ensuring the availability of safety equipment when it is needed, and accelerating emergency response times.

Winner Instrumentation Technologies (I-Tech) designed a two-step solution to allow London to monitor lifebelts and pinpoint the location of a person in need of rescue support.

The first step of the solution suggests the deployment of small, battery-powered devices that will monitor the lifebelts. To prevent misuse, the device will sound a high-pitched alarm if a lifebelt is removed. If the lifebelt is not placed back in its housing unit for eight seconds, an emergency message will be sent via the Itron IoT network to notify emergency services.

The second part of the solution is a jumper detection system that uses an optical scanner to identify when people fall from the bridge and to track their precise location to assist first responders in search and rescue. I-Tech carefully designed the solution to operate effectively even in thick fog and uses advanced data processing to ensure the lasers are detecting people instead of other objects such as birds or falling objects.

“Every city is different and you can’t just take one portfolio solution and copy it across the world. But addressing these needs requires the constant evolution of innovation,” says Dadon, who describes the challenge as “applying technology for a purpose”.

Making the right decisions

Over the coming decades, cities and technology providers will be expected to tackle a host of major global as well as local challenges. And they can only do so by working together.

As Dadon highlights, for cities every decision must consider that resources for funding and support are finite. These investments often involve trade-offs, which are consequential for residents and businesses. “They may be deciding to invest in air quality sensors rather than build new classrooms at their schools,” he says. “This is a very big deal so they have to be sure that the solutions they choose will work. And this can be scary for city managers and chief information officers.”

Demonstrating that they can deliver benefits that clearly have a positive impact in areas such as quality of life and improving the environment, as well as to the city’s balance sheet, will help to remove the fear factor that so often holds smart city development back. And they will increase their chances of doing this by undertaking due diligence at the start and putting in place an infrastructure that addresses immediate priorities but also allows the city to fulfil its longer-term ambitions.

Key recommendations: Start small to demonstrate ROI and gain stakeholder support

Smart cities can start with a single application. Start with one that delivers immediate benefits. Leverage the foundation to prove value and justify follow-on investment to key decision-makers. Starting with a robust, multi-purpose platform from the start will maximise the chance of success.

Develop a culture of collaboration

Smart cities are as much about the people and processes behind them as the technology. Cities need to ensure that as well as introducing new technologies, they are adapting ways of working and processes, and creating a culture that aligns goals towards long-term transformation.

360-degree leadership and vision

Not only must smart cities put in place an executive layer with responsibility for devising a holistic vision but ensure individual departmental efforts are coordinated to deliver on this promise. Only looking at projects from all angles will help identify opportunities for cross-departmental efficiencies and maximise benefit to residents.

Engage all stakeholders

As well as departments and agencies, this also means external ones such as citizens and relevant parties in the ecosystem. Ensure everyone has a voice and help them to see projects in the bigger picture.

Encourage open minds and open platforms

Without one or both of these, the smart city project is at risk from the start. Be open to new ideas and ways of working but don’t invest in anything until you are satisfied that what you are buying will enable you to realise your vision.

Tap into the creativity of open ecosystems to drive innovation

Connect and engage with the world of innovation. Who knows what tomorrow’s challenges will be, let alone how to address them, but having a mechanism in place to constantly innovate will help maximise the benefits of your investments and ensure a three-dimensional ROI.





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