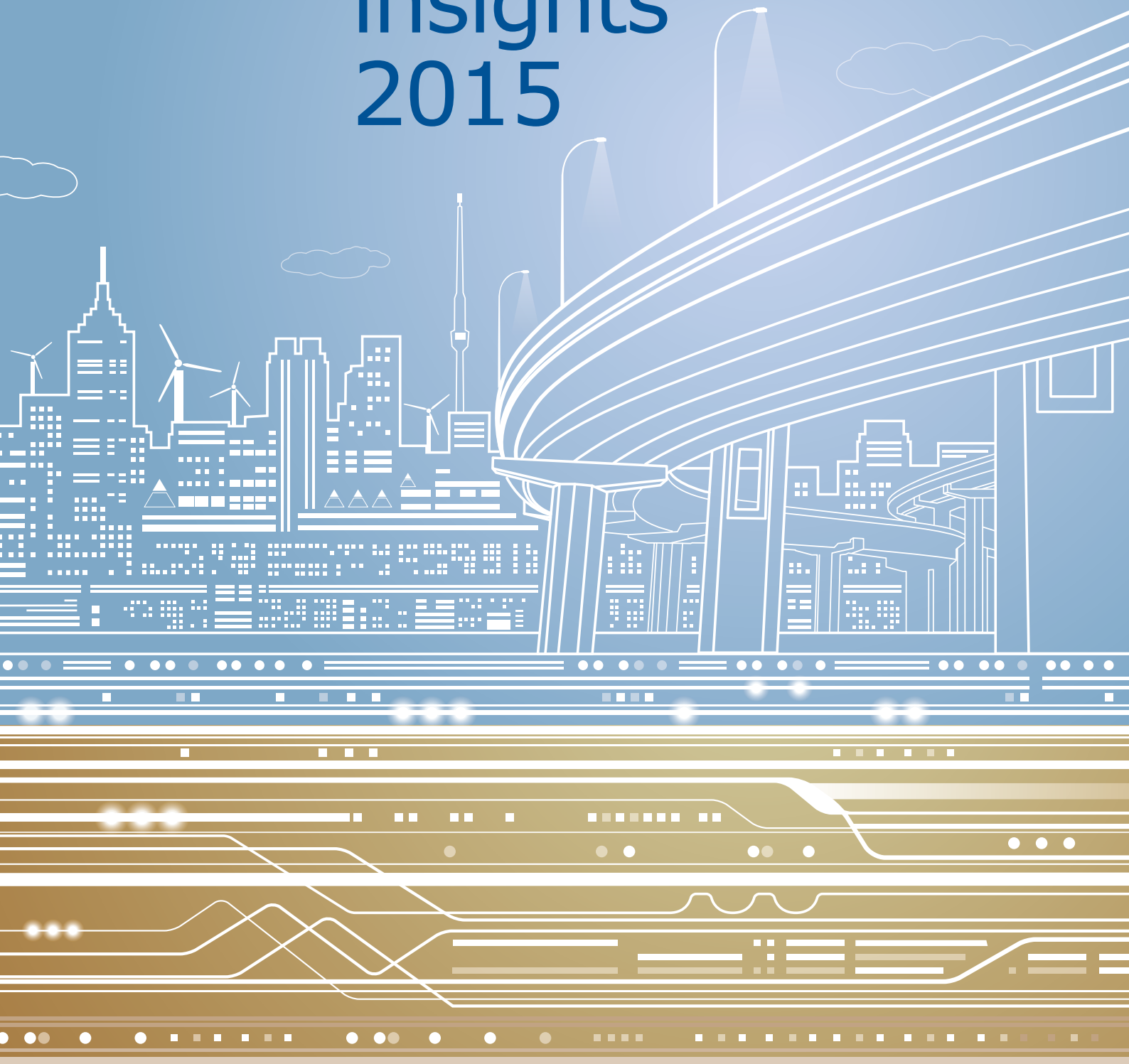


# Urban infrastructure insights 2015



Written by

The  
Economist

Intelligence  
Unit

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# Foreword

## The challenges of an increasingly urbanised world

The pace at which urban development is happening across the world in the twenty-first century seems unstoppable. Highly-concentrated demographic growth in cities is one of the greatest challenges that leaders face as they look to protect the future of their cities in the face of the overwhelming global sustainability crisis.

Through the rise of urban centres, city authorities have become more involved than ever in citizens' wellbeing. Urban governance requires political and economic skills, and, as we have increasingly seen, it also requires harnessing technological and social inventions & adaptations to manage, process, communicate and feedback on decision-making.

The debate concerning the future of cities has been dominated in recent years by the concept of "smart", viewed especially from the perspective of information network and big data use to improve the efficiency of infrastructure and services. However, excluding some examples, this perspective has underestimated the capacity of cities' own citizens and the role they can play in using technological advances to participate in the local decision-making



and become stakeholders in their urban environments

At FCC (Fomento de Construcciones y Contratas) we believe that citizens form a vital part of an axis with policy makers and private companies that are contracted by local governments. FCC is a Citizen Services company, and by this we mean that we put citizens at the heart of what we do, whether it is delivering vital metro and rail links in Riyadh or Lima, managing critical waste services across the UK, Spain and in much of Central & Eastern Europe, or

providing full cycle water services in 22 countries around the world.

We have partnered with the Economist Intelligence Unit on this global survey and report because we believe that foresight and public debate is needed to address the challenges already mentioned.

As you will see from the report's findings one of the greatest obstacles we face is matching the expectations and requirements of citizens with practical, financially viable solutions delivered by city authorities and service providers. It is about financial models, information flows and management systems, and a further challenge to this is delivering these solutions in a way that fosters greater social integration. This is something that goes right to the heart of our business.

We are pleased to share these findings with you and we hope they assist you with your own understanding of issues that are impacting citizens, policy makers and businesses every day in our increasingly urbanised world.

Juan Bejar  
Vice Chairman & CEO, FCC Group

# Executive summary

Globally, urban infrastructure is in better shape than many reports would have you believe, but, if cities fail to ramp up spending on their transport, energy, water and waste-management systems in the near future, these vital infrastructures and services are going to suffer—and city leaders will be blamed. In a recent Economist Intelligence Unit survey, business executives and policymakers stated that failure to maintain key infrastructure systems and services in their cities is the direct result of poor leadership and a lack of skills among city leaders.

This is not an inherent failing of the public sector; indeed, the policymakers surveyed judge themselves more harshly than the private sector judges them. However, it does suggest that cities should spend more time training their leaders and collaborating with the private sector. In fact, more than half of respondents believe that more extensive use of public-private partnerships (PPPs) would be the most effective way in which to improve infrastructure and services in their city; moreover, 82% say the government should work more closely with the private sector to improve urban infrastructure and services. City leaders must also put greater emphasis on building relationships with citizens to win support for these investments, because, even when projects deliver their intended results, if the public does not support them, they are likely to be viewed as failures.

To get the greatest value from these infrastructure investments, city leaders must think more strategically about how

to plan, fund and implement them. That includes building platforms to engage the public in discussions about investment decisions, creating greater transparency around spending, incorporating environmental and social issues into decision making, as well as partnering with private organisations to find new sources of funding and design ideas. Together, these strategies will help leaders transition their cities for the future, and ensure they can attract the multinational firms that can enable their economies to grow.

This paper, based on a survey of more than 400 respondents—300 business executives and 100 policymakers—investigates the state of urban infrastructure around the world and how city leaders can engage with citizens and service providers to secure support and investment for these projects.

The research examines:

- The infrastructure systems that require the most attention, today and in the future.
- How the quality and efficiency of infrastructure impacts urban economic growth.
- The social, political and financial obstacles to infrastructure and service delivery.
- The relationships and interactions between citizens, government authorities and infrastructure or service providers.
- What city leaders can do to create sustainable infrastructure solutions that business leaders and citizens will support.

Key findings include the following:

- **Respondents overwhelmingly blame city leaders for poor infrastructure and services.** Lack of political will (40%), lack of skills among officials (39%), and poor governmental effectiveness (34%) are seen as the principal impediments to infrastructure delivery. Lack of funds was also cited by 34% of respondents as an issue. Policymakers are even harder on city leaders—more than half cited lack of skills and knowledge of officials as top impediments—than are their private-sector peers.
- **Those in Western Europe were more likely to cite a lack of funds as an impediment than any other region.** This is partly the result of having to upgrade and maintain aging infrastructure while struggling with the lingering economic crisis. However, it also suggests that governments are overlooking the opportunity to take advantage of record-low interest rates, favouring instead short-term austerity.
- **Respondents need high-quality infrastructure to improve the status of their cities, but they want to focus more on operations and maintenance to do so.** A majority see attracting multinational companies as a top priority for city leaders, with over 75% asserting that the availability and quality of their infrastructure will affect what destination multinational companies choose to invest in.

However, a significant 65% say their city should improve maintenance and operations of existing systems and services, rather than build new physical infrastructure. This can conflict with the desires of city leaders, who often prefer expensive new infrastructure projects that leave a greater personal legacy.

- **Despite media depictions of infrastructure on the verge of collapse, urban infrastructure is still in relatively good shape. However, it needs major investment to stay that way.** While three-quarters of respondents say their city infrastructure is adequate today, 68% believe increased investment will be needed within the next five years to keep it that way. One in ten say that their current systems and services are already inadequate or seriously deficient; in Latin America, this rises to a worrisome 44%.
- **Strong relationships and better collaboration between citizens and city leaders are crucial to the success of infrastructure projects.** Roughly half of all survey respondents assert that greater transparency around public spending would be the most efficient way in which to improve infrastructure and services in their cities; and 26% feel their city should implement platforms to receive citizen feedback on services to become more sustainable. This desire to participate in the infrastructure conversation highlights an opportunity for city leaders to engage the population through more interactive communication channels, such as mobile reporting.
- **Respondents believe private-sector involvement is vital to improving urban infrastructure and services.** While most think that the public sector should lead these initiatives, 82% say the government should work to a greater extent with the private sector to improve urban infrastructure and services. Moreover,

increased use of PPPs was the most often cited means of providing the greatest possible improvement (54%) to infrastructure and services.

- **Rail and road investments are the leading infrastructure concerns, underscoring the need for sustainable systems for transporting people and goods.** Policymakers tend to be more worried than executives about hidden infrastructure systems, including energy, water and information technology (IT) networks, which require significant investment to maintain.
- **Executives believe “improving education” should be their city’s top concern, but policymakers do not even put it in the top three.** This highlights a troubling disconnect and should prompt city leaders to re-consider their priorities. Social infrastructure and softer investments in human capital cannot be neglected, as cities work to attract investment and increase growth.
- **Respondents are willing to adapt their use of infrastructure, if they are given the tools to track it.** More than 70% say they would be likely to change their energy/water consumption and transport usage if they were given better access to information about their use of these services. This should encourage city leaders to invest in smart-grid infrastructure, mobile-transit-tracking applications and sensor technologies to engage users and relay usage information to citizens.
- **Respondents are eager to support clean-energy initiatives, but citizens are less aware of the value that water and waste projects can provide.** This is good news for cities investing in energy upgrades, but for cities trying to develop non-energy-related sustainability initiatives, these results suggest they will face an uphill battle in winning public support. ●

# About the research

*Insights into urban infrastructure and services* is a report written by The Economist Intelligence Unit (EIU) and sponsored by FCC (Fomento de Construcciones y Contratas), a Spanish environmental services, infrastructure, water group. The research is based on a survey of 409 global respondents, including 306 business executives and 103 policymakers, conducted in September and October of 2014. Around half (51%) are board members or C-level executives; the rest are vice-presidents, directors, or business-unit or department heads. Respondents are drawn from Western Europe, North America, Latin America, the Middle East and Asia-Pacific. Half of the companies represented in the sample earn more than US\$500m in annual global revenue.

To complement the survey findings, the EIU conducted in-depth interviews with 18 city leaders, industry experts, and senior executives from around the world. We would like to thank all survey respondents, and the following executives (listed alphabetically) for their time and insights:

**Leonie van den Beuken**, head of Spatial Planning and Environmental Issues for the Port of Amsterdam

**Stefan Brem**, head of Risk Analysis and Research Co-ordination for the Swiss Federal Office for Civil Protection, Zurich

**Isabel Dedring**, deputy mayor for Transport, London

**Michael Häupl**, mayor and governor, Vienna

**Dan Hoornweg**, professor and research chair, University of Ontario Institute of Technology, and former lead advisor, Sustainable Cities to the World Bank

**Greg Koch**, director of global water stewardship in the Office of Sustainability at The Coca-Cola Company

**Ed Lee**, mayor, San Francisco

**Toni Lindau**, president and director of EMBARQ, Brazil

**Stefan Majer**, head of the Department of Traffic and member of the Magistrate, Frankfurt

**Michael Muenter**, head of Mayor's Office for Policy Planning, Stuttgart

**Tom Murcott**, executive vice-president, International, Gale International, Songdo, South Korea

**Eduardo Paes**, mayor, Rio de Janeiro

**Guilherme Penin**, federal secretary of Port Policies, Brasilia

**Kais Samarra**, head of Urban Development Abu Dhabi Urban Planning

**Bill Tompson**, senior economist, Organisation for Economic Co-operation and Development (OECD), Czech Republic

**Mike Tinskey**, global director of Vehicle Electrification and Infrastructure, Ford Motor Company, Detroit

**David Wagstaff**, head of Heat Strategy and Policy for the Department of Energy, UK

**Mark Watts**, executive director, C40 Cities Climate Leadership, London, UK

# Introduction

Around the world, urban infrastructure is aging and populations are surging, forcing today's city leaders to make tough decisions about infrastructure that will impact generations to come. These choices will define the legacy they leave and whether they are able to position their cities to thrive in the future. But they also have to make these choices within the confines of limited city budgets that must simultaneously address the need for new or upgraded transport, water, energy, IT and waste systems. Such financial strains often lead to frustrating compromises, and city leaders must be ready to defend their choices to public and private stakeholders, to ensure they have buy-in for these investments. In many cases, "selling" these projects to cash-strapped taxpayers is a major obstacle, as city leaders try to convince citizens to support an expensive urban project that may disrupt their environment and take years to complete.

To overcome these financial and social obstacles, many city leaders are seeking private-sector collaborators to take advantage of innovative financing and project-delivery solutions. They are also creating platforms that allow citizens to share their feedback, learn about how resources are being allocated and weigh in on which projects should be funded. Such relationship management may require extra time in the early phases of these projects, but they can streamline delivery in the long run and help city leaders maintain on-going support.

These obstacles to infrastructure development can seem insurmountable,

but they must be addressed if cities want to be well positioned for the future. As Michael Häupl, mayor of Vienna, asserts, "Infrastructure development is an opportunity for growth and competitiveness, but also for creating and preserving jobs, especially in challenging economic times."

Keeping these systems and services operational, and readying them for the next generation, is a constant challenge. In developed-nation cities, roads, waterways, sewers systems and energy grids are often decades old and many have long since passed their expected life cycles. These aging systems were built with out-of-date technology, and are experiencing an increasing need for maintenance and upgrades to keep them operational.

"Well developed cities face the challenge of retrofitting infrastructure that no longer fits the purpose," says Mark Watts, executive director of C40 Cities Climate Leadership in London, a network of leaders from the world's megacities taking action to reduce greenhouse-gas emissions. Many of these cities have been in reaction mode, repairing water mains, power grids and roads as problems occur. But to position themselves for the future, city leaders need to think more strategically, Mr Watts says. "They need a new blueprint. They can't just follow what other cities have done in the past."

What is required is the implementation of new technologies designed to support future populations with environmentally sustainable solutions. From clean energy, to cities redesigned with rapid transit in

mind, these systems will require innovative thinking and strong leadership to realise these projects. "These are huge decisions that will have implications for decades," says Dan Hoornweg, professor and research chair at the University of Ontario Institute of Technology, and former lead advisor, on sustainable cities to the World Bank. "Infrastructure is like the bones of the city, so you've got to make choices with the long view in mind."

In emerging markets, city leaders are facing an even bigger challenge, as rapid population growth pushes already insufficient infrastructure further beyond its capacity. These pressures result in massive congestion, over-tapped water systems, and unreliable access to energy and IT. There is a vital need to reduce waste; this includes both the inefficient use of infrastructure systems and the amount of waste produced by city residents. "The planet is reeling from the collective impact of cities," Mr Hoornweg says. And as urban populations continue to grow, the pressure on city leaders to build sustainable high-performing infrastructure systems and services is only going to increase. "If we don't get new cities right, and fix the existing cities, we're screwed."

This is especially true for leaders in the cities where these systems are breaking down. According to our survey, citizens and business leaders overwhelmingly blame city leaders for poor infrastructure maintenance, citing lack of political will, lack of skills among officials, and poor governmental effectiveness for these problems. And the

worse off a city's infrastructure is, the less faith citizens have in their leaders. Among those who live in cities where infrastructure is viewed as inadequate today, more than half cite "corruption or misuse of funds" as a leading impediment. This should be a wake-up call to city leaders that they need to demonstrate better leadership, greater transparency and more accountability for their infrastructure decision making. Citizens and business executives would also prefer to see city leaders invest in maintenance of existing systems and services, more than emphasising investment in brand new infrastructure, which generally comes with a much higher price tag.

The most innovative city leaders have gotten in front of these challenges by using lessons learned from their global peers, partnering with citizens and the private sector to implement sustainable solutions that reduce congestion and system failures, while improving quality of life for people and businesses. These choices are not always easy and often face social opposition, but, when leaders promise, and then deliver, long-term value for the community, they are able to transform their urban infrastructure and position the city for a more prosperous and sustainable future. ●



Section **1**

# Funding the right infrastructure spurs economic prosperity

Despite pessimism conveyed by many in the media, global urban-infrastructure systems and services are in decent shape. However, city leaders cannot afford to be complacent. While three-quarters of respondents assessed their current systems as adequate today, fully 68% say they will need to make substantial investments within the next five years to keep these systems functioning and to meet the needs of fast-growing populations. This is especially true of Latin America and Asia-Pacific, where the state of infrastructure is more dire—44% and 31%, respectively, say their infrastructure is currently inadequate or will become so in the next five years, suggesting a heightened sense of urgency in these regions to invest in new systems and services.

Regardless of the region, finding the funds to support these improvements will be one of the biggest challenges city leaders face in the coming years.

Moreover, the price tag on these projects will be substantial: The American Society of Civil Engineers estimates that the US will have to invest US\$3.6trn to get its roads, bridges, water systems and other infrastructure back in shape. In Germany, a government-appointed commission highlighted that the country will need to spend €7.2bn (US\$8.9bn) annually for the next 15 years to address its infrastructure deficiencies; and Mexico recently raised its infrastructure-spending goal to 7.7trn pesos (US\$587bn), nearly twice the 4trn-peso goal announced last July. Solid relationship building makes good sense, as it enables cities to deliver the infrastructure systems and services they need, both to improve quality of life for citizens and to attract the multinational businesses that are often vital to economic growth. “If you don’t have effective infrastructure, you don’t have a successful city,” says Isabel Dedring, deputy mayor for Transport, London.

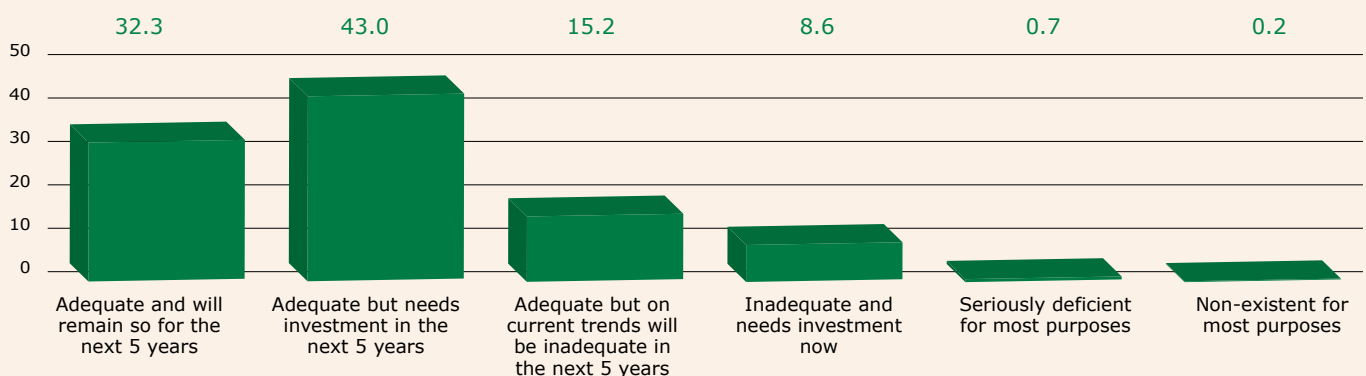
**“If you don’t have effective infrastructure, you don’t have a successful city.”**

Isabel Dedring, deputy mayor for Transport, London.

But the question remains: where will that money come from? Many countries are already falling short of infrastructure-investment promises. In Qatar, for example, government spending fell 6.6% in 2014 from the previous year; and, in Brazil, infrastructure spending outside of the World Cup and the Olympic venues has fallen dramatically, leaving many of the longer-term investments in rapid-transit systems cancelled or delayed. In Europe, Mr Häupl blames budget consolidation and continual government-austerity efforts in the EU for the lack of funding for infrastructure upgrades.

**The infrastructure and services in the city where I principally live or work are...**

% respondents



Source: Economist Intelligence Unit survey, November 2014.

**“They need to develop better governance structures, and investment-planning and management solutions.”**

Bill Tompson, senior economist, Organisation for Economic Co-operation and Development (OECD), Czech Republic.

“[And it] is not likely to end for the foreseeable future,” he adds that the costs of neglect and inaction will strongly affect urban development.

This is not a surprising development. Lagging economic growth, depressed tax revenue and skittish financial markets present challenges for governments seeking to fund these massive projects. It is leading many city leaders to build stronger relationships with the private sector in order to take advantage of alternative financing opportunities or PPP arrangements; and to engage citizens more effectively in the infrastructure-management process, to win their buy-in for these costly endeavours. These economic conditions require city leaders to take a more strategic approach to project planning and stakeholder management, and a keener eye towards controlling budgets and managing stakeholder relationships, says Bill Tompson, a senior economist with the Organisation for Economic Co-operation

and Development (OECD): “They need to develop better governance structures, and investment-planning and management solutions.”

It may be a difficult transition for government officials, but the outcomes will be worth it if they can secure buy-in from citizens for these projects, and attract more businesses to the local economy. This is one area where policymakers and business leaders agree. Nearly half of each group suggested that “encouraging multinational companies to set up business” should be among the top priorities of city leadership. This alignment is beneficial for city leaders who need to win public-sector support for major projects that will deliver the most economic value for all of their current and future residents.

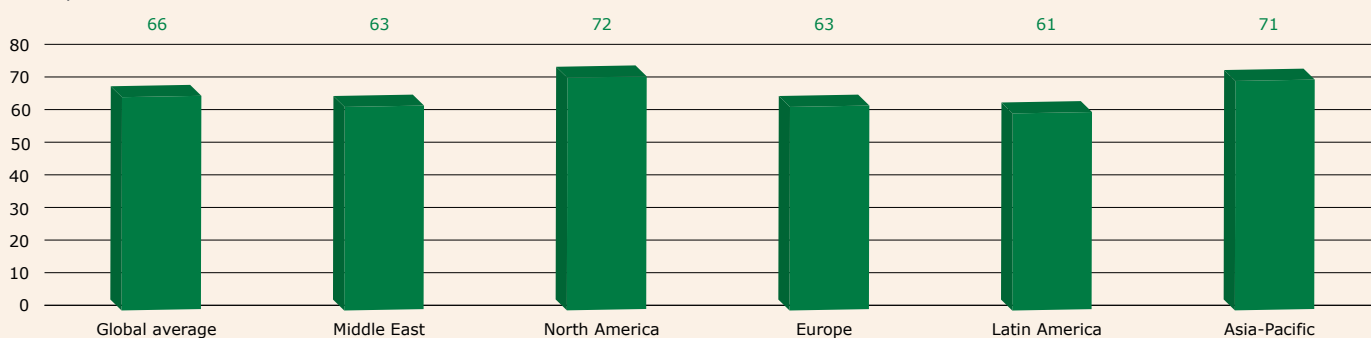
Respondents are not all aligned on how to get there. Half of executives in the survey said “improving education” should be the top priority for city leaders,

making it their number-one infrastructure concern. Yet, the policymakers surveyed didn’t even rank education in the top three on their lists, highlighting an alarming disconnect between the priorities of business leaders and city leaders. If city leaders want to win the trust and support of private citizens and the business sector, they need to invest in the infrastructure systems and services that these constituent groups value the most.

Rio de Janeiro’s mayor, Eduardo Paes, is doing just that, through several programmes designed to prioritise school development. “Education has a direct impact on long-term economic growth and human development,” he says. Since 2009, his city has invested more than R\$1.5bn (US\$571m) to build and update schools and child-care centres. Mr Paes is also currently supporting the Factory of Schools project to build more than 136 new schools in the city in order to increase the number of children in

**Survey respondents affirming that their city needs to improve maintenance and operations more than it requires new physical infrastructure**

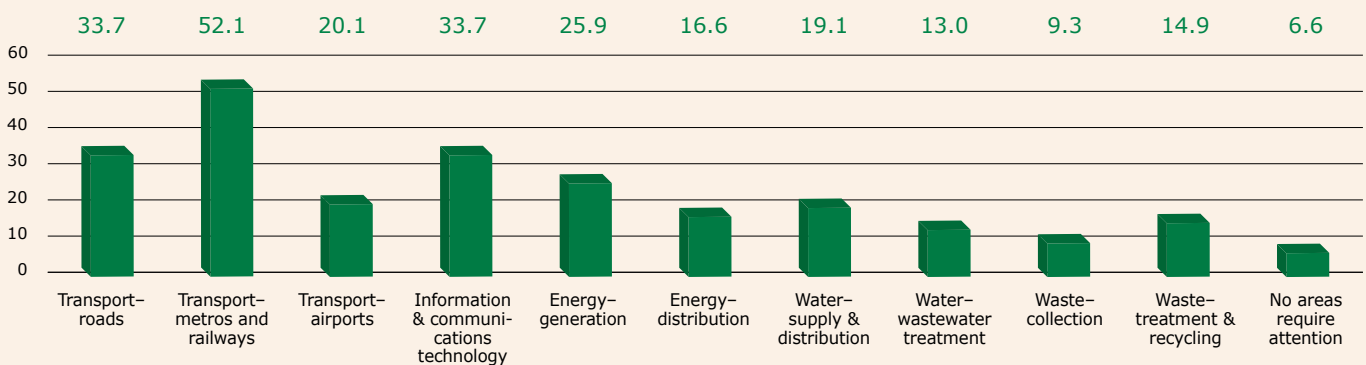
% respondents



Source: Economist Intelligence Unit survey, November 2014.

### In your opinion, which areas of your country's urban infrastructure and services require most attention in the immediate future?

This refers to new infrastructure and services as well as upgrades and improved maintenance for existing infrastructure.  
% respondents



Source: Economist Intelligence Unit survey, November 2014.

full-time education. In this, it is important to recognise that social infrastructure is as vital as physical infrastructure when it comes to building an economically dynamic city. Another key disconnect concerns how infrastructure spending is best allocated.

Two-thirds of respondents want city leaders to prioritise maintenance of existing systems and services over new physical infrastructure, likely because these projects are generally less costly, have shorter turnaround times, and are a more efficient use of resources.

"Investing in existing infrastructure can deliver a lot of value relatively quickly," notes Ms Dedring.

#### Case Study 1

##### Amsterdam city leaders learn the value of compromise

Many cities face increasing pressure to meet the needs of a growing population in an already crowded area. This can damage the relationships between different parts of a city or its government, as they find themselves battling over limited land and resources in a struggle to accommodate the needs of citizens and businesses. However, it doesn't have to be that way, says Leonie Van den Beuken, head of Spatial Planning and Environmental Issues for the Port of Amsterdam. She argues that good relationship management and a willingness to compromise grant participating stakeholders and citizens the most value when making key infrastructure decisions.

The offices of the port and the city were involved in a clash over who would get access to land belonging to the port. This is one of the oldest parts of the port, but still very good quality, able to serve the largest ships, and incorporate more modern storage and shipping technology – all key investments necessary to support the burgeoning Amsterdam economy. But city leaders wanted to use the land to create new city areas, considered crucial to accommodate the growing population in the already densely populated city. Rather than fighting over who would win the land, the two groups endeavoured to listen to each other's case and collaborate toward mutual goals.

After many meetings and in-depth studies, both parties acknowledged their mutual interest and co-dependence. Recognising that each project offered strategic value for the local economy, it became clear the land was not needed for

the growth of the city before 2040, Ms Van Beuken states. So the city agreed to postpone the development of the housing projects. "Whilst the land is reserved for the future growth of the city, the residing companies can stay till 2040. The city will grow closer, however, so an effort will have to be made to reduce long-term environmental impact on the upcoming neighbourhoods."

In October 2014 the mayor also requested the city council approve €105m (US\$132m) in funding for construction of the new sea-lock system. The national government would only pay for the sea lock once it reached its 100-year lifespan, in 2029, recounts Ms Van den Beuken. "Waiting another 15 years was not a good option for the city's economy."

At about the same time, talks took place between railroad authorities and the Port about a dedicated cargo line at the Amsterdam railroad station. The dedicated cargo line had to be given up so the railroad authorities can deal with the heavy flow of people using the platforms for train travel, which was leading to safety issues. By working with the railroad group and their customers, they were able to create a schedule using shared lines that does not impact shipping schedules. "This was another case where all parties decided not to maximise their own stakes at the costs of others, but to turn to a mutual gains approach and cooperation," she says.

It's all about viewing stakeholders as partners rather than adversaries, and aspiring to meet common goals for the good of the city. "We don't look at these choices as wins and losses. We look at them as mutual gains that benefit us all," Ms Van den Beuken says. "The Amsterdam Ports have a clear path for growth again." ●

### Road and rail top their concerns

Business executives and policymakers do agree that transportation infrastructure should be a priority for city leaders. In most cities, those projects prominently feature rail and road systems. Executives and policymakers ranked metros and rail among their cities' top infrastructure concerns, underscoring the need to find sustainable methods of transportation for people and goods.

This is perhaps why many of the biggest urban-infrastructure projects currently underway involve building major transportation centres and metro lines. Vienna Central Station, for example, is one of the biggest infrastructure and construction projects in Europe; the station itself was recently completed and the surrounding redevelopment will be concluded in 2015. This seven-year €987m (US\$1.3bn) project serves as a daily transport hub for 145,000 people and 1,000 trains, including eight express-train lines, as well as linking passengers with bus lines, tram lines and subway stops throughout the city. The project is vital to Vienna's efforts to encourage citizens to use public, rather than private transportation, Mr Häupl says. "The comprehensive use of public transport and fast access to inner-city green spaces are indicators that justify Vienna's calling itself a model environmental city."

And London's nine-year, £14.8bn (US\$23.6bn) Crossrail project, to build a 118-km railway line across Greater

**“If you can show that it will result in a better, faster, cheaper, greener or more reliable system, you can sell it to the public.”**

David Wagstaff, head of Heat Strategy and Policy for the Department of Energy, UK.

London, is considered one of the most significant infrastructure initiatives ever undertaken in the UK. "It's a fantastic project," Ms Dedring says. The new line will add capacity and alleviate congestion on the Tube, which is a major challenge for London's citizens. Investing in projects that directly address quality-of-life issues helps officials like Ms Dedring strengthen the trust and support of the community for infrastructure endeavours.

Not every region has the same set of priorities, or the same quality-of-life challenges. In the Asia-Pacific region, for example, energy generation ranks among the top three infrastructure choices, reflecting the steady demand for new energy sources as local populations grow. Almost 1bn people in the region are currently without reliable access to electricity, and demand for energy is expected to almost double by 2030, according to the Asian Development Bank (ADB), pushing these city leaders to make building new sources of energy

a leading goal.

In the Middle East, respondents were more likely to cite airports, rather than metros, as a focal point for infrastructure development, reflecting the region's efforts to become a global economic hub. The Middle East is currently home to several major airport projects, including the expansion of Abu Dhabi International Airport (AUH), which will increase the facility's capacity to 27m passengers per year by 2017 and to 40m per year by 2030 according to recent reports. "Abu Dhabi wants to be a global capital with sustainable economic growth," says Mr Samarrai. The airport project, along with massive investments in other infrastructure systems, as well as schools and social programmes, is part of that master plan.

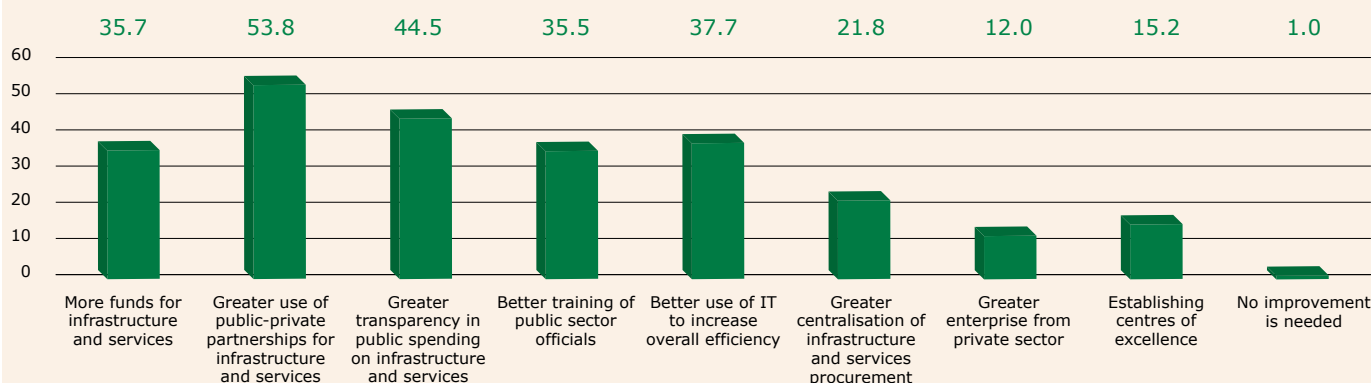
### Out of sight, out of mind: Tackling hidden infrastructure systems

Executives also put IT and road infrastructure among their top three concerns. Policymakers are equally concerned about IT systems, although energy and water supply are also near the top of their lists. This disparity is not surprising. Most citizens are more likely to be concerned about infrastructure that they can see breaking down. Congestion, road closures, train delays and other transportation failings are indicators that infrastructure is in need of investment. They do not see potholes or traffic jams in their water, sewage or energy infrastructure, so it is easy to assume

### In the city in which you are based, which, if any, of the following factors would produce the greatest infrastructure and services improvements?

Select up to three.

% respondents



Source: Economist Intelligence Unit survey, November 2014.



## Road and Rail Top their Concerns

Good transport infrastructure is essential to moving people and goods in any city, and it is a top priority for citizens, administrations and businesses. New road and rail projects, as well as upgrades or maintenance to existing systems, have the power to transform the social and economic dynamics of a city. However, meticulous planning and experience are required in order to balance the demands of all those affected – this is a must.

In April 2014, FCC inaugurated Line One of the Panama Metro, Central America's first such transport system. We are proud to be able to say that through planning and engagement with many stakeholders we managed to deliver the project in record time, in just over three years. The Secretary of Panama Metro, an agency of the National Government that commissioned the construction and will manage the new transit system, estimates that Line

One will serve one million people while reducing traffic congestion in Panama's capital city.

Similarly, FCC has also begun construction of Line Two of the Lima Metro. At 35km long and employing more than 11,000 people, it is the biggest infrastructure project currently underway in Latin America. This mega-project will improve the quality of life in Lima and reducing travel time for millions of Peruvians. The project will require an investment of approximately 4,400 million euros, with the first section due for completion in 2016.

One of the best examples of the transformative impact of transport infrastructure is the New Europe Bridge, built by FCC, and opened to the public in December 2013. The

1.9 km bridge connecting Vidin in Bulgaria, and Calafat in Romania has reduced journey times from three hours to just ten minutes, and has become a strong symbol of what can be achieved through cross-border collaboration connecting Europe. EU Commissioner for Regional Policy, Johannes Hahn, praised it for "ushering in a whole range of opportunities for business and research on both sides of the water".

With metro projects underway in Riyadh, Doha, Lima and Bucharest FCC Construction will continue to take the same approach of planning and engagement that has successfully built over 200 kilometres of high speed railway as well as thousands of kilometres of roads, dual carriageways and motorways all over the world. ●



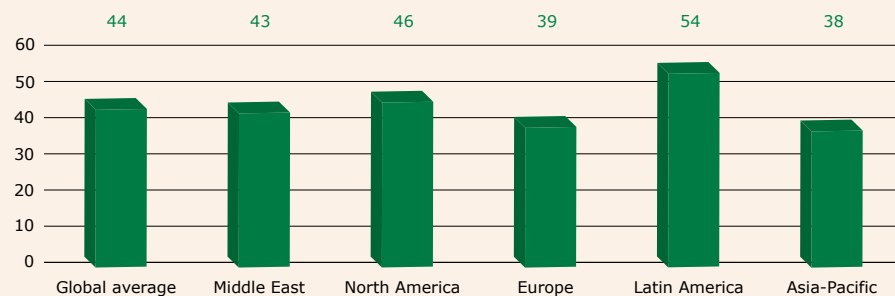
Miguel Jurado  
Chairman of FCC Construction



A section of Line One of the Panama City Metro, built by FCC Construction.

### Greater transparency in public spending is a top factor for improving infrastructure and services

% respondents



Source: Economist Intelligence Unit survey, November 2014.

these systems are always fully functioning.

Policymakers are more aware of these hidden systems and the massive investments that are required to maintain and upgrade them. They are cognisant of the far-reaching economic impact of infrastructural failure, both in terms of the hard costs related to reactively fixing failed energy grids or broken water mains in as little time as possible, and the economic impact to businesses affected by these breakdowns.

But it's hard to convince citizens to support these projects, particularly if it means raising their rates. Most are loath to support expensive upgrade projects that might impact their utility bills, although, when they break down, even for a few hours, citizens are outraged, says Mr Hoornweg. "No-one wants to pay to bury the power lines, but, when an ice storm knocks out their power for four days, they are incensed."

City leaders can't ignore the failings of these hidden systems, so they have to do a better job of building trusting relationships with private citizens and business leaders, and educating them about the importance of infrastructure investments, says David Wagstaff, head of Heat Strategy and Policy for the Department of Energy and Climate Change (DECC) in London. "If you can show that it will result in a better, faster, cheaper, greener or more reliable system, you can sell it to the public."

This is all part of managing stakeholder relationships. When city leaders take the time to communicate with citizens about on-going

infrastructure needs, build transparency into the way they allocate funds and create opportunities for citizens to offer feedback on project development, they can win their trust and support for these vital investments. This relationship-building process should include sharing real data about the cost and value of the project, and getting the public's feedback on the plan. Skipping this step may save time on the front end, but it can lead to backlash against the project, mistrust of city leaders, and dissatisfaction with project outcomes, even when they deliver the intended value. In the survey, respondents ranked greater transparency around public spending (45%) among the top three factors that would produce the greatest infrastructure and services improvements in their cities. This was the second-most frequently cited area for improvement ahead of greater funding.

"It is extremely important to allow citizens to have their say and get involved in the management of the city,"

**“When planning infrastructure projects in the future, it will be necessary to communicate with customers and citizens in a more comprehensive and transparent way.”**

Stefan Majer, head of the Department of Traffic and member of the Magistrate, Frankfurt

says Mr Paes. He should know: Latin America is more focused on transparency in public spending as a means to improve infrastructure and service delivery than any other region.

### The people want a say

Such transparency can go a long way towards securing public support, which is crucial to any successful infrastructure project, especially when it has a significant price tag. Regardless of how much benefit a project will bring to a city, its perceived value will rely heavily on whether it has public support.

"When planning infrastructure projects in the future, it will be necessary to communicate with customers and citizens in a more comprehensive and transparent way," says Stefan Majer, head of the Department of Traffic and member of the Magistrate, Frankfurt. That means communicating the value of potential projects, and listening to the concerns of customers and citizens regarding the financial, environmental and social impact. A key part of this is recognising the relationship between government, the private sector and the citizens who will be using the infrastructure and services; even if a project delivers real benefits, these will not be realised without building support from all stakeholders.

When city leaders take the time to win public support, it saves time and money in the long run, and can turn these investments into major public success stories. Consider San Francisco's US\$248m 2011 Road Repaving and Street Safety Bond Program. At the time, the city had a tremendous backlog of street repair and replacement projects, but didn't have a budget sufficient to address this.

Rather than raising taxes to ramp up spending, city leaders asked voters to approve a bond programme to fund the repairs, giving them the power to decide whether the city should pay to improve the condition of the city's roads. The mayor encouraged support for the initiatives through media campaigns and public meetings to discuss the state of road infrastructure, and added a measure mandating local hiring for road projects that appealed to community

**“We knew we couldn’t generate any revenue from the park, but it was key to the project because it gives people somewhere desirable to go.”**

Tom Murcott, executive vice-president, International, Gale International, Songdo, South Korea

groups. The bond was approved with a 68% vote, and the programme now spends US\$70m per year on road upgrades and maintenance projects. “Our city streets show marked improvements due to the voter-approved road-repaving bond, which is exceeding its goals, making streets smoother and safer, and creating jobs—all without raising property taxes,” Mr Lee says. To maintain support, the city hosts websites with street maps showing citizens the progress being made, and giving them opportunities to point out roads that still need work. Rather than assuming that initial approval was sufficient, San Francisco maintained its engagement with city residents, sharing information and inviting continuous feedback, which helped to win citizens’ initial support for the project and maintain that support throughout the programme.

In comparison, there are countless examples of urban-infrastructure projects that were pushed through without public support and faced serious public backlash as a result. One of the more notable examples is the on-going Stuttgart 21 project, a railway and urban-development initiative that includes 57 km of new railways, 30 km of tunnels and 25 km of high-speed lines. Protestors argue that the €6bn (US\$7.5bn) price tag, and related environmental impact, make it a bad investment. Just before the project was scheduled to break ground in 2007, they delivered 67,000 signatures against it, but the mayor moved the project forward anyway.

“That infuriated those who were against the project,” says Michael

Muenter, head of the Mayor’s Policy Office for Stuttgart. In retrospect, he thinks that, if the mayor had delayed construction in order to build public buy-in for the project and listened to the protestors’ concerns, he might have avoided some of the backlash. “There should have been a longer discussion process that included opportunities for open-ended dialogue with the public,” Mr Muenter says. Instead, protestors held a mass demonstration against the project, drawing more than 100,000 people.

This is a classic example of the importance of on-going attention to community relations in the success of infrastructure projects. Even though public-opinion polls show the project currently has support from 58% of the community, protesters still gather on the steps of city hall once a week to voice their discontent.

#### **It’s about quality of life**

The most innovative city leaders go beyond merely getting citizen support for infrastructure projects. They view public-infrastructure investment as an anchor point and enabler of social integration. From building parks, schools and bike lanes, to implementing policies and programmes that ensure all community members’ needs are met, these leaders recognise that the infrastructure decisions they make today will determine the quality of life for citizens going forward. “To be competitive, you can’t just invest in infrastructure projects,” says Kais Samarrai, head of Urban Development for Abu Dhabi’s Urban Planning Council. “There must also be tremendous investment in social development and programmes.”

This attitude aligns with our survey results, which show three out of four respondents agree that social integration is an important factor in their city’s infrastructure and service delivery. However, making social integration part of infrastructure planning requires thoughtful urban planning, addressing the long-term emotional, as well as physical needs of the community, says Tom Murcott, executive vice-president, at Gale International. Gale International is

part of the PPP developing Songdo IBD, a US\$40bn “eco city” near Seoul, South Korea with the public-sector sponsor Incheon Metropolitan City.

One of the biggest challenges for Songdo is making sure local stakeholders support the project, which is one of the reasons the Gale International team recommended the inclusion of a 100-acre park in the middle of the city and prioritised construction of it over any of the office buildings, apartments, or other urban structures in the plan. “We knew we couldn’t generate any revenue from the park, but it was key to the project because it gives people somewhere desirable to go,” Mr Murcott says.

The Gale International team had to sell local-government decision-makers on the idea of starting with the park, which, so far, it has had the desired effect. Even though the city is not completely built, it has become a destination for citizens from Seoul and many nearby communities, which encourages new investors and occupiers to choose Songdo. And, by developing the real estate around the edges of the park, it increases property value and quality of life for future inhabitants. “Every design decision we make is about enhancing the quality of life.”

Stuttgart city leaders are making similar choices as they strive to build infrastructure that supports—rather than hinders—social integration as the city’s population grows, says Mr Muenter. That includes adding rapid transit lines to ease congestion, carrying out rolling renovations to 300 parks and squares and implementing an inner-city development model that requires all new housing developments in the city to dedicate at least 20% of flats to low-income housing, in order to ensure families who work in the city can also live in the city. “[The housing policy] was very controversial with the real-estate people, but our ultimate goal was social cohesion,” Mr Muenter says. “We want a city where everyone can live.” While the real-estate community fought the plan, the government received widespread support from communities and political groups. ●



## Section 2

# Managing infrastructure delivery

The successful delivery of any infrastructure project is about more than meeting deadlines or budget mandates. It's about effectively managing resources and demonstrating the value of the project to the city's stakeholders. If citizens don't feel like the project is worth the investment, or that city leaders ignored their concerns, or abused the funds, these projects will be viewed as failures, regardless of whether they met their goals. This is especially true in cash-strapped cities, where sceptical citizens need to trust city officials' ability to deliver on their promises.

City leaders can overcome such doubts and increase their chances of success by building stronger relationships with the community, the private sector, and other public officials who are invested in the planning and delivery of these projects. These collaborations can also bring fresh ideas to the table, Mr Hoornweg says. "Cities need to come up

with new methods for infrastructure planning, and the engineers and planners who work in the private sector can help them do that."

### When funding and project planning fall short

Governments around the world have ambitious plans to invest in infrastructure, but follow-through and funding can be a challenge. Even when national governments announce grand plans to invest huge sums of money in infrastructure upgrades, there never seems to be enough to go around. Lack of funds was cited by more than one-third of respondents as a leading impediment to infrastructure and service delivery; even when they do have access to funds, many city leaders struggle to decide which urban-infrastructure project to address. Recently, funding shortfalls have been especially common in Western Europe, where respondents were more

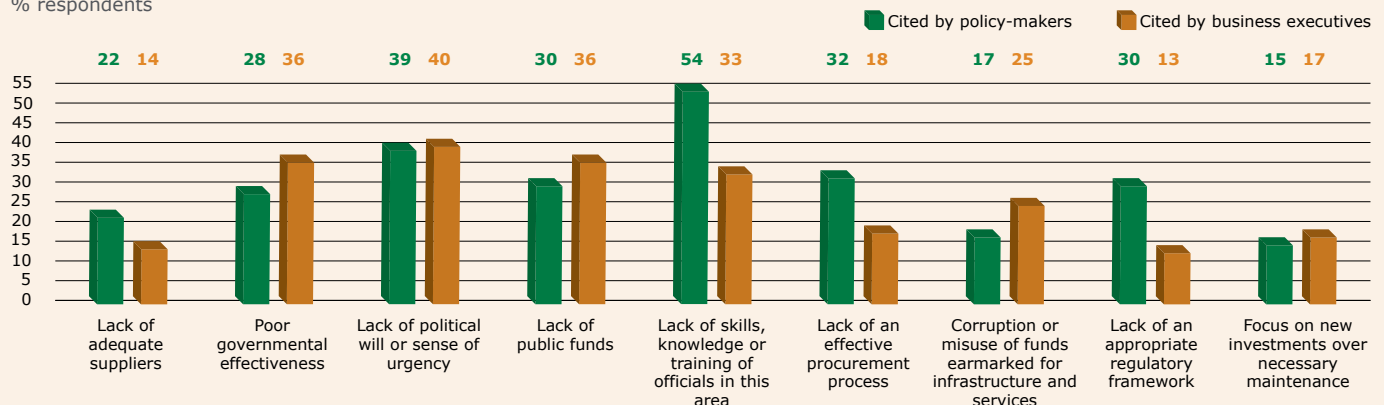
**“The population in the cities has increased at the same time as available tax dollars for infrastructure have declined.”**

Stefan Majer, head of the Department of Traffic and member of the Magistrate, Frankfurt.

likely to cite lack of funds as an impediment than in other regions, and are, by extension, limited in the choices they can make. "The population in the cities has increased at the same time as available tax dollars for infrastructure have declined," says Frankfurt's Mr Majer. "Towns such as Frankfurt are no longer capable of shouldering the costs, so they are depending on the financial support of

### Leading obstacles to urban infrastructure and services

% respondents



Source: Economist Intelligence Unit survey, November 2014.



the federal government and the states.”

Even when cities are able to secure funds to support major projects, money alone won't solve all of their problems. Space constraints, public opposition, environmental risks, regulatory issues and lack of project-management expertise are just a few of the obstacles urban leaders face when trying to implement major programmes.

In Brazil, for example, the government is lending money to cities across the nation in an effort to spur infrastructure development to improve urban mobility. However, there is still little local governance or oversight of these initiatives, says Toni Lindau, president and director of EMBARQ Brazil, a programme of the World Resources Institute (WRI), to support sustainable urban-transport and urban-planning solutions.

Brazil has made insufficient investments in its infrastructure, despite its rapid urbanisation in recent decades, Mr Lindau says. “Cities have grown chaotically, with little infrastructure planning.” Even though they are now receiving money to upgrade these systems, most Brazilian city leaders have no experience in managing large projects. “In many cases, this is the most money these cities have received in their history,” he says. Most of the project plans lack additional budget for hiring outside expertise or training project leaders, so these leaders are left to manage on their own. “That adds a lot of risk.”

Regulations can also get in the way of delivering services effectively—30% of policymakers overall said the regulatory environment is a leading impediment to infrastructure projects, this was more than twice the percentage of respondents from the private sector citing this as an area of major concern.

“In Brazil, the biggest obstacle to infrastructure-project delivery has always been bureaucracy,” says Guilherme Penin, a federal secretary of Port Policies based in Brasília. Securing permits, clearing environmental and legal audits, and getting stakeholders to release funds can add years to these projects. Although, he says, the government is making efforts to ease the bottlenecks

**“Success will come about only if governments, infrastructure developers and industry work together on a global scale.”**

Mike Tinskey, global director of Vehicle Electrification and Infrastructure, Ford Motor Company, Detroit.

caused by the red tape, by making simple changes to the process, such as approvals for road construction. “Before the work could only begin when 500 kilometers were licensed,” he says. “Now we divided the licenses in ‘tranches’ of 25km so that if there is an easier stretch to be licensed, it will be licensed first and work can begin on it. With this change, it is no longer necessary to wait for the licensing of the most difficult passages, that are located in environmentally sensitive areas, he notes. “(Such changes) can make things much more efficient.”

#### **PPPs bring money, efficiency and new ideas**

If the public sector wants to find innovative, sustainable and cost-effective solutions for their infrastructure needs, they have to open themselves up to new ideas, says Mike Tinskey, Ford Motor Company's global director of Vehicle Electrification and Infrastructure. “Success will come about only if governments, infrastructure developers and industry work together on a global scale.”

One popular model for infrastructure collaboration are PPPs, through which private companies help city leaders to secure additional financing, access to innovative ideas, and to take advantage of lean project-delivery practices that have been honed in the private sector—where missing deadlines or budget goals translate directly to lost margins. These can all translate to major benefits for city infrastructure.

Survey respondents overall said the public sector should lead provision of

infrastructure and services, although policymakers were almost twice as likely to choose themselves (62%), compared to business executives (37%), suggesting that the public sector may be overestimating its ability to meet citizens' infrastructure needs.

Regionally, Latin America's public sector fared worst: just 27% of respondents favoured the public sector to lead these projects, compared to around 50% of those in North America, the Middle East, and Asia-Pacific. Europe also lagged behind in their faith in government effectiveness.

#### **Making the business case**

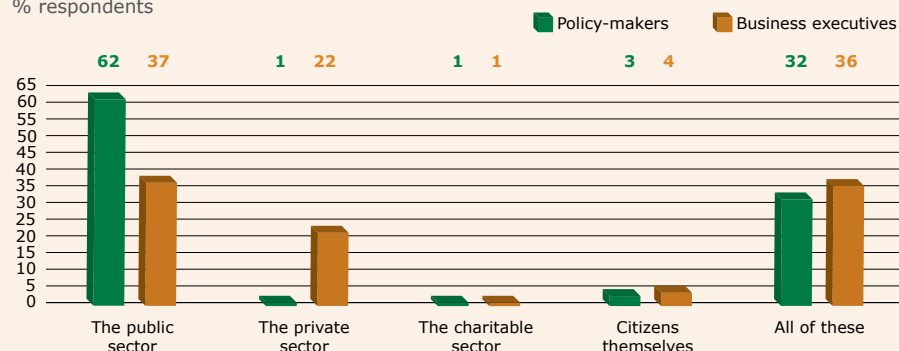
However, everyone—even public-sector officials—agreed that the public sector can't do it alone. Fully 82% of respondents (and 84% of policymakers) agree that the government should work with the private sector to improve urban infrastructure and services, and more than half (54%) said better use of PPPs would deliver the greatest improvement to urban infrastructure and services. This indicates that they recognise the financial and business value the private sector can bring to these initiatives, including opportunities for risk sharing, and accessing new models for funding. Public-sector organisations are not known for being cutting-edge when it comes to infrastructure choices, which is one of the many reasons why they are making room for the private sector in these projects.

In the last several years, more and more city projects have embraced PPPs, private financing and other private-sector models for delivering infrastructure. Private companies get involved in these collaborations because they see these projects as stable investments that align with their core competencies, while the public sector sees them as a solution to major funding challenges and an opportunity to lessen the risk and burden of delivering these projects on their own.

However, defining terms that work for all parties can be tricky, says the OECD's Mr Tompson. To make these projects work, city officials have to think in terms of return on investment, depreciation and financial accountability. “Cities don't follow the same accounting principles

### Which single sector would be most effective in upgrading infrastructure and services in your city?

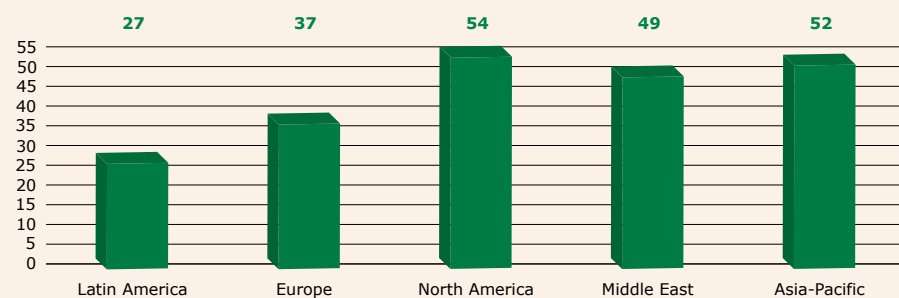
% respondents



Source: Economist Intelligence Unit survey, November 2014.

### Public sector believed to be most effective for upgrading infrastructure and services by region

% respondents



Source: Economist Intelligence Unit survey, November 2014.

used by companies," he says. That includes things such as depreciating assets and defining a measurable return on investment. But investors need that kind of information if they are going to assess accurately the viability of a long-term concession. "If you don't have the analytical capability to evaluate the economic impact of a project, it can be hard to secure investment for it," Mr. Thompson says. "No-one wants to lend without a good prospect of payback."

City leaders can abate this challenge by building a solid business case for these projects that showcase the long-term financial, social and environmental benefits of the project. Many investors today are drawn to clean-tech infrastructure projects, like renewable-energy schemes and water-conservation efforts, says C40's Mr. Watts. But they won't invest in them just because they are green. "Good projects find investors, and good city managers, who have taken the time to build relationships with the private sector, will

find the partners they need." Partnerships have to offer a good return on the investment with clearly defined benefits, such as policies that incentivise clean-energy policies and risk-mitigation strategies, in case those policies should change.

#### Be open to new ideas

Working with the private sector brings more than money to projects. By looking

outside of their own team for ideas, city leaders also need to take advantage of the innovative minds these companies bring by involving them earlier in the planning process, says Mr. Hoornweg. "Engineers need to take a more active role in these projects to optimise infrastructure decision making," he says. "They are the ones that can help cities figure out how to operate with less staff, less energy, and less environmental impact."

They also bring a new frame of reference to the project, which can help city leaders make better design decisions, says Gale International's Mr. Murcott, points to the company's own early planning on the Songdo project in South Korea, when he urged city officials to prioritise the completion a US\$1bn bridge to connect the airport to Songdo. The bridge would cut travel time from 90 minutes to 15, which was a critical selling point for multinational companies to set up shop there.

"It was a major investment, but we agreed that, to make Songdo IBD a truly international destination, the necessary infrastructure was crucial to success," he says. Bringing private-sector minds to the planning table can help city leaders see their projects in a new light, and they make better decisions as a result.

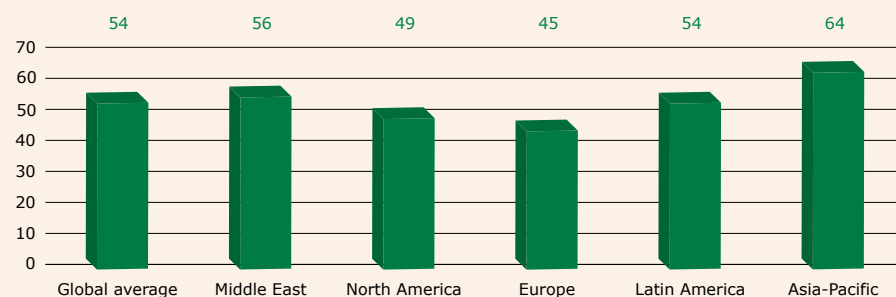
#### What are other cities doing?

Along with tapping private-sector experts, city leaders should look for guidance from their peers, says C40's Mr. Watts. "No city in the world has a monopoly on good ideas."

By talking to each other, they can take lessons learned and find inspiration for

### Greater use of public-private partnerships is one of the top factors for improving urban infrastructure and services

% respondents



Source: Economist Intelligence Unit survey, November 2014.

**“Good projects find investors, and good city managers, who have taken the time to build relationships with the private sector, will find the partners they need.”**

Mark Watts, executive director, C40 Cities Climate Leadership, London, UK.

their own transformative urban-infrastructure solutions. “Very few leaders in any field want to be the first to do everything because it takes a lot of political capital to be a pioneer,” Mr Watts says. However, when they share their success stories with each other, it gives them the confidence to forge ahead.

Mr Watt’s points to the spread of Bus Rapid Transit (BRT) projects in recent years, following the success of the popular BRT system in Curitiba, Brazil; and the widespread implementation of bike paths and bike-rental programmes modelled after Copenhagen, which is now considered the best biking city in the world. “A lot of our success comes from listening to inspirational narratives from exceptional city leaders talking about what they accomplished, what challenges they faced, and how they overcame them,” Mr Watts says. The more these leaders share their successes—and failures—the more quickly good solutions can be implemented around the world.

### The role of business

Business leaders can also benefit from participating in infrastructure development as a way to let the community know they are invested in the long term success of the city, and to ensure a sustainable business environment, says Greg Koch, director of global water stewardship in the Office of Sustainability at The Coca-Cola Company. This is especially true in emerging market cities that may not have the resources to build out their own infrastructure systems. “Part of our due diligence is to work closely with the local government, to advocate for

### Case Study 2

#### Rio drives a transportation revolution

When Rio de Janeiro won the opportunity to host the 2016 Olympics, it was the catalyst for city mayor, Eduardo Paes, to implement his plan to make Rio the “city of the future”. A big part of that vision is building new infrastructure that is environmentally friendly, socially integrated, and uses technology and innovative design to address the mobility needs of the city’s people.

It’s no easy task. Rio, like many cities in Brazil, faces massive urban sprawl, and insufficient infrastructure to support its surging population growth. However, by copying the successes of other leading cities, Mr Paes has been able to implement projects that are helping Rio transform itself. One of the most successful projects to emerge from this vision is the city’s new Bus Rapid Transit (BRT) system. The transportation system is designed to deliver the quality, speed and improved environmental impact of light rail, but with the lower budget frame of less asset-intensive bus systems. This is accomplished through the use of high-speed buses, dedicated lanes, and above-ground passenger stations.

“Fast-growing cities like Rio don’t have the infrastructure budgets that London or New York have to build expensive underground metro systems,” says Mark Watts, executive director of C40 Cities Climate Leadership in London, a network of leaders from the world’s megacities taking action to reduce greenhouse-gas emissions. Finding innovative, cost-effective solutions, such as BRT, enables city leaders like Mr Paes to solve transportation crises with reasonable budgets and in a short time frame.

### Getting the public on board

To ensure he had support for the BRT project prior to breaking ground, Mr Paes’s team conducted public hearings in each community to present the project, explain the impact to the neighbourhood and the benefits once it was complete. Kiosks were also installed at strategic points in the area to take residents’ queries and share information.

In June 2012 Rio launched its first BRT corridor, called the Transoeste, on the west side of the city. The corridor now serves 185,000 passengers per day and has cut travel times for those passengers in half. Two years later, the second corridor was inaugurated. Transcarioca connects Barra to the International Airport and has been transporting over 200,000 passengers every day. Mr Paes’s team estimates that, by the time the two additional corridors are open in 2016, the share of trips made by mass transit in Rio is expected to increase from 18% to 63%, which would be among the largest proportion of mass transit users of any city in the world.

“Compact cities with strong public-transit systems reduce reliance on motorised passenger vehicles, carbon emissions and pollution,” Mr Paes adds. “That means not only positive impacts on quality of life, but also economic opportunities and higher productivity for urban citizens.”

“The success of Rio’s BRT system is an extraordinary accomplishment,” Mr Watts adds. “Mayor Paes has used the push of the 2016 Olympics to deliver a transportation revolution.” ●

infrastructure investment and to ensure our use of water won’t negatively impact the local people or environment,” Mr Koch says.

When existing systems come up short, the company will make community investments in the infrastructure necessary to support its business, by supporting

water preservation programmes, digging wells, cleaning local waterways, and installing rainwater harvest technology in communities that are water-scarce. The company also has built several co-generation heat and power plants and wastewater treatment systems in their own facilities, to lessen the operation’s

## “No city in the world has a monopoly on good ideas.”

Mark Watts, executive director, C40 Cities Climate Leadership, London, UK.

impact on local resources while ensuring their own consistent access to clean water and energy. “Ultimately infrastructure is the responsibility of government,” he says, “but if these investments benefit our business then it makes sense for us to do it when possible.”

Businesses also need to work with city leaders on risk management as critical

infrastructure can be impacted by a disaster, says Stefan Brem, head of Risk Analysis and Research Co-ordination at Switzerland’s Federal Office of Civil Protection. Floods, power outages, fires and other disasters can shut down a city’s business district and leave a company’s employees in perilous situations. Collaboration between the public and private sectors on disaster planning ensures everyone has a plan in place should a catastrophe occur. “It is so important that the public and private sector do joint assessments of risk, so that, when the time comes, they can respond in a thoughtful manner.” ●

Section **3****Better information is key to more effective action**

One way to rein in spending while focusing on sustainable solutions, is to invest in more cost-effective maintenance projects, rather than building complex, costly new systems. As highlighted, two-thirds of respondents agree that their cities need to improve maintenance and operations of existing systems more than they require new physical infrastructure. These projects are easier to fund, generally involve less red tape and can start to deliver measurable value almost immediately.

London's Ms Dedring points to her city's on-going efforts to improve capacity on the Tube, its underground metro system. Rather than adding new tracks or stations, her team focused on improving the reliability of the existing traffic by shortening response time to incidents, implementing proactive maintenance to prevent failures, and improving the process for upgrading cars and other assets. As a result of these changes, delays have fallen by 40% in the last five years, she says. That increased reliability means they can run more trains closer together to accommodate more passengers. "It is an unsung project that has had a huge impact."

These kinds of cost-effective operations and maintenance projects demonstrate the significant value that can come from small changes; however, getting government support for such initiatives can be surprisingly difficult. "There is a tendency (among government officials) to favour new infrastructure, because it is exciting and involves interviews and ribbon cutting," Ms

Dedring says.

Indeed, the Tube productivity project was the result of pressure brought by stories in the press and on social media complaining about Tube performance, including pictures of people being forced to walk out of Tube tunnels after their trains broke down. "It got a lot of media attention, which triggered political pressure for change," Ms Dedring says.

**Better data and smarter cities**

One way to win support for these projects and to build stronger relationships between government, infrastructure providers and citizens is to open clear channels for information sharing. One means to do this is to make citizens more aware of the impact their behaviour has on infrastructure needs; this has the potential to deliver a meaningful change in how services are demanded and infrastructure used. A vast majority of respondents indicated that they would be willing to change their energy and water consumption (72%),

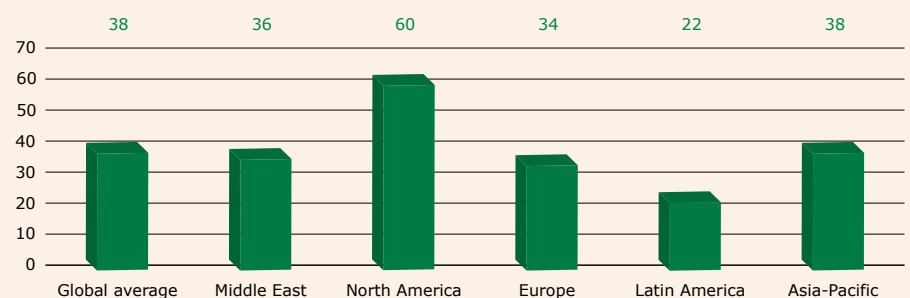
as well as transport (76%) behaviour—if they were given better access to information about usage levels and traffic disruptions, respectively.

Making these improvements requires a systematic approach to managing data, connecting information feedback with decision making and infrastructure provision. The role that IT can play to improve service delivery is expanding. Unfortunately, however, only in North America do most respondents see a better use of IT as a key route to improving infrastructure and urban services; it was their top choice, cited by 60%, compared to just 22% of those in Latin America, and under 40% in other regions. In parallel, respondents in North American were much more likely to say that their city should employ a platform to receive citizen feedback on services as a route to becoming more sustainable and more likely to express a willingness to change their infrastructure usage accordingly.

This regional discrepancy suggests

**Better use of IT to increase overall efficiency is a top factor for improving urban infrastructure and services**

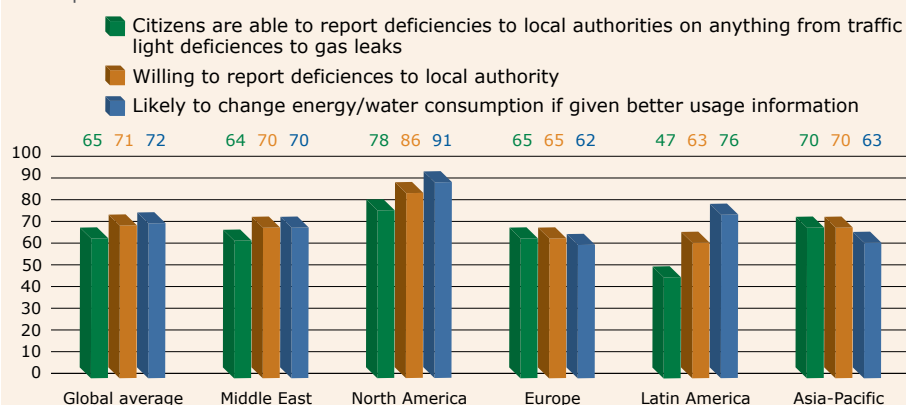
% respondents



Source: Economist Intelligence Unit survey, November 2014.

### Citizens are willing to act if they know how

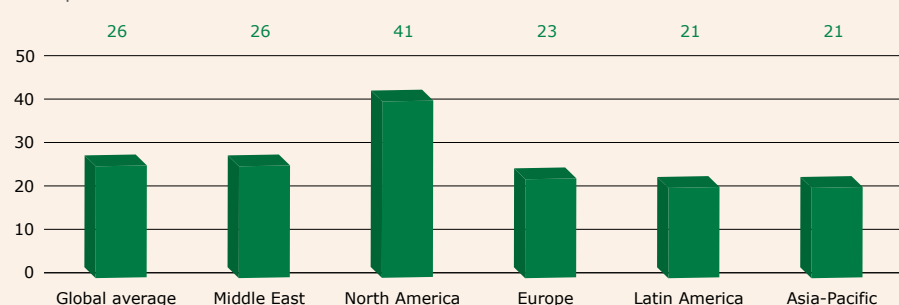
% respondents



Source: Economist Intelligence Unit survey, November 2014.

### To become more sustainable, my city should employ a platform to receive citizen feedback on services

% respondents



Source: Economist Intelligence Unit survey, November 2014.

See chart in appendix: Which of the following initiatives, if any, do you think your city should engage in to become more sustainable?

that policymakers and citizens in many regions may not be taking full advantage of IT as a driver of greater efficiency or overlooking the connections between data sharing, citizen feedback and sustainability issues. City leaders need to do a better job of managing their infrastructures as a set of complex systems and working with their citizens both to receive their feedback and to provide timely information. This highlights the need for strong relationships and communications between city officials and communities. Harnessing behavioural change and citizen involvement can improve outcomes, while reducing costs and building buy-in from the city's stakeholders.

IBM's Smarter Planet Program, for example, showed consumers used an average of 6.6% less water after smart water meters were installed in their

homes; and an on-going study by Pacific Gas and Electric, a California-based utility shows consumers who receive monthly home-energy-use reports started using less energy immediately, at all hours of day, suggesting that they changed the settings on their heating systems, air conditioners, or other equipment that runs continuously, and that the change in behaviour continued over the months they were tracked.

This should be strong encouragement for city leaders looking to invest in smart-city technologies, including smart-grid infrastructure, mobile-transit-tracking applications, sensor technologies, data analytics and other tools to integrate data from multiple sources in order to inform and connect citizens in real time. These tools can quickly enable cities to reduce both their congestion and their carbon footprint, while delaying the need to build costly

new infrastructure—a key concern for cities around the globe. At the same time, these technologies improve quality of life for citizens, and help leaders attract innovative global companies, which are key goals for today's leaders.

Many cities are already seeing success with smart-city solutions, offering valuable roadmaps for other city leaders on how smart technology could help them address their own environmental, social and funding challenges. In New York City, the City 24/7 programme gives citizens access to Wi-Fi-enabled public smart screens located in old phone booths, which integrate information from government programmes, businesses, and citizens to provide information about nearby events and local vendors. In the case of Glasgow, UK, city leaders recently rolled out a city dashboard that gives citizens real-time information on traffic flow, weather alerts, accidents, and waiting times for rail and bus services. And then there is Tel Aviv, which has been lauded for many smart-city initiatives, including the roll out of city-wide Wi-Fi access, location-based smartphone technology to help visitors, and the Digi-Tel project, which allows citizens to access services and information via email, text message or a customisable website.

### The citizen stakeholder

These are just a few examples of how more connected technologies can address urban challenges and foster stronger relationships with citizens and business owners. But these kinds of projects should not be undertaken lightly. Smart-city solutions require integration and management of huge amounts of data in order to leverage real value. That means cities need to develop their own analytics expertise or partner with the private sector to tap into these skill sets. They also need to win citizen support—both for the financial investment, and their willingness to share information in order to make these tools effective.

Based on our survey data, convincing citizens to support information-sharing solutions that bring real-world benefits should not be a hard sell. More than 70% of respondents say they would change the way they use infrastructure, given



### Better Data and Smarter Cities

Infrastructure such as full-cycle water management, although regarded by many as a “hidden” service, plays a critical role in the city, which cannot be underestimated. There is a big information gap that needs to be closed between citizens, city authorities and infrastructure service providers. Where we can introduce platforms for feedback, citizens will start to feel more involved, the authorities will understand the demands on the city, and service providers like FCC Aqualia will be better placed to deliver intelligent and efficient solutions.

It is with exactly this in mind that the

R&D section of our business launched an ambitious pilot project called SmartWater with the local government of Santander, Spain. Through the introduction of an app end users in the water supply are able to track their own consumption, receive alerts and notifications related to the service and report incidents. The research by the EIU shows overwhelmingly that citizens want to have the opportunity to do just this, and that by working together we

can better improve water efficiency.

At FCC Aqualia we operate in 22 countries on 4 continents, providing services to over 1,100

municipalities and more than 23.5 million people. This means we are

in a critical position to ensure the most efficient use of one of the world’s most precious resources. We can help achieve this by turning water cycle management from a service that goes on around us without being noticed, to one that every citizen plays an active role in. ●



Felix Parra  
Chief Executive of FCC Aqualia



FCC Aqualia’s SmartWater app for the government of Santander



better information about usage rates, and a similar number say they would be willing to report deficiencies to local authorities. This suggests a strong willingness to participate, although, to fully engage these stakeholders in an information exchange, city leaders must prove that they can be trusted guardians of these data. Whether they want citizens to share private information, or take the time to report a pothole, they've got to clarify how the data will be used and where the benefits will be. This is best achieved by sharing detailed information about how the system will work, how data will be stored, and the financial, social and environmental benefits these projects can deliver.

And, when integrating IT further into critical infrastructures, city leaders must also remember to factor security into their project plans. As Mr Brem asserts, if cities are going to realise their full potential value, "Grids can't just be smart, they also have to be secure."

### Building the future

As city leaders plan for the future, increasing sustainability while lessening environmental impact has become a priority in virtually all urban-infrastructure projects.

Survey respondents also show an interest in sustainable-infrastructure projects, especially if they involve energy—imposing energy-efficiency standards for businesses and investing in renewable energy were among the top three choices of initiatives that would

## “Try to understand what your city really needs, and not just what your department wants.”

Leonie van den Beuken, head of Spatial Planning and Environmental Issues for the Port of Amsterdam.

help their city become more sustainable. In comparison, just 26% said their city should focus on reducing water consumption, and only 25% wanted to see more investments in reducing waste and improving recycling.

This is good news for cities that want to invest in renewables and other clean-energy projects and, frankly, these initiatives can be valuable. However, non-energy-related sustainability initiatives are vital for cities to deliver on their sustainability goals. This means that cities need to engage and educate their citizens about the broader environmental benefits of investments in recycling, water management, public transportation and other infrastructure initiatives. Although the environmental value of these endeavours is profound, it is less readily understood by the public and their support is essential.

Waste management, for example, is a particularly important topic, states Mr Hoornweg. "We need to figure out how to run cities with less garbage and less energy," he says. It is imperative that city leaders win public support for

recycling and better waste-management solutions, if they want to reduce their environmental impact and vulnerability.

### Setting goals sets the stage

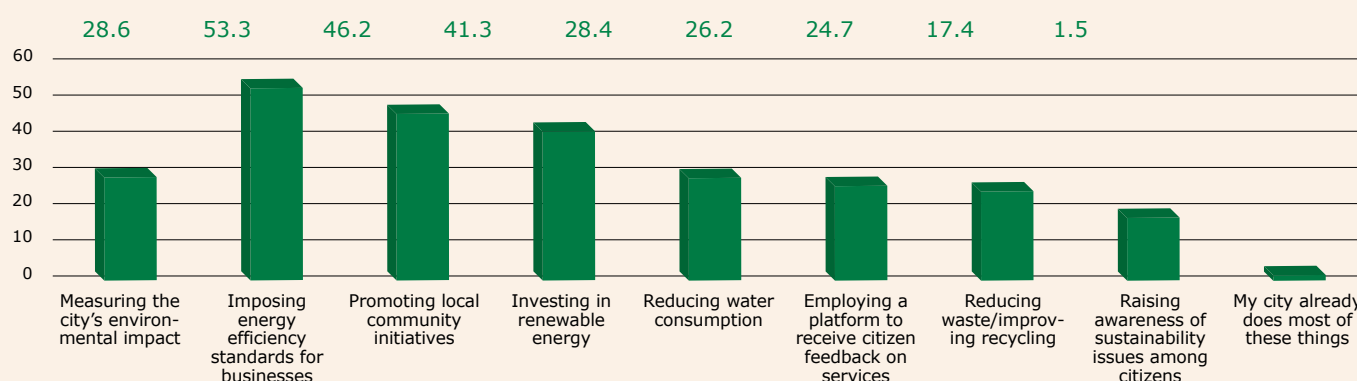
Some city leaders are gaining broad support for sustainable initiatives by setting environmental mandates for the future. Abu Dhabi's city leaders, for example, set a public goal to generate 7% of the city's electricity from renewable sources by 2020; Vancouver recently released a 10-step action plan to become the "world's greenest city by 2020", and London set a mandate in 2007 to cut carbon-dioxide (CO<sub>2</sub>) emissions by 60% by 2025. These mandates act as a catalyst for sustainable projects and provide a tangible goal against which to measure their impact.

"Sometimes these projects can be an uphill struggle," says the DECC's Mr Wagstaff. He has been trying to help cities across the UK to build low-carbon heat networks that can eventually replace the in-home boilers currently used by 80% of home owners. "The idea that these cities need to build a whole new underground infrastructure is a big challenge," he says. He cites the country's national mandate to reduce greenhouse-gas emissions by at least 80% by 2050 as an impetus for city leaders to make that change. "We can't meet that goal if we have 20m gas and oil boilers running every day," he says.

Indeed, many cities are already far down the path of implementing major green-infrastructure projects to support

### Which of the following initiatives, if any, do you think your city should engage in to become more sustainable?

Select up to three  
% respondents



Source: Economist Intelligence Unit survey, November 2014.



## Building the Future

The findings of this report highlight some of the biggest challenges we face in urban waste management, particularly in terms of galvanising wider support for these services. According to the World Bank, by 2025 4.3 billion urban residents are expected to be generating 2.2 billion tonnes of urban waste every year, so it is critical to manage waste more effectively and more efficiently than ever before.

By demonstrating the value of the service, driving technological innovation and improving transparency through data sharing and citizen engagement we can help the circular waste economy to flourish. FCC Medio Ambiente operates in 5,000 municipalities in 20 countries across the world, and we do so with this approach in mind.

Barcelona has long been recognised as one of the pioneers of smart city initiatives, not only in Spain but globally.

Demonstrating just what can be achieved through Public Private Partnerships, FCC is proud to have been working for the city for over 100 years in a row. Our efficient management of the sewer systems, and innovative approach to waste collection using our FCC-designed hybrid-electric truck, continue to play a key part in the smart delivery of services for Barcelona's citizens.

This collaborative, technology driven approach to waste management also typifies our work in the UK. FCC Environment now operates three Energy from Waste (EfW) facilities, in Nottingham, Kent and Lincolnshire, with two more under construction and a sixth one also in the pipeline in Edinburgh. Together these plants will enable us to treat more than one a half million tonnes of waste per year and turn it into valuable 'green' energy.

Finally, the findings of the report relating to education and demonstrating



Agustín García Gila  
Chairman FCC Medio Ambiente

the value of "hidden" services such as waste are very pertinent. As one of many similar initiatives, last year in Serbia we introduced an environmental education program to bring our activity closer to children and young people. If we want the support of citizens it is vital that we continue to do this across all age groups, and every urban environment we operate in. ●



FCC's Hybrid electric vehicle for urban solid waste collection, Barcelona

### Case Study 3

#### Money and ambition fuels growth in Abu Dhabi

Abu Dhabi is currently pouring massive resources into a vast array of infrastructure projects, including roads, rail, energy, water, airports, urban housing, schools and more. The reason: the region wants to elevate itself to the status of economic leader in the eyes of the international community—and it has the massive financial resources to make it happen.

“Abu Dhabi wants to become a global capital of sustainable economic growth that is not dependent on fossil fuel for its primary GDP,” says Kais Samarrai, head of Urban Development Planning Abu Dhabi. Thoughtful infrastructure development plays a critical role in making that happen.

The city benefits from having money to invest in these projects and not a lot of obsolescent or obsolete infrastructure to replace or upgrade. “It is an advantage that we are a relatively new city,” Mr Samarrai says. This frees the region to implement cutting-edge sustainable systems, including wastewater-recycling systems, cutting-edge waste management and recycling, a state-of-the-art airport,

government buildings that meet extensive sustainability ratings, and a light-rail system that will lessen the impact of auto traffic.

However, a blank slate, and an effort to think years into the future can lead to difficult decision making.

“The risk is overprovisioning of infrastructure,” Mr Samarrai says. When building for the future you face the possibility of investing in infrastructure that will not be fully utilised for some time. “Long-term planning always carries the risk of not accurately forecasting, as in the case of the real estate market global downturn, which impacted Abu Dhabi among many other cities,” he states. That led to some infrastructure being built ahead of the market demand.

However, Mr Samarrai sees this as a small setback. He is very optimistic about how the region’s current investment in infrastructure will support its long-term economic plans. “Our goal is to put the region on the global map, similar to the Asian Tigers of the 1980s and 1990s,” he asserts. “Abu Dhabi has the capital, the vision and a government committed to making it happen.” ●

their sustainable-future visions. In Vancouver, for example, hydroelectric power accounts for 90% of the city’s energy supply, owing to aggressive investment in this sustainable energy source; Vienna is currently building a new waste-to-energy mud reclaiming project (Energie-Optimierung Schlammbehandlung), which, by 2020, will generate 100% of the energy used to treat waste from renewable sewage gas; and Rio recently replaced its Gramacho

landfill with a Solid Waste Treatment Centre that cleans wastewater for reuse and harnesses biogas for energy production.

These kinds of sustainable urban-infrastructure projects help cities reduce their environmental impact and meet sustainability goals, while helping raise their status as green cities in the eyes of businesses and travellers looking for their next destination. ●

# Conclusion

There are few easy answers when it comes to infrastructure investment. These projects are huge, risky and most cities face far greater demand for projects than there are resources to support them. But, when city leaders take the time to learn from each other's successes and failures, infrastructure challenges can be overcome. Getting there means learning to take advantage of the financial resources and innovation brought by the private sector, as well as integrating citizen feedback into operations through on-going engagement and stakeholder management.

"Twenty years from now, city leaders will be judged by their historical achievements in transforming their cities," Mr Watts adds. The leaders who make choices based on the long-term environmental, social and economic needs of their people will be the ones most celebrated for their successes. The experts interviewed for this report offer their advice on how to tackle the on-going demand for urban infrastructure and services faced by city leaders around the world:

- **City departments must work as partners to reach their strategic goals.** Before city officials fight for a project, it is vital to be sure what is really best for your city. "Try to understand what your city really needs, and not just what your department wants," says Ms Van den Beuken. She encourages city officials to work together as partners, rather than as adversaries, and to consider how individual project investments align with the broader

strategic goals of the city. This can help city leaders gain a better perspective on which projects will deliver the most value to the city, and help foster compromises that benefit the entire population.

- **Reinforce citizens' ownership of their infrastructure and service provision.** Doing this requires that relationships be built, while addressing citizens' needs. "As elected officials, we have an obligation to always put the interests of our city first, to work with communities, and ensure that we ultimately support the best project possible," says San Francisco's Mr Lee. He encourages other city leaders to create platforms through which they can engage citizens in conversations about infrastructure needs, resource allocation, and what is being done with their taxes. For example, San Francisco's SFBetterStreets.com site shares information about street-improvement projects and lets citizens make requests for repairs in their neighbourhoods. These opportunities for feedback, engage the community, highlight areas for improvement and reinforce ownership of infrastructure and services by the city's residents themselves.

- **Build trust through transparency and a commitment to openness.** To strengthen government relationships with citizens and service providers, trust is essential. Building that trust requires clarity and a commitment to openness. City leaders need to make tough decisions about infrastructure and not all of them will sit well with the public, but

you still need to be honest about what you are doing, and why you are doing it, says Stuttgart's Mr Muentert. He points to his city's rolling maintenance of more than 300 fountains, several of which have been shut down due to lack of funding. People were upset at first, he says, but once the team from the city administration conducted community-outreach efforts to educate people about the cost of the projects, and how those funds could be better spent, they understood. "There will always be compromises," he says. But when you are open with the public about those choices, you are more likely to win their support.

- **Look beyond your own team for solutions.** "The best way to create successful cities is through collaboration," says C40's Mr Watts. Groups like the C40 bring city leaders together with each other and with private-sector companies, to share ideas and to learn from each other's successes and failures. Such collaborations have led to the mass adoption of BRT systems and other urban-infrastructure innovations that might not have gained attention had these leaders not shared their stories and discussed frankly the challenges they faced in implementing them. Furthermore, private-sector companies offer their own insights, as they can share expertise gained from successful urban projects developed around the world. PPPs, specifically, are about more than contributing funding; they can be an opportunity to improve efficiency in infrastructure and service delivery.

● **Involve your citizens in long-term planning and be clear about how infrastructure investments will affect them in the future.**

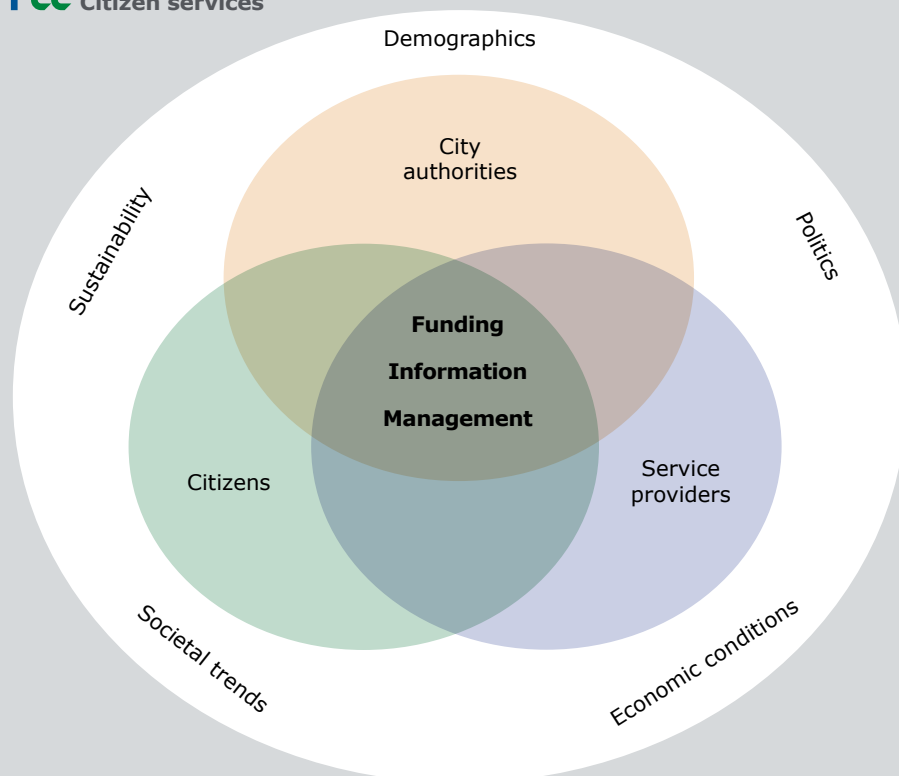
City leaders need infrastructure projects and urban services that will help the city do more with less, create less waste, and make the environment more resilient, according to Mr Hoornweg. While they can't know what technologies and infrastructure innovations will be available in the future, they can make design decisions that are flexible enough to accommodate change. For example, choosing open-source standards to enable future adaptations, or establishing policies that require new structures meet energy, water and wastewater-efficiency goals. "City leaders are the ones who will determine how well we will change course," he states. "They will drive the debate and they will make the decisions that shape their future." To do so effectively, they need to give their citizens a voice on an on-going basis, involving them and informing them about the investments that will affect them for decades to come. ●

# Insights

In an increasing number of the world's urban areas we can now interact with anything from railways to sewer systems, and from waste bins to energy grids. This is great news for the future of our cities, particularly with a rapidly rising urban population, but making only the component parts more intelligent will not in itself give rise to smarter cities. The key to this is fostering better relationships between the city stakeholders.

At FCC we recognise that although cities have got smarter, these stakeholder relationships have become ever more complex. Bridging this gap is vital for success. Based on over 100 years' experience covering environmental services, infrastructure and water, we have established a model for delivering the most effective solutions for urban areas. Improving engagement and involvement will lead to more innovative ways of funding infrastructure and services, stronger information flows and better project management. **The FCC Citizen Services Model** is explained below:

**Firstly**, it is important to recognise that no two urban areas are the same. Demographics, politics, economic conditions, societal trends, and the environment and sustainability, all differ widely in urban areas from region to region, country to country and continent to continent. There are critical lessons that cities can learn from one another, but each urban infrastructure and services solution needs to be tailored to



the city in question.

**Secondly**, there are broadly three main groups of stakeholders within a city when urban infrastructure and services projects are being discussed - local authorities, service providers and the citizens themselves. The city authorities are central to this. They have the strategic vision, and the onus is on them to deliver on this by working with the two remaining groups to ensure the best solutions for their cities.

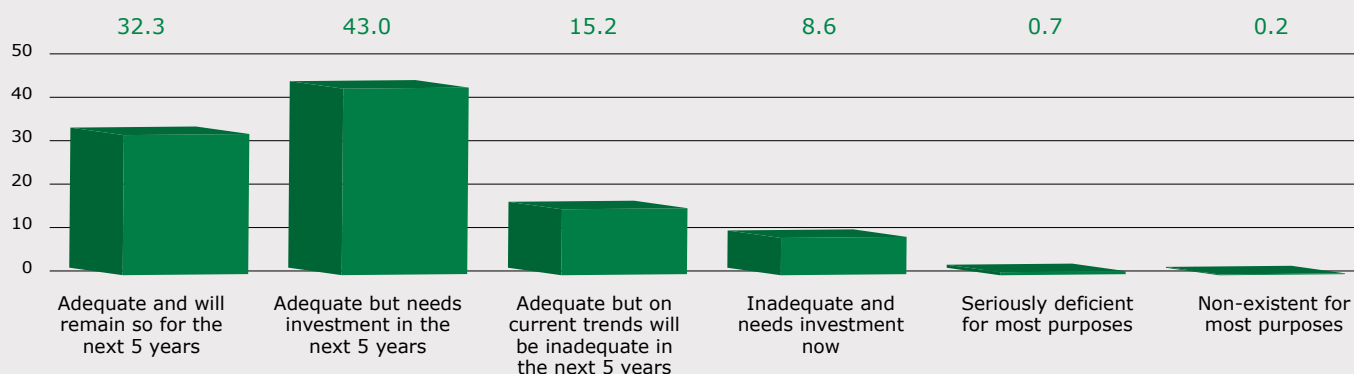
**Thirdly**, the relationship between city authorities, citizens and service providers is defined by project funding, data and the flow of information, and successful management of this engagement and interaction. In our experience, the stronger this relationship can become through collaboration, openness and long term planning, the smarter the solutions for the city will become.

FCC is a Citizen Services company. We are in this together. ●

# Appendix: Survey results

## The infrastructure and services in the city where I principally live or work are...

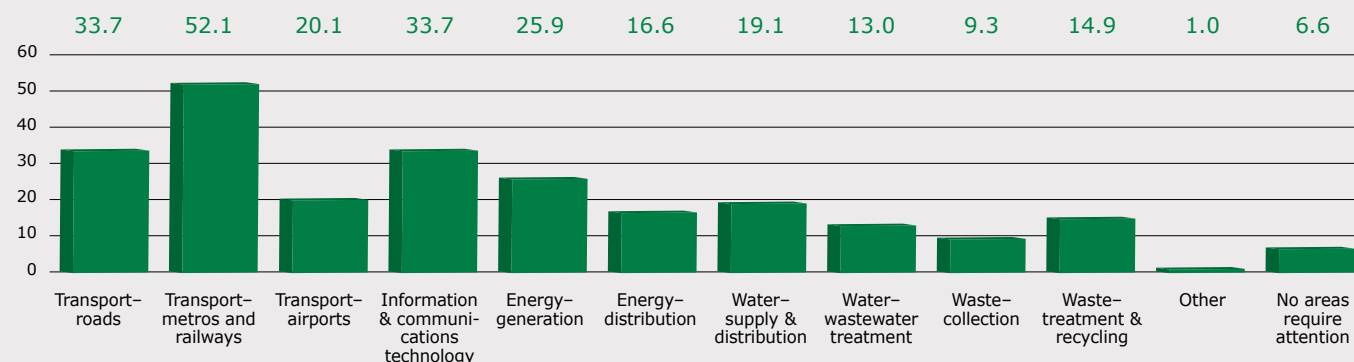
% respondents



## In your opinion, which areas of your country's urban infrastructure and services require most attention in the immediate future?

This refers to new infrastructure and services as well as upgrades and improved maintenance for existing infrastructure.

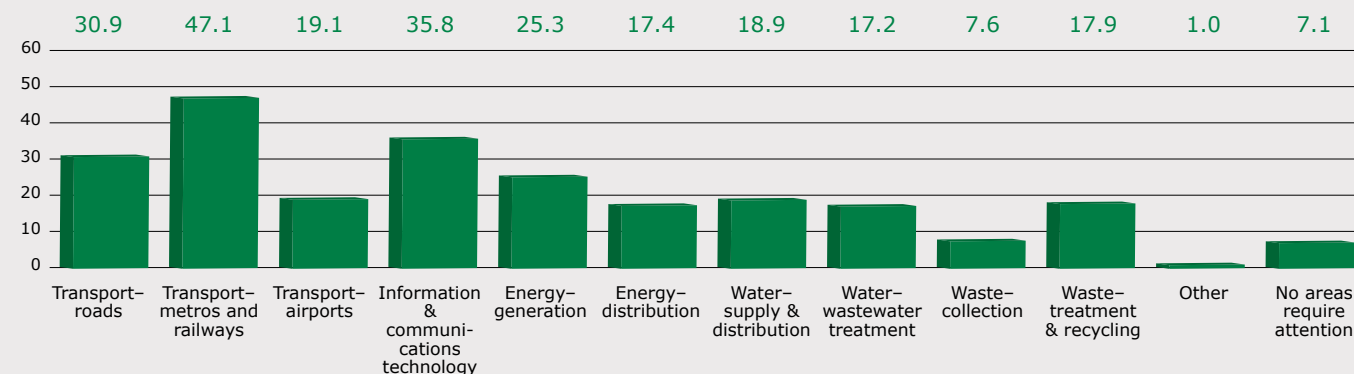
% respondents



## In your opinion, which areas of your country's urban infrastructure and services require most attention in 5 years?

This refers to new infrastructure and services as well as upgrades and improved maintenance for existing infrastructure.

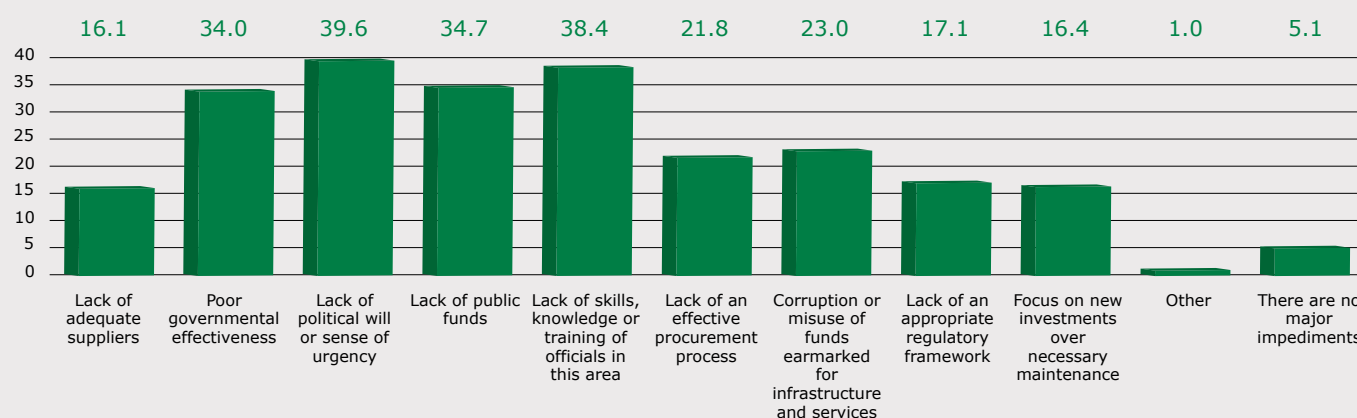
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### In the city in which you are based, which, if any, of the following are major impediments to upgrading urban infrastructure and services?

Select up to three.

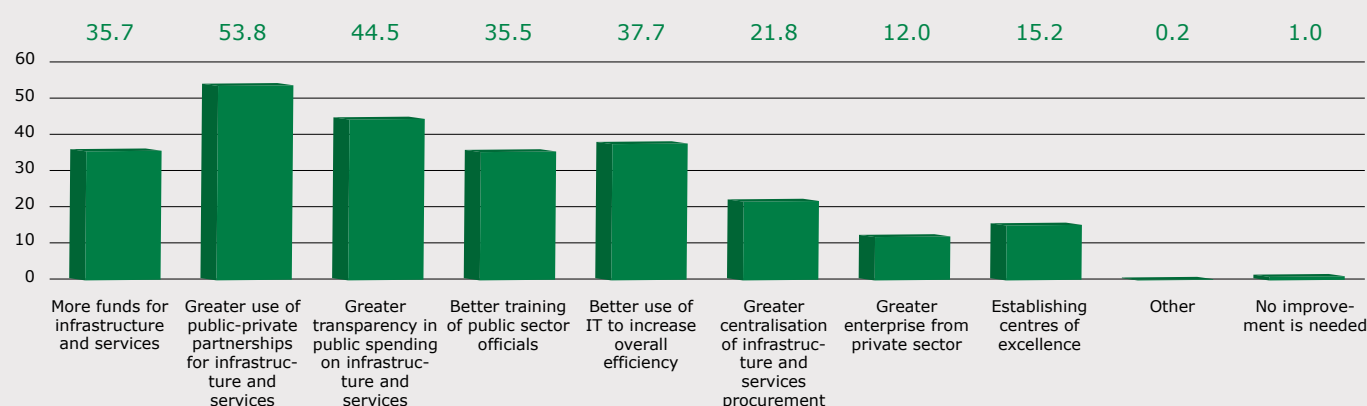
% respondents



### In the city in which you are based, which, if any, of the following factors would produce the greatest infrastructure and services improvements?

Select up to three.

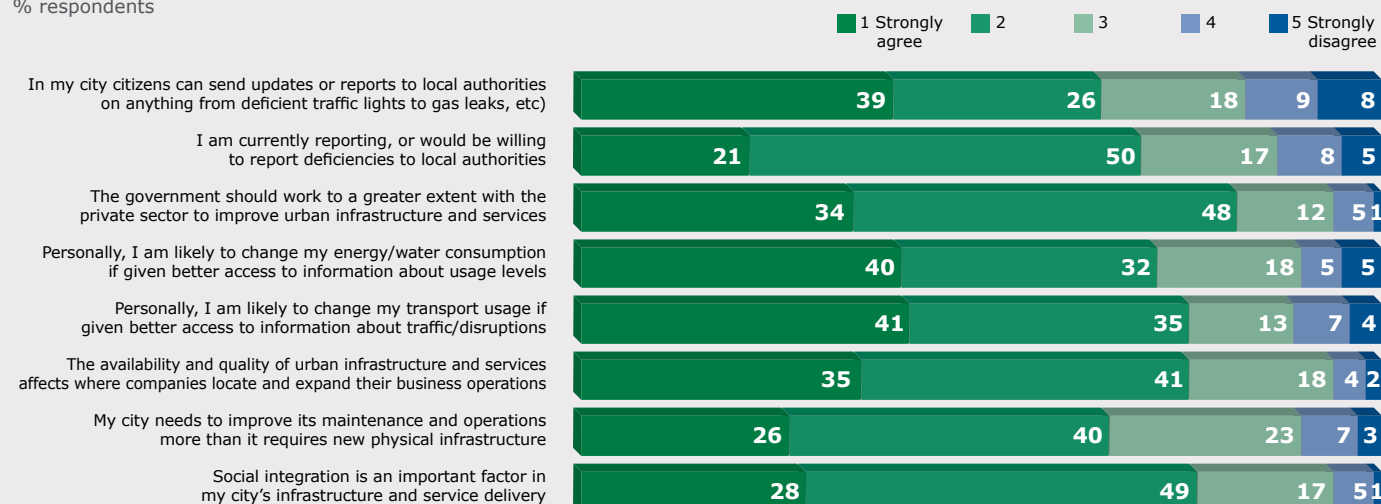
% respondents



### Please indicate whether you agree or disagree with the following statements.

Please rate on a scale of 1 to 5 where 1=strongly agree and 5=strongly disagree.

% respondents

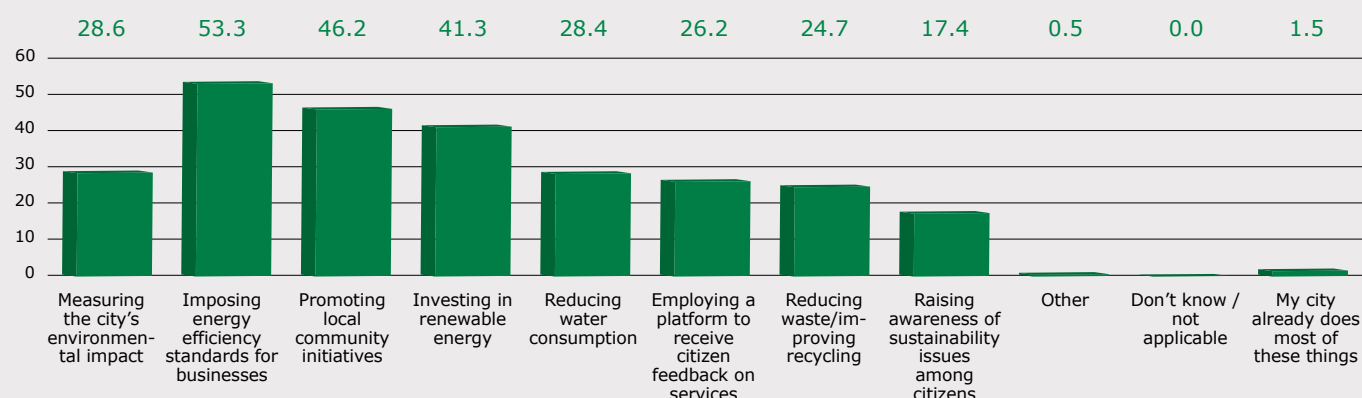




### Which of the following initiatives, if any, do you think your city should engage in to become more sustainable?

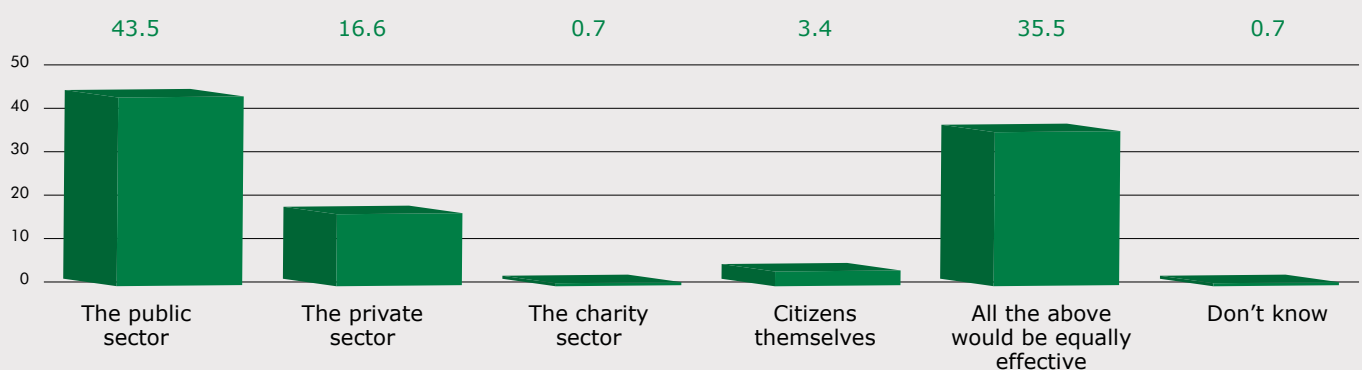
Select up to three

% respondents



### Which single sector of society do you think would be most effective in upgrading infrastructure and services in your city?

% respondents



### Which of the following cities do you consider most innovative in terms of urban infrastructure and services?

% respondents

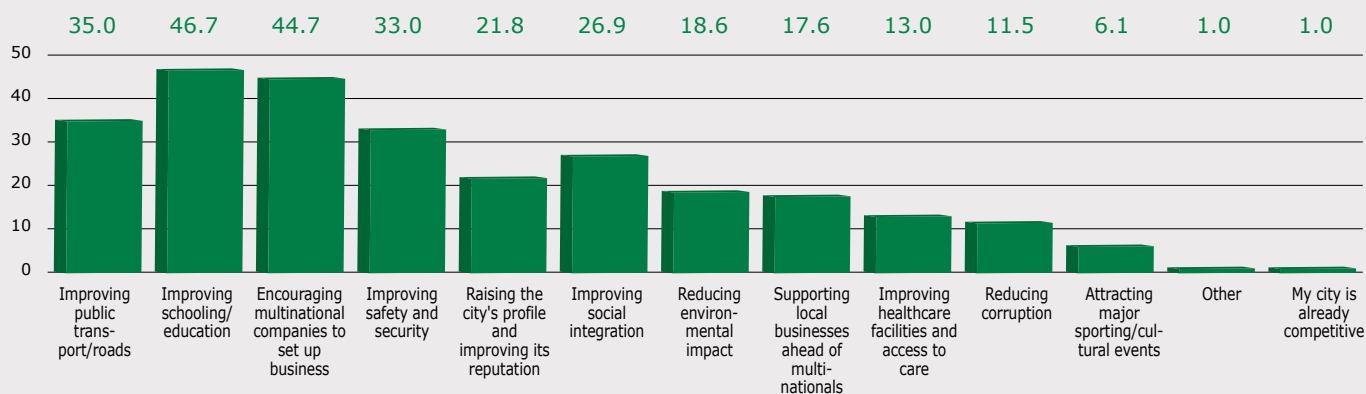




### What do you think should be the priorities for your city's mayor/leadership in order to make your city more competitive for business?

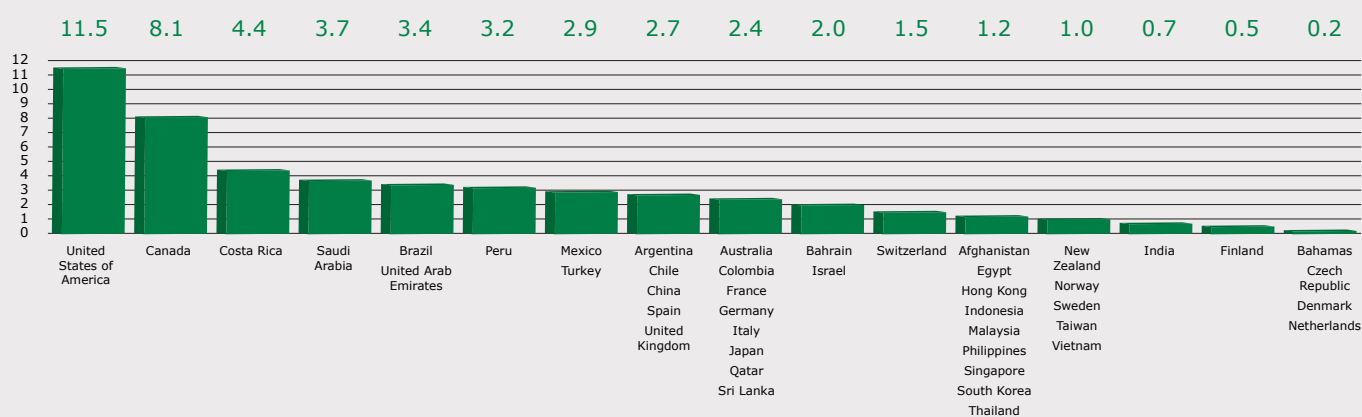
Select up to three

% respondents



### Which country are you based in?

% respondents



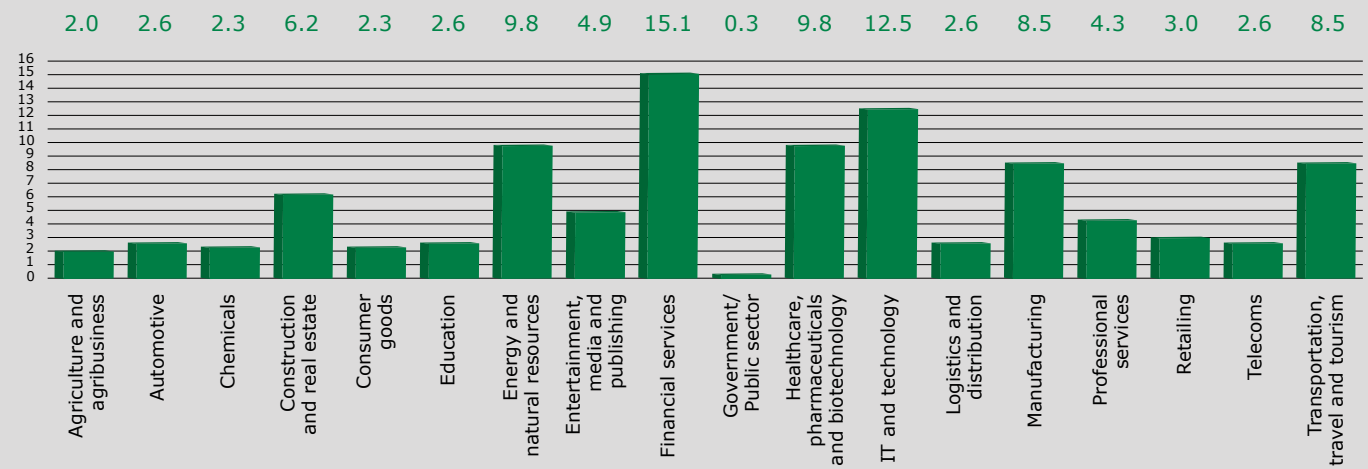
### Which of the following best describes your occupation?

% respondents

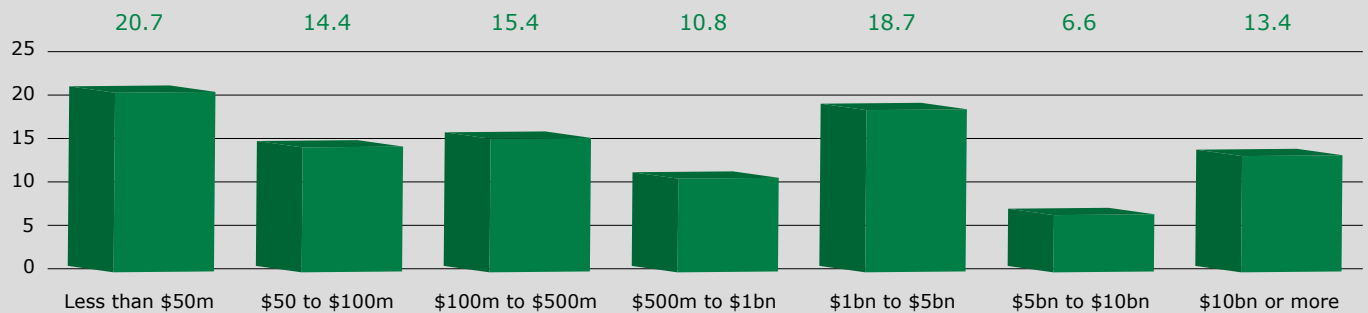


**What is your primary industry?**

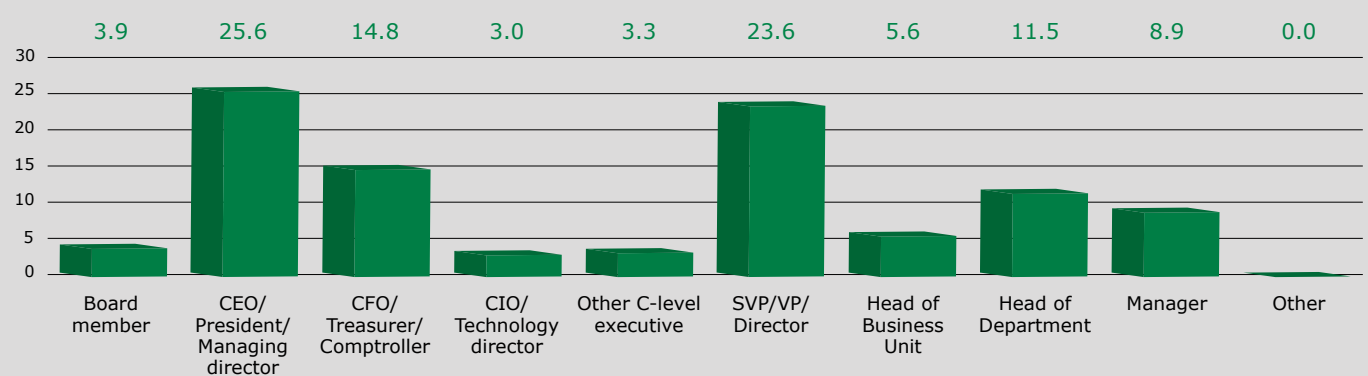
% respondents

**What are your organisation's global annual revenues in US Dollars?**

% respondents

**Which of the following best describes your title?**

% respondents



Whilst every effort has been taken to verify the accuracy of this information, neither The Economist Intelligence Unit Ltd. nor the sponsor of this report can accept any responsibility or liability for reliance by any person on this report or any of the information, opinions or conclusions set out in the report.



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