

# Connecting the cities of the future: smart transport infrastructure

Most people are loosely familiar with the idea of the smart city, even if they don't know the European Commission's (EC's) strict definition. This article explores the topic from the policy-makers' perspective and encourages them to find solutions to some fundamental questions on how smart policy can change a city. By doing so, they can create a competitive differentiator for the city, driving real change and generating cost savings.



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For some years now, policy-makers have been working to take steps toward making their cities “smart” – stitching information and communications (ICT) technology into the urban fabric. Progress has been made in various areas and a wide range of new smart technologies have been developed to push urban environments into the future.

However, working with clients across the globe has shown us that smart city policies are not always as integrated as they could be. As part of a major report into the future of smart cities, *Routes to prosperity: how smart transport infrastructure can help cities to thrive*,<sup>1</sup> EY concluded that, at present, the chief priority for urban policy-makers should be to focus on technology-enabled transport infrastructure, which can have a positive impact on businesses and individuals, and help to attract inward investment.

### How can smart transport infrastructure help

Improving and developing transport infrastructure is likely to be something that urban policy-makers already consider a high priority. Roads, rails and metro networks are the circulatory system of an active city. Good transport infrastructure is a key to economic growth and competitiveness. This type of investment is also extremely cost-effective: the IMF estimates every dollar invested in infrastructure increases output by nearly three.<sup>3</sup>

Policy-makers considering how to invest in their cities should ensure that they spend money on developing the infrastructure of the future by investing in smart transport. Smart infrastructure takes the environment, the economy and residents’ quality of life into account; it improves mobility, accessibility and equality.<sup>4</sup>

## What is a smart city?

According to the EC, a smart city is a place where the traditional networks and services are made more efficient with the use of digital and telecommunication technologies for the benefit of its inhabitants and businesses. It means smarter urban transport networks, upgraded water supply and waste disposal facilities, and more efficient ways to heat and light buildings. It encompasses a more interactive and responsive city administration, safer public spaces and meeting the needs of an aging population.<sup>2</sup>

1. [http://www.ey.com/Publication/vwLUAssets/EY-routes-to-prosperity-via-smart-transport/\\$FILE/EY-routes-to-prosperity-via-smart-transport.pdf](http://www.ey.com/Publication/vwLUAssets/EY-routes-to-prosperity-via-smart-transport/$FILE/EY-routes-to-prosperity-via-smart-transport.pdf), accessed November 2015.
2. “Smart Cities,” European Commission, <https://ec.europa.eu/digital-agenda/en/smart-cities>, accessed November 2015.
3. “Why Public Investment Really is a Free Lunch,” *Financial Times*, 6 October 2014.
4. “Smart Community Infrastructures,” ISO, 2014.

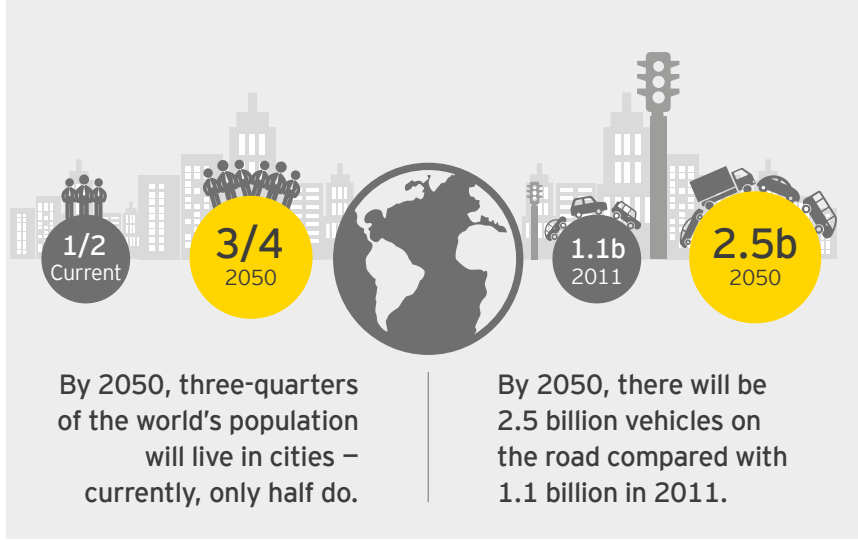


Technology-enabled transport infrastructure has a very positive economic impact, typically providing outsized gains in productivity and economic activity through network effects and other competitiveness boosts.<sup>5</sup>

The need for cities to be more efficient and more environmentally friendly places to work and live will only become more pressing in the coming years. By 2050, the United Nations (UN) estimates that three-quarters of the world's population will live in cities – currently, only half do.<sup>6</sup> Similarly, the number of vehicles on the road in 2011 was approximately 1.1 billion worldwide; by 2050, it will have more than doubled to 2.5 billion.

**So what are the benefits of investing in smart transport infrastructure?**

In the long term, developing smart transport infrastructure has substantial economic benefits. Lasting competitiveness, productivity, innovation, lower prices and higher incomes should all follow from smart transport infrastructure. In terms of lived experience, smarter transport networks ease congestion, reduce logistics, trade and production costs, increase the value of land, and create job opportunities in directly related industries and throughout the economy as a whole.



5. "The UK's Digital Road to Recovery," London School of Economics, 2009.  
6. "SlimCity – A Cross-Industry Public-Private Initiative on Urban Sustainability," World Economic Forum, 2009.

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**Both advanced and emerging economies can benefit from smart investment**

Cities in advanced economies usually don't need to expand infrastructure stock significantly, but they do have a relatively high demand to develop infrastructure systems. Meanwhile, in emerging market cities, expanding the infrastructure capital stock is typically a high priority. In advanced economies, the benefits of focusing infrastructure investment in smart technology include:

- ▶ Additional capacity through new technology, without increasing the capital stock
- ▶ Lower costs for the life cycle of a transport infrastructure system
- ▶ Extended system service life
- ▶ Increased effective capacity of the system

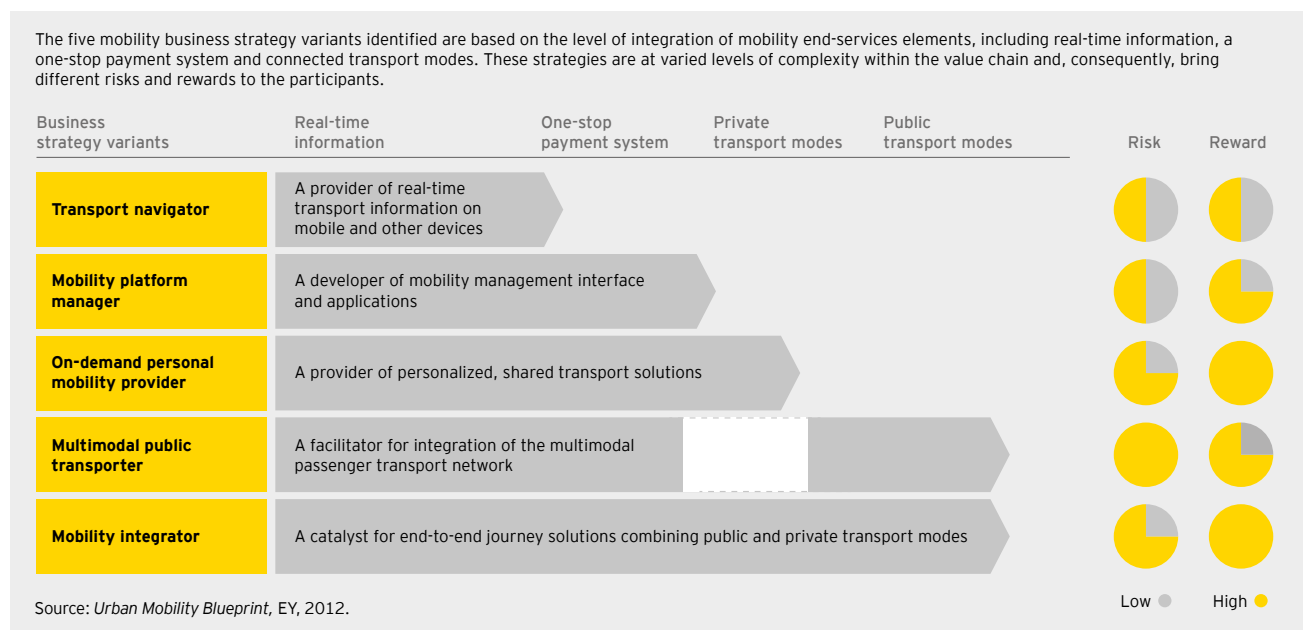
In emerging economies, the advantages of smart investment include:

- ▶ Productive capacity is swiftly scaled up.
- ▶ The traffic, population and environmental challenges of rapid urbanization are better addressed.
- ▶ Longer-term economic objectives are supported.

For both advanced and emerging economies, investing in smart technology yields a much higher rate of return than investing in traditional infrastructure projects. This is due to various multiplier effects, such as the resulting network of connected and ICT-enabled infrastructure. In turn, this fosters new consumer and business behaviors, which, themselves, open up employment opportunities.

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Figure 1: EY Urban Mobility Blueprint – smart, integrated mobility strategies offer substantial economic reward



### Aligning transport infrastructure with a city's purpose

Smart transport infrastructure has the potential to transform a city – and to help shore up economic growth well into the future. But in order to do this, policy-makers need to ensure that they are asking the right questions as they develop their smart strategies.

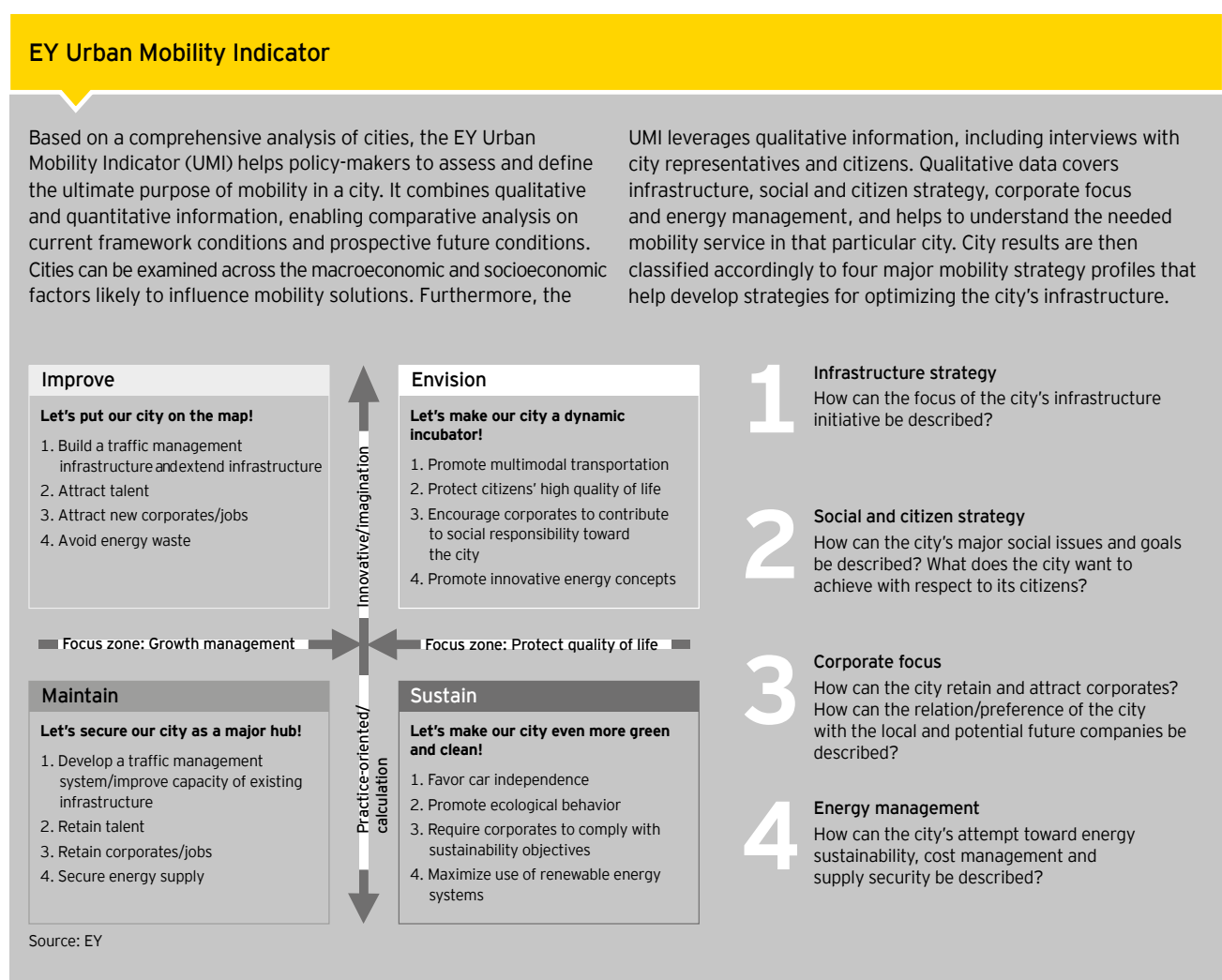
The first step for urban policy-makers is to focus on their cities' purpose – and the purpose of smart transport infrastructure, more specifically. Policy-makers should

focus on high-level objectives as they develop their strategy for smart transport infrastructure. For example, if a city's ultimate goal is to be a livable, sustainable hub for innovative industry, then smaller investments in cost-saving, interconnected smart technologies are not likely to be an effective way to achieve this. Instead, it would be preferable to use a big data analytics approach to transport demand and supply optimization. This would support better demand management, while simultaneously driving compromise on user cost, privacy and customer experience.

Depending on how policy-makers envisage the purpose of their cities, it may be that innovation doesn't have to involve absolutely cutting-edge technology. Instead, for some cities, it could be more profitable to use existing infrastructure and assets in a different way, per the spectrum of mobility strategies presented in the EY Urban Mobility Blueprint (see Figure 1). Policy-makers should also look at the EY Urban Mobility Indicator (see Figure 2), which helps urban administrators to make the right decisions for their cities.

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Figure 2: EY Urban Mobility Indicator



**Integrated policies:  
best-practice examples**

Around the world, we see cities that exemplify best practice lead with an integrated approach to transport policy-making. Effective policy supports the development of integrated transport policies and strategic plans, and helps to improve coordination between existing and new infrastructure.

London is a world leader in integrated transport infrastructure policy. London's successful Oyster card scheme, which allows a single payment device to be used on most forms of public transport, is the result of a coordinated effort between the Mayor's office and Transport for London. Meanwhile, in Germany, Berlin has effective public-private partnerships in place that provide exemplary mobility integrated solutions. Hamburg also runs a successful integrated transport solution, Switchh, which is the result of collaboration between the city's Public Transport Association and two private car hire firms.<sup>7</sup>

**Smart infrastructure:  
economic gains**

If smart mobility investment is to lead to sustained competitiveness improvements and economic growth, it must be aligned with a city's economic and social objectives. And it must also be focused on long-term gains.

In some instances, the integration of long-term economic aims and smart transport initiatives is formalized as part of high-level economic planning. In China, for example, developing smart cities is a key part of national urbanization planning.

Another way for smart transport infrastructure to be embedded in long-term plans is for it to be designed as a targeted and significant source of economic stimulus. In Osaka, Japan, for instance, high-speed railways are linked to local public transport services in order to encourage people to use public transport rather than drive their cars. Reducing the weight of traffic on the roads means that people can make journeys more efficiently, and also helps to reduce carbon emissions. Smart mobility initiatives can also help to develop a city's competitiveness.

Making solid investments in smart transport infrastructure has also helped build capacity in some cities. For instance, The Barcelona Urban Lab is simultaneously committed to improving urban mobility, developing technological solutions in the city and supporting small businesses. Start-ups and small businesses that have innovative ideas for tackling problems in Barcelona can apply for funding via the lab. From the other side, meanwhile, the city's council is able to solve its problems via the lab, while also supporting local business and innovation. So far, the lab has developed projects in parking management and traffic control.<sup>8</sup>

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7. "Was ist Switchh?" *Switchh*, [switchh.de/wps/portal/switchh/was\\_ist\\_switchh](http://switchh.de/wps/portal/switchh/was_ist_switchh), accessed November 2015.  
8. R. Wong, "Seven ways cities around the world are tackling traffic," [agenda.weforum.org/2014/07/seven-ways-cities-around-world-tackling-traffic](http://agenda.weforum.org/2014/07/seven-ways-cities-around-world-tackling-traffic), 31 July 2014, accessed November 2015.



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**Public investment, private capital**

Developing infrastructure can be very capital-intensive. As a rule, city administrations do not have access to the kinds of funds needed to make these infrastructure investments. Because of this, typically, policy-makers seek some kind of private sector funding. However, many businesses associate investing in urban infrastructure projects, particularly in new technology, with high risk.

As a result, city administrators need to focus on making investment opportunities as attractive as possible to potential

private partners. Cities leading the way in attracting private investment focus on providing the infrastructure necessary to accelerate implementation, take-up and payoff to private smart investments. The administrators who have had most success in attracting private investment also tend to use innovative financing mechanisms, including public-private partnerships. China, for instance, has had great success using the “build, operate, transfer” model in the development of urban infrastructure. In Europe, the Horizon 2020 program has also resulted in some very effective private investment.



**Helping cities to thrive**

Smart transport infrastructure can help cities to remain competitive. But they need a quality information platform to achieve this. As a result, city administrators should focus on fundamental issues: the ultimate purpose and value proposition of a city and the experience of the city for its citizens. ■

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**Eight priorities for success**

As we've seen, successfully implementing investment in smart infrastructure in a city requires an integrated, strategic approach that focuses on a city's ultimate purpose and the role of its citizens. City governments must also ensure that the existing infrastructure is aligned with new investment. We've put together eight key drivers for change. Policy-makers who focus on these eight drivers stand the best chance of successfully implementing smart infrastructure in their cities.

Sector strategy	Service delivery
1. Planning integration	5. Organizational effectiveness
2. Policy setting	6. Asset delivery
3. Regulatory role	7. Asset management
4. Operational role	8. Customer experience

Policy-makers can build a very solid smart infrastructure investment program around these eight fundamental drivers. On top of this, at all times, policy-makers should focus on ensuring that:

- ▶ Economic competitiveness is the foundation for their smart transport infrastructure investment decisions.
- ▶ Decision-making on all investment decisions is carefully coordinated.