

# PARTNERING TO BUILD SMART CITIES

**Better communications between local government leaders and technology vendors can encourage the development of connected, resource-efficient urban areas.**

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<sup>1</sup>See Richard Dobbs et al, *Urban World: Mapping the Economic Power of Cities*, McKinsey Global Institute, March 2011, on [mckinsey.com](http://mckinsey.com).

**A study** by the McKinsey Global Institute suggests that the world's 600 fastest-growing cities will account for 60 percent of global economic growth between 2010 and 2025.<sup>1</sup> To achieve and sustain this level of growth—and to acknowledge recent urbanization and climate change trends—municipalities in both emerging markets and developed nations must pay closer attention to the way they manage resources and infrastructure.

Many are pinning their hopes on smart-city projects. Broadly, the term “smart city” refers to the use of innovative technologies in complex urban environments to manage resources and infrastructure in a sustainable way and create opportunities for growth. A city may use intermodal route-planning software, for instance, to help balance the

traffic load across its transportation systems. The same city may use so-called intelligent meters to better match electricity supply with demand, or to detect water shortages. In either case, officials can use the information collected to adjust schedules, equipment, and other variables accordingly, thereby optimizing potentially scarce resources.

Municipalities in Europe and elsewhere already have smart-city initiatives under way, piloting new technologies in certain city districts. The leaders of 22@Barcelona, for instance, are seeking to convert an older industrial area in Spain into a modern, attractive city district offering energy-efficient residential and office buildings and public green spaces as well as a knowledge-sharing environment that will lure innovative companies and workers.

Several technology firms have already established departments dedicated to researching and marketing products aimed at addressing cities' traditional and smart-city infrastructure needs. But the market for such solutions is still quite immature, and the reality is that the technologies that are being implemented in full-scale rebuilding projects may not be suitable for projects in which only incremental improvements to existing infrastructures are required.

Our analysis of 50 smart-city projects in Europe reveals that nearly all were launched as pilots with tailor-made solutions, rather than as scalable initiatives. For the most part, neither city officials nor technology vendors have been willing (or able) to risk investing in large-scale demonstrations—which is why the financing for smart-city projects still comes mainly from subsidies provided by governments and research institutions rather than local budgets. When smart-city initiatives are launched, there is huge variation in the way private- and public-sector representatives collaborate, as well as in how projects are managed within cities.

Our findings reflect the need for city officials and technology vendors to come to a shared understanding about the requirements and restrictions associated with municipal development. The European Union has taken a step in that direction with its creation of the European Innovation Partnership for Smart Cities and Communities, a program designed to encourage investment in large-scale implementation projects from a consortium of EU cities and industry players. But besides pursuing funding from national and supranational budgets, one of the most critical tasks for cities and industry vendors is to spend more time systematically listening to and learning from each other, while still incorporating input from citizens and others in the local business environment. After all, these are the people



who will ultimately use, and in most cases pay for, the solution.

#### **Technology vendors and cities: a complicated relationship**

We wanted to understand how cities and technology vendors could collaborate more effectively on smart-city projects and grow the market for these solutions. So we partnered with the industry network Innovation Roundtable to conduct a series of workshops and roundtable discussions with city leaders and industry vendors from about 30 European cities, mainly in Germany. Those conversations revealed a significant, but not insurmountable, gap between each side's expectations and the realities of smart-city projects (see sidebar "About the research").

#### **What cities expect from technology providers**

Collaboration between cities and industry players in the infrastructure sector started long before the phrase "smart city" appeared, but the implementation of different kinds of complex (and thus riskier) technologies requires vendors to adapt even more to

The "intelligent electric meter" from Yellow Strom between conventional electric meters.

their audiences. The city officials we interviewed saw a lot of potential for improvement in this customer interaction; they also had valuable feedback to share about the current portfolio of products being offered.

**Customer interaction: More appropriately tailored to cities**

From the cities' perspective, many vendors focus too heavily on product presentations and neglect to detail exactly how the proposed technologies can be integrated with existing systems in complex municipal environments. Officials say they are often left wondering whether the vendor truly understands the challenges the city is facing. Specifically, they cited the following issues:

- The vendor's explanation of the technology is too complex.
- The vendor's presentation never references the decisions or specific challenges the city faces. The potential value of the technology is therefore not transparent enough.
- The vendor often neglects to explain how the financing and operating models are meant to work until much later on.
- The city's core issues are not adequately taken into consideration. This is especially true in cases where data protection, dependency on providers, and the reliability of the technology are in question.

**Product portfolio: Suitable solutions for medium-size cities**

City representatives offered these three main concerns about technology firms' products and services:

**A focus on megacities.** City officials believe that technology vendors target most of their attention on megacities and then try to sell the same project-based solutions to a mass market of smaller cities. This does not

work, city leaders say, because the products and services created for megacities are often inappropriate—by measures such as functionality, complexity, and cost—for classic European cities with about a half million inhabitants.

**No integration of solutions.** The city leaders we spoke with do not feel as though vendors are offering outstanding expertise in integrating solutions, delivering operating models, and incorporating technology into the city's local ecosystem—for instance, discussing how to involve local partners, and at what stages of the project.

**Proprietary solutions.** Many cities are anxious about becoming dependent on a single technology and provider in the course of implementing a smart-city solution. Industry standards for smart-city technologies are still emerging, and no one wants to be locked in for the long term.

**What technology vendors expect from cities**

Technology-firm managers shared with us these three main opportunities for improvement regarding their interactions with city officials:

**A clearer agenda.** The managers perceive that many cities are dealing with smart-city concepts one project at a time, without an overarching agenda. This is less than optimal from the vendor's perspective, since more important city projects could crop up and undermine the city's long-term investment of scarce financial and political capital in a smart-city infrastructure. The vendor therefore has less incentive to commit. Complicating matters further, smart-city technologies by their very nature veer from the status quo—which means they may have a harder time getting added to the

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agenda in the first place. In their considerations of new technology investments, city stakeholders may favor bids that reference solutions that have been used to that point. They may limit their support for riskier solutions.

**Less-complicated stakeholder and project management.** Vendors told us that city officials fail to recognize how cumbersome the management of smart-city projects can be for technology providers: these projects typically involve many different stakeholders from within a city and from other levels of government. A traffic project in one major city required participation and input from no less than 13 different city and government agencies, for example. In another city, responsibility for its various websites was split among several different people, and the webmaster controlled only half the sites.

**Citizens' support.** The introduction of new technologies always prompts some level of skepticism and pushback, so it is critical for those who will ultimately be affected by (and pay for) the smart-city project to participate in discussions about its usage and potential effects. The managers we interviewed noted there are limits to what they can do to convince local citizens about a project's potential benefits and outcomes. City administrators must therefore take the lead in gaining support for the proposed project—outlining the branding and quality-of-life benefits along with the financial advantages. The decade-long German railway and urban-development project Stuttgart 21 provides a lesson in how vital citizens' participation is to success in major infrastructure projects: citizens and advocacy groups that had not been involved at the beginning of the project spoke out against the mounting expenses and environmental impact associ-

## About the research

In 2012, together with the Innovation Roundtable (IRT), we started a series of workshops and discussions with more than 60 representatives from 30 European cities (mainly in Germany). The IRT is an informal network of high-ranking research managers from renowned German companies in various sectors. Based on the workshop results, a smart-city panel was formed; this group meets regularly to discuss cities' innovative technology projects and different funding options, and to exchange ideas associated with smart-city development. The recommendations highlighted in this paper are an outgrowth of this initiative.

ated with Stuttgart 21, and the project turned into a political lightning rod. It was a key factor in the 2011 state elections.

### **Bringing cities and vendors together**

So, city officials believe the industry does not understand them, and technology vendors think dealing with cities is too complicated. For these perspectives to change—and for smart-city development to grow and become a viable approach for economic growth—both sides must come to the table. Here are some recommendations for bridging the gap.

### **Recommendations for technology firms**

**Tailor your discussions with cities.** Vendors should fundamentally rework their approach to selling products, emphasizing how

Exhibit 1

## Project presentations should be tailored to each city's individual needs.

Topics that should be covered in a presentation to city leaders



solutions can be implemented and not the nuts-and-bolts of the purchase process. They should present fewer details about the technical aspects of the hardware or software in play and answer more questions about how it will be used from day to day: What is the operating model? Who among the local partners needs to be involved in its rollout, and to what degree? Potential concerns about data protection and interoperability should be addressed during the first meeting with city officials (Exhibit 1).

**Develop solutions for midsize cities.** Companies need to offer affordable solutions for medium-size cities as a complement to their existing solutions for megacities. After all, conurbations with between 150,000 and 5,000,000 inhabitants in the European Union account for 42 percent of GDP, whereas megacities with more than 10,000,000 inhabitants contribute just 12 percent

(Exhibit 2). Medium-size cities need smaller-scale solutions. Technology firms will need to research and design standardized products that are pitched directly to this cohort—products that incorporate lessons from larger smart-city projects but also factor in the needs and opportunities that smaller cities face. Pricing structures and financing options may need to be configured differently, for example, given the unique programs and infrastructures found in smaller cities.

**Ensure interoperability.** Vendors need to take cities' concerns about being dependent on a single provider seriously and address them explicitly. One viable option would be to use “open” interfaces that allow for better integration with existing systems and that enable cities to switch to another provider (if necessary) at the end of a contract. This would require the development and enforce-

ment of industry standards, especially for data exchange (such as the Open Metering System used with smart electricity meters). Although it may seem more appealing to lock in cities for the short run, using open interfaces will increase total market size (and potential business for vendors) in the long run. The national and supranational agencies that are subsidizing the adoption of smart-city technologies are increasingly including “interoperability” as a prerequisite in their applications for funding—a development that vendors are not yet prepared for. And more cities will be willing to implement smart-city solutions if they do not need to fear a long dependency.

### Recommendations for cities

For smart-city projects to gain traction, technology vendors told us, city representatives need to be strong partners who make fast, sustainable decisions. Their responses point to the following three main actions for municipalities embarking on smart-city projects.

**Formulate a clear political agenda.** A project implementing new technologies poses challenges that are different from, say, an initiative to renovate roads. It requires clear political will and strong support from both local government and city administration. Officials may want to rethink the current

Exhibit 2

## Medium-size cities account for more than 40% of GDP.

2010, %<sup>1</sup>

GDP of EU cities by city population, share of total GDP			Share of population	Number of agglomerations/conurbations	
100% = €12.3 trillion					
	Megacities	12	>10 million people	8	3
	Large cities	9	5 million–10 million people	6	5
42%	Midsize cities	19	2 million–5 million people	17	27
		23	0.15 million–2 million people	23	196
	Small cities and rural regions	37		47	

<sup>1</sup>Figures may not sum to 100%, because of rounding.

specifications in their request-for-tender processes, for instance, to allow for the application of innovative solutions. In Bottrop, Germany, for example, the city council and city administration jointly approved a model city agenda with the goal of greatly reducing carbon dioxide emissions (see sidebar “Innovation City Ruhr: Bottrop as a blueprint for a region”). Subsequent projects that contribute to this goal are now easier to get approved because there is already a fundamental consensus; all parties are committed to adopting innovative approaches. The story was the same in another German city, which partnered with a telecommunications provider on several projects designed to improve city operations and citizens’ quality of life—adopting a smart metering system, for instance, and an online program for registering children for kindergarten. This partnership required a multiyear commitment between the technology vendor and city councilors and administrators. Because this commitment was in place, a subsequent leadership change did nothing to weaken the broad support for this smart-city agenda.

**Bundle responsibilities.** As we noted previously, smart-city projects require involvement from numerous departments of the city administration, local companies, and organizations. Cities need to help vendors by mapping these partnerships, defining roles and responsibilities, and serving as a central point of access for negotiation and information. For example, officials in Berlin created a dedicated management entity that is responsible for coordinating activities associated with the development of the Urban Tech Republic project in the area of the soon-to-close Tegel airport. The conversion of this site will require high levels of coordination among local and federal authorities, multiple technology vendors, a handful of

research institutions, and local citizens. The management entity not only serves as a central point of contact for all these constituencies but also contributes much-needed project-management expertise.

**Engage citizens and local businesses.**

City officials need to devise a compelling story to engage the citizens and local businesses that are intended to benefit from an intelligent infrastructure. For instance, one city was looking for innovative uses for its redevelopment sites. Instead of acting unilaterally, however, and issuing directives, city officials assumed the role of coordinator and sought input from a range of stakeholders. Over the course of many events and workshops, it compiled and debated ideas submitted by citizens, administrators, experts, associations, and local businesses. At the end of the process, it was able to produce a white paper listing potential new uses already endorsed by large sections of the population, thereby making it more likely that the recommendations would be approved.



Innovative technologies can help improve life in cities, make economical use of resources, and ensure stable economic growth. But there are numerous obstacles to overcome to ensure the successful realization of smart-city concepts. Our interviews with leaders in industry and local government, as well as our analysis of intelligent-infrastructure projects in Europe, paint a picture of a still immature market. Cities, technology vendors, and public funding institutions alike need to work together to further develop this market. Indeed, only strong, systematic collaboration and learning among all the players involved will truly turn this into the century of smart cities. ■

# Innovation City Ruhr: Bottrop as a blueprint for a region

The Innovation City Ruhr project in Bottrop, Germany, is a prominent example of a joint effort from industry players and a city administration to develop a smart city.

Bottrop is a city of around 120,000 inhabitants located in the western part of Germany. Given its population size, Bottrop could be considered a small city or rural region. But it is part of the Ruhrgebiet, a large conglomerate of mostly midsize cities that are home to more than five million people. As such, Bottrop has developed an infrastructure, labor market, and other characteristics similar to those of midsize cities. The Ruhrgebiet was the industrial heartland of Germany for a very long time but has suffered from deindustrialization over the past few decades. Several of the cities in this area are now looking for new ways to attract investments.

In 2010, a group of companies from the Ruhrgebiet launched a competition to identify a city that could serve as a model for reducing the carbon footprint in an industrial region. Its best practices could then be passed on to other cities in the region and, eventually, to other industrial cities around Europe. For the convening companies, the winning city would provide a real-world demonstration of the value of smart-city solutions.

Bottrop won this competition by presenting a clear commitment to reducing the city's carbon footprint from all its political players; the mayor was part of the project evaluation committee, for example. Additionally, more than 20,000 members of the Bottrop community expressed their support in the application process.

The overarching agenda—to radically reduce Bottrop's CO<sub>2</sub> emissions—



of more than 120 projects across the city, all of which are coordinated by a management company dedicated to just this task and paid for by a local industry group. This company offers a single interface into the city administration for all vendors and handles a number of complex stakeholder-management tasks, including communicating with federal and EU funding agencies.

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