The Path Toward Smart Cities: Best Practices for Action

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The awareness of the potential of Smart Cities has grown exponentially over the past year as governments realize that they can positively alter the lives of their citizens with technology and data-driven opportunities. As government leaders start to transform their organizations through the application of technology to real business challenges, from civic apps to smart streetlights, they are also looking for a roadmap to shape their thinking about the future and to provide a path toward transforming into a Smart City.

The following questions were posed by Phillips Lighting to Ruthbea Yesner, Vice President of IDC Government Insights and global director of its Smart Cities Strategies practice, on behalf of Phillips Lighting's customers.

Q. What are the near-term actions that cities and communities must take to help accelerate the development of Smart Cities?

A. The Smart Cities mission can be described as “outcomes-based digital transformation” that uses new methods of innovation and creativity, as well as new sources of information, to enhance experiences, increase sustainability and resilience, and improve financial and operational performance. To transform and to address long-standing urban challenges is a complex undertaking. As the deployment of Smart City projects becomes more prevalent, there are four key areas to address in how cities manage transformation and innovation:

   **Process:** Cities must consider how to respond and change work processes as a result of new and real-time data, train and support staff to adapt to new routines and attitudes, and measure success with new KPIs. Finding the right partners for properly scoped projects and developing RFPs that lead to the best choice of solution providers is also important.

   **Governance:** Governance issues for pilots and projects, including important questions around data ownership and management, security, and new procurement models must be addressed upfront.

   **Platforms:** There are technology considerations around developing Smart City platforms without compromising on open IT and co-experimentation. A key component of this is architecting Smart City initiatives to connect disparate operations and siloed processes, starting with smaller, focused, department-level projects and growing, step by step, to larger-scale city systems.
Talent: Retraining existing staff and finding experts in the process of innovation is very important. This process includes engaging top-level leadership in developing and supporting the short- and long-term vision of the city; all successful Smart Cities are backed by the Mayor and/or City Manager. It also means creating new organizational structures to bring different departments together for decision making.

Finally, no city can operate without understanding the community’s needs and wishes. While many initiatives center around public safety, transportation, and civic engagement, a good rule is to start with projects that are publicly noticed and can be concretely measured. Such projects clearly demonstrate the benefits of Smart City investments.

Q. What kinds of cross-departmental structures are cities creating to facilitate Smart City projects?

A. Smart City projects often begin with or are promoted by municipal leadership such as a Mayor or City Manager. However, while senior leadership may have a strong vision, the implementation of that vision requires a dedicated team of employees, access to outside expertise, availability of funding sources, and, perhaps most importantly, workers with the skills to manage the innovation process, build consensus with stakeholders, and encourage change and new ideas. To deal with these challenges, cities have created new organizations to oversee the Smart City strategic plan and staffed them with community catalysts to take charge of the success of these initiatives.

The most common and effective cross-departmental structure is the development of an internal Innovation or Smart City department. This group often reports to the Mayor or City Manager, but it also is directly tied to the CIO and led by the Chief Innovation Officer or Director of Smart City programs. The team brings together stakeholders to make IT investments tied directly to specific business outcomes. They are experts in managing the innovation process and engaging key employees from various departments. IDC’s research shows that departments account for one-third of Smart City project budgets and make 40% of project decisions, so this team serves as a vital intermediary between the Mayor’s office and the department heads.

There are also organizations that bring together different city stakeholders with experts from other levels of government, other jurisdictions, or universities. The MetroLab Network focuses on creating partnerships between cities and universities, and the Global City Team Challenge brings together federal, state, and municipal agencies around specific issues, such as public safety or transportation.

Other types of organizations also offer unique structures for accelerating Smart City projects. Quasi-municipal non-profit organizations, such as co-funded innovation centers, operate outside some of the rules governing cities. They offer flexibility in procuring services and trying new technologies. This model also allows cities to test new types of working relationships as an alternative to the traditional buyer-seller model for products and services. Examples of this model include Forum Virium Helsinki, the Dallas Innovation Alliance, and Chicago’s UI Labs, among many others.

Q. What key technologies should we consider in enhancing our Smart City efforts?

A. As digitization increases and physical systems become digital assets, it is fundamental for cities to connect disparate systems and siloes to gain better insight, achieve operational efficiency, and create new services that businesses, tourists, and communities expect. Smart Cities must harness the data from smart devices, networks, cloud infrastructure, applications, and analytics to develop new insights, products, and services. This is not an
easy task. It requires scale and interconnectivity to move beyond siloed, departmental initiatives supported by disparate systems in order to achieve cross-departmental data sharing and a more unified systemic view of city operations. While this is still an immature investment area for cities, many are beginning to work on a platform strategy to enhance their Smart City efforts. Smart City platforms are cloud-based systems that integrate smart technologies to enable the rapid delivery of new applications and create a connected ecosystem.

The term "platform" is used for many types of component capabilities and is important to a Smart Cities system which includes management of devices, connectivity, data, analytics, and intelligence via visualization tools and dashboards, and application enablement. Underpinning these capabilities are the underlying needs for cost containment, interoperability, security, and the flexibility to take an iterative approach to new service innovations. Given the fragmentation of existing legacy systems, and the large amounts of devices and resulting data coming from new systems, true integration may not be possible for a unified view, and the goal must be toward interoperability. A cloud-based platform can rapidly deploy and test new solutions to allow flexible scaling up or down of deployments, and it can provide access to an ecosystem of providers, such as vertical specialists and local suppliers.

IDC believes the platform conversation should be focused on the long-term "system of systems" strategy in which different systems interoperate. For example, surface transportation systems are connected to law enforcement systems, and both are connected to lighting systems. In short, as discrete smart initiatives develop, there is the potential to work with systems integrators to connect to other smart things and smart systems that share data, communicate events, and work together via a platform. It is this system of systems that provides the basis for solving systemic and complex urban problems.

Q. What is smart, connected lighting and how it is a catalyst for Smart City development?

A. Smart, connected lighting includes city or utility-owned light poles on streets, bridges and highways, pedestrian and bike paths, and in parks and residential neighborhoods. These light poles, estimated at over 320 million worldwide, serve a growing purpose in Smart Cities as a potential source of ubiquitous electrical power that is at an elevation advantageous for a sensor and connectivity platform. The availability of streetlights as connected infrastructure is key to more quickly and easily getting a Smart City project underway.

IDC defines connected lighting as LED lighting that is IP-connected and whose physical infrastructure is used for additional connected devices which collect and transmit data to the community, utilities, the private sector, and multiple government departments. Connected lighting offers tremendous benefits to cities, including:

**Energy savings**: LED bulbs offer energy savings because they deliver the same light at lower wattages than mercury or high-pressure sodium bulbs. Their software enables dimming and brightening according to need. LED lamps also last 3 to 4 times longer than legacy bulbs and are estimated to use 1/10th the amount of energy.

**Better customer service and operational savings**: The longer lifespan of LEDs reduces installation and replacement costs. They can also be remotely monitored and managed, reducing onsite visits and lessening fuel and staff costs. Automatic outage detection also reduces false alarms and 311 complaints, and operators can quickly schedule repairs. Improved lighting provides better visibility for roads and pedestrians.
Platform for Smart City services: Smart streetlights that use networked LEDs can become a platform for other services with lower incremental costs. The streetlight network can be used for EV charging stations, public Wi-Fi, smart parking, traffic light controls, and other community services. Various sensors could be mounted on the lamppost, routed through the network, and managed remotely. Popular use cases include: air quality and environmental sensors to determine particulate levels or dangerous particulates, noise sensors for loud disturbances or detecting gunshots, and irradiance sensors to assist with grid balancing.

There are interesting examples of connected lighting around the world. In Cardiff, Wales, some 14,000 LED streetlights connect wirelessly to a central dashboard that monitors and controls the network. Beyond the estimated 50% in energy savings, operators can continuously manage and respond to environmental changes such as increasing light levels when schools let out. The infrastructure scales so additional sensors can be easily added. In New York City, the Tappan Zee Bridge will have 2,700 architectural and 500 road surface LED lights managed by a cloud-based system. Both systems will be remotely monitored and controlled in a unified dashboard. The lights will enable the bridge to improve road visibility and safety – and even provide choreographed, color light shows.

Q. Given that connected lighting solutions are relatively new, what are some best practices in developing RFPs with the right specifications?

A. Once a city has identified connected lighting as an investment area, there are some important best practices to implement. Start with a clean slate for how RFPs are drafted and developed. Traditional lighting contracts or concessions are not necessarily the right fit. Do more research than usual prior to developing an RFP. Consider a Request for Information, surveying providers on their capabilities, or inviting key players to give presentations to the city. If possible, look at other public RFPs in similar areas.

Next, identify the desired business outcomes including how success is measured. This often requires bringing together internal and external stakeholders to agree on the investment priorities. A connected lighting solution may have a top priority in terms of energy and operational savings, but a secondary goal to monitor traffic and improve road safety. In short, the technology chosen must support the desired outcomes, so identifying these outcomes first is important. Then, develop an RFP that is less prescriptive and focused less on the technology specifications and more on which technologies achieve the desired outcomes.

Be sure to identify the policies, ordinances, and other requirements that are potential roadblocks to the business outcomes your city wants to achieve. In some cases, it could be worth considering whether they can be modified.

Finally, look for a truly innovative and collaborative mindset from solution suppliers. Cities will not develop these solutions in-house. Connected lighting solutions will be long-term relationships. Look for providers that embrace interoperability, can work with other suppliers, and have open, modular, and adaptable solutions that can grow with your city’s needs.

ABOUT THIS ANALYST

Ruthbea Yesner is the Vice President of IDC Government Insights and the global director of the Smart Cities Strategies practice at IDC. In this practice, Ms. Yesner coordinates the Smart City team and Smart City research worldwide. Her research discusses the strategies and execution of relevant Smart City technologies and non-technology best practice areas, such as governance, innovation, partnerships, and business models essential for Smart City development. Ms. Yesner’s research includes the Internet of Things, big data analytics, cloud computing, mobility and social media in public works, transportation, public safety, smart water, community engagement, and Open Data initiatives.