

The network-sharing model at the core of this project allowed the private firm to make an up-front investment in new and improved IT infrastructure, providing Wi-Fi throughout the city council's buildings and at access points in the outdoor network, while at the same time generating new revenue for the city. In addition, it has been reported that the operating costs for the city's IT administration increased by no more than EUR 7,400 per year.

Between 2011 and 2015, the number of city council buildings with fiber optic connections grew by 26.2 percent, the number of kilometers of fiber optic cable laid increased by 116.8 percent, and the number of Wi-Fi hot spots increased by 119.39 percent. Despite a change of government, the contract was not affected, though the previous smart city strategy was reevaluated.

### Lessons Learned

The project reportedly yielded benefits for both Barcelona's public administration and its residents, including improved service in the city council's offices and the expansion of Wi-Fi service throughout the city. It is also reported, however, that legal and regulatory changes have made it more difficult for Tradia to sell the spare network capacity.<sup>70</sup>

This project highlights the following:

- Innovative project structures, such as bundling several IT services and contracts that were

previously separated, can facilitate better and more efficient management and operations, while also making the project more attractive to private investors. At the same time, this may help guarantee the same quality standards across the bundled services.

- PPPs should be pursued purposefully, with clear objectives and justifications for procuring a private partner. In this case, the city evidenced a clear and consistent development strategy, which facilitated the cooperative design of the project with prospective private operators in advance of the tender.
- Permitting the sale of the new infrastructure's spare capacity provided an additional and innovative funding source. Creative approaches to additional funding mechanisms can help make PPPs more commercially viable and appealing to the private sector.
- Permitting the sale of the new infrastructure's spare capacity was a creative funding source that made the project more commercially viable and appealing to the private sector.
- Municipal PPPs may be subject to unforeseeable impacts resulting from decisions made by higher levels of government. Municipal PPP agreements should plainly allocate the risks related to changes in law and regulation and, to the extent possible, include responsive mechanisms that protect both parties.

## 32. Next Generation Nationwide Broadband Network, Singapore



Photo Credit<sup>71</sup>

### Background

To enhance Singapore's global competitiveness and meet its future economic and social needs, the Singapore government decided to develop a new Next Generation Nationwide Broadband Network (NBN). The NBN involved a fiber-to-anywhere network project offering open access, competitively priced, ultra-high-speed broadband access from

1Mbps to 1Gbps for consumers and businesses. To this end, the Singapore government decided to pursue a PPP to leverage private sector innovation and capacity and optimally allocate the risks, rewards, and responsibilities between public and private sectors.

<sup>70</sup> Salvador, Jordi, Joan E. Ricart, Francesc Trillas, and Miquel R. Planas. *Barcelona Gix: IT Network Integration (Spain)*. IESE Business School: Barcelona, 2017. Accessed January 26, 2019. <https://www.iese.edu/wp-content/uploads/2019/03/ST-0445-E.pdf>.

<sup>71</sup> Someformofhuman ([https://commons.wikimedia.org/wiki/File:Singapore\\_Skyline\\_Panorama.jpg](https://commons.wikimedia.org/wiki/File:Singapore_Skyline_Panorama.jpg)), „Singapore Skyline Panorama“,

<https://creativecommons.org/licenses/by-sa/3.0/legalcode>

### Project Structure

Using a two-stage competitive bidding process, the government selected the OpenNet Consortium as the Network Company (NetCo) responsible for the passive infrastructure of the NBN (e.g. the fiber optic cable) and Nucleus Connect as the Operating Company (OpCo) responsible for the active infrastructure of the NBN (e.g. routers, switches, and network access equipment). NetCo would receive financial support from the government of up to SGD 750 million (USD 550 million), while OpCo would receive up to SGD 250 million (USD 184 million). The private partners would need to cooperate to design, build, and operate the all-fiber optic network, to connect every home, office, and institution in Singapore.

Under this PPP scheme, the government is responsible for timely disbursements of public funds and establishing an appropriate regulatory framework for the Next Generation NBN to support market investments. The private partners are responsible for implementing a sustainable business model for the Next Generation NBN over the longer term, deploying technological solutions and technical expertise, and understanding and meeting the needs of end-users.

<sup>72</sup> IDA. *Building Singapore's Next Generation Nationwide Broadband Network: Towards a Next Generation Connected Nation*. Singapore: IDA, 2010. Accessed February 17, 2019. [http://www.itu.int/net/wsis/stocktaking/docs/activities/1291981845/Towards%20a%20Next%20Generation%20Connected%20Nation\\_Singapore.pdf](http://www.itu.int/net/wsis/stocktaking/docs/activities/1291981845/Towards%20a%20Next%20Generation%20Connected%20Nation_Singapore.pdf);

Infocomm Media Development Authority. n.d. "What is the Singapore Next Generation Nationwide Broadband Network?". Accessed February 17, 2019. <https://www.imda.gov.sg/industry-development/infrastructure/next-generation-infocomm-infrastructure/wired/next-gen-nbn/what-is-next-gen-nbn/industry-structure>;

Grewal, Harin. "Case Study: Singapore's Next Generation Nationwide Broadband Network." Presentation, Singapore, November 16, 2019.

<sup>73</sup> Paul Sableman ([https://commons.wikimedia.org/wiki/File:KC\\_Streetcar\\_\(31551392370\).jpg](https://commons.wikimedia.org/wiki/File:KC_Streetcar_(31551392370).jpg)), „KC Streetcar (31551392370)“, <https://creativecommons.org/licenses/by/2.0/legalcode>

### Lessons Learned

The Next Generation NBN began commercial operations in August 2010. Since then, competitively priced fiber-optic broadband services have become available for businesses and private consumers through more than 12 different service providers and over 40 fiber-optic based broadband access plans. The project benefits not only individual consumers and businesses but also information communications (infocomm) companies. In particular, individuals benefit from richer mobile and wireless services, businesses benefit from ready access to a robust network that supports data-intensive transactions, and the infocomm companies benefit through the expanded infocomm market. The expanded market can open up new revenue streams and business opportunities.<sup>72</sup>

This project highlights the value of an open, transparent, and competitive procurement process and conducting robust project preparatory work, which helped allow this project to be delivered at a low cost without compromising the efficiency or effectiveness of the infrastructure. Key efforts in this respect included conducting studies of overseas deployments and engaging and consulting with the private sector closely and early in the process to better understand the project's impact and implication and, at the same time, to understand the type of government support required to incentivize the industry.

### 33. Free Public Wi-Fi and Interactive Kiosks Project, Kansas City, United States



Photo Credit<sup>73</sup>

#### Background

Cisco and Sprint, two major IT companies in the United States, proposed an unsolicited project to the Kansas City government to install free public Wi-Fi and interactive kiosks. These facilities would provide internet access to residents and visitors

through their mobile devices. The project further promised to streamline the city's operations, stimulate economic development, and improve the quality of life of the city's residents. The free public Wi-Fi and interactive kiosk project would use the existing Sprint Wi-Fi network, which was already serving as the backbone of Kansas City's Smart City framework. The Kansas City government accepted the proposal.

#### Project Structure

After carefully negotiating the security and contract terms, an agreement between the Kansas City government and Sprint+Cisco was executed in June 2015. Under this agreement, the private companies would install devices that provide free public Wi-Fi along the 2.2-mile Kansas City streetcar line. They would further install a series of 25 interactive digital kiosks for smart lighting and video surveillance along the streetcar line, which would use Sensity's NetSense platform. This is an intelligent Internet of Things (IoT) platform that can transform each lighting fixture into a sensory node, thereby saving money and energy, while the video