

Case study

Implementing ITU-T International Standards to Shape Smart Sustainable Cities: The Case of Singapore

Country: Singapore

Level: Local

SDG Addressed: SDG 11 – Sustainable Cities and Communities

Summary

In 2015, Singapore began collaborating with the ITU to implement the KPIs on smart sustainable cities and refine them with the help of other UN agencies. Singapore and its many institutions launched an ITU KPI pilot project called the *Smart Nation Initiative*, which addressed a variety of subjects including transport, home and environment, business productivity, health and enabled aging, and public sector services. These KPIs were specifically designed to comply with existing indicators used by other cities to help transition Singapore towards becoming a smart nation and to measure its progress.

To address these challenges, Singapore reorganized several of its ministries under the Smart Nation Programme Office based upon their ties with the private sector and general public. This decision allowed for greater connectivity between Singapore's institutional and communicative infrastructures, which are attributed to their sustainable advancements for the city-nation. Specifically, more comprehensive links were established with ICTs and ICT infrastructure between the public, private firms, and the government to improve the delivery mechanisms of the many sustainable public services. These developments acted as the catalyst for the development of all the KPI initiatives towards a smart sustainable Singapore.

Background

The drive for Singapore's dedication to becoming a smart sustainable city is encouraged by its leaders' foresight to predict and prepare for its city's future challenges. Specifically, the city-nation faces many issues related to climate change, population density, and changes in its residents' demographics. Using the advantages of ICTs, Singapore aims to address its problems by providing impactful solutions that will provide opportunities for all its inhabitants. In addition, various forms of infrastructure, policies, and other technologies are being set up to help achieve the same goals in accordance with standards set by U4SSC and Recommendation ITU-T.4901/L.1601.

Strategy

Efforts made by Singapore to achieve the goals of its *Smart Nation Initiative* are in accordance with the U4SSC KPIs contained in Recommendation ITU-T Y.4903/L.1603. Regarding economic development, the standards that Singapore adhered to were criteria for constructing technological infrastructure (T1.1.1CT), guidelines for the funding and support of innovation (T1.2), adjustments for e-commerce and export/import systems (T1.4), specifications for the provision of online services for private companies (T1.5), requirements for building and maintaining infrastructure for electrical and transportation systems specifically related to ICTs (T1.6), and guidelines for open data systems as well as e-public services (T1.7).

For environmental development the standards that were utilized are benchmarks for GHG emissions to support better air quality (T2.1), directions for adequate water saving and drainage systems in homes (T2.2), and conditions for energy consumption and the percentage that comes from renewable energy sources (T2.6). Lastly, the standards related to society and culture are criteria for student access to ICT educational tools (T3.1), measures for electronic health records, extending life expectancy, and increasing the amount of doctor's per capita (T3.2), and specifications for cyberbullying prevention (T3.3).

Results and Impact

Through the comprehensive implementation of the ICT infrastructure, Singapore was able to make significant gains towards their smart and sustainable city goals. By bringing highspeed internet access that was either free or affordable for its residents, Singapore has been able to create a dynamic system of ICTs, which acted as the backbone for the rest of its sustainable goals. With its *Smart Nation Initiative*, Singapore has been able to create secure internet networks that promote public engagement with governmental services as well as significant investments into ICT-related R&D. These developments have made Singapore a worldwide hub

for tech start-ups and other enterprises as well.

Singapore's productivity, which has historically been hampered by a lack of natural resources, has been significantly improved using ICTs by enabling the city-nation to restructure its economy towards knowledge-based services. To further this process, Singapore has used ICTs to educate a large variety of its citizens like the elderly, the disabled, students, and lesser educated adults. These online educational services provide various forms of technical competencies, which has resulted in a greater sense of equity and social inclusivity.

To assist in improving Singapore's environmental sustainability goals, ICTs have been instrumental in the monitoring of air and water quality and consumption. ICTs have also made strides in monitoring greenhouse gas emissions and have given innovators a foundation to enable them to address Singapore's environmental impact. In addition, public roads, transportation, and buildings have all been integrated with ICTs to mitigate their environmental impacts by increasing their efficiency.

Challenges and lessons learned

Singapore made significant gains in the KPI fields of "ICT", "Productivity", and "Equality and Social Inclusion" in accordance with the standards of Recommendation ITU-T.4901/L.160. However, the city-nation has lacked in adequately addressing the field of "Environmental Sustainability". Especially regarding reducing greenhouse gas emissions, developing noise-based monitoring systems, and constructing greener spaces to improve the perception of Singapore's environmental progress, it needs to divert more time and resources to improving in these efforts. Given Singapore's robust ICT infrastructure, it can quantify and analyse these issues with the vast amount of data it has procured. This will allow Singapore to address its environmental issues with sound, data-driven initiatives, which can elicit the effects deemed essential towards its *Smart Nation Initiative*.

For other cities, confronting all the targets and fields of the various sustainability goals, is a complex and difficult task. Like Singapore, some cities will make significant gains in some fields while making little to no gains on the others. By building an efficient foundation to address at least some of the issues, however, a city will be able work off that progress in addressing the others as well. Following the example of Singapore pivoting its advanced ICT systems to address its environmental sustainability goals, a city should be able to use its established networks and infrastructure to address its other goals as well.

Potential for Replication

Through the extensive use of ICTs and ICT networks, Singapore generated an enormous amount of data that was crucial for understanding how to implement developmental solutions in accordance with U4SSC and Recommendation ITU-T.4901/L.160. For other cities to replicate Singapore's success, they will need to ensure that their internal foundations prepared to handle the tasks of implementing these standards. By developing its strong internal systems and partnerships, any city will be able to implement some, if not all its sustainable initiatives.