Smart City Policies and Standards

Overview of Projects, Data Policies, and Standards

across Five International Smart Cities

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The Centre for Internet and Society (http://cis-india.org/) is a non-profit research organisation that works on policy issues relating to privacy, freedom of expression, accessibility for persons with diverse abilities, access to knowledge, intellectual property rights and openness. It engages in academic research to explore and impact the shape and form of internet, along with its relationship with the society, with particular emphasis on south-south dialogues and exchange.

1. Introduction

Smart City as a concept is evolutionary in nature, and the key elements like Information and Communication Technology (ICT), digitization of services, Internet of Things (IoT), open data, big data, social innovation, knowledge, etc., would be intrinsic to defining a Smart City.[1]

A Smart City, as a "system of systems", can potentially generate vast amounts of data, especially as cities install more sensors, gain access to data from sources such as mobile devices, and government and other agencies make more data accessible. Consequently, Big Data techniques and concepts are highly relevant to the future of Smart Cities. It was noted by Kenneth Cukier, Senior Editor of Digital Products at The Economist, that Big Data techniques can be used to enhance a number of processes essential to cities - for example, big data can be used to spot business trends, determine quality of research, prevent diseases, tack legal citations, combat crime, and determine real-time roadway traffic conditions .[2] Having said this, data is deemed to be the lifeblood of a Smart City and its availability, use, cost, quality, analysis, associated business models and governance are all areas of interest for a range of actors within a smart city.[3]

This blog reviews five Smart Cities namely Singapore, Dubai, New York City, London and Seoul. In doing so, the research seeks to point the similarities, differences and best practices in the development of smart cities across jurisdictions. To achieve this, the research reviews:

- The definition of a Smart City in a given context or project (if any).
- Existing policy/regulations around data or notes the lack thereof.
- The cities adherence to the International standards and providing an update on the current status of the Smart City programme.

1 Smart Cities and Transparent Evolution, http://www.posterheroes.org/Posterheroes3/_mat/PH3_eng.pdf

2 "Data, Data Everywhere." The Economist, February 25, 2010. Accessed March 17, 2016, http://www.economist.com/node/15557443.

3 "Smart Cities." ISO. 2015. Accessed March 17, 2016, http://www.iso.org/iso/smart_cities_report-jtc1.pdf.

2. Singapore

2.1. Introduction

The Smart Nation programme in Singapore was launched on 24th November, 2014. The programme is being driven by the Infocomm Development Authority of Singapore, through which Singapore seeks to harness ICT, networks and data to support improved livelihoods, stronger communities and creation of new opportunities for its residents.[4] According to the IDA, a Smart Nation is a city where "people and businesses are empowered through increased access to data, more participatory through the contribution of innovative ideas and solutions, and a more anticipatory government that utilises technology to better serve citizens' needs".[5] The Smart Nation programme is driven by a designated Office in the Prime Minister's Office.[6] As a core component to the Smart Nation Programme, the Smart Nation Platform has been developed as the technical architecture to support the Programme. This Platform enables greater pervasive connectivity, better situational awareness through data collection, and efficient sharing and access to collected sensor data, allowing public bodies to use such data to develop policy and practical interventions.[7] Such access would allow for anticipatory governance - a goal of the Smart Nation Programme as noted by Dr. Yaacob Ibrahim, Minister for Communications and Information stating "Insights gained from this data would enable us to better anticipate citizens' needs and help in better delivery of services".[8]

2.2. Status of the Project

The Smart Nation Programme is an ongoing initiative, being built on the past programme Intelligent Nation 2015 (iN2015 masterplan). The plan involves putting in place the

4 Transcript of Prime Minister Lee Hsien Loong's speech at Smart Nation launch on 24 November, http://www.pmo.gov.sg/mediacentre/transcript-prime-minister-lee-hsien-loongs-speech-smart-nation-launch-24-november

5 Smart Nation Vision, https://www.ida.gov.sg/Tech-Scene-News/Smart-Nation-Vision

6 Smart Nation, http://www.pmo.gov.sg/smartnation

7 Smart Nation Platform, https://www.ida.gov.sg/~/media/Files/About%20Us/Newsroom/Media%20Releases/2014/0617_smartnation/AnnexA_sn.pdf

8 Transcript of Prime Minister Lee Hsien Loong's speech at Smart Nation launch on 24 November,https://www.ida.gov.sg/blog/insg/featured/singapore-lays-groundwork-to-be-worlds-first-smart-nation/

infrastructure, policies, ecosystem and capabilities to enable a Smart Nation, by adopting a people-centric approach.[9] A number of co-creating solutions adopted by the Government include:

- Development of Mobile Apps to facilitate communication between the public and the providers of public services.
- Organization of Hackathons by government agencies or corporations in collaboration with schools and industry partners to ideate and develop solutions to tackle real-world challenges.
- Adopt measure for smart mobility to create a more seamless transport experience and providing greater access to real-time transport information so that citizens can better plan their journeys.
- Smart technologies are also being introduced to the housing estates.[10]

2.3. Policies and Regulations

The Smart Nation plan derives its legitimacy from the constitution of Singapore, holding the Prime Minister responsible to take charge of the subject 'Smart Nation' blueprint under the Statutory body of 'Smart Nation' Programme Office.[11] Singapore has a comprehensive data protection law – the Personal Data Protection Act 2012, rules governing the collection, use, disclosure and care of personal data. The Personal Data Protection Commission of Singapore has committed to work closely with the private sector, and also to support the Smart Nation vision on data privacy and cyber security ecosystem.[12] [13]

9 Prime Ministers' Office Singapore-Smart Nation, http://www.pmo.gov.sg/smartnation

10 Prime Ministers' Office Singapore-Smart Nation,http://www.pmo.gov.sg/smartnation

11 Constitution of the Republic of Singapore (Responsibility of the Prime Minister) Notification 2015, http://statutes.agc.gov.sg/aol/search/display/view.w3p;page=0;query=Status%3Acurinforce%20Type%3Aact,sl%20Content%3A%22smart%22;rec=4;resUrl=http%3A%2F%2Fstatutes.agc.gov.sg%2Faol%2Fsearch%2Fsummary%2Fresults.w3p%3Bquery%3DStatus%253Acurinforce%2520Type%253Aact,sl%2520Content%253A%2522smart%2522;whole=yes

12 Personal Data Protection Singapore-Annual Report 2014-15, https://www.pdpc.gov.sg/docs/default-source/Reports/pdpc-ar-fy14---online.pdf

13Balancing Innovation and Personal Data Protection, https://www.ida.gov.sg/Tech-Scene-News/Tech-News/Digital-Government/2015/9/Balancing-innovation-and-personal-data-protection

Towards achieving the Smart Nation vision the government has also promoted the use of open data. In 2015 the Department of Statistics has made a vast amount of data available (across multiple themes say transport, infocomm, population, etc.) for free to the public in order to encourage innovation and facilitate the Smart Nation.[14] Prior to this initiative, the government had adopted the Open Data Policy in 2011, enabling public data for analysis, research and application development.[15] The concept of Virtual Singapore, which is a part of the Smart Nation Initiative, has been developed to adopt and simulate solutions on a virtual platform using big data analytics.[16]

2.4. Adoption of International Standards

The Smart Nation initiative follows the standards laid under the purview of the Singapore Standards Council (SSC). It specifies three types of Internet of Things (IoT) Standards – sensor network standards (TR38 - for public areas & TR40 - for homes), IoT foundational standards (common set of guidelines for IoT requirements and architecture, information and service interoperability, security and data integrity) and domain-specific standards (healthcare, mobility, urban living, etc.).[17]

Singapore is part of ISO/IEC JTC 1/WG7 Sensor Networks and ISO/IEC JTC 1/WG10 Internet of Things (IoT).[18] Singapore IT standards abides to the international standards as defined by ISO, ITU, etc.Singapore is a member of many international standards forums (see Singapore International Standards Committee) which includes JTC1/WG9 - Big Data; JTC1/WG10 - Internet of Things; JTC1/WG11 - Smart Cities.

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14 Department of Statistics Singapore- Free Access to More Data on the SingStat Website from 1 March 2015,http://www.singstat.gov.sg/docs/default-source/default-document-library/news/press_releases/press27022015.pdf

15 Singapore Marks 50th Birthday With Open Data Contest, https://blog.hootsuite.com/singapore-open-data/

16 Virtual Singapore - a 3D city model platform for knowledge sharing and community collaboration,http://www.sla.gov.sg/News/tabid/142/articleid/572/category/Press%20Releases/parentId/97/year/2014/Default.aspx

17 Internet of Things (IoT) Standards Outline to Support Smart Nation Initiative Unveiled, http://www.spring.gov.sg/NewsEvents/PR/Pages/Internet-of-Things-(IoT)-Standards-Outline-to-Support-Smart-Nation-Initiative-Unveiled-20150812.aspx

18 Information Technology Standards Committee, https://www.itsc.org.sg/technical-committees/internet-of-things-technical-committee-iottc ;https://www.ida.gov.sg/~/media/Files/Infocomm%20Landscape/iN2015/Reports/realisingthevisionin2015.pdf

3. Dubai, United Arab Emirates

3.1. Introduction

The Dubai Smart City strategy was launched as part of the Dubai Plan 2021 vision, in the year 2015.[19] Dubai Plan 2021 describes the future of Dubai evolving through holistic and complementary perspectives, starting with the people and the society and places the government as the custodian of the city's development. Within the Plan, the smart city theme envisions a platform that is fully connected and integrated infrastructure that enables easy mobility for all residents and tourists, and provides easy access to all economic centers and social services, in line with the world's best cities.[20] Center to the smart city platform is data and data analytics, particularly cross functional data and big data techniques to give a complete view of the city.[21] As envisioned, the Dubai Data portal would provide a gateway to empower relevant stakeholders to understand the nuances of the city and pursue questions that will result in the greatest impact from the city's data.[22] The platform will be based on current data and existing services, initiatives, and networks to identify opportunities for a smart city.[23] The Smart City Plan also includes a framework for aligning districts of Dubai with the Smart City vision and dimensions.[24]

The Smart Dubai roadmap 2015 provides a consolidated report and planned smart city services, its status and the stage of its implementation, for e.g. Smart Grid, Mobile Payment, Smart Water, Health applications, Public Wi-Fi, Municipality, E-Traffic solutions, etc.[25]

3.2. Status of the Project

The Smart Dubai strategy is envisioned to be completed by the year 2020, and currently it's ongoing. The first phase of Smart Dubai masterplan is expected to end by 2016. Between 2017

19 Government of Dubai-2021 Dubai Plan-Purpose, http://www.dubaiplan2021.ae/the-purpose/

20 Government of Dubai-2021 Dubai Plan,http://www.dubaiplan2021.ae/dubai-plan-2021/

21 Smart Dubai, http://www.smartdubai.ae/foundation_layers.php

22 The Internet of Things: Connections for People's happiness, http://www.smartdubai.ae/story021002.php

23 Smart Dubai-current state, http://www.smartdubai.ae/current_state.php

24 Smart Dubai-District Guidelines, http://smartdubai.ae/districtguidelines/Smart_Dubai_District_Guidelines_Public_Brief.pdf

25 http://roadmap.smartdubai.ae/search-services-public.php; http://roadmap.smartdubai.ae/search-initiatives-public.php

and 2019, the plan aims to deliver new initiatives and services. The second phase of the masterplan is expected to be completed by the year 2020.[26]

3.3. Policies and Regulations

The Smart City Plan is being driven by the Dubai Smart City Office – which has been established under Law No. (29) of 2015 on the establishment of Dubai Smart City Office; Law No. (30) of 2015 on the establishment of Dubai Smart City Establishment; Decree No. (37) of 2015 on the formation of the Board of the Dubai Smart City Office; and Decree No (38) of 2015- appointing a Director General for the Office, which will develop overall policies and strategic plans, supervise the smart transformation process and approve joint initiatives, projects and services.[27] Also, an open data law called Dubai Open Data Law was issued to complete the legislative framework for transforming Dubai into a Smart City.[28] This law will enable the sharing of non-confidential data between public entities and other stakeholders.

3.4. Adoption of International Standards

In 2015 the Smart Dubai Executive Committee has collaborated through an agreement with the International Telecommunications Union (ITU) adopt the performance indicators by the ITU Focus Group on Smart Sustainable Cities to evaluate the feasibility of the indicators.[29] The Focus Group is working towards identifying global best practices for the development of smart cities.[30]

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26 Smart Dubai-Smart District Guidelines, http://smartdubai.ae/districtguidelines/Smart_Dubai_District_Guidelines_Public_Brief.pdf

27 Dubai Ruler issues new laws to further enhance the organisational structure and legal framework of Dubai Smart City, https://www.wam.ae/en/news/emirates/1395288828473.html

28 http://slc.dubai.gov.ae/en/AboutDepartment/News/Lists/NewsCentre/DispForm.aspx?ID=147&ContentTypeId=0x01001D47EB13C23E544893300E8367A23439 ; http://www.smartdubai.ae/dubai_data.php

29 Dubai first city to trial ITU key performance indicators for smart sustainable cities, http://www.itu.int/net/pressoffice/press_releases/2015/12.aspx#.VtaYtlt97IU

30 Smart Dubai Benchmark Report 2015 Executive Summary, http://smartdubai.ae/bmr2015/methodology-public.php

4. New York City, United States of America

4.1. Introduction

The ‘One New York Plan’ announced in the year 2015 is a comprehensive plan for a sustainable and resilient city. It includes the adoption of digital technology and considers the importance of the role of data in transforming every aspect of the economy, communications, politics, and individual and family life.[31] Furthermore, through a publication on 'Building a Smart+Equitable City', the Mayor’s Office of Technology and Innovation (MOTI) describes efforts to leverage new technologies to build Smart city.

Accordingly, the plan seeks to establish better lives through establishing principles and strategic frameworks to guide connected device and Internet of Things (IoT) implementation; MOTI serving as the coordinating entity for new technology and IoT deployments across all City agencies; collaborating with academia and the private sector on innovative pilot projects, and partnering with municipal governments and organizations around the world to share best practices and leverage the impact of technological advancements.[32]

4.2. Status of the Project

OneNYC represents a unified vision for a sustainable, resilient, and equitable city developed with cross-cutting interagency collaboration, public engagement, and consultation with leading experts in their respective fields. The Mayor’s Office of Sustainability oversees the development of OneNYC and now shares responsibility with the Mayor’s Office of Recovery and Resiliency for ensuring its implementation.[33]

4.3. Policies and Regulations

As per the Local Law 11 of 2012, each City entity must identify and ultimately publish all of its digital public data for citywide aggregation and publication by 2018. In adherence to this law, there exists a NYC Open Data Plan which requires annual data updation.[34]

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31 Building a Smart + Equitable City, http://www1.nyc.gov/assets/forward/documents/NYC-Smart-Equitable-City-Final.pdf

32 Building a Smart + Equitable City, http://www1.nyc.gov/site/forward/innovations/smartnyc.page

33 One New York: The Plan for a Strong and Just City, http://www1.nyc.gov/html/onenyc/about.html

34 Open Data for All, http://www1.nyc.gov/assets/home/downloads/pdf/reports/2015/NYC-Open-Data-Plan-2015.pdf

The LinkNYC initiative, one of the key projects to make New York a 'smart' city, aims to connect everyone through a city wide wi-fi network. The LinkNYC initiative will retrofit payphones with kiosks to provide high-speed WiFi hotspots and charging stations for increased connectivity.[35] Data Privacy in the initiative is addressed through the customer first privacy policy, which considers user's privacy on priority and will not sell any personal information or share with third parties for their own use. LinkNYC will use anonymized, aggregate data to make the system more efficient and to develop insights to improve your Link experience .[36]

4.4. Adoption of International Standards

The ANSI Network on Smart and Sustainable Cities (ANSSC) is a forum for information sharing and coordination on voluntary standards, conformity assessment and related activities for smart and sustainable cities in the US.[37] The US is a signatory of the ISO/ITU defined standards on smart cities.[38]

5. London, United Kingdom

5.1. Introduction

The Smart London Plan was unveiled in the year 2013 by the Mayor of London. The plan is being driven through the Greater London Authority, with the advice of the Smart London Board. The Smart London Plan envisions 'Using the creative power of new technologies to serve London and improve Londoner's lives'.[39] 'Smart London' is about harnessing new technology and data so that businesses, Londoners and visitors experience the city in a better way, and do not face bureaucratic hassle and congestion. Smart London seeks to improve the city as a whole and focuses on city macro functions that result from the interplay between city subsystems - such as local labour markets to financial markets, from local government to education, healthcare, transportation and utilities. According to strategy documents, a smarter London recognises and

35 7 public projects that are turning New York into a "smart city", http://www.builtinnyc.com/2015/11/24/7-projects-are-turning-new-york-futuristic-technology-hub

36 LinkNYC, https://www.link.nyc/faq.html#privacy

37 ANSI Network on Smart and Sustainable Cities, http://www.ansi.org/standards_activities/standards_boards_panels/anssc/overview.aspx?menuid=3

38 IoT-Enabled Smart City Framework, http://publicaa.ansi.org/sites/apdl/Documents/News%20and%20Publications/Links%20Within%20Stories/IoT-EnabledSmartCityFrameworkWP20160213.pdf

39 Smart London (UK) Plan: Digital Technologies, London and Londoners, http://munkschool.utoronto.ca/ipl/files/2015/03/KleinmanM_Smart-London-UK-v5_30AP2015.pdf

employs data as a service and will leverage data to enable informed decision making and the design of new activities.

5.2. Status of the Project

This project is currently ongoing. Since its formation in March 2013, the Smart London Board has been advising the Greater London Authority.The Plan sits within the overarching framework of the Mayor's Vision 2020. [40]

5.3. Policies and Regulations

The Smart London Plan incorporates the existing open data platform called 'London DataStore'. The rules and guidelines for this platform are defined by the Greater London Authority, which includes working with public and private sector organisations to create, maintain and utilise it, enabling common data standards, identify and prioritise which data are needed to address London's growth challenges, establish a Smart London Borough Partnership to encourage boroughs to free up London's local level data. Also, privacy is protected and there is transparent use of data - to ensure data use is managed in the best interests of the public rather than private enterprise.42 The Smart London Plan aims to build on this existing datastore to identify and publish data that addresses specific growth challenges, with an emphasis on working with companies and communities to create, maintain, and use this data.[41]

The Open Data White Paper, issued by the Office of Paymaster General, seeks to build a transparent society by releasing public data through open data platforms and leveraging the potential of emerging technologies.[42] The Greater London Authority processes personal data in accordance with the Data Protection Act 1998.[43]

5.4. Adoption of International Standards

The British Standards Institution (BSI) has already established Smart City standards and has associated with the ISO Advisory Group on smart city standards. The UK subscribes to the BSI

40 Smart London Plan, http://www.london.gov.uk/sites/default/files/smart_london_plan.pdf
41 Smart London Plan, http://www.london.gov.uk/sites/default/files/smart_london_plan.pdf
42 Open Data-White Paper, https://data.gov.uk/sites/default/files/Open_data_White_Paper.pdf
43 London Datastore-Privacy, http://data.london.gov.uk/about/privacy/

standards for smart cities and has adopted the same.[44] The following standards and publications help address various issues for a city to become a smart city:

- The development of a standard on Smart city terminology (PAS 180)
- The development of a Smart city framework standard (PAS 181)
- The development of a Data concept model for smart cities (PAS 182)
- A Smart city overview document (PD 8100)
- A Smart city planning guidelines document (PD 8101)
- BS 8904 Guidance for community sustainable development provides a decision-making framework that will help setting objectives in response to the needs and aspirations of city stakeholders
- BS 11000 Collaborative relationship management
- BSI BIP 2228:2013 Inclusive urban design - A guide to creating accessible public spaces.

Further, the Smart London Plan incorporates open data standards in accordance with London DataStore.[45] Various government reports – Smart Cities background paper, Open Data White Paper, etc., have suggested the use of standards related to Internet of Things (IoT), open data standards, etc.[46]

6. Seoul, Republic of Korea

6.1. Introduction

Smart Seoul 2015 was announced in June 2011 by the Seoul Metropolitan Government, which envisions integrating IT services into every field, including administration, welfare, industry and living. Through this, the Seoul Metropolitan Government plans to create a Seoul that uses smart

44 Future Cities Standards Centre in London, https://eu-smartcities.eu/commitment/5937

45 Smart London Plan, http://www.london.gov.uk/sites/default/files/smart_london_plan.pdf

46 Smart Cities background paper, October 2013, https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/246019/bis-13-1209-smart-cities-background-paper-digital.pdf

technologies by 2015.[47] Towards this, the Seoul Metropolitan Government plans to make use of Big Data in policy development, and through scientific analytics, will provide customized administrative services and reduce wasteful spending. Also, the government is utilising Big Data to analyse trends emerging from existing services.[48] Examples of projects that leverage big data that the government has undertaken include the Taxi Matchmaking Project – analyzes the data related to taxi stands and passengers, the Owl Bus[49] - maps the bus routes, etc.

6.2. Status of the Project

Building on the Smart Seoul 2015, the Seoul Metropolitan Government plans to establish 'Global Digital Seoul 2020 – New Connections, Different Experiences' vision in next five-years. In this multi-objective plan, it aims to establish a 'Big Data campus' providing win-win cooperation among public, private, industry and university.[50]

6.3. Policies and Regulations

The Smart Seoul 2015 aims to create a 'Seoul Data Mart', which will be an open platform that makes public information available for data processing.[51] Furthermore, Seoul has opened the Seoul Open Data Plaza[52], an online channel to share and provide citizens with all of Seoul's public data, such as real-time bus operation schedules, subway schedules, non-smoking areas, locations of public Wi-Fi services, shoeshine shops, and facilities for disabled people, and the information registered in Seoul Open Data Plaza is provided in the open API format.

South Korea has a comprehensive law governing data privacy – Personal Information Protection Act, 2011. The law includes data protection rules and principles, including obligations on the data controller and the consent of data subjects, rights to access personal data or object to its

47 Presentation of 2015 Blueprint of Seoul as 'State-of-the-art Smart City', http://english.seoul.go.kr/presentation-of-2015-blueprint-of-seoul-as-%E2%80%98state-of-the-art-smart-city%E2%80%99/

48 "Policy Where There is Demand," Seoul Utilizes Big Data, http://english.seoul.go.kr/policy-demand-seoul-utilizes-big-data/

49 Seoul's "Owl Bus" Based on Big Data Technology, http://www.citiesalliance.org/sites/citiesalliance.org/files/Seoul-Owl-Bus-11052014.pdf

50 Seoul Launches "Global Digital Seoul 2020", http://english.seoul.go.kr/seoul-launches-global-digital-seoul-2020/

51 Smart Seoul 2015, http://english.seoul.go.kr/wp-content/uploads/2014/02/SMART_SEOUL_2015_41.pdf

52 Disclosing public data through the Seoul Open Data Plaza, http://english.seoul.go.kr/policy-information/key-policies/informatization/seoul-open-data-plaza/

collection, and security requirements. It also covers cookies and spam, data processing by third parties and the international transfer of data.[53]

6.4. International Standards

The smart city standards are adopted in the development of smart cities in Korea.[54] Korea has adopted the ISO/TC 268, which is focused on sustainable development in communities. Korea also has one working group developing city indicators and another working group developing metrics for smart community infrastructures.[55]

7. Conclusion

The smart city projects studied are at different levels of implementation and have both similarities and differences. Below is an analysis of some of the key similarities and differences between smart city projects, a comparison of these points to India's 100 Smart City Mission, and a summary of best practices around the development of smart city frameworks.

7.1. Nodal Agency

All cities studied have nodal agencies driving the smart city initiatives and many have policies in place backing these initiatives. For example, while the Smart Nation programme in Singapore is being driven by the Infocomm Development Authority, in London the smart city project is governed by the Great London Authority. The Smart Seoul Project in Korea is governed by the Seoul Metropolitan Government and New York has the Mayor's Office of Technology and Innovation serving as the coordinating entity for new technology and IoT deployments across all City agencies. In India, the nodal agency driving the 100 Smart Cities Project is the Ministry of Urban Development under the Indian Government. In India, the implementation of the Mission at the City level will be done by a Special Purpose Vehicle (SPV), which will be a limited company and will plan, appraise, approve, release funds, implement, manage, operate, monitor and evaluate the Smart City development projects.

53 Data protection in South Korea: overview, http://uk.practicallaw.com/2-579-7926

54 Smart Cities Seoul: a case study, https://www.itu.int/dms_pub/itu-t/oth/23/01/T23010000190001PDFE.pdf

55 Smart Cities-ISO, http://www.iso.org/iso/livelinkgetfile-isocs?nodeid=16193764

7.2. Policies

Many of the cities had open data policies and data protection policies that pertain to the Smart City initiatives. In Dubai, an open data law called Dubai Open Data Law has been issued to complete the legislative framework for transforming Dubai into a Smart City and the Smart City Establishment will develop policies for the project. New York also has an Open Data Plan in place and LinkNYC will use anonymized, aggregate data to address data privacy of users. In London, the Smart London Plan incorporates the existing open data platform called 'London DataStore', the rules for which are defined by the Greater London Authority, which also ensures privacy and transparent use of data by processing personal data in accordance with the Data Protection Act 1998. For regulation of data in Seoul, a 'Seoul Data Mart' will be established to make public information available for data processing and the Seoul Open Data Plaza is an existing online channel to share and provide citizens with all of Seoul's public data. South Korea has a comprehensive law governing data privacy in place as well. In Singapore, the Personal Data Protection Commission has committed to work and support the Smart Nation vision on data privacy and cyber security ecosystem. To achieve the vision of the project, the government has also promoted the use of open data. It can be said the these countries , with clearly laid out policies to support and guide the project, have well planned ecosystem for regulation and governance of systems, technologies and cities. All cities have incorporated open data into smart cities and many have developed guidelines for its use. All cities have similar goals of enhancing the lives of citizens and developing anticipatory regulation, however, there appears to be little discussion on the need to amend existing law or enable new law around privacy and data protection in light of data collection through smart cities. In India, no enabling legislation or policy has been formulated by the Government, apart from releasing "Mission Statement and Guidelines", which provides details about the Project and vision, excluding a definition of a 'smart city' or the relevant applicable laws and policies. No information is publically available regarding deployment of open data, use of specific technologies like cloud, big data, etc., the relevant policies and applicability of laws. Unlike India, all cities recognize the importance of big data techniques in enabling smart city visions, technology and policies. On the lines of these cities, India must work towards addressing the need for an open data framework in light of the 100 Smart Cities Mission to enable the sharing of non-confidential data between public entities and other stakeholders. This requires co-ordination to incorporate, enable and draw upon open data architecture in the cities by the Government with the existing open data framework in India,

like the National Data Sharing and Accessibility Policy, 2012. Use of technology in the form of IoT and Big Data entails access to open data, bringing another policy area in its ambit which needs consideration. Also, identification and development of open standards for IoT must be looked at. Also, as data in smart cities will be generated, collected, used, and shared by both the public and private sector. It is essential that India's existing data protection standards and regime must be amended to extend the data regulation beyond a body corporate and oversee the collection and use of data by the Government, and its agencies.

7.3. Standards

In Singapore, the Smart Nation initiative follows the standards laid under the purview of the Singapore Standards Council (SSC)and the Singapore IT standards abides to the international standards as defined by ISO, ITU, etc. The Country is also a member of many international standards forums (see Singapore International Standards Committee) which includes JTC1/WG9- Big Data; JTC1/WG10 - Internet of Things; JTC1/WG11 - Smart Cities. In Dubai, the Smart Dubai Executive Committee with the International Telecommunications Union (ITU) to adopt the performance indicators by the ITU Focus Group on Smart Sustainable Cities to evaluate the feasibility of the indicators. For the purpose of standards, the ANSI Network on Smart and Sustainable Cities (ANSSC) in New York is a forum smart and sustainable cities, along with US being a signatory of the ISO/ITU defined standards on smart cities. Also, The British Standards Institution (BSI) has already established Smart City standards and has associated with the ISO Advisory Group on smart city standards. The UK subscribes to the BSI standards for smart cities and has adopted the same and the Smart London Plan incorporates open data standards in accordance with London DataStore. For development of smart cities, Korea has adopted the ISO/TC 268, which is focused on sustainable development in communities and also has one working group developing city indicators and another working group developing metrics for smart community infrastructures. However, in India, the Bureau of Indian Standards (BIS) has undertaken the task to formulate standardised guidelines for central and state authorities in planning, design and construction of smart cities by setting up a technical committee under the Civil engineering department of the Bureau. However, adoption of the standards by implementing agencies would be voluntary and intends to complement internationally available documents in this area. Also, The Global Cities Institute (GCI) has undertaken a mission in the year 2015 to align with the Bureau of Indian Standards regarding

development of standards of smart cities and also to forge relationships with Indian cities in light of ISO 37120. It can be said that India has currently not yet adopted international standards, but is in the process of developing national standards and adopting key international standards. Unlike other cities, which are adopting standards - national, ISO, or ITU, Indian cities are yet to adopt standards for regulation of the future smart cities.

7.4. Notes for India

India is in the nascent stages of developing smart cities across the country. Drawing from the practices adopted by cities across the world, smart cities in India should adopt strong regulatory and governance frameworks regarding technical standards, open data and data security and data protection policies. These policies will be essential in ensuring the sustainability and efficiency of smart cities while safeguarding individual rights. Some of these policies are already in place - such as India’s Open Data Policy and India’s data protection standards under section 43A of the ITA. It will be important to see how these policies are adopted and applied to the context of smart cities.

8. Authors

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