Singapore's Smart Nation Initiative – A Policy and Organisational Perspective

Abstract

In light of an increasingly digitised and knowledge-based economy, Singapore introduced its Smart Nation initiative. As a policy initiative guiding Singapore's digital transformation, the Smart Nation initiative relies on several policy tools or 'enablers' to achieve a range of economic, social, and urban policy goals. This case study will assess these policy tools and goals, situating them within the context of Singapore's overall approach to economic development. More than simply a policy initiative, the Smart Nation initiative has also involved public administrative reform. In response to inadequate public interest as well as a perceived lack of pace in Singapore's digital transformation, a centralised public agency, the Smart Nation and Digital Government Group, was formed to coordinate cross-government digitisation efforts. Singapore's ongoing transformation into a Smart Nation has therefore involved both policy innovation and a reorganization of public administration processes. However, Singapore also continues to face challenges in its digitisation efforts, such as insufficient private sector participation or ground-up initiatives.

Introduction

The rapid urbanisation and increasing urban density that Singapore had experienced over the past few decades gave rise to increasingly complex and intertwined policy issues, such as overcrowding, strains to public infrastructure, and high costs of housing, among others. These emerging urban policy issues also resulted more recently in public discontent, as was evident in the decline in vote-share for the ruling People's Action Party in the 2011 General Elections.[1] Yet at the same time, Singapore's ongoing shift to a knowledge-based economy stimulated much interest in the economic possibilities associated with digitisation and big data.[2]

It was at the intersection of these two issues – growing urban complexity and economic digitisation – that Singapore's transformation into a smart city was first mooted and eventually implemented in the form of the Smart Nation initiative. More than simply the mobilization and application of advanced digital and info-communications technology (ICT) to complex urban problems, the Smart Nation initiative also represented a means through which Singapore could explore potential new areas of growth associated with the new digital

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[1] Derek Da Cunha, *Breakthrough: Roadmap for Singapore's Political Future* (Singapore: Straits Times Press Reference, 2012); Kenneth Paul Tan, "Singapore in 2011: A 'New Normal' in Politics?," *Asian Survey* 52, no. 1 (February 2012): 220–26.

[2] Kent E. Calder, *Singapore: Smart City, Smart State* (Washington, D.C: Brookings Institution Press, 2016); Wee Kwang Tan, "Big Data: Singapore's New Economic Resource," Enterprise Innovation | Asia's Premier Business and Technology Publication, November 1, 2016, https://www.enterpriseinnovation.net/article/big-data-singapores-new-economic-resource-847989586.

economy. Furthermore, the Smart Nation initiative also gave rise to shifts in Singapore's approach to public administration.

This case study will discuss the policy and public administration implications of the Smart Nation initiative. A brief overview of the Smart Nation initiative is provided below.

Background: The Smart Nation initiative

Launched in 2014, the Smart Nation initiative aims to "support better living, stronger communities, and create more opportunities, for all".[3] This can be further delineated into two parts: improving people's lives, and creating new economic opportunities. These two inter-related goals were emphasized in a speech given by Prime Minister Lee Hsien Loong at the launch of the Smart Nation initiative, where he emphasized the goals of improving citizens' lives and allowing them to connect with each other through the use of sensors and smart devices, as well as enhancing economic productivity and exploring new opportunities through such technology.[4]

The Smart Nation initiative built on the Singapore government's earlier efforts to digitise public service delivery through its 'e-government' drive.[5] The government recognised early on that computerisation was an important tool to enhance Singapore's economic competitiveness. This began with a 'Civil Service Computerisation Programme' that was introduced in the late 1980s and the formation of a government agency – the National Computer Board (NCB) – in 1981 to drive computerisation. This was followed by a slew of initiatives in the late 1990s through 2000s, such as the 'IT 2000' strategic plan, e-Government Action Plans, iGov 2010 initiative, and 2015 eGov Masterplan.[6] With the growing convergence of IT and telecommunications, the NCB was merged with the Telecommunication Authority of Singapore (TAS) to form Infocomm Development Authority (IDA) in 1999, which was later restructured into the Government Technology Agency (GovTech) and the Info-communications Media Development Authority (IMDA). At the physical ICT infrastructure level, a nationwide information network was initiated in the 1990s and it later evolved into the Wireless@SG programme and the Next Generation National Broadband Network.

However while these earlier e-government initiatives tended to focus on increasing efficiency in public service delivery, the Smart Nation initiative was much more comprehensive, reflecting a broader 'digital

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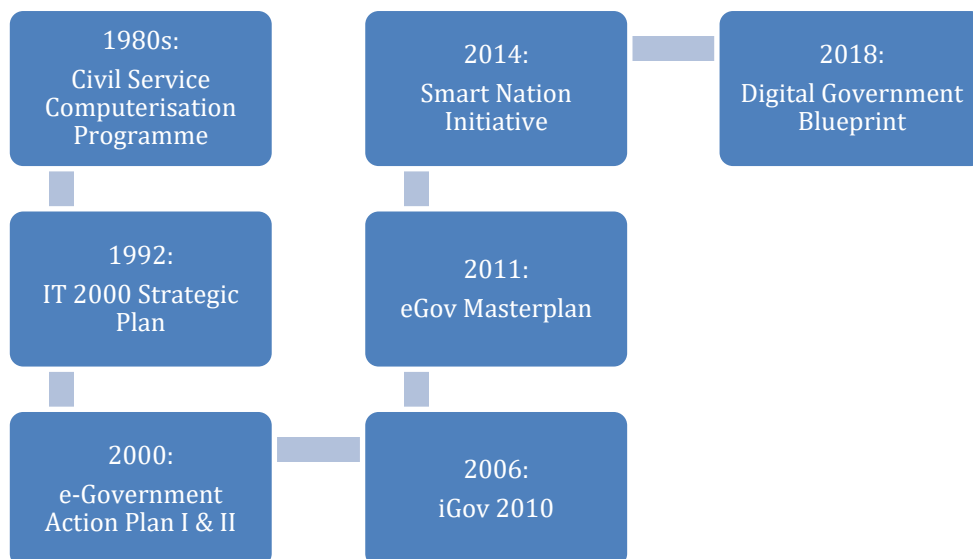[3] Smart Nation Programme Office, "About Smart Nation," 2016, http://www.smartnation.sg/about-smart-nation.

[4] Hsien Loong Lee, "Smart Nation: Better Living, More Opportunities, Stronger Communities" (Prime Minister Lee Hsien Loong's speech at Smart Nation launch, Singapore, November 24, 2014).

[5] Chee Wee Tan and Shan L. Pan, "Managing E-Transformation in the Public Sector: An E-Government Study of the Inland Revenue Authority of Singapore (IRAS)," *European Journal of Information Systems* 12, no. 4 (December 1, 2003): 269–81, https://doi.org/10.1057/palgrave.ejis.3000479; Krishnamurthy Sriramesh and Milagros Rivera-Sánchez, "E-Government in a Corporatist, Communitarian Society: The Case of Singapore," *New Media & Society* 8, no. 5 (October 1, 2006): 707–30, https://doi.org/10.1177/1461444806065661; Calvin M. L. Chan, YiMeng Lau, and Shan L. Pan, "E-Government Implementation: A Macro Analysis of Singapore's E-Government Initiatives," *Government Information Quarterly* 25, no. 2 (April 2008): 239–55, https://doi.org/10.1016/j.giq.2006.04.011.

[6] Christina Soh, Boon Siong Neo, and M. Lynne Markus, "IT2000: A Critical Appraisal of Singapore's State-Wide Strategic Planning Process for Information Technology," *The Journal of Strategic Information Systems* 2, no. 4 (December 1, 1993): 351–72, https://doi.org/10.1016/0963-8687(93)90011-X; Mahizhnan Arun and Mui Teng Yap, "Singapore : The Development of an Intelligent Island and Social Dividends of Information Technology," *Urban Studies* 37, no. 10 (September 1, 2000): 1749–56, https://doi.org/10.1080/00420980020080371; GovTech Singapore, "eGov Masterplans," eGov Masterplans, 2017, http://www.tech.gov.sg/About-Us/Corporate-Publications/eGov-Masterplan.

transformation' that aimed to digitise the all aspects of urban life in Singapore, often through collaborations with non-state actors such as businesses, citizens, and NGOs. [7] Figure 1 provides a broad timeline of Singapore's e-government initiatives.

Figure 1: Timeline of e-government initiatives

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┌─────────────────────┐   ┌─────────────────────┐        ┌─────────────────────┐
│      1980s:          │   │      2014:           │        │      2018:           │
│   Civil Service      │   │   Smart Nation       │────────│  Digital Government  │
│  Computerisation     │   │   Initiative         │        │     Blueprint        │
│    Programme         │   │                      │        │                      │
└─────────────────────┘   └─────────────────────┘        └─────────────────────┘
           │                         │
┌─────────────────────┐   ┌─────────────────────┐
│      1992:           │   │      2011:           │
│   IT 2000 Strategic  │   │   eGov Masterplan    │
│       Plan           │   │                      │
└─────────────────────┘   └─────────────────────┘
           │                         │
┌─────────────────────┐   ┌─────────────────────┐
│      2000:           │   │      2006:           │
│   e-Government       │───│   iGov 2010          │
│  Action Plan I & II  │   │                      │
└─────────────────────┘   └─────────────────────┘
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In many instances, these various plans tended to build upon each other, with the introduction of SingPass, a single user ID for online transactions with government agencies, and Wireless@SG in the early 2000s facilitating the Smart Nation initiative's broader efforts at public service delivery through online platforms. Similarly, iGov 2010 sought to enhance the integration of data, process and systems for Government agencies while eGov 2015 introduced a stronger focus on collaboration within and outside Government.[8] There was therefore a sense of continuity across the government's various eGov masterplans, with early computerisation efforts focusing on enhancing public service efficiency and subsequent masterplans seeking to position the government for the digital economy by emphasizing whole-of-government approaches as well as citizen and business collaboration.[9]

All these elements could be found in the Smart Nation initiative, which acted as a successor to all these prior masterplans. The Digital Government Blueprint launched in June 2018 further articulated the government's ambitions for the digital transformation of the public sector. The Blueprint aimed to re-engineer business processes, re-architect technology infrastructure and transform services, not only for citizens and businesses, but to transform the way public officers worked.

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[7] Smart Nation Programme Office, "About Smart Nation"; Kok Fai Loke, "Government to Call for S$2.4b of ICT Tenders This Year for Smart Nation Projects," Channel NewsAsia, May 24, 2017, http://www.channelnewsasia.com/news/singapore/government-to-call-for-s-2-4b-of-ict-tenders-this-year-for-smart-8879506.

[8] GovTech Singapore, "eGov Masterplans," eGov Masterplans, 2016, http://www.tech.gov.sg/About-Us/Corporate-Publications/eGov-Masterplan.

[9] GovTech Singapore.

The Smart Nation goals were supported by three key pillars—Digital Economy, Digital Government and Digital Society. At a more granular level, the Smart Nation focused on six key initiatives or domains:[10]

- Transport
- Urban living
- Startups and businesses
- Health
- Digital government services
- Strategic National Projects[11]

The initiative also relied on a set of 'enablers' to achieve digitization within these six domains:[12]

- Facilitating smart solutions through test-bedding and research collaborations.
- Nurturing a culture of experimentation and sustaining innovation.
    - Data sharing through the open data portal and Smart Nation Platform
    - Investments in Research and Development (R&D)
    - 'Living laboratories' for the development and piloting of technological solutions.
    - Growing an industry and start-up ecosystem
    - Cyber-security and data privacy
- Building computational capabilities
    - Educational programmes at various levels, including young children, secondary school students, and working professionals.
    - Upgrading programmes such as SkillsFuture.
    - A Smart Nation Fellowship Programme that invites experienced data scientists and engineers to work with the government to develop technological solutions.

In order to implement these initiatives, a Smart Nation Programme Office (SNPO) was established. Situated within the Prime Minister's Office, the Office was led by Minister-in-Charge Dr Vivian Balahkrishnan. However, there had since been an administrative re-organisation of the government's Smart Nation capabilities and units. The administrative reorganisation would be discussed in a later section.

Policy Options

This section will discuss the various policy options that have emerged as part of the Smart Nation initiative. This included the policy tools and objectives encapsulated within the initiative, as well as the administrative reforms that were enacted to implement these tools and achieve their related objectives.

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[10] Smart Nation Singapore, "Initiatives," Smart Nation Singapore, November 12, 2018, https://www.smartnation.sg/what-is-smart-nation/initiatives
[11] The Strategic National Projects are National Digital Identity, E-Payments, Smart Nation Sensor Platform, Smart Urban Mobility, and Moments of Life.
[12] Smart Nation Programme Office.

Policy Tools and Objectives

The Smart Nation initiative focused on the two goals of 'improving people's lives' and 'creating new economic opportunities'. These two goals can further be delineated into three policy objectives: driving economic development, addressing urban or municipal issues, and community building. Aside from creating economic opportunities and addressing urban issues, the initiative also emphasized the co-creation of solutions with citizens and fostering stronger communities through new digital platforms of communication and interaction.[13]

The various 'enablers' could then be seen as the policy measures or tools that were implemented in pursuit of these goals. Table 1 provides a summary of these policy tools and objectives that were associated with the Smart Nation initiative, along with selected examples of some tools. While this list is by no means exhaustive, it provides a broad overview of the Smart Nation initiative's policy tools and objectives.

Table 1: Policy tools and objectives for Smart Nation initiative

Policy Tools	Policy Objectives	Lead Agency
Test-bedding and Trials e.g. Jurong Lake District, A*STAR self-driving vehicle road tests	Economic Development; Municipal	Urban Redevelopment Authority (URA), Agency for Science Technology and Research (A*STAR)
Open Data and Smart Nation Platforms	Economic Development; Community Building; Municipal	SNPO
Investments in R&D e.g. National Research Foundation (NRF) investments in Artificial Intelligence, under AI.SG.	Economic Development	NRF
Laboratories e.g. SMRT-NTU Smart Urban Rail Corporate Laboratory	Economic Development	Universities and Research Institutions
Start-up accelerators e.g. Co-funding start-up accelerators through SPRING Seeds Capital	Economic Development	SPRING Singapore
Increased cyber-security e.g. Cyber Security Agency of Singapore	Economic Development; Municipal	Cyber Security Agency of Singapore (CSA)
Regulatory reforms e.g. FinTech Regulatory Sandbox	Economic Development	Monetary Authority of Singapore (MAS)
Talent and capacity-building e.g. ICT skills-training through SkillsFuture scheme	Economic Development	SkillsFuture Singapore

As Table 1 shows, the Smart Nation initiative placed a strong premium on goals of economic development. As Prime Minister Lee Hsien Loong noted in a speech, the advanced data and IT technologies that might emerge

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[13] Smart Nation Programme Office, "About Smart Nation"; Smart Nation Programme Office, "About Smart Nation | Enablers."

from the Smart Nation initiative could contribute to greater economic productivity and generate new business opportunities.[14] This was in line with Singapore's existing 'developmental state' approach to industrial policy and economic governance, which emphasized sectoral targeting and identifying future areas of growth.[15] In this instance, the Smart Nation initiative focused on the digital economy, as well as its relevant components, such as big data, as a key area of growth.

Furthermore, many of these tools involved diverting state resources towards building up Smart Nation capabilities. These included investments in R&D through agencies such as the National Research Foundation or co-funding start-up accelerators through SPRING Singapore's investment arm, SPRING Seeds Singapore. In other instances, policy tools have involved joint efforts, such as the SMRT-NTU Urban Rail Corporate Laboratory or the Monetary Authority of Singapore's FinTech Regulatory Sandbox. For the Smart Nation initiative, joint laboratories between state agencies and universities or corporate entities have become an important means through which policymakers can foster technological innovations. Lastly, efforts to establish Smart Nation capabilities in the citizenry such as ICT skills-training through SkillsFuture courses encourage the formation of more IT professionals and data specialists.

Aside from economic development however, the initiative also focused on resolving urban-municipal issues as well as community development. Indeed, of the six key domains, three were focused on urban issues (transport, urban living and health). Policy innovations and initiatives that focused on these three key domains had been piloted and test-bedded in districts such as Punggol Northshore district, Yuhua as well as Jurong Lake District.[16] In all instances, smart technologies were introduced into homes and neighbourhoods, with the aim of enhancing citizens' everyday lives, as well as addressing municipal issues such as neighbourhood cleanliness, security, and transport, among others.

At the national level, urban-centric initiatives included an OneService app that allowed citizens to report municipal issues, as well as various pilot projects exploring new modes of public transit.[17] The OneService app represented a need to consolidate the capabilities and resources of different municipal organisations. Prior to

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[14] Hsien Loong Lee, "Speech by Prime Minister Lee Hsien Loong" (Smart Nation Launch, Singapore, November 26, 2014), http://www.pmo.gov.sg/newsroom/transcript-prime-minister-lee-hsien-loongs-speech-smart-nation-launch-24-november.

[15] W.G. Huff, "The Developmental State, Government, and Singapore's Economic Development since 1960," *World Development* 23, no. 8 (August 1995): 1421–38; Linda Low, "The Singapore Developmental State in the New Economy and Polity," *The Pacific Review* 14, no. 3 (January 1, 2001): 411–41; Martin Perry, Lily Kong, and Brenda Yeoh, *Singapore: A Developmental City State* (Chichester: John Wiley and Sons, 1997).

[16] Irene Tham, "Jurong Lake District to Be Test Bed for 'Smart Nation,'" *Straits Times*, June 18, 2014, http://news.asiaone.com/news/singapore/jurong-lake-district-be-test-bed-smart-nation; Cherie Thio, "A Smart District, a Leisure Destination," *Skyline*, 2014, http://www.ura.gov.sg/skyline/skyline14/skyline14-02/article-03.html; Housing and Development Board, "Yuhua the First Existing HDB Estate to Go Smart | HDB InfoWEB," HDB InfoWEB, July 28, 2015, http://www.hdb.gov.sg/cs/infoweb/press-release/yuhua-the-first-existing-hdb-estate-to-go-smart; Channel NewsAsia, "HDB to Explore Use of Smart Planning Tools for More Towns and Estates," Channel NewsAsia, December 27, 2015, http://www.channelnewsasia.com/news/singapore/hdb-to-explore-use-of/2354866.html.

[17] Ministry of National Development, "OneService Mobile App – Making It Easier For You To Report Municipal Issues | Municipal Services Office," Ministry of National Development Website, January 25, 2015, http://www.mnd.gov.sg/mso/press-oneservice.htm; Smart Nation Programme Office, "Mobility-on-Demand: Real-Time Demand-Driven Transport through Apps," 2017, http://www.smartnation.sg/initiatives/Mobility/mobility-on-demand--real-time-demand-driven-transport-through-apps; Smart Nation Programme Office, "Self-Driving Vehicles (SDVs): Future of Mobility in Singapore," 2017, http://www.smartnation.sg/initiatives/Mobility/self-driving-vehicles-sdvs--future-of-mobility-in-singapore.

the introduction of the app, municipal issues were addressed by various public agencies, such as National Parks, the Land Transport Authority, Housing Development Board, etc. As we will discuss below, the emergence of such centralised policy feedback mechanisms suggests a need to address the risks of policy fragmentation, especially in the realm of public service digitisation.

Regarding community development, Prime Minister Lee noted that the Smart Nation initiative could foster the development of stronger and more closely-knit communities, "where technology will enable more people to connect to one another more easily and intensely".[18] The Smart Nation initiative's fifth key domain of public sector service was also related to such goals of community development, particularly in terms of fostering greater social capital and state-societal relations.

As Table 1 also shows, different policy tools facilitated the achievement of different policy objectives. For instance, investments in R&D encouraged technological and business innovations, hence contributing to economic development. In some cases, a single policy tool could be formulated to attain multiple objectives. For instance, the Open Data and Smart Nation platforms encouraged greater interaction and co-creation among public, private, and societal actors. In this case, the platforms contributed towards economic development (by encouraging business collaborations), urban-municipal issues (by facilitating the co-creation of urban solutions), and community development (by fostering greater interactions among various stakeholders and participants).

In short, the Smart Nation initiative comprised a set of policy tools and objectives that contributed to Singapore's economic and social development. Aside from this tri-factor policy focus on economic development, urban-municipal issues, and community development however, the Smart Nation initiative also involved significant administrative re-organisation. These public administration reforms are discussed next.

Public Administration Reform

Despite the successful implementation of the initiative and its suite of policy tools and objectives, Prime Minister Lee noted that Smart Nation initiative was not progressing as rapidly as the government had expected,[19] with insufficient private sector participation identified as a major shortcoming.[20] Furthermore, and as Table 1 above shows, the implementation of the various Smart Nation policy initiatives often involved multiple public agencies, with different agencies taking on a leading role in different initiatives. This often led to administrative overlaps. In order to prevent further fragmentation of Singapore's digitisation efforts, the Singapore government sought to re-organise and consolidate the various public agencies and units that were

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[18] Lee, "Smart Nation: Better Living, More Opportunities, Stronger Communities."

[19] Hsien Loong Lee, "Dialogue at Camp Sequoia" (Camp Sequoia, Singapore, February 26, 2017), http://www.pmo.gov.sg/newsroom/dialogue-pm-lee-hsien-loong-camp-sequoia; Terence Lee, "Brief: Singapore Admits Smart Nation Moving Too Slowly," Tech in Asia, April 15, 2017, https://www.techinasia.com/singapore-admits-smart-nation-moving-slowly.

[20] Peter Ho, "Imagining Endless Possible Futures," *TODAY*, April 19, 2017, http://www.todayonline.com/singapore/imagining-endless-possible-futures; Weizhen Tan, "The Big Read: Speed Bumps Hinder Singapore's Smart Nation Drive," *TODAYonline*, April 14, 2017, http://m.todayonline.com/singapore/big-read-speed-bumps-hinder-singapores-smart-nation-drive; Weizhen Tan, "A Mixed Report Card for Smart Nation Initiatives," *TODAYonline*, April 14, 2017, http://www.todayonline.com/singapore/big-read-mixed-report-card-singapores-smart-nation-drive.

involved in formulating and implementing the Smart Nation initiative. What had emerged was a centralised agency, the Smart Nation and Digital Government Group (SNDGG), established in May 2017.

Established under the Prime Minister's Office, the SNDGG was an umbrella institution that housed the various units and agencies involved in the Smart Nation initiative.[21] These included the newly formed Smart Nation and Digital Government Office (SNDGO) and Government Technology Agency of Singapore (GovTech). While SNDGO was essentially tasked with formulating the various Smart Nation policy initiatives, GovTech implemented these initiatives. The SNDGO consolidated staff from the Smart Nation Programme Office, the Ministry of Finance's Digital Government Directorate, and the Ministry of Communications and Information's Government Technology Policy department.[22]

A pictorial representation of the SNDGG and its component institutions is provided in Figure 2 below.

Figure 2: Organisation Structure of Smart Nation and Digital Government Group (SNDGG)
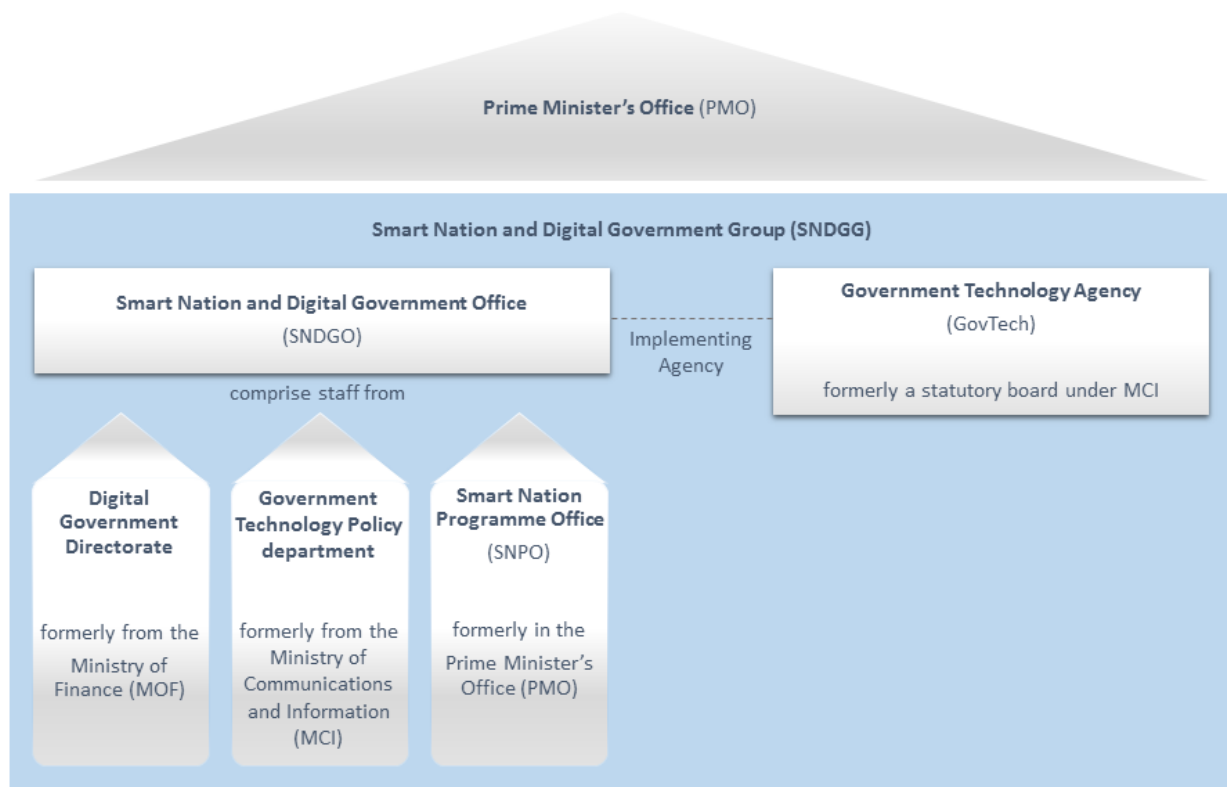
Adapted from Prime Minister's Office website.[23]

More importantly, the formation of the SNDGG represented efforts at centralising and consolidating the government's Smart Nation units and capabilities. This mirrored other recent administrative re-organisations,

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[21] Joanna Seow, "Boost for Smart Nation Push with Agencies under One Roof," March 25, 2017, http://www.straitstimes.com/politics/boost-for-smart-nation-push-with-agencies-under-one-roof.

[22] Prime Minister's Office Singapore, "Formation of The Smart Nation and Digital Government Group in the Prime Minister's Office," Press Release (Singapore: Prime Minister's Office Singapore, March 20, 2017), http://www.pmo.gov.sg/newsroom/formation-smart-nation-and-digital-government-group-prime-minister%E2%80%99s-office.

[23] Prime Minister's Office Singapore.

such as the establishment of the Municipal Services Office (MSO) or the Cyber Security Agency of Singapore (CSA). Both MSO and CSA were national-level centralised agencies tasked with coordinating the activities of the various other public agencies in their respective policy domains, as well as harmonising policy formulation and implementation processes across these agencies. In coordinating the activities of these other agencies however, there was also a strong element of inter-agency cooperation.

Even as the SNDGG operated as the central governing body for Singapore's Smart Nation initiative, it did so in cooperation with other public agencies and government bodies. A good example of this could be found in the Monetary Authority of Singapore's efforts to transform Singapore into a 'smart financial centre', through policy tools such as the FinTech regulatory sandbox, which were often designed and implemented in conjunction with the SNDGG and other relevant agencies.[24] The Smart Nation initiative, in short, involved extensive policy collaboration between Singapore's various public agencies and policy units. Under the direction of the SNDGG and through digital means of collaboration such as the Open Data and Smart Nation platforms, the Smart Nation initiative fostered, and in turn relied on, the close 'policy relations' that had formed among Singapore's public policy institutions.[25]

Ongoing Challenges

Despite these efforts to reorganise and streamline the government's digitisation efforts, analysts have identified limitations and shortcomings in the Smart Nation initiative. For instance, it had been noted that the initiative was unable to capture public imagination and lacked a clear success story.[26] Ironically, the government's efforts at centralising its digitisation drive may have further entrenched the state's role in driving the digital sector, in the process crowding out private sector opportunities.[27]

Indeed, it had often been noted that the success of Singapore's Smart Nation initiative continues to hinge on the government's ability to encourage user-driven innovations, especially through progressive and flexible regulations.[28] The formation of the SNDGG therefore had given rise to fundamental trade-offs between centralised government direction and the need for user-driven innovation. While administrative centralisation had given rise to policy efficiency, it also posed new challenges for private sector participation in the Smart Nation initiative.

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[24] Ravi Menon, "A Smart Financial Centre" (Global Technology Law Conference 2015, Singapore, June 29, 2015), http://www.mas.gov.sg/news-and-publications/speeches-and-monetary-policy-statements/speeches/2015/a-smart-financial-centre.aspx; Monetary Authority of Singapore, "MAS FinTech Regulatory Sandbox," MAS Website, November 26, 2016, http://www.mas.gov.sg/Singapore-Financial-Centre/Smart-Financial-Centre/FinTech-Regulatory-Sandbox.aspx; Julien de Salaberry, "The Case for a HealthTech Regulatory Sandbox in Singapore – Galen Growth Asia," *Galen Growth Asia* (blog), February 13, 2017, https://www.galengrowth.asia/2017/02/13/the-case-for-a-healthtech-regulatory-sandbox-in-singapore/.

[25] J.J. Woo, "Policy Relations and Policy Subsystems: Financial Policy in Hong Kong and Singapore," *International Journal of Public Administration* 38, no. 8 (2015): 553–61; J.J. Woo, *Business and Politics in Asia's Key Financial Centres - Hong Kong, Singapore and Shanghai*, 1st ed. (Singapore: Springer, 2016).

[26] Kevin Kwang, "Commentary: Singapore's Smart Nation Vision Blurry without a Success Story," Channel NewsAsia, August 15, 2017, http://www.channelnewsasia.com/news/singapore/commentary-singapore-s-smart-nation-vision-blurry-without-a-9122400.

[27] Tan, "The Big Read."

[28] Kevin Kwang, "'Users Need to Be in Driving Seat' of Smart Nation Initiatives: IMEC CTO," Channel NewsAsia, September 6, 2017, http://www.channelnewsasia.com/news/singapore/users-need-to-be-in-driving-seat-of-smart-nation-initiatives-9190592.

Conclusion

This case study has provided an overview of Singapore's Smart Nation initiative, focusing on both policy and public administration aspects of the initiative. Like many other smart cities, the Smart Nation initiative was established to, on the one hand, address the growing complexity that had accompanied rapid urbanisation and, on the other, explore the economic opportunities that might arise from Singapore's increasingly digitised and knowledge-based economy. However, this case study also identified an additional policy objective in the initiative, that of community building.

In order to address these three policy objectives – economic development, addressing urban issues, and community building – the Smart Nation initiative also encapsulated a set of 'enablers'. The discussion above has taken a policy-oriented approach to understanding the Smart Nation initiative, by framing these 'enablers' as policy tools and identifying the three major policy objectives. More importantly, the case study sought to address the linkages between tools and objectives. This framework of policy tools and objectives draws from the 'policy design' approach, which has conceptualised the policy process as a matter of finding the right policy 'tools' in order to attain a desired set of policy objectives.[29] This 'tool-based' design approach can therefore provide policymakers with a systematic way of differentiating between policy means and ends.

Aside from policy design, the Smart Nation initiative also gave rise to a spate of administrative reorganisations. As the case study discussed above, these included the formation of the SNDGG as the centralised public agency overseeing the initiative. Comprising institutions and personnel from a variety of public agencies and units that were previously involved, to varying extents, in Singapore's digital transformation, the SNDGG represented a growing trend towards administrative centralisation and centralised coordination of policy activities, especially in light of growing urban complexity. However, the Smart Nation initiative also continues to face challenges. The resolution of these challenges remain works in progress.

Proposed Discussion Questions

1. How did the Smart Nation initiative differ from earlier efforts to digitise government operations and processes?

2. What were the opportunities, issues and difficulties of formulating a coherent Smart Nation initiative for Singapore? What prompted the creation of the Smart Nation and Digital Government Group?

3. Are there trade-offs to centralising and consolidating Singapore's Smart Nation capabilities for policy-making and implementation under Smart Nation and Digital Government Group and GovTech? Do such efforts contradict ongoing trends of decentralisation and privatisation?

4. How would the implementation and regulation of Singapore's Smart Nation initiatives be affected by the reorganisation?

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[29] Michael Howlett, Mukherjee Ishani, and Jun Jie Woo. "From Tools to Toolkits in Policy Design Studies: The New Design Orientation and Policy Formulation Research." *Policy and Politics* 43, no. 2 (April 30, 2015): 291–311; Michael Howlett, M. Ramesh, and Anthony Perl. *Studying Public Policy: Policy Cycles and Policy Subsystems.* 3rd ed. Oxford: Oxford University Press, 2009; Michael Howlett. *Designing Public Policies: Principles and Instruments.* 1st ed. London: Routledge, 2011.

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