

This current version (v2) was published on Dec 2020.
The first version was released on Jun 2018.

DIGITAL GOVERNMENT BLUEPRINT
“A SINGAPORE GOVERNMENT THAT IS *DIGITAL TO THE CORE,*
AND SERVES WITH HEART”

Digitalisation is critical for the Government

1. The Singapore Government has made bold strides and steady progress in our journey to become a digital-to-the-core Government that serves with heart. Our journey started over 30 years ago, with the National Computerisation Programme in the 1980s. Today, our digital Government efforts are well regarded internationally. Our people and businesses are able to easily transact with the Government online, and our public officers make use of digital tools in their day-to-day work.

2. The conditions are now ripe for us to take Government’s digital transformation to the next level. Rapid technological advances, particularly in big data, the Internet of Things (IoT) and Artificial Intelligence (AI), have the potential to fundamentally transform Government for the better. At the same time, we face increasing manpower constraints and an ageing workforce. This is even as we seek to do more to support the public and our businesses. Our people, including a growing group of “digital natives”, also expect top-notch digital services.

3. COVID-19 has made the necessity of digitalisation and a digital Government even more urgent. It has reaffirmed our emphasis to build up our capabilities and press on with efforts to pursue deeper and more extensive transformation and digitalisation within the Government. Given the nature of the crisis, there should also be greater public acceptance to digital services that minimise physical contact, and to the use of IT tools to keep us safe. Recognising the public health situation, many government agencies have seized the opportunity to accelerate the use of data and technology to better communicate with the public, to sense-make the situation, and to strengthen operations ranging from contact tracing to mask distribution. Delivery of

services and schemes have also been brought online to better serve our people and businesses.

4. More than ever, digitalisation will be a key pillar of our public service transformation efforts. It will enable a public service that is leaner and stronger, with skilled and adaptable officers at the leading edge of service delivery and innovation. It will help us command strong public trust, confidence and support.

5. The Digital Government Blueprint builds on the foundations laid by previous e-Government masterplans. It is a statement of our ambition to better leverage data and harness new technologies, and to drive broader efforts to build a digital economy and digital society, in support of Smart Nation. It spells out how we will organise ourselves around our mission and stakeholders, instead of Ministries and agencies. It explains how we will strengthen integration between policy, operations and technology to support the Government's mission and better serve stakeholders. This will require us to re-engineer the Government's ICT infrastructure, operate reliable, resilient and secure systems, and raise our digital capabilities to pursue innovation. Ultimately, we will not be able to become a Digital Government on our own. We will have to partner the community and businesses to embrace technology and drive adoption.

6. We will improve this blueprint iteratively. As technology evolves and needs change, we will have to adjust our plans. Nonetheless, this blueprint articulates concrete milestones for specific initiatives and areas that we will embark on now.

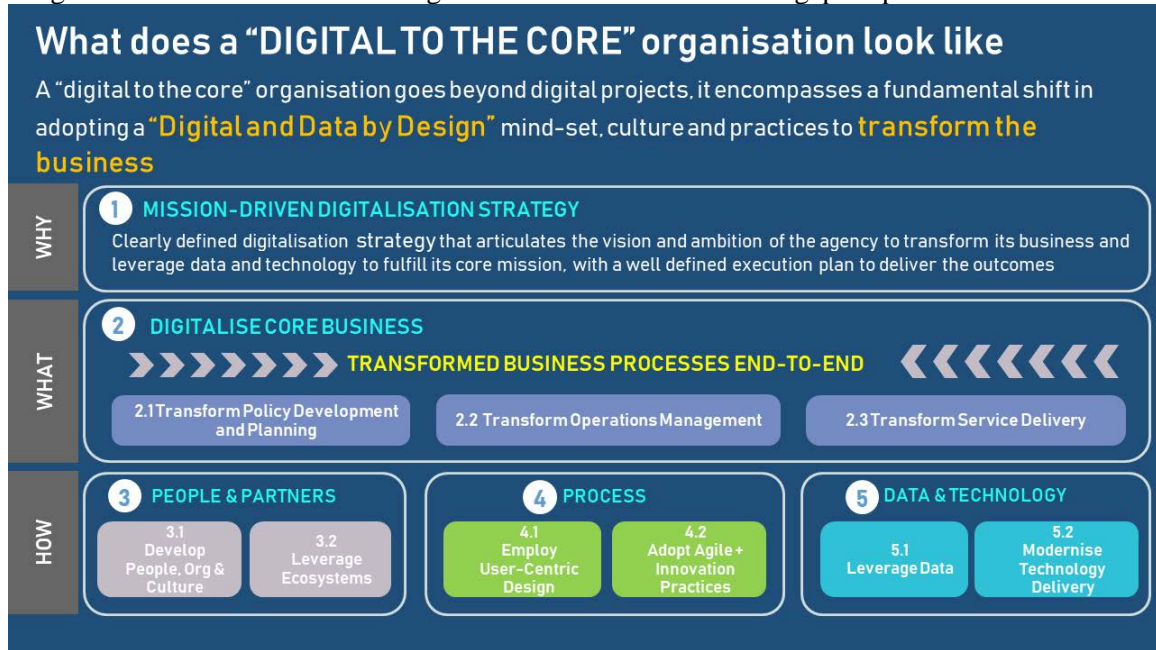
Our Vision - A Government that is *Digital to the Core, and Serves with Heart*

7. Digitalisation is not an end goal in itself, and will enable the Government to better achieve its mission: to improve the quality of service delivery, increase efficiency and productivity, and enable new and better means of engaging with people and businesses.

8. Achieving the "digital to the core" vision will require every government agency to digitalise end-to-end, from policy development and planning, to operations management and service delivery, to reap the full benefits of

digitalisation, as shown in Diagram 1 below (“What”). Operationalising this transformation would then require fundamental shifts in the development of people and engagement of partners; re-examination of processes; and better leveraging technology and data (the “How”).

Diagram 1: What it means to be “digital to the core” within the Singapore public service



9. Even as the Government rapidly digitalises, it must still be one that “serves with heart”. Digitalisation helps us serve with greater empathy, by enabling personalised and seamless experiences for different groups of stakeholders. It allows us to serve citizens better and builds trust through the delivery of more relevant policies and services. When work is automated where possible, public officers can also better provide a personal touch. Our digitalisation drive must be inclusive in order to succeed. We will work with Singaporeans to embrace digital technology in everyday living, and co-create solutions and services, as part of the Singapore Together movement.

Serving our Citizens and Businesses

10. The digital medium allows us to build stakeholder-centric services that cater to the needs of the individual. It enables policies, services and infrastructure to be better designed through the use of data and evidence-based policy-making, rather than by agencies’ functional boundaries or our manpower limitations.

11. For citizens and businesses, this means that transacting with us will be easy, seamless and secure. Our citizens and businesses will:

- a. Find our digital services intuitive, easy to use, and relevant to their needs;
- b. Enjoy the convenience of completing government transactions in a paperless, presence-less manner from start to finish, anytime, anywhere and on any device;
- c. Only need to give information or request for help once, as the relevant data or request will be shared with the right public agencies; and
- d. Feel confident that their data is secure.

Supporting our Public Service Officers

12. The Government must have a digitally-confident workforce which is supported by a digitally-enabled workplace and digital tools. To do this, we will support our officers to continually upskill themselves, adapt to new challenges and requirements, and work more effectively across agencies as well as with our citizens and businesses.

13. Our public officers will work in an environment where they can:
- a. Evolve and design better policies through the integrated use of data and digital technologies;
 - b. Execute high quality decisions and processes in a timely manner, supported by data and automation;
 - c. Connect and collaborate with other public officers easily through digital means;
 - d. Access high quality internal corporate services and processes; and
 - e. Be trained and empowered to harness technology and data in their work.

Supporting public officers with digital tools

Reroute is a bus planning simulator that helps bus planners to improve the public transport system. Using farecard data that captures commuters' travel patterns, the Land Transport Authority (LTA) and GovTech developed an

application that facilitates analysis of alternative travel options when bus planners review bus route proposals.

To begin a simulation, bus planners provide a scenario to the simulation specifying proposed changes to the transport network. Reroute then simulates the new travel patterns of commuters and shows bus planners the predicted impact to commuters. Bus planners then consider these results together with their domain expertise on operational feasibility, implementation strategy and cost to make an assessment and decision.

Each simulation takes just 20 minutes to one hour to complete, saving a bus planner at least one working day, with higher efficiency for more complex scenarios. The model also enables planners to propose and validate more scenarios to better plan the network.

An efficient and well-planned bus network can save time for consumers and bring benefits to more than four million public rides on more than 300 bus routes daily.

Building a Digital Government

14. Building a Digital Government involves the efforts of every government agency. Agencies will improve how we operate, how we deliver services, and how we engage our stakeholders. The Smart Nation and Digital Government Group will support agencies by laying out the overall blueprint, building common platforms and systems, exercising technical leadership by setting and enforcing Information and Communications Technology and Smart Systems (ICT&SS) standards, supporting agencies with technical expertise, and developing the ICT&SS competency of the public sector.

15. We have a six-fold strategy to build a Digital Government. This entails:

- a. Integrating services around citizen and business needs;
- b. Strengthening integration between policy, operations and technology;
- c. Re-engineering the Government's ICT infrastructure;
- d. Operating reliable, resilient and secure systems;
- e. Raising our digital capabilities to pursue innovation; and

- f. Co-creating with citizens and businesses, and facilitating adoption of technology.

Integrating services around citizen and business needs

- 16. The Government will take greater steps to digitally integrate services around the needs of citizens and businesses, to serve with greater empathy.

Integrating services around citizens' needs

Service Journeys have been used by the Government to redesign processes and services through a user-centric approach, so as to deliver services that are easy-to-use, seamless and relevant.

The first Moments of Life app was developed using the Service Journey approach to proactively support families with young children by bundling streamlined services and information, such as birth registration and early childhood services. The app was then expanded to support seniors aged 60 and above in their journey to live active and engaged lives.

In Aug 2020, we rebranded the app to LifeSG, and will be transitioning the app from serving specific moments of life, to providing one-stop and personalised access to government services for all citizens. LifeSG will offer users more ready access to digital government services through the consolidation of personalised content. Citizens can explore and easily access more than 40 Government services and discover recommended content through a personalised dashboard.

Integrating services around businesses' needs

Business owners who wish to set up a food services business now only have to fill in a streamlined form with no more than 90 data fields, as compared to up to 14 forms with 845 data fields previously. The application will also be auto-routed to relevant agencies concurrently where practical, to enable parallel processing. This cuts the turnaround time needed to complete the licence application process by between 10 to 14 days.

The GoBusiness portal was launched in Oct 2019 to serve businesses better. For a start, the portal dived deeper into the licence application journey for

companies in the Food Services sector and seeks to make the process simpler, faster and better. For example, as part of the licence application journey, businesses would be asked a series of questions regarding their business needs and the portal would recommend the relevant licences accordingly.

GoBusiness' most recent feature, GoBusiness Gov Assist, was launched in August 2020. This 24/7 online service makes it simpler and faster for companies to navigate over 160 Government assistance schemes to identify which ones best suit their needs. The e-Adviser asks businesses a few questions about their business needs and profile before guiding them to relevant assistance schemes including grants, loans, tax incentives and programs.

GoBusiness will also progressively expand to provide a wider variety of businesses-centric e-Services (e.g. businesses looking for to start up, premises use checks).

Strengthening integration between policy, operations and technology

17. Within the Government, tight integration between our policy, operational and technology communities is essential.

18. We are not pursuing digital technologies for their own sake, but applying digital technologies where most needed to meet our mission, or to overcome resource scarcity. Our ministries are developing comprehensive digitalisation plans in tandem with their strategic and work plans, and making digital transformation a leadership priority.

19. At the operational level, technology presents opportunities to completely re-engineer our processes. We will go beyond just digitising existing processes, and will review and change them.

Re-engineering processes using technology

The Authentic Court Order (ACO) system was introduced in January 2020, to simplify the process of verifying Court Orders.

Previously, parties needed to make a Certified True Copy (“CTC”) of their court orders as proof of having obtained a court order. Applying for CTC took several days and required more than one trip to the Court. A fee needed to be paid for every hardcopy CTC.

From January 2020, eligible court orders can be validated online. Parties can show a photocopy, email, or even a screenshot of an ACO to any relying party. The relying party (a bank, government agency etc.) can verify the authenticity of the order by retrieving a validated copy of the same court order directly from the ACO website. There is no waiting time and no need to collect CTCs in person, and this service is free of charge.

Prior to the launch of the system, the courts conducted extensive engagement with key stakeholders, including banks, insurers, and government agencies, to familiarise them with the new system and ensure smooth adoption. Engagement continues in the form of surveys which allow for feedback to be gathered and for the ACO system to be continually enhanced to better serve user needs.

20. We also need to challenge ourselves to harness emerging technologies to improve the way we formulate policy and run operations. In particular, we will make a big push for the use of AI to support the work of the Government, as part of the national effort to develop and deploy AI solutions to generate economic value and improve lives. We will identify high-impact areas for the deployment of AI in Government, including improving policy analysis and formulation, automating processes to overcome manpower constraints, and providing personalised and anticipatory services. This builds on the efforts outlined in the National AI Strategy that was launched in Nov 2019. We will develop a set of guidelines on the use of AI to manage the risks.

21. We will continue to develop the Smart Nation Sensor Platform to support the deployment of IoT and Smart Systems, and use sensor data for sensemaking, automation and actuation to improve efficiency and introduce intelligence in city operations (e.g. plant and soil sensor data can be collected in city parks for plant health monitoring, and automated irrigation can reduce manpower costs). For technologies that are less mature, such as blockchain,

we will start with small-scale experiments and find opportunities to synergise or scale-up successes.

Harnessing new technologies: blockchain

OpenCerts (opencerts.io) is a blockchain-based platform developed by the Government Technology Agency, Ministry of Education, Ngee Ann Polytechnic and SkillsFuture Singapore. The platform offers an easy and reliable way to issue and validate academic certificates that are tamper-resistant.

Built on open source and standards, educational institutions can easily create digital versions of every academic certificate that has been or will be issued, and publish them on a public ledger.

With OpenCerts, education institutions benefit from the cost savings of verifying issued certificates automatically. Students too receive their academic certificates and transcripts as a digital file, that can be easily viewed, shared and verified by potential employers and universities internationally. There is significant potential to extend the use cases beyond education certificates, with plans to use this for pilot licenses for unmanned aircraft and for business entities' information registered with ACRA.

Using robotics for COVID-19 ground operations

GovTech added capabilities to SPOT, a four-legged robot developed by US company Boston Dynamics, to support ground operations for COVID-19. The robot was enhanced with various functionalities such as remote control, 3D mapping, and people-counting video analytics to help with safe-distancing and delivery operations.

At Bishan-Ang Mo Kio Park, SPOT broadcasts a recorded message advising park users to keep a safe distance, and is also fitted with cameras to estimate the number of park visitors. SPOT is controlled remotely, thus reducing the manpower required for park patrols, and also reduces physical contact between staff and park visitors.

SPOT also helps to deliver essential items such as medicine to patients at the community isolation facility located in Changi Exhibition Centre. This

reduces human contact between patients and medical staff, thereby lowering the medical staff's exposure risk to the virus.

22. To further strengthen integration between policy, operations and technology, Chief Digital Strategy Officers have been appointed to lead and implement digitalisation plans within their Ministries and respective agencies. They are paired with Chief Information Officers, who support them from a technical perspective. At the middle management and working levels, we will also help policy and operations officers understand the opportunities which technologies may offer, and expose our technology officers to the Government's business needs so they can design effective solutions.

Re-engineering the Government's digital infrastructure

23. There is a need to deliver ICT projects in a timely and cost-effective manner. Our systems have to be interoperable and easy to maintain over time. In order to do this, we will leverage common, open-source and commercial platforms where we can, and customise only when necessary. Data standards and processes will also be put in place to ensure quality data can be shared faster and in a secure manner across WOG. Modern software development approaches will also be adopted to achieve higher quality and more cost-effective app development. This requires the Government to significantly re-engineer ourselves to be one that is lean, agile and future-ready.

24. A key enabler is CODEX (Core Operations, Development Environment and eXchange), which is a suite of digital solutions that will enable the Government to deliver better digital services to citizens faster and more cost efficiently. It comprises:

- a. A Government Data Architecture for common data standards and formats that better enables seamless data sharing between agencies;
- b. A systematic shift of less sensitive Government systems and data onto the commercial cloud, enabling the use of leading-edge cloud tools to develop digital services; and
- c. A Singapore Government Technology Stack (SGTS) comprising a suite of shared software components and infrastructure to enable more efficient and focused building of digital applications.

Government Data Architecture to enable data sharing

Enabling data sharing across agencies requires simultaneously tackling legislative, policy, capability and technical challenges. Building on the legal safeguards formalised by the Public Sector Governance Act, as well as the comprehensive digitisation of Government records to ensure machine readability, the Government Data Architecture fundamentally redesigns how data is managed within the public sector. It lays the foundation for the shared infrastructure to share data safely and efficiently, to improve cross-sector policy analysis and service delivery.

Single Sources of Truths (SSOTs) are designated to provide clean, verified and authoritative for core data fields commonly used for policy making and service delivery. Trusted Centres (TCs)¹ are responsible for fusing data from SSOTs and sharing it across whole-of-Government.

All public officers will be able to discover and access data needed for their work through Vault and Geospace. These platforms allow officers to browse a meta data-catalogue, securely download sample datasets immediately for exploratory analysis and then request for the full datasets from the TCs. A suite of best-in-class data analytics tools will also be made available in Analytics.Gov to enable rapid development of data and AI models. Security is built into these central platforms to achieve both convenience and compliance.

Shifting selected Government systems to commercial cloud

Migration to commercial cloud is a way to modernise the Government's ICT systems to reap the benefits of best-in-class commercial solutions. It will lead to cheaper hosting, higher availability and greater ease of continually improving services.

We have set ourselves a target of migrating 70% of less sensitive Government systems by 2023. Major systems such as corporate services for Finance and Human Resource will be hosted on the commercial cloud.

¹ Department of Statistics (DoS) for individual and business data, Singapore Land Authority (SLA) for geospatial data, and the Government Technology Agency (GovTech) for sensor data

A Tech Stack shared by all Government agencies

The Singapore Government Tech Stack (SGTS) is a collection of common digital services and infrastructure available to all Government agencies to build their digital applications. This reduces the time and effort needed to introduce new digital services and improves existing ones, and allows greater interoperability.

SGTS will allow agencies to focus on designing solutions that best meet the citizens' and businesses' needs. The MyInfo initiative was one of the first projects to use the SGTS. The pilot was developed and delivered in four months, instead of what would typically take a year. Other notable digital services that use components of the SGTS include the Business Grants Portal and the LifeSG initiative.

25. The work experience of every public officer will also be transformed through digitalisation. In particular, we need to meet the needs of a mobile workforce and telecommuting, as these become new norms. Digital services and tools simplify processes, facilitate collaboration and enable knowledge discovery across the Government, thus enabling officers to be productive, work better and work smarter. Workspaces, processes, policies and culture will be reimaged to enable new ways of working in a digital environment.

Supporting work-from-home arrangements

To support the work of public servants, the majority of whom are working from home since the Circuit Breaker period, the Government significantly improved the bandwidth and server capacity of its IT infrastructure. This allowed us to double the daily Virtual Private Network (VPN) logins from 60,000 to 120,000.

Digital tools have also allowed virtual meetings and remote work arrangements to take place with minimal disruptions. We were able to support an exponential increase in the number of Skype meetings per day from 1,600 in Jan 2020 to an average of 10,000 during the circuit breaker period.

26. The Government's digital platforms can also be extended to help businesses and the larger community. We will open up more platforms for businesses to participate in, to enable new innovative Business-to-Business and Business-to-Consumer services. We will also build digital platforms to connect citizens, not just to build a community but also to support crowdsourcing for solutions and services.

Extending digital platforms to businesses

MyInfo is a Government-developed data platform, which enables locally registered businesses to digitalise their business operations by requesting for citizen's personal data via secure Application Programming Interfaces (API) with their consent. With real-time consent-based access to data items from more than 10 government agencies, businesses are able to retrieve verified personal data for B2C digital transactions.

Since on-boarding to MyInfo, businesses have reported:

- Usage by 80% of eligible customers
- 80% reduction in transaction time for digital transactions
- 20% improvement in digital transaction completion from better user experience
- 15% increase in approvals due to better data quality
- Instant application processing using verified customers' identities

Businesses were able to create a new category of instant products and services by automating customer verification with MyInfo, allowing immediate approval and provisioning of bank accounts, credit cards, personal loans and remittance services, driving a true digital economy in Singapore. MyInfo is currently available in over 500 public and private digital services.

MyInfo has also been extended to enable B2B transactions with the addition of corporate data. This has enabled the streamlining loans, bank account opening, and grants applications by SMEs.

The NDI Application Programming Interface (API) Developer & Partner Portal (<https://www.ndi-api.gov.sg>) is a one-stop resource for private sector entities to integrate their digital services and applications with NDI APIs such as MyInfo, Verify & Login. Developers can refer to online tutorials,

API specifications or use the sandbox framework to develop their applications. The portal also allows business partners to submit their application to be integrated with NDI APIs.

Beside NDI APIs, developers can also access Singapore Government Developer Portal (www.developer.gov.sg) and search for other tech products that they would like to collaborate with the Government.

Reliable, Secure and Resilient Systems

27. As cyber threats become more sophisticated, we will need to enhance the security and resiliency of our systems. We need to continually safeguard both Government and citizens' data, and ensure that critical public services remain unaffected.

28. The Government will develop a Cybersecurity Strategy for our ICT and smart systems. The existing audit regime will be strengthened and a new cybersecurity architecture will also be developed to enhance monitoring and detection of threats. We will heighten cybersecurity awareness among our public officers by incorporating cyber literacy curriculum as part of public officers' induction programmes.

Strengthening data security

To uphold public confidence and deliver a high quality of public service to our citizens through the use of data, the Government conducted a comprehensive review of data security practices across the entire Public Service in 2019.

The Public Sector Data Security Review Committee made recommendations across five areas:

1. Enhance technology and processes to effectively protect data against security threats and prevent data compromises;
2. Strengthen processes to detect and respond to data incidents swiftly and effectively;
3. Improve culture of excellence around sharing and using data securely, and raise public officers' competencies in safeguarding data;

4. Enhance frameworks and processes to improve accountability and transparency of the public sector data security regime; and
5. Introduce and strengthen organisational and governance structures to drive a resilient public sector data security regime that can meet future needs.

The Government accepted the Committee's recommendations and has begun implementing them so that Singaporeans can be confident that the Government takes data security seriously and will do the utmost to protect citizens' data. These recommendations will also enable public officers to use and share data with greater confidence as the data is well secured.

Raising our Digital Capabilities to Pursue Innovation

29. We must have the right capabilities to support our level of ambition and ensure that the Government is able to “think big, start small and act fast” to seize new opportunities.

Developing capabilities within Government

The Government has been deepening its technical capabilities through a Centre of Excellence (or CentEx) for ICT and Smart Systems, where specialist engineering expertise will be grown to support the WOG.

The CentEx will house capability centres such as Data Science and AI, ICT Infrastructure, Application Development, Sensors and IoT, Cybersecurity, and Geospatial. The CentEx may expand into new technology capability areas as the need arises – for example, in robotics, VR/AR, digital twins or blockchain.

The CentEx will support the development of ICT skills and leadership for WOG through:

- a. Building an in-house reserve of deep technical skills in areas where internal capabilities are needed to deal with highly complex issues on short notice;
- b. Raising capabilities of ICT practitioners and leaders across the WOG; and

- c. Equipping public officers with relevant broad-based ICT skills (e.g. basic awareness of data analytics).

Nurturing manpower with the right technological expertise is the best way to build up long-term capabilities. Through the CentEx, we will grow bigger pools of specialist manpower that can capture and take advantage of technology opportunities as they present themselves. Given how rapidly technology is advancing, it is easy for us to be left behind or for our systems to become obsolete quickly if our capabilities cannot keep up with the changes.

Swift actions to support COVID-19 operations

The in-house capabilities we have built up over the last few years have allowed us to quickly develop digital tools to support the response to COVID-19. These solutions range from supporting mask distribution operations, providing timely and accurate information of the pandemic situation, and improving the speed and accuracy of contact tracing.

Maskgowhere.gov.sg is a website that allows residents to key in the postal code of their address to find out where and when they could go collect the masks that the Government was distributing to 1.3 million households. GovTech worked closely with People's Association (PA) to get the platform ready within 36 hours, including a system that tracked the mask collection progress across 743 collection centres. This allowed resources to be directed to centres where help was needed.

Many online applications for COVID-19 assistance were also developed quickly, often within a few days, by building on existing tools like FormSG and SingPass/MyInfo. This saved many applicants trips to the Social Service Offices or Community Centres during the Circuit Breaker period, and provided significant convenience to them.

Other solutions that have been developed included the TraceTogether mobile application and token to help identify non-transient contact among people and the SafeEntry check-in system to log check-in/out of employees

at workplaces and people visiting public places such as malls and supermarkets. These solutions have helped to expedite contract tracing effort and establish transmission clusters much faster.

30. The Government will also take a more proactive approach to managing and deploying ICT and related talent within the public service. We established the Government Chief Digital Technology Officer (GCDTO) appointment as the Head of Profession who will exercise functional leadership in critical areas such as technology masterplanning for WOG, competency development and manpower planning.

31. Through our public service leadership schemes, we will develop leaders who are competent and experienced in both policy and technical domains to fill apex leadership positions. Alongside this, a Smart Nation Scholarship has been launched in 2018 to identify young ICT engineering talent to fill technical leadership positions (e.g. Chief Data Scientists) in the future.

32. We will train public service officers to have basic competency in digital skills. We will commit to training 20,000 officers in data science by 2023. Beyond data science training, the Government has developed a basic digital literacy framework for public service officers, with an accompanying training plan. This will also include specific ICT competencies tied to certain job functions. To further support Agencies' digital transformation efforts, a Digital Academy will be established in Q1 2021 to uplift the digital skills of public service officers, build deep capabilities in the WOG ICT&SS sector and enhance digital transformation and leadership abilities of Public Service Leaders. Digitalisation is also enabling a culture of life-long learning in the public service, as all officers can access training courses on-the-go through the public sector-wide LEARN app.

33. Underpinning all these new capabilities, we need a shift in our public service culture to better support transformation and innovation. We want to encourage a "dare to try" mind-set, where officers will be empowered to try out new ideas and new ways of working, which will be critical to support the realisation of new opportunities.

34. To complement the Government's in-house capabilities, we will also proactively collaborate with industry and research institutions, especially those in emerging technology areas. Such partnerships will allow us to learn

from industry and research and development (R&D) players to deepen our knowledge and stay ahead of technology trends. On the industry front, the Government will also identify and engage key strategic partners for Smart Nation and Digital Government interests and support them to build up capabilities.

35. On the research front, we will put in place mechanisms to align R&D activities towards our Digital Government efforts. This includes facilitating the translation of research to address current government needs, and seeding future digital capabilities from cutting edge R&D in our research institutions.

Co-creating with Citizens and Businesses, and Facilitating Adoption of Technology

36. As part of the Singapore Together movement, the Government will step up engagement efforts to explain digital policies, work together with citizens and businesses to gather feedback, seek new ideas on how we can serve them better, and co-create the solutions and services with them. Facilitating meaningful engagements upstream will help us develop services that are well adopted and trusted by the public.

37. The Smart Nation Co-creating with Our People Everywhere (SCOPE) has been launched to engage the public during early stages of product development while Tech Kaki focuses on engagement sessions to deep dive into specific products. Citizens are involved in the design of products that will be used by them, with product improvements and redesigns done iteratively to address user feedback and problems identified.

38. To encourage co-creation with the community, the Government has launched the Singapore Government Developer Portal (www.developer.gov.sg), a centralised portal for public sector and industry developers to discover and co-develop using products developed by the Singapore Government. In addition to STACK-X meetups, we conducted the STACK2020 Developer Conference to engage the larger developer community in Singapore. Going forward, we will take greater steps to work more closely with industry and businesses to solve public sector challenges.

39. We believe that as we push ahead, no one should be left behind, in line with the Digital Readiness Blueprint. Services should be user-friendly,

accessible and beneficial to different population segments. They should comply with a set of digital standards and design principles, which was published by GovTech in end-2018. We will provide extra help to those who need it to adopt our services. To achieve greater digital inclusion, we will pilot select digital services in vernacular languages and see how we could deploy assistive technology in a bigger way.

GovTech Assisted Living Ecosystem (GALE) empowering Agencies to deliver proactive social support services

GALE leverages technological solutions to optimise multi-agencies' approach in rendering a myriad of social support services through greater op-tech collaboration and coordination.

The Case Coordination and Referral Management System (CCRM), an online project management portal which is part of GALE, seeks to strengthen the linkages between the agencies and social services by improving the back-end operational services through information sharing to enable proactive care to better improve the lives of the elderly and underprivileged groups.

The Personal Alert Button (PAB) integrates digital technologies with IOT and sensors to better serve the vulnerable senior residents through the replacement of existing pull-cord Alert Alarm System with the Wireless Alert Alarm System. This project is part of GALE and it seeks to improve the lives of the elderly by providing a faster response time during an emergency, with dedicated 24/7 telecare support upon activation.

Assistive technology for an inclusive society

The eCanvas, a neural-networked voice command system, provides greater independence for persons with disabilities to pursue their artistic endeavours.

Developed by GovTech, it features a motorised aluminium frame that clamps onto a drawing canvas and brings the canvas within reach of the painter. The connected microphone receives voice commands from the painter and activates the system to move to dispense paint on a palette.

The voice command system used in the eCanvas can be customised to help persons with disabilities perform other tasks independently. It can also be adapted to serve other segments of society such as the elderly with mobility issues.

40. To increase awareness and adoption of technologies across various population segments, Digital Clinics have been conducted to help participants with the use of smartphones and Government apps. We have also initiated a “Smart Nation Ambassador” programme to mobilise early tech-adopters to engage the wider public in adoption of digital solutions. Both public officers and citizens can sign up to be volunteers.

41. Beyond adoption of technologies, we hope that digital services can be a means to empower Singaporeans to help each other and co-deliver solutions.

Mobilising citizens to co-deliver digital solutions

myResponder, co-developed by the Singapore Civil Defence Force and GovTech, is an app to crowdsource for lifesavers. It notifies registered Community First Responders, who are trained in life-saving skills, of medical emergencies and fire cases happening within a 400m radius. To date, close to 30,000 cases have been responded to.

The Dementia Friends mobile app provides a supportive community for persons with dementia as well as their caregivers. Members of the public can play an active role in looking out for missing persons with dementia within their community. Users can also find information and resources on dementia and caregiving.

Key Performance Indicators (KPIs)

42. The Government will hold itself to a set of KPIs for Digital Government, as outlined below. These capture our intended end-state – where our citizens and businesses are guaranteed seamless and easy transactions online such that it would be their preferred mode to transact with Government; where we catalyse new opportunities through our platforms and data, and where our officers are more effective and empowered through digital tools and data.

43. The Government should seek to provide end-to-end digital services to our citizens. Some of our services already have this. For example, the process of filing one’s income taxes is fully digital, and our citizens can access library resources without having to physically access the library. We will have to do so for our other services.

44. Achieving the KPIs will require significant improvements in how we currently deliver digital services, as well as the delivery of new tools and platforms. While technology can be the catalyst, it will require a collective re-engineering on Government’s part on how we provide services and conduct our work.

45. The KPIs are not the only measure of Digital Government outcomes and we have introduced measures such as the Digital Maturity Index to assess the digital maturity across Singapore’s public sector agencies, and to benchmark with both local and overseas private sector organisations. Intervention measures will be developed to help chart our progress towards “digital to the core”.

S/N	KPI	By 2023
Stakeholder Satisfaction		
1	Citizen Satisfaction with Digital Services (via survey)	75-80% to rate very satisfied
2	Business Satisfaction with Digital Services (via survey)	75-80% to rate very satisfied
End-to-End Digital Options		
3	Services that offer e-payment options (inbound and outbound)	100%
4	Services that are pre-filled with Government-verified data	100%
5	Services that offer digital options for wet ink signatures	100%*
End-to-End Digital Transactions		
6	Percentage of transactions completed digitally from end-to-end	90-95%*
7	Percentage of payments (inbound and outbound) completed via e-payments	100%*
Digital Capabilities		

S/N	KPI	By 2023
8	Number of public officers trained in data analytics and data science	20,000
9	Number of public officers with basic digital literacy	All public officers
Transformative Digital Projects		
10	Number of transformative digital projects	30-50 projects
AI, Data and Data Analytics		
11	Percentage of Ministry families that use AI for service delivery or policy making	All Ministry families to have at least one AI project
12	Number of high-impact data analytics projects	10 cross-agency projects per year, and 2 projects per Ministry family per year
13	Core data fields in machine readable format, and transmittable by APIs	90-100%
14	Time required to share data for cross-agency projects	No more than 7 working days to share data for cross-agency projects
Commercial Cloud Migration		
15	Percentage of eligible [^] Government systems on commercial cloud	70%

** Excludes services or individuals where the KPI cannot be met for valid reasons. These reasons can include legislative reasons, or that certain segments of our population (e.g. the elderly or persons with disabilities) are unable to have access to or use digital tools.*

[^] Government systems qualify if data classification requirements allow them to be moved to cloud.

A Digital Government for a Smart Nation

46. As we embark on this new phase of Digital Government, the Government will continue its efforts to drive the digital transformation of our economy, as well as to help Singaporeans achieve digital access, literacy, and participation, so that we can seize new opportunities in an increasingly digital world as a Smart Nation.

Addendum to Digital Government Blueprint New Direction for Digitalisation (updated as of Dec 2020)

47. To build a Digital Government that is capable of meeting citizens' and businesses' current and future needs, the Government needs to undertake not just process and business model changes, but also deeper organisational policy, structure, and culture changes. Building on experience from COVID-19, we have identified a few key areas that will be critical to become a digitally-transformed Government:

- a. The Government would need to rethink its operating model to build data-driven cultures and organisations. Traditional IT teams will need to evolve towards becoming digital and data teams, with expanded scope for data engineering and even analytics. Digital teams would also need to be more multi-disciplinary, comprising expertise from both technology and business domains.
- b. To become “digital to the core”, we need to use digitalisation to improve policy making and implementation. Digitalisation may have allowed us to perform service delivery and operations using more cost effective and automated ways, but we also need to see how it can transform policy formulation and evaluation. There will be greater efforts to make use of Government Data Architecture for policy planning and new digital platforms such as LifeSG will also support policies which are more personalised, and which can be adjusted in response to user behaviour much more frequently. This would allow the Government to respond to citizens' needs in a more agile manner.
- c. Our Digital Government efforts must also help Singapore emerge stronger post-COVID, including looking at how digitalisation can support our national recovery and priorities, beyond how we have been

helping citizens. Digital enablers such as National Digital Identity can also be leveraged for the Digital Economy. This will help build an environmentally sustainable resilient and economically competitive nation that makes full use of the potential of technology.

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