Exploring Public Digital Transformation

Case Studies from Singapore, India and Taiwan

KONRAD ADENAUER STIFTUNG

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EXPLORING
PUBLIC DIGITAL
TRANSFORMATION

Case Studies from Singapore, India and Taiwan

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Note to the Reader

With the unprecedented technological advancement and digital revolution, administrations all over the world are challenged to go beyond their cultural practices and obsolete methodologies, often characterized by inefficiency. This imperative is underscored by the necessity to remain competitive with entities that have already achieved full digitization, or are steadily progressing towards it, grandly enhancing their citizens' quality of life and facilitating administrative efficacy. Therefore, the need for insightful guidance and strategic foresight has never been more pressing.

The Konrad-Adenauer-Stiftung Rule of Law Program Asia (KAS RLPA) is thus proud to present this original study on digitalization, which meticulously examines the digital strategies and best practices of Singapore, India, and Taiwan's administration and judicial system. Well-known as front-runners of digital governance and innovation, this study is an opportunity to learn from their success stories and understand how these administrations managed to leverage technology to enhance efficiency and citizen engagement.

With a focus on enhancing citizen welfare, India has pursued an ambitious digitalization strategy, epitomized by the India Stack, a comprehensive framework integrating digital identity, financial services, and data utilization. While commendable progress has been made, legal hurdles, notably concerning privacy rights, have necessitated careful navigation. This study explores India's journey, from foundational achievements to ongoing legal and regulatory challenges.

Taiwan presents a distinct approach to digital administration and judiciary, characterized by recent legislative and practical developments aimed at modernizing legal systems and practices. This study's analysis encompasses the digitization of administrative and judicial operations, examining strategies, implementation timelines, and the interplay between legislative amendments and procedural enhancements.

A paradigm shift in Singapore's digital government approach, from extensive outsourcing to internal innovation, illustrates a remarkable trajectory. Key drivers, including policy decisions, talent management, and a culture of agility and collaboration, underpin Singapore's success story. By delving into the inner workings of innovation units within the government, this report uncovers the grassroots innovation driving digital transformation.

This study builds upon a delegation trip to India, Taiwan and Singapore, led by German MP Nadine Schoen and MP Thomas Heilmann in August 2023, aimed at learning about these countries' digitalization landscape. Through these case studies, the report uncovers the multifaceted nature of digitalization's impact on governance, spanning technological innovation, legal frameworks, and organizational culture. The KAS Rule of Law Program hopes that this report will offer stakeholders, policymakers, and practitioners a roadmap for informed decision-making and transformative action.

We extend our sincere appreciation to Yogesh Hirdaramani (GovInsider, Singapore), Dr. Amitendu Palit (NUS, Institute of South Asian Studies, Singapore) and Prof. Lee Chien-Liang (Academia Sinica, Taiwan), the distinguished authors whose expertise and insights have enriched this study. Their dedication to advancing the discourse on digitalization has been instrumental in shaping this endeavor.

At the KAS Rule of Law Programme Asia, we are committed to providing a platform for meaningful dialogue on state modernisation. Join us!

Stefan Samse
Director of the KAS Rule of Law Program Asia

Olivia Schlouch
Program Manager, KAS Rule of Law Program Asia

Singapore, June 2024

About the Konrad-Adenauer-Stiftung's Rule of Law Programme Asia

Freedom, justice, and solidarity are the basic principles underlying the work of the Konrad-Adenauer-Stiftung (KAS). The KAS is a political foundation, closely associated with the Christian Democratic Union of Germany (CDU). As co-founder of the CDU and the first Chancellor of the Federal Republic of Germany, Konrad Adenauer (1876-1967) united Christian-social, conservative, and liberal traditions.

KAS contributes, underpinned by values, to helping Germany meet its growing responsibilities throughout the world. With more than 100 offices abroad, KAS makes a unique contribution to the promotion of democracy, the rule of law and a social market economy.

In 2005, the Konrad-Adenauer-Stiftung started a regional programme to support the development of the Rule of Law in Asian countries. The Rule of Law Programme Asia is one of five regional rule of law programmes managed worldwide by the KAS.

With this regional programme, the foundation's long-term goal is to contribute to the development and enhancement of an efficient legal system, based on the rule of law, as a core element of a democratic polity in the countries of Asia. This includes the establishment or stabilisation of those institutions or organisations which guarantee the constitutional order and the enforcement of citizens' rights in accordance with the Rule of Law.

The Rule of Law Programme Asia focuses on the following areas of interest, in which there is substantial need for reform and consultation within and among the countries of the region:

- Constitutional Law and the Promotion of Democracy
- Procedural Law
- Protection of Human and Minority Rights
- Good Governance and Corruption Prevention
- Independence of the Judiciary
- Environmental Law
- Tech Law / State Modernization / AI ethics

The primary aim of activities of the programme in the above-mentioned areas is for development of the rule of law through regional seminars, dialogue, political exchanges, research and training activities.

FROM OUTSOURCING TO OPEN-SOURCING:

The Role of Intrapreneurship and Agile Stability in Singapore's Digital Government Journey

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About the Author

Yogesh Tulsi Hirdaramani
Head of Content Production, GovInsider

Yogesh Hirdaramani is the Head of Content Production at GovInsider, a digital publication focused on public sector innovation in the Asia-Pacific Region and beyond. He has written widely on digital government and public sector innovation within the Singapore context and beyond, as well as the globalisation of higher education and historical representations of eco-culture in Singapore. He graduated with Bachelor of Arts (with Honours) from Yale-NUS College.

Mailing address: 1 Raffles Place, #02-01 One Raffles Place Mall, 048616 Singapore
Telephone: +65 9652 9594
E-mail: yogesh@govinsider.asia

Abstract

In 2010, 90 per cent of the Singapore government's IT spend was outsourced to external vendors. Ten years later, the government was rapidly developing and open-sourcing its technology solutions like contact tracing, government-developed messaging systems, and AI-driven automated temperature screening gantries for other countries to adopt during the Covid-19 pandemic. What drove this shift in its digital government approach?

This paper will draw on documents including past interviews, opinion pieces, and press releases, as well as secondary scholarship, to flesh out the key drivers that enabled the Singapore Government's Smart Nation and Digital Government Group to develop key digital government capabilities across the whole of government. These include policy choices made to attract, retain, and deepen in-house tech talent; the creation of common shared technology components, approaches, and standards; as well as a spirit of agility, collaboration and entrepreneurship that continues to drive outsized innovation.

This paper further adds to extant scholarship on Singapore's digital government success story by turning the gaze to two innovative units within the Singapore government. Through in-depth interviews with current leaders of these units, this paper argues that digitalisation initiatives within the Singapore government do not only spring from top-down directives and strategic national projects, but through civil servant-led innovation and entrepreneurship at the level of individual units.

Keywords: Singapore, digital government, e-government, innovation, citizen developer, state intrapreneurship, agile stability, agile

FROM OUTSOURCING TO OPEN-SOURCING:

The Role of Intrapreneurship and Agile Stability in Singapore's Digital Government Journey

1. INTRODUCTION

Singapore confirmed its first case of the Covid-19 virus on 23 January 2020 (Goh & Toh, 2020). Within eight weeks, the Government Technology Office (GovTech) – the government's central digitalisation agency – had released the TraceTogether application, a contact-tracing mobile app that could help users identify close contacts (Tang & Mahmud, 2020). At a time when other countries were monitoring the spread of the virus through tracking cellphone location data and drone surveillance, TraceTogether promised to help users identify close contacts without compromising location or personal data (Halbfinger, Kershner & Bergman 2020; Lindberg & Murphy, 2020).[1] Two weeks later, the team open-sourced the app, making it available for other countries to adopt in their own Covid-19 management efforts (GovTech Singapore, 2020a). By the end of 2020, countries like Australia, Canada, and Poland, had implemented contact tracing systems based on OpenTrace, the open-source version of TraceTogether.

This was only one of the many examples of Covid-19 management technology that emerged from the island nation within the first few months of the global pandemic. The country also developed and rolled out a government messaging system that could send daily WhatsApp updates to over 500,000 residents, and open-sourced an AI-powered automated temperature screening gantry. Many of these innovations were built by in-house government developers within weeks, if not days (Basu, 2020; GovTech Singapore, 2020b). Today, the island-nation has joined the United Nations' Digital Public Good Alliance, and open-sourced many more digital government products to aid digital efforts globally (Smart Nation Singapore, 2024). It also consistently ranks highly in digital government maturity indexes, ranking 12th overall in the United Nations e-government survey 2022 (United Nations, 2022). Given the speed at which these developments took place, it may be surprising to learn that 90 per cent of the government's IT spend was outsourced to external vendors until as late as 2010 (Chan & Miller, 2023: 12). This paper will explore how the Southeast Asian country went from outsourcing its digital needs to developing internal engineering capabilities and becoming a leader in digital government efforts globally.

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[1] While this generally held true for the duration of the Covid-19 pandemic, revelations that the government had tapped on the data to aid in a murder investigation led to increased debate around TraceTogether's privacy protocols in 2021. The government responded by introducing legislation to limit the scope of law enforcement's use of contact tracing data (Han, 2021).

Singapore's digital government journey began in 1980 with the National Computerisation Plan, which sought to computerise major government functions within five years, amongst other goals, to grow the local information technology sector (Hioe, 2001). Throughout the 1980s, the National Computer Board would go on to set up an internal computer network system, an internal communications network, and an information network that allowed the government to disseminate information via the Internet to citizens (National Computer Board, 1999: 8). By the 1990s and 2000s, its IT arm had been corporatised as the National Computer Systems Pte. Ltd (NCS), and many government IT functions had been outsourced to the industry more broadly (*ibid.*, 10). According to an article co-authored by Chan Cheow Hoe, the former Government Chief Digital Technology Officer of Singapore, "the pendulum for executing public sector IT efforts swung almost fully in the other direction towards vendor outsourcing" and by 2010, "about 90 percent of the government's spend on IT operations was outsourced to external vendors" (Chan & Miller, 2023: 12). While digitalisation efforts continued during this period, they were often piecemeal and driven by individual agencies' efforts (Lee, 2014).

This led to the disappearance of much internal technology and engineering competencies within the government, creating a "major bottleneck" in the way of the civilian government's digital transformation efforts (Chan & Miller, 2023: 12). As a result, a team of seven people was tasked to run an experimental digital services team in 2010 within the former Infocomm Development Authority (IDA), growing to over 100 people by 2016 (GovTech Singapore, 2016). This initial team set the groundwork for the formation of GovTech within Singapore's Ministry of Communications and Information (MCI) in 2016, as part of the

Smart Nation initiative, introduced in 2014 to spur whole-of-nation ICT development. Within the government, this meant taking on a more "whole-of-government" approach to digital transformation (Lee, 2014). The new national plan was to be guided by the new Smart Nation Programme Office (SNPO), set up within the Prime Minister's Office (*ibid.*). In 2017, the government replaced SNPO with the Smart Nation and Digital Government Office (SNDGO), which incorporated staff from SNPO, GovTech, and the Ministry of Finance's Digital Government Directorate to oversee plans and priorities for digital transformation (Prime Minister's Office, 2017). At the same time, GovTech was reorganised as the "implementation arm" of SNDGO under the Prime Minister's Office, forming the combined Smart Nation and Digital Government Group (SNDGG) (*ibid.*). Today, GovTech plays host to over 3000 employees, and has successfully engineered several whole-of-government digital platforms that include the Government on Commercial Cloud and the Singapore Government Tech Stack (GovTech Singapore, 2022a).

The creation of GovTech and the intentional decision to rebuild internal technical and engineering capabilities is not unique to Singapore. In the 2000s, leading digital governments around the world had begun to take note of the "gradual transfer of responsibility for IT infrastructure" to the private sector (Collington, 2021: 315) and countries like the United Kingdom began taking steps towards re-building internal technical capacities (Kattel and Takala, 2021: 9). In an interview with the United Nations, Chan Cheow Hoe shared that this rebuilding would ensure that Singapore's government IT leaders would be empowered to better assess the work of IT vendors, create horizontal platforms for digital transformation, and enable more agile IT development. "If you start building very core internal capabilities, you become more capable of challenging the industry, right? You know what you're going to buy, whether it makes sense or not, whether it's cost effective, whether it's the right way of architecting a system," he explained (Chan & Miller, 2022a).

There was also a developmentalist strand within the formation of GovTech: Singapore's government has long played an interventionist role in steering the nation's trajectory, driving developmental policies and outcomes (Woods, Bunnell & Kong, 2023: 7). The Smart Nation initiative and the formation of GovTech sought not only to upgrade digital government services but also the country's broader ICT ecosystem as a whole. Chan said, "we also wanted to challenge the industry to upgrade itself" (Chan & Miller, 2022a). Drawing on interviews with 31 senior and junior stakeholders from across the Singapore government, Woods, Bunnell, & Kong argue that what sets Singapore's Smart Nation strategy apart from other developmentalist smart city projects is its focus on mobilising, recruiting, and "insourcing" civic-minded domestic talent towards the public sector, rather than imposing top-down masterplans (2023: 10). This has created a culture where Singapore's innovation ecosystem is "public-sector led", and civil servants have become the "drivers of innovation" (*ibid.*: 4, 7). Other scholars have also highlighted the role that the Smart Nation initiative has played in driving the adoption of digital government tools in Singapore: as Smart Nation's broader remit includes raising the digital literacy of citizens and businesses, regular people were more inclined to adopt digital government tools when they emerged (Pereira, Lee & Fife, 2023).

Policy choices like attracting, retaining, and deepening in-house tech talent have played a key role in driving the country's digital government success, alongside other commonly discussed factors such the creation of common shared tech components, approaches, and standards; strong political direction coming from the Prime Minister's Office; and the creation of robust data and cloud policies to support digital government efforts. This paper seeks to review these factors and add to them by arguing that a culture of entrepreneurship that has taken root within the Singapore government plays a key role in driving the government's digital success. Beyond looking at the story of GovTech, this paper will consider the role of two other agencies within the Singapore government that have driven digital government efforts; VITAL, an agency situated within the Ministry of Finance that provides corporate shared services across the government; as well as Open Government Products, a small experimental tech lab situated within GovTech. By looking at these two case studies, this paper argues that digitalisation initiatives within the Singapore government do not only spring from top-down directives and strategic national projects, but through civil servant-led innovation and entrepreneurship at the level of individual units.

2. METHODOLOGY

To break down the story of Singapore's digital government journey, this paper draws on past interviews, press releases, and opinion pieces that reflect various moments in Singapore's progress. As Singapore's digital government is consistently held up as an exemplar, leaders from GovTech have conducted several high-profile interviews geared towards a public sector audience, either for a global government audience or local government leaders. In particular, Chan spoke on Singapore's digital journey in a four-hour-long video series, the "Singapore Digital Government Story," commissioned by the United Nations Department of Economic and Social Affairs, Division of Public Institutions and Digital Government – the body that oversees the United Nation's biennial e-government development index (EGDI). His reflections in this series have been a critical resource for this paper. Other key sources include publications by Singapore's Civil Service College authored by SNDGG leaders, press releases, and various opinion pieces written by or with SNDGG leaders. I echo Miao and Phelps' observation that the use of such secondary sources is necessary to trace organisational development over the years, as interviewees may not remember the finer details accurately (2019: 323).

Interviews were also conducted with present and former leaders of OGP and VITAL to understand the organisational development of these two units, as well as a former leader of the Personal Data Protection Commission, Yeong Zee Kin, who was a legal advisor to the Smart Nation Programme Office in its early years. These interviews covered topics such as the factors that have contributed to the successes of Singapore's digital government efforts, their hiring and training practices, and how their teams have secured buy-in for their products. While elite interviews with Singapore's government leaders can result in leaders uncritically replicating the Singapore story (*ibid.*: 323), they offer a valuable opportunity to understand the discourses, mindsets, and attitudes adopted by the leaders of Singapore's digital government and peer into "the black box of Singapore's governmentality" (Woods, Bunnell, & Kong 2023: 11). The case studies featuring OGP and VITAL were sent to their respective teams for fact-checking.

3. FOUNDATIONAL FACTORS FOR SINGAPORE'S DIGITAL GOVERNMENT EFFORTS

3.1 Organisational Structure: Digital At The Heart Of Government

A key reason for the success of the SNDGG was the initial decision to structure the team within the Prime Minister's Office in 2017. This signalled strong political will to drive digital transformation as a whole-of-government endeavour and provided the entity with the policy making power to drive strategic national projects – a departure from the previous piecemeal approach to digitalisation within the government. Within the Prime Minister's office, the group is overseen by a permanent secretary, a role that is typically charged with overseeing ministries. In Chan's words, "… it's a very senior level involvement … really very much almost like a ministry by itself" (Chan, 2022b). Within months of its formation, the SNDGG put out a list of key strategic national projects involving multi-agency efforts such as the country's digital identity, digital payments, Internet-of-Things platform, a moments of life application, and smart mobility digital infrastructure. These projects were envisioned to be the "foundation" infrastructure that would enable the pervasive adoption of digital technologies (GovTech Singapore, 2017).

This structuring enabled Singapore's government to oversee digital transformation goals across the government from the vantage point of the highest office in the government, via targets set out within the 2018 Digital Government Blueprint. The blueprint not only set out the long-term vision for digital government transformation – such as key values, the creation of common digital platforms, operating resilient and secure systems, and raising digital skills within the civil service – but also set key performance indicators for all ministries to achieve. These were 5-year goals that all ministries were expected to reach and included metrics such as citizen satisfaction, the integration of digital payments, digital skills training for public officers, and high-impact data analytics projects (Smart Nation and Digital Government Group, 2018). With its seat in the "centre of government" (Chan 2022a), SNDGG was able to revise the government's approach to digital transformation – for instance, working closely with the Ministry of Finance in 2018 to adopt a more agile approach to tech funding and procurement (Ng, 2019: 11).

Beyond setting goals for ministries, SNDGG works closely with various ministries to identify and roll out "no-regrets" high-impact digital initiatives (*ibid.*, 10). These included supporting the Ministry of Home Affairs in digitising death registration and working with the Ministry of Environment and Water Resources' near real-time automated metre reading (*ibid.*). To establish accountability, the SNDGG appointed a Chief Digital Strategy Officer at the Deputy Secretary level in every Ministry to "own" the digitalisation journey within each vertical (Chan 2022a). This sought to ensure ownership of digital transformation by improving ops-tech integration at the highest levels of each Ministry and having them oversee the journey towards meeting the blueprint's targets (Ng, 2019: 12). These officers have clear lines of authority over the digitalisation committees within their ministries, which include Chief Information Officers, Chief Data Officers, and Chief Information Security Officers. In addition, GovTech supports the work of each Ministry via its Services group, which deploys officers to over 60 per cent of public agencies to support digitalisation efforts (GovTech Singapore, 2022a). As of 2022, the Services group accounted for over half of GovTech employees (*ibid.*). The SNDGG also appointed a Government Chief Digital Technology Officer to lift the standards of the tech community across the government by creating common competencies and training, common technical standards and operation concepts, and a common HR scheme (Ng, 2019: 13).

3.2 Forward-Looking Data and Cloud Policies to Enable Innovation

Through the formation of the SNDGG, the government implemented forward-looking data and commercial cloud policies that accounted for the rapidly changing technological landscape. In 2018, the government enacted the Public Sector (Governance) Act (PSGA) to update public sector data security provisions. The act carries the same data protection standards as the country's Personal Data Protection Act (PDPA), which applies to industry players, but enables agencies to share data with each other to improve service delivery (Ministry of Communications and Information, 2019). There has also been an effort to align PDPA and PSGA as much as possible to ensure consistency across both public and private sectors and reduce confusion for vendors working with the public sector (Yeong, 2024).

Following the PSGA, SNDGO's Government Data Office introduced the Government Data Architecture (GDA) in 2019, which sought to drive a data-sharing-by-default approach and bring the country's Government Data Strategy to fruition by 2023 (Tay, 2020; Lim, 2019: 48). The strategy aimed to establish Single Sources of Truth (SSOTs) by assigning agencies as data owners for various data fields – e.g. the Ministry of Social and Family Development oversees family relationships data – and Trusted Centres that aggregates data across SSOTs, making it easier for users to request for cross-sectoral datasets. By distributing data ownership across various Ministries, the government aimed to reduce cybersecurity risk (Chan & Miller 2023: 16). In response to a series of data breaches, the Prime Minister convened a Public Sector Data Security Review Committee in 2019 that delivered 24 key recommendations to improve the security around government-held data, with 22 of these recommendations operationalised by 2023 (Smart Nation and Digital Government Office, 2023). The government allocated S$1 billion to enhance cybersecurity and data security capabilities within the public sector from 2020 to 2022 and now releases annual reports on the state of data security within the government (Smart Nation Singapore, n.d.).

In 2018, the government simultaneously announced an ambitious plan to move less sensitive systems to the commercial cloud to capture benefits such as better development environments, lowered maintenance costs, the availability of cloud-native services, and the ease of scaling services to meet changes in demand (Lee, 2018). Before that, the government's use of commercial cloud was largely restricted to hosting unclassified websites and ad-hoc projects (GovTech Singapore, 2018a; Amazon Web Services, 2017). With SNDGO as a central digitalisation office, it was able to craft policies that accounted for considerations such as which workloads could go to the cloud, whether data should reside in Singapore, and how much physical control the government should have over cloud infrastructure (Chan & Miller, 2022a). In 2020, the SNDGG updated the Digital Government Blueprint to set a new target of moving 70 per cent of less sensitive government systems over to the Government on Commercial Cloud 2.0 by the end of 2023, a goal they have reportedly exceeded (Smart Nation Digital Government Group, 2020; Hirdaramani, 2024).

The Government on Commercial Cloud (GCC) 1.0 was built as a wrapper platform in partnership with Singaporean company Xtremax to enable government agencies to re-engineer government software and applications, access commercial cloud servers, storage, applications, and services of their choice, including Amazon Web Services, Google Cloud, and Microsoft Azure without worrying about security and compliance concerns (Xtremax, 2018). By 2021, the government began redesigning this platform in-house, now called the Government on Commercial Cloud 2.0, which was launched progressively in May 2022 (Tan, 2021; Digital Government Exchange, 2023: 8). The policy decision to redesign the government's cloud in-house enabled GovTech to simplify the onboarding process for agencies and help product teams deliver services more securely and with reduced costs (GovTech Singapore, 2022b). It also reflected the growing internal engineering capabilities within GovTech. In 2023, GovTech launched GCC+ as a central commercial cloud hosting platform for more sensitive systems, catering to more stringent data sovereignty and security requirements via the AWS Private Local Zone service, while more sensitive systems remained within private clouds or on-premises (Digital Government Exchange, 2023: 8). According to the government, the adoption of cloud has halved hosting costs and helped agencies develop new products quickly – a critical capability during the Covid-19 pandemic (Puthucheary, 2022; Digital Government Exchange, 2021).

3.3 Embracing Modern App Development with Horizontal Platforms

"We believe in one philosophy: think big, start small, act fast." (Chan & Miller, 2022a)

With cloud and data policies sorted out by the Smart Nation Digital Government Office, it set the stage for GovTech to make modern app development methodologies a reality for the whole-of-government. This meant shifting away from traditional methods of app development and procurement and moving towards a more agile style of development, where GovTech employees could identify key problems, build minimum viable products, test these products with user feedback, and continuously improve these products to better solve problems (*ibid.*). GovTech was one of the first organisations in the Singapore government to consciously adopt an agile attitude towards software development and operations (GovTech Singapore, 2016). This is one of the advantages ushered in by the introduction of GovTech: by building in-house tech capabilities, as opposed to procuring tech products from vendors, the Singapore government was able to build new products quickly and then iteratively improve these services upon collecting feedback. For example, the OGP team built and launched FormSG, a form builder tool for government agencies, within 1 week to solve one agency's problems and continued to refine it over time (Loo, 2019: 91). Within a year, it saw widespread adoption and 160 agencies are currently using the platform (*FormSG*, n.d.).

This agile approach to development was aided by the creation of the Singapore Government Tech Stack (SGTS), which provided development teams with a common set of reusable tools and services they could use to quickly assemble new products. The decision to create a technology stack was driven by need – before that, productivity was much lower, and it took much longer to develop and introduce new code (Chan & Miller, 2022c). The base layer of SGTS provides development, security, and monitoring platforms that help DevOps teams begin agile development, while the service layer provides digital identity and digital payment plugins, design tools, and analytics and data tools (GovTech Singapore, n.d.a.). The service layer also includes API Exchange, or APEX, a central data exchange platform that enables government agencies to share data automatically via API plugins (Basu, 2017). Through SGTS, GovTech sought to "modernise development practice across agencies to help build secure systems in alignment with cloud platforms offered" and enable better visibility and observability for government systems on the cloud (Digital Government Exchange, 2023: 4). The SGTS also helped developers focus on refining actual use-cases rather than rebuilding infrastructure from scratch each time, enabling a much wider range of applications (Chan & Miller, 2023: 15).

These horizontal platforms – the GDA, SGTS, and the GCC – provided an "unprecedented opportunity to build an engineering culture in the public service" (Ng, 2019: 12) and shifted Singapore's digital government momentum away from the monolithic systems of past vendor-driven IT efforts. These horizontal platforms also reflect Singapore's broader use of infrastructures to enable growth (Mahizhnan, 1999: 15). But critical to such a culture is the freedom to innovate and develop new projects. This is where GovTech's "WhiteSpace" comes in: staff in GovTech can propose ideas to senior management that go beyond planned products and they will receive three months and financial support to develop a prototype, with the eventual goal of building an MVP (minimum viable product) if successful (Chan & Miller, 2023: 13). Many products have emerged from such initiatives, such as the country's LifeSG app (Ng, 2019: 13). Even if discontinued, the sum spent is small enough and "almost always" generates useful capabilities (Chan & Miller, 2023: 13). GovTech has also encouraged a culture of "innersourcing", where developers can contribute code repositories to the Tech Stack and help others tackle common challenges (Cavanaugh, 2024).

3.4 Recruiting, Retaining, and Deepening Tech Talent

Central to the question of developing in-house capacity and rebuilding internal engineering capabilities was attracting top tech talent: How was Singapore going to compete with the Silicon Valleys of the world for premiere top talent? Today, GovTech employs over 3000 people, and is comprised of a product team that oversees strategic national projects, whole-of-government ICT infrastructure like the cloud, and five capability centres in fields like data science and AI, digital services, and sensors; a services team that supports digital transformation in over 60 agencies; and a cybersecurity and governance team (GovTech Singapore, 2022a). But the initial team of only seven people had to embark on a concerted effort to recruit, retain, and deepen tech talent over the years to achieve a sufficient level of scale and support for digital transformation within the government. The approach taken by GovTech resembles the "Weberian" characteristics of successful bureaucratic organisations, which include meritocratic recruitment and providing long-term, predictable career paths, as discussed by Evans and Rauch (1999, p. 749) in their study of East Asian developmental states (which included Singapore).

As the goal was to attract talent that could introduce a modern engineering culture within the government, GovTech organised annual recruitment trips to the San Francisco Bay Area to engage overseas Singaporean talent and showcase the opportunities available within GovTech and in Singapore more broadly (Ng, 2019: 6). They also revised salary schemes to match the remuneration available in the private sector (*ibid.*: 15). Next, they introduced a three to six-month Smart Nation Fellowship for overseas Singaporean talent to collaborate on digital projects (*ibid.*: 17) and a two-year long Technology Associate programme to recruit fresh graduates (GovTech Singapore, n.d.b.). Such programmes were one avenue through which GovTech could showcase its startup-like culture to potential recruits (Woods, Bunnell & Kong 2023: 13). This active recruitment strategy tended to draw "civic-minded" or "purpose driven" talent who wanted to create an impact on people's lives (*ibid.*: 15; Chan & Miller, 2022b) – in Woods, Bunnel, and Kong's interviews with GovTech employees, both citizen and non-citizens shared that Singapore's political system offers the rare opportunity to create nationwide public impact through public sector technology (2023, 14).

To retain such talent, GovTech created long-term career opportunities for staff to continue developing over time both within GovTech and across the government more broadly, including capability centres in other agencies (Chan & Miller, 2022b). High-potential staff are encouraged to move around teams and learn "the lay of the land" as they progress (*ibid.*). Beyond lateral movement, there are also career paths for individual who would like to specialise in tech, become leaders of teams, or become managers that engage with policy and bureaucracy concerns – and these paths were developed even before the official launch of GovTech in 2017 (*ibid.*). Prior to the formation of GovTech, there were no career tracks for deep tech specialists (*ibid.*). Both tech and non-tech talent have the opportunity to deepen their tech skills through a Digital Academy as well, and the government organises developer conferences for government developers to learn from the private sector and share their expertise (*ibid.*; Chan & Miller, 2022d). In recent years, GovTech has also begun providing an attachment programme for employees to work in the private sector for six months as well as a mentorship programme that match employees with technical mentors (GovTech Singapore, n.d.c.).

4. BUILDING A CULTURE OF INTRAPRENEURSHIP WITHIN GOVTECH

But while the right policies, talent, and tools are vital for driving innovation, on a day-to-day level innovation has been sustained by a spirit of entrepreneurship and an orientation towards doing things differently. Miao and Phelps (2019: 322) have characterised the Singapore government as a representative case of "state intrapreneurialism", in which public sector agencies achieve mission outcomes by tapping on internal entrepreneurial energies to find and exploit opportunities. Similarly, Kattel and Takala (2021: 1-4) have proposed the concept of "public sector dynamic capabilities" in which public sector organisations integrate new competencies to address changing environments, question existing routines, and generate new approaches. In their study of the United Kingdom's Government Digital Service (GDS), they argue that strong political will and internal dissatisfaction with the government's approach to digital transformation led to the creation of dynamic capabilities via the GDS (*ibid*., 18). This led to a renewed focus on user needs, the creation of horizontal platforms that other government agencies could tap on, and a professionalisation phase (*ibid*., 8). While this paper has thus far demonstrated that Singapore's GovTech displays a similar trajectory in development, GovTech is distinguished by its developmentalist attitude characteristic of the Singapore government: it sees itself as bearing the role of uplifting industries and raising the standards of industry more generally.

As a result, GovTech has increasingly reshaped itself to resemble private sector technology companies by adopting an entrepreneurial attitude towards government service, in which developers are empowered to build successful products, win market share, and thus achieve moonshot outcomes, such as those set out in the Digital Government Blueprint. Ng Chee Khern, the former Permanent Secretary of Smart Nation and Digital Government, is quoted as saying, "the Prime Minister told us not to benchmark to other governments, but benchmark to technology companies" in an interview with Woods, Bunnell, and Kong (2023, 13). In his history of GovTech, Chan similarly pointed to examples like Uber and Netflix as exemplars of contemporary digitalisation that use technology to solve problems in a better way that governments can look to for inspiration (Chan & Miller, 2022a). GovTech's entrepreneurial leanings are also present in its core philosophy, "think big, start small, act fast" – an innovation mantra that originated from Mats Lederhausen, managing director of McDonald's Ventures in the early 2000s (Gubman & Russel). Others in SNDGG have also recommended viewing the process of public service as an act of entrepreneurship (Lim, 2019: 52-53). Crucially, what sets the intrapreneurial state apart from traditional bureaucracies is its focus on achieving outcomes, rather than fulfilling pre-determined requirements (Miao & Phelps, 2019: 322).

How does this spirit of entrepreneurship manifest? In Chan's telling, where governments traditionally adopted an "inside-out" approach, GovTech decided to adopt an "outside-in" approach to build successful products: by understanding the challenges when users face with technology, GovTech could develop better products and services for them that were effective, efficient, and frictionless (Chan & Miller, 2022a). Notably, he encouraged listeners – other government digitalisation leaders – to think of users as "customers" to serve, emulating the discourses of tech companies (*ibid.*). For example, Singapore's Moments of Life application – now rebranded as LifeSG – compiles more than 70 services related to key moments in citizen's lives into one application to simplify citizen engagement with government services (GovTech Singapore, n.d.d.). To ensure the product was usable, they interviewed potential users to learn about user experience and pain points and worked closely with participating agencies to iteratively develop a strong app (Wong, 2018; Masramli, 2018). This focus on user centricity seems to have paid off: as of 2020, seven in 10 Singaporean births had been registered through LifeSG (GovTech Singapore, 2020c). Since 2016, GovTech has also cultivated an end-user community of Singaporeans who test and review upcoming digital services and applications (GovTech Singapore, n.d.e.).

The Moments of Life application is an instructive case in more ways than one – the GovTech team had to not only build an app that solved citizen problems; they had to win the trust and collaboration of over 15 participating agencies, many of which had different working styles and technical systems (Wong, 2018). If we think of GovTech as a tech company, its customers include not just citizens but other government agencies as well, which GovTech had to win over. For example, though the Singapore Government Tech Stack is a common resource that all Ministries can tap on, Chan shared that its use was optional: "when you mandate something, people tend to get soft" (Chan & Miller, 2022c). By keeping the stack optional, GovTech wanted to ensure that it was a usable product that other agencies would voluntarily tap on (*ibid.*). "We take a very commercial approach towards building products. The most important thing is that people need to feel that the product is relevant to them," he explained (Chan & Miller, 2022a). Of course, not all products are optional – tools like Singpass, Singapore's National Digital Identity, are mandatory to prevent agencies from creating their own duplicate identity verification tools – but many are (*ibid.*). Once the stack was developed, it was used mainly by developers before its use was promoted to GovTech's five capability centres and then to other agencies, explained Chan (Chan & Miller, 2022c).

Once these horizontal platforms were live within government, the next step was to garner industry buy-in and drive adoption with the private sector. For instance, the "Digital Identity" modules within the tech stack are accessible to the private sector via API integration (GovTech Singapore, n.d.f.). Businesses can integrate these modules to enable password-less login, digital signing of electronic documents, as well as verify users' identities using biometric facial scan and obtain consented data via trusted government sources (*ibid.*). As a result, Singpass currently enables 97 per cent of the eligible population to digitally access more than 2,000 public and private sector services (World Bank, 2022: xiv). Users now complete more than 350 million transactions annually in domains such as financial services, education, healthcare, and other business services (*ibid.*). Even though Singpass is not a mandatory application for the industry to adopt, the Singapore government drove adoption by identifying use-cases with the most value and sectors that require high levels of trust (*ibid.*: xv). In the same vein, the GovWallet module, which enables government agencies to disburse money to citizens, has been adopted by bank industry partners to enable users to have more options when it comes to withdrawing or spending these payouts (GovTech Singapore, n.d.g.).

The government generally adopts a posture of collaboration and co-creation with industry players when it comes to building digital government products. This tendency for the government to co-develop projects means that "[Smart Nation] innovation itself is led by the public sector, sometimes in collaborative partnership with private sector partnerships, but not dependent on it," argued Woods, Bunnell & Kong (2021: 15). For the financial year of 2023, almost half of the government's ICT budget was expected to be co-developed with the industry via the tech stack (Hirdaramani, 2023). Industry players also have access to the base layer of the tech stack, such as the GCC 2.0, via the Tech Acceleration Lab – a controlled sandbox environment that allows tech companies and startups to more quickly co-create and prototype digital government products with the government (Wong, 2021). During the Covid-19 pandemic, the government worked with blockchain startup Accredify to build digital health passports, tapping on tools on the tech stack to make the project a reality (Poon, 2020).

In line with the government's developmentalist posture, GovTech plays an active role in supporting the country's ICT scene and positions itself as a leader for the tech innovation scene in Singapore. GovTech's role in nurturing the ICT community in Singapore complements SNDGO's broader role in driving the developmentalist Smart Nation agenda to transform Singapore into an international tech hub (Joo, 2021: 169-170). GovTech does so primarily through its regular developers' conference – a biennial STACK Conference and monthly STACK meetups, which showcase GovTech products and explore various emerging tech topics (GovTech Singapore, n.d.h.). Such developers' conferences are usually held by leading tech companies elsewhere: Singapore is unique as one of the few countries which have government-led developers conferences, noted Chan (Chan & Miller, 2022c): "These are very important ways of getting buy-in from the larger community and the industry. More importantly, hopefully, when the industry adopts these things, it also elevates the industry." He further explained that the successful implementation of STACK has only been possible due to the fact that GovTech operates similarly to tech companies, with an engineering and product development core (Chan & Miller, 2022d). Many of GovTech's codes are also open-sourced for developers in the private sector and other governments to access and tap on (GovTech Singapore, n.d.i.).

5. DELIVERING AGILE STABILITY FROM THE GROUND-UP: CIVIL SERVANT-LED INNOVATION

Though Singapore's GovTech stands as an exemplar of how governments can approach digital government innovation by cultivating intrapreneurship and a modern engineering culture, the risk of this energy disappearing is a real one. In their study of the GDS, Kattel and Takala (2021:19) warn that the professionalisation phase of the GDS has "put constraints on the dynamism and the agility of the organisation ... Dynamic capabilities require constant nurturing within public organisations." Elsewhere, Kattel, Dreschler, and Karo (2019: 13-14) suggest that for entrepreneurial states to flourish, they need to cultivate capacities for delivering both agile change and stable services through evolving configurations of organisations that can deliver both outcomes in tandem. In the case of Singapore, digital government does go beyond GovTech – several other organisations exist to nurture digital transformation within healthcare, defence science and technology, and the economy. To examine how Singapore sustains digital intrapreneurship and the delivery of agile stability, this paper will now analyse two examples of digital agencies that contribute to the digital transformation of the government through civil servant-led innovation.

5.1 Open Government Products: An Experimental Tech Unit to Deliver Agile Solutions

"The best play that the government can make is to hedge. I don't mean hedge in the sense that one will fail, and one will succeed, but to make multiple plays. OGP in effect is a different play." - Russell Chan, Head of People, Open Government Products (Chan, 2024).

GovTech's experimental tech unit, Open Government Products (OGP), started as a team within GovTech's Data Science and Artificial Intelligence Division in 2015 (*ibid.*). In its early years, members of the team built tech tools such as Singapore's open data platform, data.gov.sg, Parking.sg, a mobile application alternative to parking coupons, and common tools like website and form builders for government agencies (*ibid.*; Poon, 2019). By 2019, the team had split off to become an independent unit housed within GovTech in an effort to "structurally enable tech-push and white space innovation" (Ng, 2019: 13). Its remit included developing new products more quickly, in the style of tech companies, as well as testing new policies and organisational approaches for running tech teams (*ibid.*). Unlike GovTech, which had the responsibility of overseeing the development of strategic projects and core infrastructure for government agencies, OGP team members had more freedom and agility to test new ideas and experiment with new prototypes to solve emerging challenges.

As a result of being structured separately, the team has a direct line of communication with senior leadership in the government and even to Ministers directly, enabling them to cut through the bureaucracy when developing solutions (Chan, 2024). Its leaner size also allows the team to experiment with hiring practices, performance management and other organisational tweaks (*ibid*). Once successful, such tweaks can be adopted within GovTech more broadly (*ibid.*). For example, OGP recruits staff through assessment rounds that test candidates with real-world, skills-based tests focused on determining candidates' suitability (*ibid.*). Members from functional teams – like engineers and product managers – are also included in the hiring process to assess a candidate's suitability for the role (*ibid.*). Salaries offered are then determined by assessed level of performance, rather than by a candidate's educational or career experience (Open Government Products, n.d.a.). Internally, the team also uses peer appraisals for assessment and promotion (Li & Chan, 2021).

When it comes to developing products, the team adopted a methodology of building "unpolished" products quickly before iterating and improving products in tandem with user feedback (GovTech Singapore, 2018b). The team also has the space to reimagine government development practices – and many of its innovations are then rolled over to GovTech as a whole. For instance, OGP was exempt from IM8, the regulations that guide tech management in government, enabling it to move faster than other development teams in government (Chan, 2024). As a result of this exemption, the team was able to incubate alternative development models and draw on its experiences to inform and contribute to GovTech's recent IM8 reforms (*ibid.*, Hirdaramani, 2024). The unit was also able to get waivers to use off-the-shelf software-as-a-service (SaaS) and other cloud-native products early on rather than rebuild products from scratch (Chan, 2024). As of 2023, GovTech as a whole has become keener to deploy SaaS and cloud-native products, with nearly a quarter of its 2023 budget set aside for SaaS products rather than building more on-premises systems (Hirdaramani, 2023).

This experimental stance towards tech development became crucial during the Covid-19 pandemic, when the government had to rapidly build new tools to address the emerging crisis. OGP took on the task of developing critical new systems when the need arose, including a vaccine appointment system that could withstand a high number of users; a messaging system that could broadcast daily updates to 500,000 residents via WhatsApp; and a tool to help check in on and verify that people with confirmed or suspected cases were compliant to quarantine policies (Mahmud, 2022; Basu, 2020). The unit operated in teams much leaner than those in GovTech – three to four people as opposed to teams of 20 to 30 (Mahmud, 2022). Covid-19 proved to the broader government that OGP was not just a space for small-scale experiments or minor projects: many of these initiatives were scaled to support whole-of-nation pandemic management systems. In 2024, OGP joined the United Nations' Digital Public Good Alliance on behalf of Singapore with plans to open-source high impact projects for other countries to adopt (Smart Nation Singapore, 2024).

To understand how OGP enables a culture of intrapreneurialism to flourish and gives developers the space to experiment, build good products, and win buy-in from stakeholders, this paper will highlight three key factors.

5.1.1 Outcome-Focused, User-Centric Development

Key to OGP's success in building products is its focus on developing small-scale products that solve specific, clearly defined problems rather than building products with pre-defined requirements. Where traditional government IT systems attempt to cover a broad swath of functions, products by OGP focus "on doing one thing only and doing it well" (Li & Chan, 2021). By sustaining direct access to users on the ground, OGP teams seek to ensure that their products solve the key problem at hand, rather than just meeting pre-defined requirements (Chan, 2024). All members – including engineers, product managers, and designers – are expected to go on the ground, test, see how users engage with the product, and be held accountable for continuing to improve the product to better solve the problem at hand (*ibid.*).

During the hiring process, the team looks out for "entrepreneurial" people who are not just technically skilled but are problem solvers in their own right who are joining to "make public good happen" (Chan, 2024). This echoes Woods, Bunnel & Kong's observation that "insourcing talent ensures that civic mindedness is the nucleus of the Smart Nation" (2023: 15) and the broader point that for government digitalisation efforts to be successful and sustain the agility characteristic of modern tech approaches, a culture of entrepreneurial, civic-minded development is a key ingredient. As teams are kept small, everybody leans in to lend support – product managers debug technical issues and engineers respond to support tickets (Li & Chan, 2021).

"No one in the team goes, 'serving users is not my job.' It's not as if engineers sit in a room and just do the work, and only designers go and test. Everyone goes and tests. Everyone goes and sees impact. Everyone's held accountable for the impact to the user." (*Chan, 2024*)

Teams work in small groups of four - eight to develop products, work with stakeholders to refine prototypes, and continue maintaining the app upon release. Keeping product teams lean and simplifying products to focus on core features are some of the ways the team seeks to avoid product bloat (Li, 2019). For one of their earliest projects, ParkingSG, the team shadowed experienced parking enforcement officers to find out how they worked – and realised they were so good at their jobs, advanced features like computer vision would be useless (GovTech Singapore, 2018b; 2018c). Instead, they opted for simple features that would make the officers' lives easier, tested the product with volunteers to account for how people would actually interact with the product on a daily basis, and focused on ensuring core features could withstand scaling up to thousands of users. Within a year, the tool went from facilitating 300,000 parking sessions at launch to supporting over a million sessions monthly (Chan, 2019).

Even when they partner with other government agencies to build products, OGP members focus on reaching out to actual users and meeting the needs of the end-user, rather than the business owner (in this case, the partner government agencies) (Chan, 2024). When the team worked the Ministry of Health and the Health Promotion Board to develop a health appointment system to drive up adult vaccination rates, they interviewed general practitioners, clinical assistants, and senior citizens to understand pain-points and build an intuitive system – particularly for senior citizens and clinic assistants, who may not be used to such systems (Teng, 2022; Abdullah, 2022). Since its launch in 2022, the product now sees more than 100 000 active users, according to OGP's product page (Open Government Products, n.d.b.). Today, government agencies are more keen to work with OGP than before, and there is significant "inbound demand" (Chan, 2024).

Once a product is live, the team rarely mandates its use, either in government or nationally – rather, they prefer to let the products speak for themselves and allow people to use them to solve problems (*ibid.*). For internal systems, they conduct sharing sessions for officers from other units to understand how these tools can support their workflows, like FormSG (*ibid.*). For products with larger use cases, the team partners closely with government agencies to help scale the product (*ibid.*). In the case of RedeemSG, a national voucher system, OGP partnered with Community Development Councils (CDC) and People's Association to support the rollout of the country's household support scheme during the Covid-19 pandemic, where each household was provided with S$100 vouchers (*ibid.*). As a result of the team's focus on solving problems, the unit is also willing to kill products that do not meet a clear use case or duplicates other efforts (*ibid.*).

5.1.2 Sustaining Innovation and Collaboration with Hackathons

"The hope was that if you get the most motivated, most capable people to come together, come up with ideas, figure out how to get solutions built, you are going to get something good out of it." - Li Hongyi, Director of Open Government Products, 2023 (*Yeo, 2023*)

Beyond its ethos of user-centric software design and development, the unit also sustains its agility and entrepreneurial efforts through regular hackathons that provide team members with the freedom to explore new ideas, engage with citizens and other government agencies, and develop prototypes. Since 2020, the unit has set aside January as a dedicated time for whitespace innovation, where OGP members pause non-core projects and work on specific public good problems of their choice (Open Government Products, 2021). During the "Hack for Public Good" months in January, members then embark on "learning journeys" to learn from government officers on the challenges they face, before beginning their ideation and prototyping (*ibid.*). These hackathons have been credited as the source of flagship OGP products, such as RedeemSG, Postman – the government's mass messaging tool – and ScamShield, which supports citizens in blocking scam calls and messages, a growing bugbear in the nation (*ibid.*). This structured space for innovation is one mechanism through which the team sustains its agility and enables its developers to remain up to date with the challenges public officers and citizens face.

They have also expanded to include working with the private sector and empowering citizens to build their own tools during these hackathons. They have increasingly called for developers from technology companies, such as Amazon Web Services and Stripe, to pitch in and contribute their expertise to solving public challenges (Hirdaramani, 2022). Since 2023, OGP has begun running citizen hackathons, titled "Build for Good", for citizens to solve public good challenges in a similar fashion while OGP provides mentorship, workshops, and resources to guide their journeys (Ministry for Communications and Information, 2024). The 2023 iteration of Build for Good resulted in tools that include a web app to support citizens in recycling better, an AI app to help busy school counselors document case notes faster, and an AI chatbot to help elderly people write resumes (Yeo, 2023). Winning prototypes can move into further product development, and some of these tools have gone into their pilot phase as of 2024 (Ministry for Communications and Information, 2024). The team will soon launch an environmental-themed hackathon in partnership with the Ministry of Sustainability and the Environment (*ibid.*).

These hackathons reflect a broader ethos of working with the community and other stakeholders to co-create solutions that solve public good challenges. The team regularly open sources products for the developer community and showcases their engineering work at engineer meetups (Chan, 2024). For them, collaboration with the right stakeholders on the right problems are a critical ingredient to enabling their mission, supporting other government agencies in operating in similar ways, and reshaping how governments should interact with citizens (*ibid*). As part of this effort to increase transparency to citizens and invite collaborations, the unit has also set up pages on their website that detail the impact of, the teams that work on, and the costs of each product (Open Government Products, n.d.c.). They conduct sharing sessions with other government agencies in the region and globally as well.

5.1.3 Maintaining Agility in the Long Run Through New Structures

Once OGP proved its value during Covid–19 pandemic, the team expanded – today, it operates with 170 people, from an initial unit of 30 people (Chan, 2024). Where product teams were almost under-resourced previously, now product teams operate with around four to eight people, covering developers, product managers, and policy folks – a more optimal size (*ibid.*). However, as the team expands, so does the threat of ossification and centralisation. For now, the team is pursuing a strategy of horizontal scaling: more people mean more product teams, as well as a few more coordination layers to ensure smooth operations (*ibid.*). The team plans to remain steady at this size and is careful not to enlarge product teams any further to prevent a loss of agility (*ibid*).

In the longer term, the unit plans to continue reviewing how OGP operates and striking the balance between agility and expansion, while continuing to serve its purpose (*ibid.*). As such, OGP has begun partnering with other agencies within government and developing tools to create similar capabilities elsewhere, so that OGP does not become a single point of failure for the government (*ibid*). The team has cultivated strong relationships with healthcare technology teams in government and has internally developed a HealthTech team focused specifically on supporting HealthTech innovation within government (Open Government Products, n.d.d.). Such verticals aim to support capacity building in other parts of government and ensure that OGP's model continues to scale, without letting the core organization grow too large (Chan, 2024). Beyond that, the team runs "TechUp", a month-long programme which equips public officers with baseline technical knowledge and agile problem-solving skills. These programs enable other units within government to grow while they continue to run independently (Chan, 2024). In the long run, the unit is considering "spinning out" smaller teams to incubate new organisations within other parts of government (*ibid*). This recalls Kattel, Drescher, and Karo's observation that in practice, bureaucracies sustain agile stability through the "mushrooming of various innovation labs and teams in the public sector explicitly working in agile, open ways" (2019: 13).

5.2 VITAL: From Backroom to Centre of Government Administration

In contrast to OGP, VITAL plays a much more unassuming role within the Singapore government. The corporate shared services unit was set up in July 2006 to aggregate common administrative services such as HR, payroll, and finance, and achieve economies of scale for the government. It initially served 18 agencies and operations staff from these client agencies were absorbed or seconded to help the agency get going (VITAL, 2016). By 2016, the team had grown to 460 people that provided corporate services for more than 100 agencies within government and facilitated two million transactions annually, with a 99.8 per cent accuracy and on-time rate (*ibid.*). In 2020, the agency was appointed as the government's robotics and automation lead, with the task of identifying key robotics and automation tools to improve internal administrative services across the government (Poon, 2021). While a GovTech team within VITAL supports its work, and VITAL does tap on GovTech's commercial cloud infrastructure, the work of identifying and implementing new RPA projects remains VITAL's forte.

From a superficial perspective, VITAL does not lend itself to neat comparison with OGP. Where OGP was an effort to structurally enable agile development and create space for innovation, VITAL was primarily an efficiency play – the team was brought together to save money for the overall government. The creation of VITAL was inspired by a similar effort in the Ministry of Defence, where a corporate shared services team had helped save S$4 million in costs within a year and a half (VITAL, 2016). As a result, VITAL is in many ways much more entrepreneurial than other government agencies in the classical sense of the term: focusing on business development, securing and maintaining government clients, reducing costs and recovering costs through fees and charges to government agencies for the use of its services. Unlike OGP, VITAL could not pick the staff transferred to the newly established organisation and could not assess the suitability of these recruits (Hoe & Lim, 2024). In fact, many left due to trouble adjusting to the new processes (*ibid*). During its initial years, leaders in VITAL thus had to create a new identity for the team, harmonise disparate processes across a wide variety of agencies, and continue to prove its value to other agencies, who had the option of working with private sector service providers if they so chose to (VITAL, 2016; Hoe & Lim, 2024).

In recent years, VITAL has grappled with more existential concerns. As automation technology became more prevalent, there were worries that VITAL staff would be out of jobs with their manual administrative tasks fully automated (Hoe & Lim, 2024). Leaders at VITAL responded by sending VITAL employees – most of whom had little IT training and no university education – for courses in data analytics and design thinking while also scaling up the use of Robotic Process Automation (RPA) in VITAL (*ibid.*). Rather than hiring new staff or developers, the unit decided to adopt a strategy of grooming its existing staff. By training employees in RPA and data analytics, VITAL leaders enabled everyday staff to automate their workflows and perform higher-level tasks, providing them with new career trajectories. At the same time, VITAL put in place a central RPA platform for government agencies to tap on, in line with its new role as robotics and automation lead in the government. This section will explore how VITAL's twin strategies of enabling employee-led innovation and adopting a platform approach has driven digital transformation for corporate services within the government.

5.2.1 Employee-Led Innovation Through a Citizen Developer Strategy

To drive the automation of VITAL's manual processes, the team upskilled staff and trained them in RPA and other skills, such as data analytics and design thinking. By training everyday staff in automation, VITAL directly enabled officers to improve their own business processes: rather than outsourcing the task of automating VITAL's processes to external parties who may be less familiar with internal processes and practices, VITAL enabled staff to take ownership of revamping and modernising the processes they were intimately familiar with (Boo, 2024). In an interview with Singapore's national broadsheet *The Straits Times*, a VITAL employee with no programming background spoke about how she designed a bot to automatically extract name data from a human resources information system, input them into templates, and notify the agency of course enrolment statuses – a process that was otherwise cumbersome (*ibid.*). This had the added benefit of opening career progression opportunities for her, and she has since become an operations technology specialist (*ibid.*). Other citizen developers within VITAL have developed team-wide and enterprise-wide automation to solve organisational challenges more broadly (Dabrinze, 2023). So far, staff have automated over 70 processes (*ibid.*) and by 2024, over 50% of staff had been trained in RPA skills (Tang, 2024).

By upskilling non-IT talent in the use of no-code and low-code tools to drive automation, VITAL circumvented the need to hire experienced developers while driving digital transformation efforts. This is a key benefit of citizen developer strategies, which seek to train non-IT employees in delivering useful and innovative applications that meet business needs. Initially, RPA capabilities were confined to a select group of specialists that took time to train, so the team turned to training operational staff to acquire low-code RPA development skills to augment the efforts of the specialists (Tang, 2024). The team also identified other skills, such as design thinking and data analytics, that could add value to VITAL's overall mission (Hoe & Lim, 2024). VITAL pursued this upskilling strategy by working with training providers, covering all training costs, and allowing staff to attend these courses during working hours (Boo, 2024). Those taking the basic data analytics course would graduate upon completing a two-day hackathon, during which they would tackle a business challenge faced by VITAL (Hoe & Lim, 2024). The citizen developer strategy was also supported by VITAL's adoption of commercial cloud services via the GCC, which enabled access to no-code and low-code development tools, data visualisation tools, and data analysis tools (Lui, 2022a). VITAL continues to spur innovation through initiatives such as an annual RPA challenge that recognises individual contributions and online RPA community platforms to create a self-sustaining community of RPA practitioners (Tang, 2024).

As a result of upskilling employees, the shared services team was well-positioned to refashion the role it played within the government and sustain its relevance as a leader in operations and tech integration. With members who could automate processes and analyse transactions, VITAL was able to launch its Shared Services Competency Framework in 2021 to formally reposition its staff away from merely processing transactions towards being able to "pre-empt issues, provide agencies with insights from data, and recommend policy and process improvements" (VITAL, 2023). In a 2022 presentation, then Chief Executive Dennis Lui remarked:

"VITAL of the old was a transactional processing outfit, [with] everybody doing paperwork eight to five. The VITAL of today and tomorrow is an ops-tech leader, no different from an IT firm, where we bring in all the relevant technologies around the world, in our domain, and bring us forward so that we can serve our colleagues, public service colleagues better and then we can serve Singapore even better." (Lui, 2022a).

Even as the adoption of RPA began to redefine the role VITAL played within government, automation also supported the efficiency gains that are the bread and butter of VITAL – RPA had enabled savings of over 16,000 hours and avoided the potential costs of hiring IT professionals (Hoe & Lim, 2024).

5.2.2 Refashioning VITAL as a Platform for Whole-of-Government

As a corporate shared services team, VITAL was not only in a position to reap economies of scale, but to introduce new services that would not have been possible otherwise, such as a government-wide travel agency programme, a set of asset and inventory management services, and a corporate card programme to support business expenditures during overseas travels (VITAL, 2016). When such services were centralised, the team was able to oversee common trends, work with stakeholders, and recommend policy improvements (*ibid.*). It was also able to roll out 14 whole-of-government procurement contracts by 2016, aggregating demand across the government for greater efficiencies and economies of scale (*ibid.*). In this way, VITAL had begun operating as a horizontal platform serving whole-of-government needs prior to its appointment as the government's robotics and automation lead in 2020. Now, the team explicitly brands itself as a platform – "VITAL as a Platform" – drawing inspiration from the Platform-as-a-Service offerings of cloud computing companies (Lui, 2022b).

VITAL began its journey as a hub for robotics and automation in 2018, when the team initiated the organisation-wide implementation of automation through an innovation hub team, VITAL's Automation Centre of Excellence (Yuen, 2024). The hub worked with the operations team within VITAL to trial the automation of various administrative processes, including finance, HR, payroll, and procurement (*ibid.*). Once the trials had concluded, the innovation hub scaled up RPA implementation and began the upskilling journey for VITAL staff, with the automation COE taking the lead in supporting RPA training efforts and raising awareness of the benefits of RPA adoption to staff (*ibid.*). It did this through getting officers to share their success stories of implementing RPA and an internal website which shared RPA resources to VITAL officers (*ibid.*). These efforts to scale up the use of RPA within VITAL and secure buy-in from VITAL staff would be invaluable towards its later efforts in becoming a central RPA platform for the whole-of-government.

As robotics and automation lead, VITAL similarly sought to create shared resources for RPA developers across government through the Robotics and Automation Hub, which stored RPA resources such as common automation scripts (Hoe & Lim, 2024). As RPA skills and developers are widespread through the government, VITAL sought to connect RPA resources via this portal and create a platform for cross collaboration (Lui & Tay, 2021). This draws on VITAL's history of forging strong relationships with government agencies, which it has cultivated through its Service Partnership team that engages agencies (Yuen, 2024). Beyond the Hub, the agency has also launched a whole-of-government RPA platform by procuring a cloud-native automation platform hosted within the government's private cloud (Hoe & Lim, 2024; Liew, 2022). Agencies can subscribe to the platform for a fee and access RPA tools to develop automation scripts (*ibid.*). This platform supports VITAL and other agencies in using advanced robotics and automation tools supplemented with AI capabilities and there is a sandbox environment for agencies to explore such tools with a safe and controlled environment (Yuen 2024). By creating these platforms "at the centre of government", RPA processes are being scaled up to the rest of government (Lui & Tay, 2021).

VITAL offers a unique example of how government agencies can tap on the latent entrepreneurial capabilities of its staff by providing them with the right resources and training. Through repositioning itself as a platform and grooming its employees as intrapreneurs, VITAL fulfilled its original purpose of cutting costs, eliminating duplicated efforts, and creating new value for public sector agencies. By cultivating intrapreneurialism and empowering workers to automate their own processes through low-code and no-code tools, they were able to exploit new opportunities and fulfill their original mandate, while enabling the overall agency to reposition itself as a platform for the digital transformation of government operations. In this way, it was able to support the digital transformation of the Singapore government while continuing to deliver its core services — an example of agile stability starkly different from OGP's curation of agile capacities. Where OGP was expressly set up to cultivate agility and innovation, VITAL leaders had to balance its core focus on efficiency while building up its innovation capacities to keep itself relevant; where OGP could select people with an entrepreneurial mindset, VITAL had to convince its employees to take on new skills and grow as citizen developers with the ability to reshape

VITAL's processes. When placed in conversation, both agencies reflect the different ways government bodies can accelerate internal digital transformation through cultivating a base of intrapreneurs, deliver agile stability, and provide outsized support for the digital transformation of the broader government body.

6. CONCLUSION

For governments to sustain digital transformation across a long period of time, it is necessary but not sufficient to invest in the right foundations, such as the right organisational structures, forward-thinking data and cloud policies, developing horizontal tech platforms and attracting leading tech talent. To ensure digital transformation took root across government, leading digital government agencies in Singapore sought to inculcate a culture of entrepreneurship within employees and encourage ground-up digitalisation efforts. This has enabled the Singapore government to adopt a posture of agile stability, wherein core services that support citizens' lives and the work of public employees persist while staff work on innovative new efforts that create new efficiencies and respond to new problems. In addition, this paper has demonstrated that digital transformation within the government need not only lie in the hands of central digitalisation agencies: rather, smaller teams also play a critical role in driving digital innovation. This is in line with Kattel, Dreschler, and Karo's observation that innovation bureaucracies are driven by "constellations of public organisations that deliver agile stability" (2019: 14). Similar research on government digital transformation efforts can consider how digital transformation emerges across the spectrum of public sector agencies.

Future research on Singapore's digital government could likewise consider the role of other government agencies that oversee digital transformation within specific industry verticals: e.g., JTC Corporation's focus on nurturing the smart city ecosystem and Synapxe's work on the country's health technology ecosystem. Such case studies could further deepen our understanding of the ways in which Singapore's developmentalist bent drives the digital transformation efforts within government. Scholars may also wish to situate Singapore's digital transformation efforts within its unique historical context and political economy – its long history of efficient public administration, its single-party system, and its survival ideology – which could further deepen our understanding of the emergence of Singapore government's entrepreneurial energies when it came to digital transformation. To deepen our understanding of the role of civil servants in driving digital transformation, future scholars could conduct more in-depth interviews with individual employees as well.

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INDIA’S DIGITAL PUBLIC INFRASTRUCTURE:

Evolution, Regulatory Perspectives and Future Outlook

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INDIA'S DIGITAL PUBLIC INFRASTRUCTURE:

Evolution, Regulatory Perspectives and Future Outlook

Amitendu Palit[1]

Efficient digital public infrastructures are essential for meaningful deliveries of public services. Public services delivered through traditional non-digital modes have been found wanting both quantitatively and qualitatively. Systemic and institutional imperfections have resulted in suboptimal delivery of public services to intended beneficiaries leading to loss of citizen welfare. While these concerns prevail in both the global North and South, a heavily populous country like India has been particularly sensitive to the adverse effects of poor distribution of public services.

This paper explores India's digitalization strategy in the context of the country aiming to establish an efficient digital public infrastructure for enhancing citizen welfare. The paper reflects on India's major accomplishments in building the digital infrastructure through a citizen-centric and state-driven approach. It specifically examines the evolution of the *India Stack* that combines the trinity of unique digital identity, access to digital financial services and use of data in an interoperable and secure manner for expanding the Indian state's ability to efficiently deliver public services through a 'whole-of-government' citizen-focused approach. While India's achievements in delivering welfare through the India Stack have been remarkable, its evolution has faced challenges. The most significant among these is the legal challenge of the constitutional validity of India's unique identity with respect to whether it amounts to violation of the constitutional right to privacy. The judicial decision on the challenge has firmly settled the matter and India has moved to building the next phase of the legal architecture for regulating India Stack, enacting the digital personal data protection framework. As data management and protection rules kick in, India needs to prepare for more implementation challenges.

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[1] Senior Research Fellow and Research Lead (trade and economics), Institute of South Asian Studies, National University of Singapore.

The paper is divided into four sections. Section 1 discusses the importance of efficient digital public infrastructures in distributing welfare benefits in a modern world, where non-digital infrastructures have been found lacking in addressing citizen's needs. Section 2 studies the evolution of the India Stack and the country's achievements. Section 3 studies closely the legal challenges faced by India's unique identity, the concomitant progress of the identification process and the Supreme Court of India's ruling on the issue. Section 4 discusses India's DPDPA 2023 and compares it with the GDPR framework of the EU. Section 5 discusses the outlook for the India Stack, in terms of its prospects for wider global adoption, and the implementation challenges it faces.

SECTION 1: THE NECESSITY OF AN EFFECTIVE DIGITAL PUBLIC INFRASTRUCTURE (DPI)

DPIs include multiple systems and solutions for supporting critical social functions and services[2]. These include digital forms of identity and their verification, digital payments and data exchanges, and civil registration. The Digital Public Goods Alliance (DPGA) suggests that DPIs can include proprietary and open-source solutions also, including digital public goods[3].

Efficient and cost-effective DPIs are essential for effective delivery of crucial public services. Public services delivered through traditional non-digital modes have been found wanting in both quantitative and qualitative aspects. They suffer from systemic and institutional imperfections that lead to stunted and suboptimal delivery of public services to intended beneficiaries. From a citizen's perspective, these imperfections are responsible for significant loss of citizen welfare. From a government and state perspective, they are responsible for impeding efficient distribution of government subsidies and economic benefits. The concerns over loss of welfare from poor distribution applies not just to low-income and developing countries but developed countries as well[4].

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[2] DPGA 2022.

[3] Ibid.

The role of DPIs have become particularly prominent since the outbreak of the COVID19 pandemic. The pandemic created major logistic challenges for countries with movement of marine and air cargo encountering long delays in crossing borders following the widespread incidence of dedication personnel falling sick leading to delay in grant of clearances. The exigency underscored the necessity of digitalizing cross-border documentation and procedures for smooth movement of goods. In addition to crossing borders and facilitating international trade, the urgency of digital delivery of a variety of public services was felt strongly in education and health.

These are two essential services where digitalization across the world has expanded rapidly after COVID19, and public infrastructures have taken to digital deliveries in extensive fashion. DPIs have begun orienting themselves predominantly through their roles in delivering effective education and health services. Across the world, education services have displayed remarkable proclivity to switch to online delivery enabling large sections of populations to continue accessing primary, secondary and tertiary education services. In an identical manner, digital delivery of healthcare services has enabled provision of the same to large numbers of people. The benefits of contactless digitally provided health services were evident during the COVID19 pandemic that shut off human interface and made digital engagement the default option.

As more and more countries explore the option of digitalizing delivery of public services, the challenges of pursuing such a strategy are becoming obvious. The challenges are particularly more for developing countries, which have poor people, and are looking to allocate scarce state resources to those who need them the most. India's experience is instructive in this regard. The following sections will study this experience closely.

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[4] Palit 2023.

SECTION 2: INDIA'S DPI ACHIEVEMENTS

India has been a notable example from not just the Global South, but also among the major economies of the world, specifically the G20 group of countries, in building a national digital public infrastructure (DPI) for serving various needs of its citizens. From a global perspective, India enjoys and owns 'legitimacy' in this respect[5] that enabled it to champion the push for expanding the cause of DPI within the G20 community during its Presidency of the G20 last year.

India's achievements in digital transformation have been remarkable. From just a little more than a quarter of the population that had bank accounts and were therefore a part of the country's formal financial system in 2008, the proportion increased to almost 80 per cent by 2021[6]. This huge leap came from the adoption of the strategy of *Jan Dhan*[7].

Launched in August 2014 through the *Prime Minister's Jan Dhan Yojana* (PMJDY) – the financial inclusion initiative – was a dedicated initiative for bringing in the poor into the formal financial system, promoting financial inclusive and delivering financial services at affordable rates to the poor and marginal sections of the society. The initiative emphasized on opening savings bank deposit accounts with minimum paperwork and even zero balance: and issuing credit cards for withdrawing cash and paying at merchant outlets, and extending micro-insurance, pension, and credit to the poor. By 16 August 2023, the scheme has been able to mobilize more than 500 million bank accounts. Nearly 340 million indigenously promoted *RuPay* debit cards[8] have been issued to the beneficiaries. It is further noteworthy that more than 50 per cent of the Jan Dhan account holders are women and two-third of these accounts are held by customers in rural and semi-urban areas[9].

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[5] Nordhaug, Liv Marte 2023.

[6] Ibid.

[7] *Jan* means people and *dhan* means wealth, indicating the combined meaning of the two words to suggest people's wealth.

[8] Tambe and Jain, 2024. RuPay debit cards were launched by the Reserve Bank of India in 2012. They have been indigenously developed by the National Payments Council of India. These debit cards are part of an Indian multinational financial service network. All customers having bank accounts under the PMJDY scheme are issued RuPay debit cards.

[9] 'The Pradhan Mantri Jan Dhan Yojana (PMJDY) – the National Mission for Financial Inclusion – completes nine years of successful implementation today', Press Information Bureau (PIB), Government of India. 28 August 2023. https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1952793

The large achievements in financial inclusion were facilitated by efforts to establish verifiable digital identities for the population. Known as *Aadhar* – efforts to establish the unique digital identities – begun from 2009, at a time when the conceptual notion of such an identity was barely known in the rest of the world.

The need for a verifiable digital identity for the population arose from the realization that benefits of public welfare programmes were often missing their intended beneficiaries due to lack of appropriate verifiable identities. Estimates for various public welfare programmes running on government subsidies estimated the leakages to vary from 10 per cent to as much as 60 per cent depending on the specific programme[10]. The leakages meant high wastage of precious financial resources in a country that struggled to balance its revenues and expenditure and ran large budget deficits due to expenditures exceeding mobilized revenues.

The Unique Identification Authority of India (UIDAI) was established in 2009 or implementing easily verifiable, unique, and non-transferrable digital identities for the population[11]. These identities, termed *Aadhar*, were issued after collecting basic information on individuals that provided multiple means of authenticating the information through distinctive identifiers, like biometrics[12]. Since its inception in 2009, and over a period of nearly 15 years, around 1.37 billion *Aadhar* identities have been generated till April 2024, covering virtually the entire Indian population of 1.4 billion[13].

The widespread acceptance of *Aadhar* has been due to its success in establishing strong principles of trust and faith between providers and recipients of various public services[14]. *Aadhar* has enabled beneficiaries of public welfare programmes, ostensibly, large sections of the poor and marginal in India, to obtain the welfare benefits without any intermediation. Various schemes that are running successfully premised on the foundation of *Aadhar* are government pensions, subsidized food grains, medical benefits, and subsidized cooking gas. The use of *Aadhar* for these welfare schemes has increased the efficiency of delivering the services by disbanding the earlier 'siloed' approach that caused significant leakages. The World Bank estimates suggest that the digital identities have been able to bring in savings of about US$1billion for the government by reducing corruption and cutting leakages[15]. In this regard, it is noteworthy – as discussed in the next section – the Supreme Court of India, in its various interim orders on the constitutional validity of *Aadhar*, consistently maintained the necessity of using *Aadhar* for delivery of welfare services funded by government subsidies.

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[10] Raghavan, Jain & Verma, 2019.

[11] Though the UIDAI was launched in 2009 for embarking on the process of issuing unique digital identities, its legal identity was established later, in the Aadhar Act of 2016. https://uidai.gov.in/images/targeted_delivery_of_financial_and_other_subsidies_benefits_and_services_13072016.pdf

[12] Nilekani, 2021. https://www.chandlerinstitute.org/governancematters/indias-aadhaar-system-bringing-e-government-to-life

[13] Aadhar Dashboard, Unique Identification Authority of India. https://uidai.gov.in/aadhaar_dashboard/

[14] Palit, 2023.

Aadhar has been instrumental in accelerating financial inclusion in the country through its crucial role in enabling the unbanked population to integrate with the formal financial system of the country. The integration has facilitated direct transfer of government funds to the PMJDY accounts digitally. In this regard, the third element of India's DPI, besides *Jan Dhan* and *Aadhar*, has been the rapid advance in digital connectivity through mobile phones. The trinity of digital access to financial services (*Jan Dhan*), digital identity (*Aadhar*) and digital connectivity (*mobile* phones) has enabled India to significantly expand the Indian state's ability to efficiently deliver public services through a 'whole-of-government' and citizen-centric approach.

India Stack

The discussion of India's DPI remains incomplete without an understanding of what is described as the 'India Stack'.

The India Stack is a national digital infrastructure offering a low-cost digital push through a unified software platform. It comprises the interfaces of digital identity; seamless payments between individuals and entities through interoperable digital payment systems; and sharing data in a secured fashion[16]. The foundations of the Stack are built through the identity layer, which provides every resident a unique and verifiable identity; payments layer, allowing anybody to pay anybody through fast, cheap, and interoperable means;

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[15] 'Aadhar ID saving Indian govt. about $1 billion per annum: World Bank', *The Economic Times*, 14 January 2016. https://economictimes.indiatimes.com/news/economy/finance/aadhaar-id-saving-indian-govt-about-1-billion-per-annum-world-bank/articleshow/50575112.cms?from=mdr

[16] IBEF 2023.

and data layer. The identity layer comprises the *Aadhar*, electronic verification of KYC (Know Your Customer)[17] and electronic signature; the payments layer includes unified payments interface[18], *Aadhar* payments bridge[19] and *Aadhar* enabled payments services[20]; finally, the data layer comprises a data empowerment and protection architecture, facilitated by the Ministry of Information Technology (MeiTY) and the Reserve Bank of India (RBI) authenticated by the data owners.

The conceptual underpinning of the India Stack resonates with the broader idea of the GovStack. The latter comprises 'digital solutions layered on top of one another making each layer more impactful and powerful than each solution alone'[21]. The India Stack embodies this 'whole-of-government' approach. As mentioned earlier, India has achieved notable success in expanding financial inclusion in the country by 'banking the unbanked' and ensuring efficient delivery of government subsidies and benefits to them. However, the success in this respect couldn't have been possible without the identity, payments and data layers mutually complementing each other and reinforcing each other's capacities. In simpler terms, digital delivery of government subsidies to the poor, and abilities of these newly 'banked' poor people to access various financial services, couldn't have been possible through just the payments layer of the India Stack. These have happened due to the support of the identity layer and data layer, provided through unique identification and secure exchange of data.

As a DPI, the India Stack has been a 'win-win' combination for both beneficiaries of the public welfare schemes as well as the government. The former are receiving their benefits in an effective and affordable manner. At the same time, the government has greatly benefitted from the sharp reduction in the cost of leakage from welfare schemes that has expanded government savings. These attributes have been responsible for India's proactive efforts to strategize its DPI as one of its major exports to the rest of the world, as demonstrated during its G20 Presidency[22]. Looked at specifically from the perspective of digital financial inclusion, there are noticeable disparities among the G20 members[23]. India's experience in this regard with its indigenously developed GovStack can be illustrative for several countries, particularly those from the Global South, who are currently engaged in expanding financial inclusion in their national populations. Indeed, national efforts to enhance digital delivery of financial services is also being energized through adoption of sovereign digital currencies by central banks of various G20 members[24]. India's efforts to position its DPI as a global export, though, has faced mixed responses. These will be further discussed in Section 4.

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[17] KYC – Know Your Customer norms are information asked by Indian banks and financial institutions for verifying customer details. These include basic information like name, age, address, phone number, email, and income tax identification numbers, which are called personal account numbers (PAN) issued by the income tax authorities in India.

[18] The Unified Payments Interface (UPI) registers customers on a virtual payment address for facilitating transfer of money digitally in a secure fashion from one bank account to another. More than 300 banks are using UPI in India. The UPI is also being used for facilitating international digital transfers. It has, for example, been made interoperable between India and Singapore, by linking with the *PayNow*.

[19] A system for electronically channeling government benefits and subsidies to Aadhar enabled bank accounts using the unique Aadhar number.

[20] The service enables Aadhar holders to access their Aadhar linked bank accounts for basic banking transactions, including remittances.

[21] DPGA 2022.

SECTION 3: LEGISLATIVE POLICIES FOR UNIQUE IDENTIFICATION AND JUDICIAL RESPONSES

India's achievements in DPI, particularly the expansion of the India Stack, has the identity layer as one of its core tenets. *Aadhar* – the unique identity awarded to individuals by the UIDAI – had its genesis nearly fifteen years ago. The process of establishing a unique digital identity for individuals that can be used for availing a variety of essential services evolved through an interface of multiple perspectives. The perspectives were variously contributed by key organs of the Indian state: the government, the civil society, and the judiciary. The government worked on building *Aadhar* as a foundational tool and non-negotiable necessity for providing essential services to Indian citizens premised on the ostensible goal of the benefits reaching their intended beneficiaries. The civil society's dominant perspective was to argue that collecting citizen data through biometric means for creating unique digital identities worked against the right to privacy guaranteed to citizens by the Indian Constitution. The judiciary's perspective, conveyed through the seminal judgments of the Supreme Court of India on the subject, reflected careful assessment of both perspectives and concomitant efforts to arrive at appropriate balancing of interest in its decisions.

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[22] Palit 2023.

[23] Ray, Morgan and Thakur, 2022.

[24] 'Study shows 130 countries exploring central bank digital currencies', Reuters, 29 June 2023. https://www.reuters.com/markets/currencies/study-shows-130-countries-exploring-central-bank-digital-currencies-2023-06-28/

The idea of establishing a legislative framework for *Aadhar* – and the unique identification it entailed for individuals – was first proposed in 2009 through the announcement of the scheme for issuing unique identification (UID) programme[25]. This followed the decision to establish the UIDAI in the same year, through an executive order, issued by the then United Progressive Alliance (UPA) government. The UIDAI eventually became the statutory body responsible for issuing *Aadhar* numbers in July 2016, after the promulgation of the *Aadhar* (Targeted Delivery of Financial and Other Subsidies, Benefits and Services) Act of 2016.

The UIDAI was mandated to issue policies for implementing the unique identification scheme, through which individuals were to be awarded unique identity numbers. The key emphasis in this regard was on 'unique' – as being unique meant the identity couldn't be duplicated. An obvious implication of identifying individuals with unique identities was to ensure that public welfare schemes run by the government exchequer were able to deliver their services and benefits to the 'right' beneficiaries. This was essential for preventing 'leakages' as the welfare schemes in India were historically criticized for their noted inabilities to miss many of the intended beneficiaries and thereby not being effective in improving living standards of the poor and vulnerable. As noted in the discussion in Section 2, plugging the leakages has been one of the biggest successes of *Aadhar*.

In April 2010, the UIDAI declared its goal of making the unique identity the universal proof of identity for the country's residents that would enable them to prove their identities everywhere[26]. Within a few months, from September 2010, the *Aadhar* project was launched for proceeding on national enrollment of *Aadhar* for citizens. Soon after, in December 2010, the 'National Identification Authority of India'(NIA) Bill was introduced in the Upper House of the Indian Parliament[27] for providing a legislative framework to the issue of unique identities and functions of the UIDAI.

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[25] 'A Unique Identity for the People', Unique Identification Authority of India, Government of India. https://www.uidai.gov.in/images/Aadhaar_Brochure_July_22.pdf

[26] The unique identity is not a proof of citizenship. It doesn't' replace the passport. Nor is it a substitute for other identities issued by the Government of India, such as driving license, voter identity card and permanent account number (PAN) by Income Tax authorities.

[27] In the Supreme Court of India, Civil Original Jurisdiction. Writ Petition (Civil) No. 494 of 2012. https://uidai.gov.in/images/news/Judgement_26-Sep-2018.pdf

Constitutional Validity Of The Unique Identity

The first legal challenge to *Aadhar* was mounted in 2012 through a writ petition filed in the Supreme Court of India arguing that the *Aadhar* scheme violated the right to privacy as enshrined in Article 21 of the Indian Constitution. Several subsequent petitions were subsequently filed. The Supreme Court decided to combine all these petitions together for deciding on the issue[28].

Fundamental rights originally provided by the Indian Constitution are rights to equality; freedom of speech and expression; against exploitation; freedom of conscience and free profession, practice, and propagation of religion; conserving culture, language, and script; constitutional remedies for enforcement of fundamental rights[29]. Citizens can approach courts for violation of fundamental rights, and they have constitutional remedies, which itself is a fundamental right, for enforcement of other fundamental rights.

The constitutional validity of *Aadhar* was challenged Justice Puttuswamy (retired) and other petitioners on the grounds that it violated the right to privacy, which is ‘a facet of fundamental rights enshrined in the Constitution’[30]. The Government of India’s legal defence to the challenge was right to privacy was not a fundamental right. In this respect, the defence alluded to an earlier judgment of the Supreme Court that upheld the view right to privacy is not a fundamental right. However, subsequent judgments took a contrary view. Eventually a Constitution Bench of the Supreme Court conclusively ruled in the matter deciding that right to privacy is a fundamental right in accordance with the Articles 14, 19 and 21 of the Constitution of India. With this issue having been settled, the Supreme Court’s review of the civil writ petitions focused on whether issuing unique identities on the basis of digitally collected data, indeed violated the right to privacy.

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[28] The main petition was filed by retired Justice K.S. Puttaswamy. The eventual judgment delivered by the Supreme Court on the subject enlists the petition by Justice K.S. Puttaswamy (retd.) and another as Petitioners versus the Union of India and others as Respodnents. As in 29 above.

[29] ‘Fundamental Rights’, KnowIndia, Government of India. https://knowindia.india.gov.in/profile/fundamental-rights.php#:~:text=Right%20to%20freedom%20of%20speech,order%2C%20decency%20or%20morality)

[30] https://uidai.gov.in/images/news/Judgement_26-Sep-2018.pdf

The specific grounds on which the civil petitioners argued that *Aadhar* was violating the right to privacy, and the counter arguments by the state, are summarized in Table 1.

Table 1: Aadhar and the Right to Privacy

Arguments against Aadhar	Counter arguments
1. Individuals being enrolled for Aadhar are required to part with 'core' information – biometric information collected through photograph, fingerprint, Iris scan, or other biological attributes[31]. Enrollment agencies collecting the information, most of which are unregulated private agencies appointed by the UIDAI, might be misusing it. The view connected to the concern that India didn't have at that point in time (2012-2014, when most of the petitions were filed), a privacy law for monitoring use of personal data stored by UIDAI and other agencies, both government and private[32].	The biometric information collected for enrollment is minimal and is stored in the central depository for future authentication. 'Sensitive' information of individuals, such as religion, caste, medical history, or income, is not asked for during enrollment and no data is collected on these[33].
2. Aadhar number holders are required to authenticate identities each time they obtain specific services. As a result, requesting agencies providing the services collect the personal information of their users repeatedly, making the data vulnerable to misuse. Furthermore, transactions for which the personal data are collected are also known to the agencies, increasing the security risks data being misused.	During both enrollment and authentication, the biometric information collected from individuals gets transferred to a central depository within a few seconds in an encrypted form. This avoids the possibility of misuse of data by enrolling/requesting agencies. The system of collection data is therefore fully secure.

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[31] 'Biometric information' means photograph, fingerprint, Iris scan, or such other biological attributes of an individual as may be specified by regulations. Page 2. 'The Aadhar (Targeted Delivery of Financial and other Subsidies, Benefits and Services) Act 2016, No. 18 of 2016, The Gazette of India, Ministry of Law and Justice, 26 March 2016, New Delhi. https://uidai.gov.in/images/targeted_delivery_of_financial_and_other_subsidies_benefits_and_services_13072016.pdf

[32] Banerjee, 2016.

[33] An important issue to be noted in this regard is that Aadhar collects 'minimal' data required for establishing the uniqueness of an individual: these are name, gender, date of birth and address, along with biometric data. Nilekani.

3. The collected data, which is stored in a central depository, can also get leaked and used by non-state actors. Indeed, in this regard, the foremost concern raised by petitioners was about the lack of adequate regulations for protection of sensitive data.	The data sent to the automated biometric identification system is anonymized and the system doesn't have access to the resident's demographic information. The encrypted enrolment data sent to the central depository is decrypted, but never stored. The original biometric information is archived and stored offline and cannot be accessed online.

Source: Prepared by Author

An important point to be noted with respect to the arguments of petitioners (Table 1) regarding Aadhar's violation of privacy is the context of the time when these concerns were voiced, and legal contestations unfolded. The petitions were filed during the first half of the last decade, beginning from 2012 onward. The concerns on violation of privacy were connected to the NIA Bill of 2010 Bill that had already been presented in the Parliament. Following the introduction of the Bill, along with the establishment of the UIDAI and efforts to enroll individuals for *Aadhar*, the country experienced a rush, from both from public and private sector agencies, on insisting on *Aadhar* for extending services (e.g. telecom services, opening bank accounts, providing cooking gas connections, issue, and renewal of driving licenses etc.). The key concern of the civil petitions was regarding the insistence of agencies on *Aadhar* at a point in time when the countries lacked laws for safeguarding privacy.

There is no denying that the legislative framework for the unique identification process was yet to mature during the period when the constitutional validity of *Aadhar* was being challenged. This was evident from the fact that while the NIA Bill of 2010 was introduced in the Parliament and the UIDAI was set up through an executive order for issuing *Aadhar* numbers, a group of experts appointed by the Government for giving directions on privacy standards, found the NIA Bill to be inadequate in many respects. The Justice Shah Commission set up by the Planning Commission of India[34] for the purpose submitted its report in October 2012 underscoring that Right to Privacy was guaranteed under Article 21 of the Constitution and that legal frameworks for privacy required to be technologically neutral and interoperable by global standards[35]. In the context of the NIA Bill, the Shah Commission emphasized that services couldn't be denied to individuals for not having *Aadhar* and possession of *Aadhar* should be voluntary for individuals. It is noteworthy that the legal challenge to *Aadhar* filed by Justice Puttuswamy was at around the same time of the submission of the Shah Commission report.

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[34] The Modi Government subsequently re-named the Planning Commission as the NITI (New Institution for Transforming India) Aayog.

Progress on Aadhar

While the question of *Aadhar* violating the right to privacy was being examined, the Government proceeded with issuing of *Aadhar* numbers and agencies begun insisting on it for extending services. The Supreme Court reacted to these insistences through various interim orders that it passed from time to time. The orders emphasized that possession of *Aadhar* was voluntary on part of individuals and the inability to provide *Aadhar* couldn't be a ground for denying services to individuals. It was evident from the tone and content of the various orders of the Supreme Court that it was unwilling to let *Aadhar* become an essential and mandatory instrument for availing services, till it arrived at a decision on the unique identity number violating the right to privacy.

The government, on the other hand, was looking to progressively make *Aadhar* the key 'identity' in the running of its various welfare schemes that involved government subsidies, such as distribution of food grains for the poor, extending cooking fuel at subsidized rates and various pension schemes. While agreeing with the use of *Aadhar* for these schemes, the Supreme Court clarified: "The production of an Aadhar Card will not be condition for obtaining any benefits otherwise due to a citizen"[36]. The Supreme Court was on the same page with the government on the importance of unique identities being used for extending benefits that involved government services. On other occasions, however, it was not in favour of using *Aadhar*. These orders were suggestive of the Supreme Court's interpretation of the *Aadhar* as being a fundamental necessity in effective implementation of public welfare schemes in the country.

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[35] Banerjee 2016.

[36] Interim Order of 11 August 2015 delivered by a three-judge bench of the Supreme Court. Page 21, https://uidai.gov.in/images/news/Judgement_26-Sep-2018.pdf

The further interesting point was that in it none of its interim orders did the Supreme Court prevent, or even discourage, progress on *Aadhar*. While noting the concerns of petitioners on the unique identity's arguable infringement of privacy, it also, at the same time, accepted the undeniable importance of a unique identity in enabling the government to deliver welfare benefits in a just and efficient manner to those in urgent need of such benefits. The interim orders reflected the highest Court's efforts to ensure 'balance of interest' from the perspectives of both the citizen and the government. This involved allowing the former to exhaustively avail services without mandatory production of *Aadhar* and encouraging Aadhar's use in government welfare schemes. On the other hand, from a state perspective, the Supreme Court did not roll back *Aadhar*, appreciating its normative value from a socio-economic welfare and distributive perspective.

As the debate on the constitutionality of *Aadhar* continued, the government moved to create a legislative framework for *Aadhar*. The move implied obliteration of the earlier NIA Bill of 2010 with a new legislation. This was proposed as the *Aadhar* (Targeted Delivery of Financial and Other Services) Bill of 2016 and was a definitive step towards carving out a legislative framework for issuing unique identification numbers and governing their subsequent use. This was necessary as without a well-defined legislative framework, the safety of the individual-specific digital information being mobilized through *Aadhar*, would be difficult to safeguard. The Bill, after being passed by the Parliament, received Presidential ascent, and become an Act and a law of the land on 25 March 2016, popularly referred to as the Aadhar Act of 2016[37]. The enactment was not without controversy though as questions were raised over the fact that the Bill was passed as a 'Money Bill' by the Lower House of the Parliament, which is empowered to pass such Bills, without the scrutiny of the Upper House.

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[37] 'The Aadhar (Targeted Delivery of Financial and other Subsidies, Benefits and Services) Act 2016, No. 18 of 2016, The Gazette of India, Ministry of Law and Justice, 26 March 2016, New Delhi. https://www.scobserver.in/wp-content/uploads/2021/09/the_aadhaar_act_2016.pdf

The Aadhar Verdict

The Supreme Court delivered its judgment on the constitutional validity of *Aadhar* on 26 September 2018[38]. The key features of the judgment were as follows.

1. The Judgment upheld the constitutional validity of *Aadhar*. It confirmed that *Aadhar* doesn't violate the individual's right to privacy as provided by the Indian Constitution. For establishing this view, it was affirmed that the state collects minimum demographic and biometric information from individuals. In addition to minimality, there were enough systemic safeguards in place for protecting the data collected.

2. Emphasizing that *Aadhar* was indeed an 'unique' identification as it was based on biometric information, the Judgment confirmed that *Aadhar* helped in better targeting of state subsidies and benefits for the disadvantaged sections of the society and was therefore an empowering tool for the poor and marginal.

3. While upholding that possession of *Aadhar* was mandatory for availing benefits connected to state subsidies, the Judgment clarified that it was not so for several other purposes, such as those coming under the purview of government educational bodies and for opening bank accounts. *Aadhar*, though, was deemed necessary for filing income tax returns and obtaining personal account number (PAN) for individual taxpayers.

4. The Judgment struck down certain provisions of the Aadhar Act of 2016. The most significant of these was Section 57, which was declared 'unconstitutional', and private agencies were prohibited from insisting on *Aadhar* for providing services[39]. Further provisions that were struck out included: disclosing *Aadhar* information in interest of 'national security'; retaining *Aadhar* data for 5 years[40] ; and mandatory linking of bank account and mobile numbers to *Aadhar*.

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[38] The judgement was delivered by a five-judge bench of the Supreme Court. It was a 4:1 majority judgment. The then Chief Justice of India, Justice Misra, along with Justice Khanwilkar and Justice Sikri, wrote the majority opinion for the judgment. Justice Bhushan wrote a concurring opinion to the majority judgment. Justice Chandrachud had a dissenting opinion. 'Constitutionality of Aadhar Act: Judgment Summary', Supreme Court Observer, 26 September 2018. https://www.scobserver.in/reports/constitutionality-of-aadhaar-justice-k-s-puttaswamy-union-of-india-judgment-in-plain-english/

[39] 'What Supreme Court's Aadhar verdict means for you : 10 points', mint, 26 September 2018. https://www.livemint.com/Companies/cpSHu1fjQ1WvOP8vMi27aL/What-Supreme-Courts-Aadhaar-verdict-means-for-you-10-point.html

[40] The Judgment held that data could be retained only up to six months.

The Judgment provided a distinct direction on use of *Aadhar* by drawing a sharp wedge between agencies who could insist on *Aadhar* and those who couldn't. The former included state agencies disbursing benefits entailing government subsidies and those involved in mobilizing state revenues, such as income taxes. The Judgment was emphatic in denying non-state agencies, such as commercial banks and telecom service providers, the authority of insisting on *Aadhar*. To a significant extent, this addressed one of the important concerns of civil petitioners (Table 1). The Supreme Court clearly found *Aadhar* a key tool for ensuring distributive justice in the country and concurred with the government in making it mandatory for accessing government subsidy benefits. In this regard, it is pertinent to note the views of the Court: "By no stretch of imagination, therefore, it can be said that there is no defined state aim in legislating Aadhar Act. .... In a welfare state, where measures are taken to ameliorate the sufferings of the downtrodden, the aim of the Act is to ensure that these benefits actually reach the populace for whom they are meant. This is naturally a legitimate state aim."[41] The Court's emphatic ruling in Aadhar's role on ensuring distributive justice has been instrumental in institutionalizing the identity layer in the India Stack – as mentioned in the earlier section – and enhancing its progression.

It is further illuminating that the Judgment took particular note of two competing fundamental rights for individuals: right to privacy, and right to food, shelter, and employment, respectively. In this regard, the Judgment upheld the notion that 'inroads' into the right to privacy through collection of biometric information through *Aadhar* is 'minimal'. On the other hand, the *Aadhar*, by collecting the biometric information that it does, empowers individuals, particularly the poor and marginal, to obtain state welfare benefits, which advances their overall socio-economic welfare. It is this 'empowering' feature that the Supreme Court felt was the key benefit of *Aadhar*, even if the latter might amount to a minimal invasion on individual privacy. This virtuous character of *Aadhar* – it's distinct ability to ensure appropriate utilization of government funds for delivering benefits to intended beneficiaries – went a long way in convincing the Supreme Court that it was not incorrect to pass the Aadhar Bill as a 'Money Bill'[42] by the Parliament, in the sense of Aadhar's usefulness being organically related to money spent by the government on subsidized public welfare schemes.

Following the Supreme Court judgment, several review petitions were filed, urging the Court to review its decision and strike down the Aadhar Act. These petitions, though, were collectively dismissed by a five-judge bench of the Supreme Court on 20 January 2021[43]. The Aadhar Act of 2016 remains operational in India with the Aadhar being a core foundation of India's digital public infrastructure and more than 90 per cent of resident Indians now having *Aadhar* number.

SECTION 4: THE DIGITAL PERSONAL DATA PROTECTION ACT (DPDPA) 2023

An important implication of the Court's judgement on *Aadhar* delivered on 26 September 2018 was the need for bringing in a legislative framework for data protection. The judgment recognized several key principles of data protection. These included minimization of data collected for unique identification; limiting the purposes of collecting such data and using the data only for these specific purposes; retaining the data for a maximum period of six months and safeguarding the data collected[44]. All these directions underpinned the necessity and importance of a well-defined legislative framework for data protection in India. The significance of a data security framework can hardly be overstated in the context of a strong foundation for the data layer of the India Stack.

Nearly five years after the Supreme Court's judgment, the Indian Parliament enacted the Digital Personal Data Protection Act of 2023[45]. The Act provides for "... the processing of digital personal data in a manner that recognizes both the right of individuals to protect their personal data and the need to process such personal data for lawful purposes and for matters connected therewith or incidental thereto."[46] The spirit of the legislation connects squarely to the core tenets of the directions provided by the Supreme Court.

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[43] Aadhar Review, Beghar Foundation vs Justice K.S. Puttuswamy (Retd.), Supreme Court Observer. https://www.scobserver.in/cases/beghar-foundation-ks-puttaswamy-aadhaar-review-case-background/

[44] Visvanath and Ramesh, 2018.

[45] The Digital Personal Data Protection Act, 2023. (no 22 of 2023), The Gazette of India, Ministry of Law and Justice, Government of India, 11 August 2023. https://www.meity.gov.in/writereaddata/files/Digital%20Personal%20Data%20Protection%20Act%202023.pdf

[46] Ibid. Page 1 of 21.

Though the Digital Personal Data Protection Act (DPDPA) has been enacted by the Parliament for establishing a rules-based framework for data protection in the country quite a few months ago, it is yet to become operational. The Ministry of Electronics and Information technology (MeitY) of the Government of India is the nodal agency for the implementation of the DPDPA and is currently drafting rules for operationalizing the Act[47]. These rules are expected to be announced for consultation and obtaining feedback from various stakeholders in July 2024 after the results are declared for the ongoing general elections to the Lower House of the Indian Parliament and a new government's assumption of office.

DPDPA & GDPR

The DPDPA has been frequently compared with the General Data Protection Regulation (GDPR), the legal framework of the European Union (EU) for protection of personal data. A broad comparison of the features of the two frameworks is provided in Table 2.

Table 2: GDPR and DPDPA: A Comparison[48]

	Feature	GDPR	DPDPA
1.	Date of entry in force	25 May 2018	11 August 2023
2.	Objectives	a) Enabling citizens and residents to control personal data. b) Unifying data regulations within the EU for simplifying operating conditions for businesses. c) Safeguarding personal data of citizens and residents from unauthorized access and misuse.	a) Empowering individuals to control personal data b) Protecting privacy of personal data of Indian citizens and enabling its responsible use c) Encouraging innovation and economic growth.

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[47] Kar 2024.

[48] 'GDPR vs India's DPDPA : Analysing the Data Protection Bill and the Indian Data Protection Landscape', Secure Privacy, 30 September 2023. https://secureprivacy.ai/blog/comparing-gdpr-dpdpa-data-protection-laws-eu-india

3.	Scope	Applies to all organizations processing personal data of individuals located in the EU (regardless of whether the organization is located in EU).	Same (regardless of whether the organization is located in India).
4.	Data subject/ principal[49] rights	Data subjects have rights to access personal data, erase the same and object to processing of personal data.	Data principals have same rights as the data subjects have under GDPR.
5.	Data controller/ fiduciary[50] and processor responsibilities.	Implementing appropriate security measures for protecting personal data and reporting data breaches to the appropriate authority. Also allows processing of particular kinds of personal data only for specified reasons.	Same as for data controllers under GDPR. Applies uniformly to all kinds of personal data.
6.	Non-compliance penalties	Failure to comply with GDPR can result in fines up to 4% of annual global turnover, or 20milion Euros, whichever is higher.	Failure to comply can attract fines of up to 5% of annual global turnover, or INR5 billion, whichever is higher.

Source: Prepared by Author

Notwithstanding the similarities mentioned in Table 2, there are differences between the GDPR and the DPDPA. While the DPDPA is yet to announce its rules, the key conceptual differences can be easily noted. One of the significant ones in this regard is with respect to the distinction that the GDPR makes between personal data, and 'special categories' of personal data, more broadly described as sensitive personal data.

Article 9 of the GDPR defines special categories of personal data as those revealing racial/ ethnic origin, political opinions, religious or philosophical beliefs, trade union affiliation and biometric data on health fundamentals, sex life and sexual orientation[51]. GDPR regulates that such data for data subjects cannot be processed without specific grounds as indicated in the regulations, such as explicit consent of the data subject, necessary use for employment or social security reasons as required by prevailing Union or State laws within the EU, substantial public interest, interest of public health etc.[52].

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[49] DPDPA uses 'principals', instead of subjects.

[50] The DPDPA uses 'fiduciary', in place of controllers.

[51] Article 9, Chapter 2, GDPR. *intersoftconsulting*; https://gdpr-info.eu/art-9-gdpr/

The DPDPA does not distinguish between personal data and more special or sensitive personal data. This point of distinction with the GDPR could be due to the fact that the DPDPA applies to only digital personal data[53], whereas the GDPR's scope of personal data covers non-digital personal data as well, This explains why data on more specific individual characteristics, such as political opinions or religious beliefs, which are non-digital in character while being sensitive, are covered under the ambit of GDPR, but are absent from the DPDPA.

On the other hand, as a further point of distinction, there are additional safeguards provided under the DPDPA, through more rights for data principals, over and above those to data subjects in the GDPR (Table 2). These include rights to immediate and effective grievance redressal and appointing nominees for exercising the rights of the data principals in the event of death or incapacity. These rights can be connected to the Supreme Court's judgement on *Aadhar* in 2018 and the principles of 'purpose limitation' for data collected – as outlined in the beginning of this section.

A further additional distinction between the GDPR and the DPDPA is the concept of significant data fiduciary (SDF) in the DPDPA. These entities, conceptually equivalent to data controllers as described in the GDPR, are considered 'significant' given the volume and sensitivity of personal data they process, risks to rights of data principals, and potential impacts that data collection by these fiduciaries have on sovereignty of India, its electoral democracy, state security and public order. The special data fiduciaries will also be bound by additional protocols such as appointing resident data protection officials, employing risk mitigation measures, and carrying out periodic audits[54].

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[52] Ibid.

[53] Latham and Watkins, 2023. Digital personal data is data collected in digital form and those that are collected or stored in a non-digital manner but are subsequently digitalized.

[54] Ibid.

On the whole, the DPDPA is expected to be a firm pillar in further strengthening of the data layer of the India Stack. The enactment of the legislation has provided the last 'missing piece' in the bulwark for the legislative framework of India's DPI embodied in the India Stack. The DPDPA consolidates the data empowerment and protection architecture of the data layer, thereby creating the conditions for smooth interoperability between platforms, especially *Aadhar*-enabled payment platforms, in a secure fashion while safeguarding privacy.

SECTION 5: THE OUTLOOK FOR INDIA STACK AND CHALLENGES

With a population exceeding 1.4 billion, India is now the world's most populous country. For any elected government, extending welfare services to such a large population in an effective manner, is a huge public policy challenge. It is therefore imperative for India to have a delivery system for public services that maximizes scale and efficiency[55]. The imperative has driven India's efforts towards an effective DPI that has been premised on the India Stack, which, like Gov Stack, follows a 'whole-of-government' citizen-focused approach. The approach that focuses on effective delivery of welfare services that would ensure disbursement of benefits from government funds to intended beneficiaries has been endorsed by the highest court of the country.

The citizen-centric welfare-focused approach that has driven the growth of India's DPI is unique in the sense of it being a product that embodies the context and purposes of the developing countries of the world that have significant sections of poor and socio-economically marginal people in their countries.

The lessons that have emerged from the evolution of India's DPI, in terms of the challenges of achieving scale are particularly relevant for those countries, which are among the most populous in the world. Most of the populous countries of the world are large developing countries as well, a structural character similar to that of India's. Their further demographic and socio-economic similarities with India, which, in turn, are generic characteristics of the ‘Global South’, include national per capita incomes lower than their developed counterparts, indicating lower standards of living for people. These lower standards are particularly visible among large sections of low-income populations having limited access to basic facilities making it imperative for national public policies to focus on improving efficiency in public services. The objective, again, connects to that behind India’s DPI drive.

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[55] Palit 2023.

Notwithstanding its achievements, greater global adoption of India’s DPI and the India Stack, might encounter challenges. These were evident during India’s G20 Presidency. At the last G20 Summit, India put considerable effort behind projecting its DPI as a global export and emphasize on its wider adoption by the G20 community. The response was mixed in this regard. The G7 group (Canada, France, Germany, Italy, Japan, the US, UK, and the EU) within the G20 displayed less enthusiasm in endorsing the model of the India Stack as the go- for the G20[56]. It could have been because the ‘whole-of-government’ approach does not operate on the principle of profit maximization and is entirely focused on delivering distributive justice by putting the state at the forefront of service delivery. The approach dilutes, if not entirely negating, the interests of private sector actors driven by profit motives for becoming a part of the story. As a result, prominent global digital financial service providers, such as Visa and Mastercard, who dominate financial transactions in G7, as well as in many parts of the ‘Global South’, where their services are availed by people habituated to card-based digital financial transactions, do not see much scope for their roles in a global model based on the India Stack[57]. Furthermore, India’s indigenously developed interoperable payment platform, the UPI, can emerge a powerful competitor for these existing service providers, as experienced in India. It is not surprising to experience pushbacks from these established global actors[58] in the greater context of the Indian solution being adopted by more and more countries across the world[59]. These competitive economic pressures are likely to increase as India integrates with more countries through seamless cross-border interoperable payment platforms.

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[56] ‘G7 adopts cautious approach to India’s push for digital public infra’, Hindustan Times, 13 April 2023. https://www.hindustantimes.com/india-news/indias-digital-public-infrastructure-dpi-gains-more-interest-from-developing-countries-despite-pushback-from-g7-states-says-report-101681327576846.html

[57] Palit 2023.

[58] As in 58.

[59] India’s UPI is already interoperable bilaterally for sending and receiving money with several developed countries like Australia, Canada, France, US, and the UK, all of which are G7 members.

Implementation Challenges

The DPI that India has built over the last decade and more has focused steadfastly on scale and efficiency. But notwithstanding its phenomenal achievements, India's DPI faces several challenges. These challenges will evolve over time. Some of these are discussed here.

Scale and Complexity

The UIDAI's mission of issuing unique digital identities for all residents of the country will have to be maintained in as strident and rigorous a manner as possible. As the UIDAI itself notes, it will have to keep working on 'achieving near 100 per cent coverage in all age-groups'[60]. This coverage will need to be matched by efforts to ensure the digital identities are kept updated for authentication through biometrics at all points in time and in the foreseeable future, including the farthest possible time horizon. The task is made complicated by the fact that as more and more individuals use *Aadhar* for more and more purposes, the biometric data will be called into manifold greater use, for repeated authentication. The scale at which authentication will increase might make the UIDAI's goal of exploring new areas for adoption of *Aadhar* more challenging.

Similar challenges will arise with respect to reducing authentication failure rates. According to the UIDAI itself, in the year 2023, till September, authentication services were interrupted for more than fifty hours, primarily due to delays in sending one-time-passwords (OTPs) through SMS[61]. Transaction failure rates have also affected *Aadhar*-enabled payment systems (AePS) with more than 30 per cent being the average rate of failure of such transactions due to biometric mismatch, failures in bank system and lack of internet connectivity[62]. The structural problems encountered in authentication and smooth transactions highlights the importance of a robust technological infrastructure in carrying forward the mission of *Aadhar* and the India Stack. Issues like stable internet connectivity are serious problems in several geographically remote areas of the country. In order to overcome these, innovative solutions, such as offline authentication[63], for avoiding problems arising from technical glitches, might need to be advanced at a rapid pace.

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[60] 'UIDAI Ecosystem: The Way Forward'. 'A Unique Identity for the People', Unique Identification Authority of India, Government of India. https://www.uidai.gov.in/images/Aadhaar_Brochure_July_22.pdf

[61] 'Aadhar authentication continues to face glitches', The Hindu, 9 November 2023. https://www.thehindu.com/news/national/100-billion-uses-on-aadhaar-authentication-down-for-over-54-hours-this-year/article67516689.ece

[62] Ramanathan 2023.

Data Management

The DPDPA 2023 applies to data that is digital or is maintained in a digital form after its collection. This does exclude a large amount of personal data from the purview of its scope. For example, businesses maintaining physical registers, or institutions collecting data from individuals in a physical form (e.g. hotels collecting physical copies of identity proofs of individuals), will not be coming under the DPDPA Act[64]. The exclusion doesn't significantly affect businesses. At the same time, cross-border data transfer provisions in the DPDPA[65] allow transfer of data to all countries, except those that are to be notified by the Government. With respect to these kinds of exclusions, there will be curiosity to figure out how the rules to be notified for the DPDPA soon after the general elections, combine these exclusions with interpretation of data breaches. Since the DPDPA is consent-centric and focuses on collecting minimum personal data for specific uses, its rules will need to be weaved around these principles in a way that safeguards privacy and yet doesn't become operative hindrances for businesses.

As India advances to become the world's 3rd largest economy by the end of the decade[66], it will have to keep working on bringing benefits to those people in the country, who might not be able to become proportionally better off. The role of the India Stack, therefore, will become even more important. The world will watch closely how India's DPI measures up to the task – a goal formidable and challenging by all respect.

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[63] Ibid.

[64] Verma and Taneja, 2024.

[65] Ibid. Section 16(1) of DPDPA 2023.

[66] WEF 2024.

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TAIWAN'S STRATEGY FOR A DIGITAL ADMINISTRATION AND JUDICIARY

Policy, Legal Framework And Practice

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About the Author

Dist. Prof. Dr. Chien-Liang Lee
Institutum Iurisprudentiae, Academia Sinica, Taiwan

Professor Chien-Liang Lee, Dr. jur., Göttingen University, Germany, is Distinguished Research Professor and Director at the Institutum Iurisprudentiae at Academia Sinica and Professor of Law at NTU. His main fields of research include constitutional law, administrative law, environmental protection and technology law. He was awarded Dr. Hu Shih Memorial Chair Professorship in Academia Sinica in 2012, the Outstanding Research Award in 2013 from the Ministry of Science and Technology (MOST), and received the Outstanding Research Award in 2022 from the the National Science and Technology Council (NSTC). He also served as Disciplinary Convenor of Law in the Department of Humanities and Social Sciences at MOST from 2017 to 2020. He is currently the Principal Investigator for the National Science and Technology Council (NSTC) interdisciplinary research project "In the Age of AI: Reflections on the Humanities and the Rule of Law in the Digital Society", also establishes a website "TAIWAN ARTIFICIAL INTELLIGENCE WISE AGENT NETWORK " as a platform for facilitating academic communication from relevant fields.

Mailing address 128 Academia Road, Section 2, Nankang, Taipei 115201, Taiwan
Telephone +886-2-2652-5400
E-mail chenny@sinica.edu.tw

Abstract

The legal policy and practice of digital administration and judiciary in a state of rule of law can be divided into two thinking approaches: the digitalization of administration/judiciary and the digitalization of administrative law/litigation: the former approach involves the digitalization of administrative and judicial operations, which includes various digitalization programs and measures within the government and the judiciary; the latter encompasses the legal foundations of the exercise of executive power/judicial power particularly the amendments related to digital provisions in Administrative Litigation Act and Code of Civil and Criminal Procedure. The two are interrelated and mutually influential. This paper aims at recent legislative and practical developments in Taiwan, exploring the strategies and implementation timelines of its digital legal reformations. The main idea includes three aspects:

1. Analysis of current condition, including the current state of legal systems and practices;
2. Digitization of administrative Act/judicial judgments;
3. Digitization of administrative procedures/judicial procedures. A conclusion and outlook will be provided in the final part of this paper.

Keywords: Digital Administration, Digital Judiciary, E-Governance, E-Justice, Artificial Intelligence, Generative AI, Rule of Law, Digital Transformation.

TAIWAN’S STRATEGY FOR A DIGITAL ADMINISTRATION AND JUDICIARY

– Policy, Legal Framework and Practice

1. INTRODUCTION: ASPECTS AND METHODOLOGY

The legal policy and practice of digital administration and judiciary in a state of rule of law can be divided into two thinking approaches: the digitalization of administration /judiciary and the digitalization of administrative law/litigation: the former approach involves the digitalization of administrative and judicial operations, which includes various digitalization programs and measures within the government and the judiciary; the latter encompasses the legal foundations of the exercise of executive power/judicial power particularly the amendments related to digital provisions in Administrative Litigation Act and Code of Civil and Criminal Procedure. The two are interrelated and mutually influential. This paper examines recent legislative and practical developments in Taiwan, exploring the strategies and implementation timelines of its digital legal reformations.

The exploration of the above perspectives relies on the establishment of methodology. The exploration of digitalization in administrative or judicial domains is built upon the observation of digitalization within the administration or judiciary. The first perspective involves observing from the administrative field or judicial practices. Is the real-world administration or judiciary digitalized? To what extent and in what areas? Another way to observe is through legal regulations, clarifying written regulations related to administrative or judicial digitalization and examining the outlines and patterns of administrative or judicial digitalization from legal provisions. The latter, relying on legal provisions, is easier but may not reflect reality comprehensively because the actual operation of digital administration or judiciary may only sometimes be based on legal regulations. It is essential to dig into the actual operations in the administrative and judicial domains to understand the digital administration and judiciary situation. Therefore, this article attempts to describe the situation of administrative and judicial digitalization based on obtainable empirical data and then conducts legal analysis based on regulations.

The main idea includes three aspects:

1. Analysis of current condition, including the current state of legal systems and practices;
2. Digitalization of administrative Act/judicial judgments;
3. Digitalization of administrative procedures/judicial procedures. A conclusion and outlook will be provided in the final part of this paper.

2. DIGITAL ADMINISTRATION IN TAIWAN

2.1 Policy and Spectrum

2.1.1 Service-Oriented Smart Government 1.0

To align with the trend of digital service transformation in advanced countries worldwide and enhance digital competitiveness, the National Development Council (NDC) of the Executive Yuan has implemented the “Digital Nation & Innovative Economic Development Program (DIGI+) 2017-2025” as the overarching guideline. Since 2017, the “Service-oriented smart government (2017-2020) promotion plan” has been conducted, focusing on developing cross-boundary one-stop services and fostering a collaborative environment.[1] The former includes initiatives such as the Personalized Digital Service (Mydata) Platform[2], optimizing one-stop services for real estate transfers[3], cross-domain land administration services[4], and online one-stop applications for company registration[5]. The latter encompasses efforts to enhance government digital services[6], promote value-added applications of open data[7], and ensure transparent governance[8].

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[1] According to the IMD World Digital Competitiveness Ranking 2020, Taiwan ranks 11th out of 63 major countries and economies worldwide.

[2] Since July 2020, a trial operation has been initiated, allowing individuals to consent to the use of their personal information by third parties voluntarily. The platform integrates online services with the Joint Credit Information Center and ten banks, enabling banks to request personal information from relevant departments through the MyData platform with the consent of individuals and autonomously authorize its use.

[3] Streamline the procedures related to in-person handling of real estate transfers.

[4] Since October 2019, citizens can apply for land registration cases across administrative districts, breaking the restriction of administrative regions.

2.1.2 Service-Oriented Smart Government 2.0

Since 2020, the "Service-oriented Smart Government 2.0 Promotion Plan" (2020-2025) has been implemented, focusing on deepening various initiatives of the smart government based on public demands. Simultaneously, efforts are made to enhance the foundation of the digital economy and strengthen the effectiveness of digital governance, aiming to build a precise and trustworthy smart government. The key priorities of this initiative are to improve interagency services[9], expedite the release of open data[10], and promote evidence-based decision-making[11].

2.1.3 Trustworthy AI Dialogue Engine (TAIDE)[12]

Trustworthy AI Dialogue Engine (TAIDE), the first domestic Traditional Chinese AI dialogue engine model, was directed by Taiwan's National Science and Technology Development Council (NSTC) and was open-sourced in April 2024[13]. Developed with the concern of domestic needs and ensuring the trustworthiness and applicability of generative AI, the TAIDE project team introduced various thematic textual resources and training materials for enhancing the model's performance in different thematic areas. Through legal analysis, establishment of testing norms, and development of evaluation tools, this project aims to strengthen the AI development environment, advance Taiwan's capability in information security, and combat misinformation and disinformation.

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[5] Provide 147 fully online application services. Since 2019, the "online application process for single-person companies" has been added. By June 2020, 907 companies have applied for registration online quickly.

[6] Shorten the application process for foreign white-collar employment gold cards, assist in completing the use process of the government portal, optimize product labelling inspection services, and optimize maternity benefits of labor insurance.

[7] The government's Open Data Platform provides high-value application data such as real estate transaction registration, air quality, ETC, etc., and improves the quality of government data sets, such as enhancing data sets that meet the gold standard standards for machine readability, structured, and open formats.

[8] Establish various channels for citizen online opinion participation, such as the Public Policy Online Participation Platform.

[9] To enhance digital services in the realm of people's livelihoods, simplify procedures for public applications, and bolster public trust in the government through emerging technologies, it is crucial to utilize diverse identity recognition technologies to construct cross-agency online services throughout the entire process, based on data, to provide personalized services to individuals.

[10] Establish fundamental regulations for government data application, such as authorization and fees, and set up mechanisms for open data consultation and guidance while expanding the release of high-value datasets. Priority should be given to promoting datasets related to people's livelihoods, such as public transportation and financial products.

[11] Starting from addressing concerns in people's livelihoods, progress from using past data to assist decision-making to utilize data analysis to identify decision-making gaps and clarify policy implementation bottlenecks or public opinion focuses. By linking cross-agency and cross-business data and employing analytical models and algorithms, decision support can be provided to formulate evidence-based government policies.

[12] National Science and Technology Council (2024). Trustworthy AI Dialogue Engine. https://taide.tw/index/about/project-overview.

[13] National Science and Technology Council (2024). taide/TAIDE-LX-7B. Hugging Face. https://huggingface.co/taide/TAIDE-LX-7B.

2.1.4 Cracks Down on Fraud with New Bills

In an effort to strengthen Taiwan's anti-fraud defences, the Executive Yuan in May 2024 approved four bills which targeted to combat financial, telecommunications, and internet fraud: “Fraud Crime Hazard Prevention Act”, “Money Laundering Control Act”, “Technological Investigation and Security Act”, and “Communication Security and Surveillance Act”. As the bills are subjected to tighten the grip of constantly renewing techniques or means of fraud, and to better safeguard citizen's property as well as safety.

Particularly worth mentioning is the enactment of “Technological Investigation and Security Act” which aims to equip law enforcement agencies with lawful tools for conducting investigations and surveillance utilizing technological and communication means. However, considering the potential tension and competing interests between utilizing technological means in investigations and safeguarding individual's fundamental rights, it is necessary to establish a balanced legal framework which takes into account of both human rights protection as well as the effectiveness and legality of criminal investigations. Ultimately, the Act seeks to achieve the overarching goals of ensuring national security and maintaining social order.

2.2 Legal Framework and Practice

From the directions indicated by the policies mentioned above, the spectrum of digital administration can be divided into three levels: the digitalization of administrative procedures, the digitalization of administrative decisions, and the automation and algorithmization of administrative decisions.

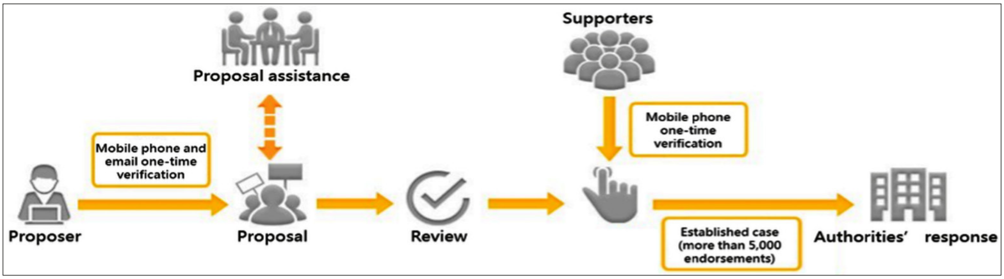
2.2.1 Digitalization of Administrative Procedures

The primary task of administrative digital transformation is the digitalization of the interface for interactions between the people and the administration, especially the digitalization of administrative procedures. In the past, the relationship between the administration and the people relied on physical interactions with civil servants, such as submitting applications, stating opinions, and examining records. Administrative decisions were mainly communicated and made through written correspondence or in person. The digital transformation of administration is evidenced by online application and receipt, electronic files as attachments with submission, online queries for administrative processes and progress, online opinions statements or oral arguments, and dissemination through digital transmission or online announcements. For example, the Ministry of Economic Affairs' "Companies, Businesses, and Limited Partnerships One-Stop Service Request."

In addition, administrative departments, including Taiwan's government agencies, have established official websites. The digitalization policy of government gazettes was promoted as early as 2004 when the Executive Yuan issued the "Government Gazette System Promotion Plan," which comprehensively digitized government gazettes and made them fully available on the Internet for the public. Local governments have established operating procedures to ensure government information disclosure, simplify document processing procedures, and implement electronic gazette editing and publishing operations to enhance administrative efficiency, such as the Taipei City Government's operating procedures for electronic gazette editing and publishing. Another example is the regulation stipulated in Article 157 of the Document Processing Regulations of the Yunlin County Government and its affiliated agencies, which mandates that the electronic gazette shall be updated online daily.

The National Development Council (NDC) established the "Public Policy Participation Platform" in 2015 as a permanent channel for the public to participate in public affairs. It has formulated the "Directions for Implementing Online Participation in Public Policy" guideline, incorporating significant policies and social issues into policy planning and seeking public opinions. Additionally, mobile SMS verification has been added to the registration of the support process to facilitate the participation of senior citizens and people with disabilities. The platform has also introduced a discussion forum function to facilitate rational discussion and dialectics. In addition, the platform also conducts online surveys for specific issues, establishes identity verification, and adjusts reward mechanisms to expand the depth of public policy participation online. See the diagram below for details.

Flowchart for Making Proposals and Registering Support


Supporters
Proposal assistance
Mobile phone one-time verification
Mobile phone and email one-time verification
Proposer
Proposal
Review
Established case (more than 5,000 endorsements)
Authorities' response

Note*:* Proposers and supporters must use diverse account numbers to log onto the Participation Platform.

Source: Directions for Implementing Online Participation in Public Policy

2.2.2 Digitalization of Administrative Decision

In administrative procedures involving interactions between the people and administrative agencies, decisions made by administrative agencies, especially administrative dispositions with specific legal effects, are crucial to people's rights and interests. Therefore, digitalizing administrative decisions constitutes an essential aspect of administrative digitalization. This can be divided into two aspects: the digitalization of the "form" of administrative decisions and the digitalization of their "effectiveness".

Regarding the form of administrative decisions, before the enactment of the Administrative Procedural Act, they were mainly based on the Official Document Formats Act[14]. According to Article 2, Paragraph 1, Subparagraph 4 of the Official Document Formats Act, when official documents are exchanged between agencies or applications and replies between the people and agencies, the form of "letters" is used for official documents. Therefore, in practice, written documents are commonly used. With the amendment of the Regulations on Official Documents in 1993, Article 2, Paragraph 2 stipulates that official documents may be sent via telegraph, telex, fax, or other electronic means as necessary.

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14 This regulation was promulgated by the National Government on November 15, 1928.

In 2000, when the Administrative Procedure Act was implemented, the principle of non-formal was adopted for administrative dispositions, meaning that an administrative disposition may be rendered in writing, orally or in any other form unless the law requires it to be formal (Article 95, Paragraph 1). The term "any other form" may undoubtedly include electronic documents, apart from gestures or machines (such as traffic lights). According to Article 68, Paragraph 2 of the same law, "A document of an administrative authority duly sent by exchange of telegraphs, telex, facsimile or other electronic means shall be deemed to have been served by the administrative authority itself," indicating that the use of electronic documents by administrative agencies must be based on "regulations." For example, based on the authorization of the Examination Affairs Act, the Ministry of Examination promulgated the "Regulations on Electronic Delivery of National Examination Registration and Application" in 2015, which stipulates in Article 2 that The Ministry of Examination may notify candidates for various examination registration and application by means of electronic transmission of documents, fax, text message, email, and other electronic documents, and shall be deemed to have been served by the administrative authority itself. Registration and application refer to registration for various national examinations, as well as applications for review of examination results and access to examination papers.

How electronic records take effect and whether they hold the same legal effectiveness as traditional written documents are not specified in the Administrative Procedure Act; a further comparison with relevant provisions of the Electronic Signatures Act might be required. The Electronic Signatures Act was promulgated on November 14, 2001, and implemented on April 1, 2002. Although this regulation explicitly defines "electronic record,"[15] "electronic signatures,"[16] and "digital signatures,"[17] it specifies that the consent of the other party involved is required, making electronic records a valid form of expression. However, the legislative purpose is "promoting the widespread use of electronic transactions and ensuring their security." Apart from this, as the competent authority specified in this regulation is the Ministry of Economic Affairs and the equivalence of electronic records and written documents is not explicitly stated in the law, the use of electronic documents in the public sector is not widespread. In response to the societal development in the digital age, the Ministry of Digital Development proposed a draft amendment in 2024, with the main points outlined as follows:

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[15] A record in electronic form, which is made of any text, sound, picture, image, symbol, or other information generated by electronic or other means not directly.

[16] Data attached to and associated with an electronic record, and executed with the intention of identifying and verifying the identity or qualification of the signatory of the electronic record and authenticating the electronic record.

[17] An electronic signature generated by the use of mathematic algorithm or other means to create a certain length of digital data encrypted by the signatory's private key, and capable of being verified by the public key.

- Clarify that the purpose of this law is to encourage the use of f electronic signatures, ensure their security, and facilitate the development of digital economy, e-government, electronic transactions, and e-commerce.
- The provisions of this law do not apply to judicial procedures. However, if otherwise specified by laws and regulations, they shall prevail.
- The competent authority shall be the Ministry of Digital Development.
- Specify that the legal effectiveness of electronic records and electronic signatures cannot be denied solely because of their electronic form.
- When electronic documents or electronic signatures are used, unless the counterparty has agreed to use electronic form, they should be given a reasonable opportunity to refuse before adopting the electronic form and also should be given a notice that their consent to adopt the electronic form will be presumed unless they refuse.
- Ensure the legal effectiveness of digital signatures and clarify the effectiveness of digital signatures, which shall be presumed as personally signed or sealed by the individual.

2.2.3 Automation and Algorithmization of Administrative Decisions

Differing from the digital form of administrative decisions, automatized administrative decisions and even algorithmized administrative decisions generated through artificial intelligence algorithms involve the degree of human intervention in the decision-making process. Conceptually and practically, these can be distinguished into two scenarios: one where administrative decisions are made with the assistance of automated machines or algorithms, and another where administrative decisions are made without human intervention, solely based on the operation of automated machines or algorithm programs.

The Administrative Procedural Act has two provisions related to automatized administrative decisions. Article 96, Paragraph 1, Subparagraph 4 of the Administrative Procedure Act states: “An administrative disposition made en masse by means of automatic machine may bear only the seal in lieu of the signature.” The other is Article 97, Subparagraph 3, which states: “Where the administrative disposition is one of the same kind rendered en masse or by means of automatic machine, for which no statement of reasons is needed in light of the situation involved;" From these two provisions, it can be inferred that the legislature presupposed the possibility of "administrative decisions made by automated machines." Textually, it seems to encompass the above two scenarios. However, from the legislative perspective, it only refers to administrative decisions made with the assistance of automated machines. These provisions are inherited from Article 37, Paragraph 5, and Article 39, Paragraph 2, Subparagraph 3 of the German Federal Administrative Procedure Act, where the original text refers to "Verwaltungsakt, der mit Hilfe automatischer Einrichtungen erlassen wird," which means "Administrative act that is issued with the aid of automatic devices." Moreover, since these provisions were enacted in 1976, they should not encompass administrative decisions generated automatically by algorithms. Furthermore, the real issue lies in the fact that these provisions are only exceptions to the obligation of providing reasons for written administrative decisions rather than authorizing administrative authorities to make administrative decisions with automated machines or algorithms. In other words, whether administrative authorities can make administrative decisions with automated machines or algorithms requires a separate legal basis.

Taiwan's Administrative Procedure Act has not introduced the provision of Article 35a of the German Federal Administrative Procedure Act regarding "fully automated issuance of an administrative act." Therefore, unless otherwise provided by law, Taiwanese administrative authorities currently do not have the authority to make automatized or algorithmized administrative decisions.

It is worth noting that in November 2022, OpenAI released ChatGPT, triggering a global trend in generative AI. This phenomenon has also impacted the public sector, raising questions about whether generative AI should be used. In response to concerns about whether and how administrative agencies should utilize artificial intelligence systems when performing administrative tasks, on August 31, 2023, the Executive Yuan established the "Reference Guidelines for the Use of Generative AI by the Executive Yuan and its Affiliated Agencies." The guidelines, consisting of 10 points, highlight the following key aspects:

- The information generated by AI models must first undergo an objective and professional assessment of its risks by the personnel in charge. Additionally, AI-generated content should not replace the independent thinking, creativity, and interpersonal interaction of the personnel in charge.
- The responsible personnel should personally author confidential documents, and using generative AI for this purpose is prohibited.

- Responsible personnel are prohibited from providing generative AI with information related to government affairs that should be kept confidential and personal information or information not authorized for disclosure by the agencies concerned.
- Agencies should not blindly trust information generated by generative AI, nor should they base administrative actions or decisions solely on unverified outputs.
- When agencies utilize generative AI to execute tasks or provide service assistance, appropriate disclosure should be made.

3. DIGITAL JUDICIARY IN TAIWAN

3.1 Policy and Spectrum

3.1.1 Judicial Yuan Digital Policy 1.0

The Judicial Yuan proposed a five-year digital policy in 2018 (Judicial Yuan Digital Policy 1.0), outlining four major goals that draw the blueprint for the information development of the Judicial Yuan: advancing hardware environment and efficiency, upgrading information systems and services, improving data and information security, and develop towards technology and i-Justice. During this period, various projects were completed, including the comprehensive reconstruction of information systems, the adjudication system, and the establishment of Chinese speech recognition systems in tribunals with citizen judges.

3.1.2 Judicial Yuan Digital Policy 2.0

The first version of the digital policy expired on July 30, 2023. Considering the digital policies and development experiences of various countries and listening to suggestions from frontline users, the Judicial Yuan formulated Digital Policy 2.0 with "digital transformation of litigation processes" as its core. The key points are as follows: Policy Focus Observing the digital transformation of judicial systems in various countries, efforts are focused on constructing "e-Courts," using information and communication technology to build efficient and convenient judicial systems, making it easier for the public to access and use the judiciary, and alleviating the heavy workload of current judicial personnel. The paperlessization of litigation documents also responds to contemporary environmental protection requirements for energy conservation and carbon reduction. Therefore, Judicial Yuan Digital Policy 2.0 is centered on efficiency, convenience, and carbon reduction, with "smartification" and "paperlessization" as the axes, serving as the mainstay of digital transformation.

3.1.2.1 Remote Proceeding

To be aligned with the international trend of judicial digitalization, remote proceeding utilizes internet communication technology and video equipment to enable individuals to participate in court activities from anywhere, overcoming geographical and pandemic restrictions. Additionally, video consultation services are provided to address queries related to legal proceedings, bridging the gap between the public and the judiciary and achieving the goal of accessible justice.

3.1.2.2 e-Procedure

Through electronic litigation, electronic service, and electronic documentation, e-Procedure maximizes the paperless and automated nature of judicial processes, enhancing litigation efficiency. Substituting traditional document exchange methods with internet-based solutions saves time and costs and contributes to energy conservation and carbon reduction efforts.

3.1.2.3 e-Management

After digitizing case data, relevant cybersecurity and personal data protection mechanisms are established. Artificial intelligence (AI) is introduced to generate electronic document bookmarks and mask personal data automatically. Post-case closure statistical reporting operations incorporate AI-driven interpretation of judgments and system automation, along with the provision of online appointment and inquiry systems, to enhance case management efficiency.

3.1.2.4 i-Justice

Deepening the application of AI technology, including optimizing existing AI applications, developing new recommendation systems, and expanding generative AI, alleviates human workload and enhances judicial efficiency. Concurrently, improving data governance facilitates the value-added application of legal data, fostering innovation in Legal Tech.

3.2 Legal Framework and Practice

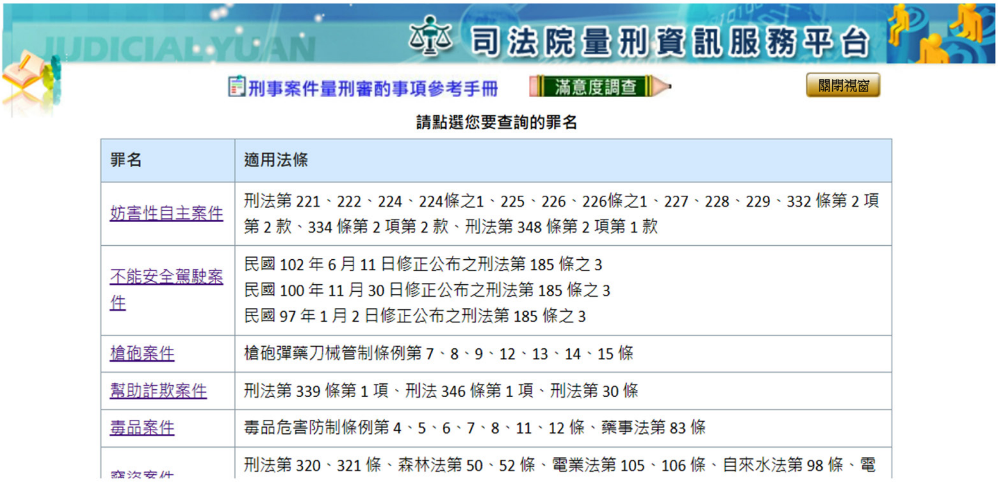
Comparing the two versions of the Judiciary Yuan's digital policy, the basic structure is roughly the same, and the content is further refined. Overall, the focus is on using digital technology as an auxiliary tool to improve the efficiency and accuracy of trials. The following describes the Criminal Sentencing System and AI Generated Content for Judgments, two systems that affect judicial decisions.

3.2.1 Criminal Sentencing System

3.2.1.1 Judicial Yuan Sentencing Information Service Platform

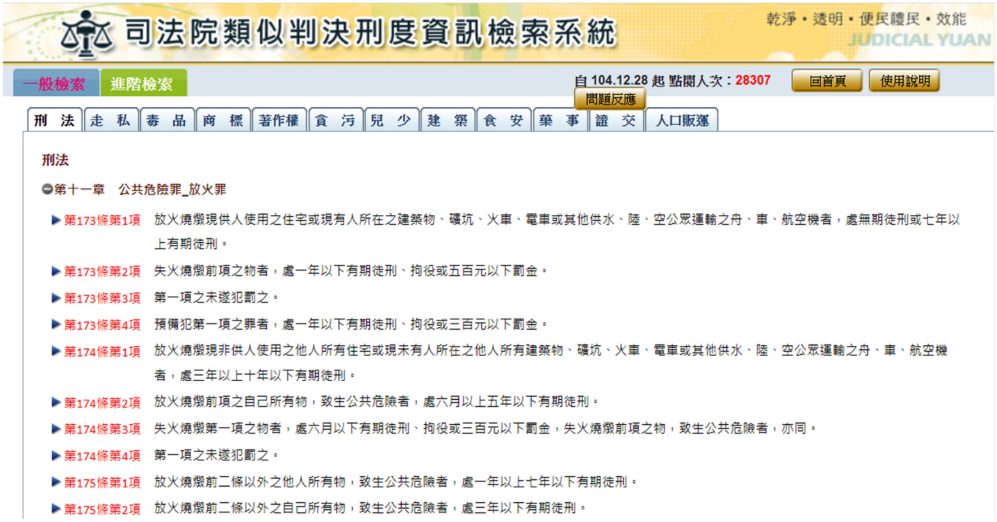
In response to society's expectations for sentencing fairness, the Judicial Yuan hopes to establish hierarchical sentencing guidelines under the principle of proportionality of crime and punishment, striving to avoid disparities in criminal sentencing. Therefore, on March 21, 2005, the Judicial Yuan convened a "Public Hearing on the Establishment of Sentencing Guidelines." Since the "White Rose Movement" initiated by the public in 2010 and the demand for sentencing reform, the Judicial Yuan has aimed to enhance the appropriateness and predictability of judicial sentencing by establishing the "Sentencing Analysis Research Group" on February 15, 2011. Drawing on sentencing reform measures in the United States, the United Kingdom, and New South Wales, Australia, the group integrates criminal trials, statistics, information professionals, and coding personnel to develop the first phase of the "Sentencing Information System." Furthermore, to enable judges to consider diverse values and perceive social fairness and justice during sentencing, the second phase of the "Sentencing Trend System" was established in September 2014.

The Judicial Yuan established the "Judicial Yuan Sentencing Information Service Platform" and the "Judicial Yuan Similar Judgment Severity Information Retrieval System." The difference between these and the sentencing trend recommendation system lies in that they do not adopt regression analysis but rather select judgments made by courts in the past (2007-2016) based on specific sentencing factors, as follows:



請點選您要查詢的罪名

罪名	適用法條
妨害性自主案件	刑法第 221、222、224、224條之1、225、226、226條之1、227、228、229、332 條第 2 項第 2 款、334 條第 2 項第 2 款、刑法第 348 條第 2 項第 1 款
不能安全駕駛案件	民國 102 年 6 月 11 日修正公布之刑法第 185 條之 3 民國 100 年 11 月 30 日修正公布之刑法第 185 條之 3 民國 97 年 1 月 2 日修正公布之刑法第 185 條之 3
槍砲案件	槍砲彈藥刀械管制條例第 7、8、9、12、13、14、15 條
幫助詐欺案件	刑法第 339 條第 1 項、刑法 346 條第 1 項、刑法第 30 條
毒品案件	毒品危害防制條例第 4、5、6、7、8、11、12 條、藥事法第 83 條
竊盜案件	刑法第 320、321 條、森林法第 50、52 條、電業法第 105、106 條、自來水法第 98 條、電



刑法

第十一章　公共危險罪_放火罪

▶第173條第1項	放火燒燬現供人使用之住宅或現有人所在之建築物、礦坑、火車、電車或其他供水、陸、空公眾運輸之舟、車、航空機者，處無期徒刑或七年以上有期徒刑。
▶第173條第2項	失火燒燬前項之物者，處一年以下有期徒刑、拘役或五百元以下罰金。
▶第173條第3項	第一項之未遂犯罰之。
▶第173條第4項	預備犯第一項之罪者，處一年以下有期徒刑、拘役或三百元以下罰金。
▶第174條第1項	放火燒燬現非供人使用之他人所有住宅或現未有人所在之他人所有建築物、礦坑、火車、電車或其他供水、陸、空公眾運輸之舟、車、航空機者，處三年以上十年以下有期徒刑。
▶第174條第2項	放火燒燬前項之自己所有物，致生公共危險者，處六月以上五年以下有期徒刑。
▶第174條第3項	失火燒燬第一項之物者，處六月以下有期徒刑、拘役或三百元以下罰金，失火燒燬前項之物，致生公共危險者，亦同。
▶第174條第4項	第一項之未遂犯罰之。
▶第175條第1項	放火燒燬前二條以外之他人所有物，致生公共危險者，處一年以上七年以下有期徒刑。
▶第175條第2項	放火燒燬前二條以外之自己所有物，致生公共危險者，處三年以下有期徒刑。

When the system was initially established, it was only available for use by judges, public defenders, and judicial assistants. Since June 2014, it has been open to prosecutors, lawyers, and defendants, and since January 2016, it has been fully open to the public[18].

Traditionally, the system involved reading past judgments by human beings, marking specific sentencing factors and storing them in a database. Currently, the "Judicial Yuan Sentencing Information Service Platform" relies on humans to do the reading (judicial substitute military service[19]), encoding detailed sentencing data. The Judicial Yuan's Criminal Division later commissioned a project titled "AI Annotation and Optimization Development Plan for Sentencing Information System[20] "with a professor from National Tsing Hua University[21], attempting to replace manual annotation with AI technology. Nevertheless, the "Judicial Yuan Similar Judgment Severity Information Retrieval System" uses a "computer" keyword-based approach[22].

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[18] Legislative Yuan Gazette, Volume 106, Issue 99, Committee Record, p. 254

[19] Legislative Yuan Gazette, Volume 112, Issue 24, Committee Record, p. 31.

[20] Project overview: http://www.phys.nthu.edu.tw/~aicmt/Sentencing%20Information%20System%20Project.html

[21] The research team includes Professor Dao-Wei Wang (Department of Physics, National Tsing Hua University), Professor Meng-Chi Lien (Institute of Law for Science and Technology, National Tsing Hua University), Professor Ying-Jie Lu (Department of Law, National Chung Cheng University), Professor Guo-Hsin Hsieh (Department of Law, National Chung Cheng University), and other relevant individuals.

[22] Legislative Yuan Gazette, Volume 106, Issue 99, Committee Record, Page 253.

Since the “Judicial Yuan Sentencing Information Service Platform” relies on manual annotation and due to workforce shortages, it only covers until 2016[23]. Meanwhile, the “Judicial Yuan Similar Judgment Severity Information Retrieval System” can query data from 2003 to 2017. Users select “offense” and “sentencing factors,” the system displays the number of judgment data, minimum severity, maximum severity, and average severity.

Although the courts consider this system non-binding, they still state: “However, if the sentencing result significantly deviates from the sentencing distribution (minimum severity, maximum severity, and average severity) of the sentencing information system, the closer it gets to the maximum severity, the more reasons should be given to explain the favorable and unfavorable evaluations of various sentencing factors and the judgment process, in order to eliminate sentencing disparities caused by irrational, subjective factors and to comply with the principles of proportionality of crime and punishment and fairness[24].” This requires the courts to fulfill their obligation to provide reasoning.

3.2.1.2 Sentencing Trend Recommendation System

The Sentencing Trend Recommendation System was established by the Judicial Yuan and began operation on December 21, 2018[25]. The reason for establishing the trend recommendation system separately from the sentencing information system is that using the sentencing information system allows relatively new judges to easily grasp the basic sentencing standards in past judicial practices, avoiding excessive disparities. However, the controversy lies in the possibility of further solidifying the long-standing standards in judicial practices, which may not necessarily conform to contemporary societal trends. Therefore, in addition to systematically summarizing and analyzing sentencing data from past judgments, the Judicial Yuan has constructed a separate sentencing trend system.

The uniqueness of the Sentencing Trend Recommendation System lies in its use of statistical regression methods to analyze the severity of various crimes. Additionally, it convenes “focus groups[26]” composed of judges, prosecutors, defense attorneys, academics, relevant government agencies, and civil organizations to discuss the factors influencing sentencing derived from the analysis of practical judgments and their impact, providing sentencing trends for various crimes. The webpage is as follows:

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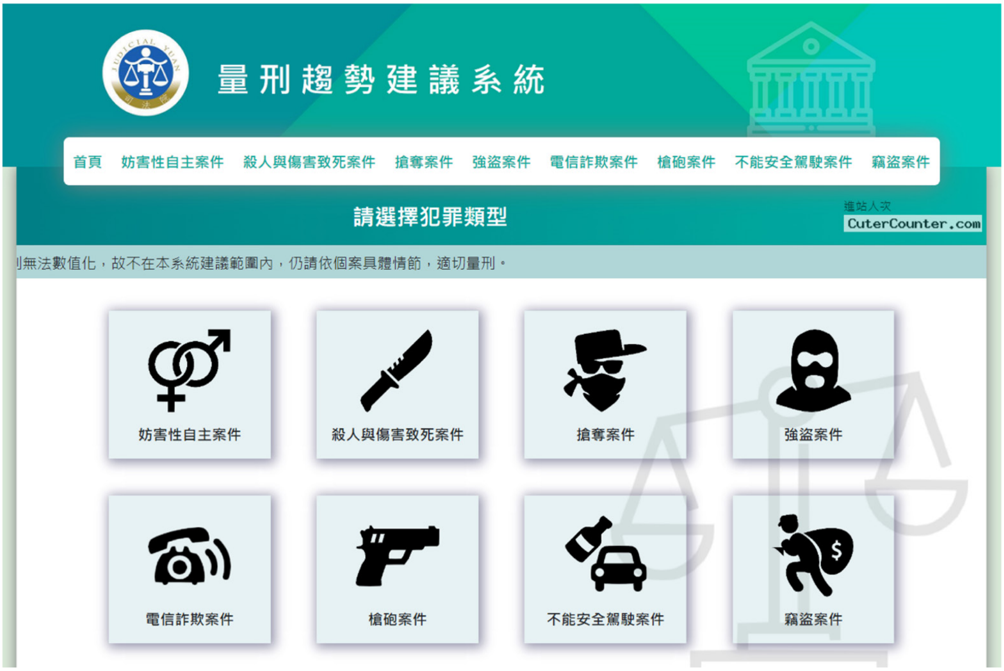
[23] Legislative Yuan Gazette, Volume 111, Issue 27, Committee Record, Page 41.

[24] Supreme Court Criminal Judgment No. 5437, 110th Year of the Republic of China.

[25] Judicial Yuan Releases Press Statement on Opening ‚Sentencing Trend Recommendation System‘ for Public Use: https://jirs.judicial.gov.tw/GNNWS/NNWSS002.asp?id=397622

[26] This qualitative research method, which involves 6-12 participants engaging in self-directed, interactive discussions on a specific topic to gather opinions, is referred to as the focus group method. It is cited in an article by Yi-ju Hu (2015) titled “Introduction to the Judicial Yuan’s Focus Group Recommended Sentencing Reference Criteria” in the “Judicial Weekly,” Issue 1766, Page 2.



無法數值化，故不在本系統建議範圍內，仍請依個案具體情節，適切量刑。

The website of the system displays the following information on the main page:

This system is developed through the analysis of practical judgment data using statistical regression. It is adjusted based on the recommendations of focus groups[27] regarding sentencing factors and their impact. This system is for reference only. If there are significant sentencing factors not included in this system for a particular case, please consider the circumstances of the case and sentence appropriately.

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[27] According to the Judicial Yuan (compiled) (2018), the "Focus Group Members" for each offense are not entirely the same. For example, in cases of drug trafficking, the focus group members include "Government Agencies: Judges from the Supreme Court and the Taiwan High Court, Prosecutors from the Taiwan High Prosecutors Office, Representatives from the Police Administration Bureau of the Ministry of the Interior. Academic Institutions: Professors from the Department of Law at Chung Cheng University. Civil Representatives: National Federation of the Bar Associations of the Republic of China, Taipei Bar Association, Taipei City United Hospital." On the other hand, for offenses related to driving under the influence of alcohol or drugs, the focus group members include "Government Agencies: Judges from the Supreme Court, Judges from the Taichung Branch of the Taiwan High Court, Representatives from the Ministry of Justice, Prosecutors from the Taiwan High Prosecutors Office. Academic Institutions: Professors from the Department of Transportation Engineering at Central Police University, Professors from the Department of Crime Prevention at Central Police University. Civil Representatives: National Federation of the Bar Associations of the Republic of China, Road Safety Foundation of the Republic of China, Taiwan Taipei Branch of the Crime Victims Protection Association."

Statutory offenses including the death penalty and life imprisonment, cannot be quantified, so they are not within the scope of this system's recommendations. The sentence should be appropriately based on the specific circumstances of the case.

The types of offences for which sentencing advice is available on the website include:

- Sexual offenses
- Offenses of homicide and offenses of injury resulting death
- Offense of abrupt taking
- Offense of Robbery
- Offense of telecommunications fraud
- Offences relating to illegal harpoons
- Drive under the influence
- Offense of larceny

When the users select "the types of offences" and "sentencing factors," the system will recommend sentencing and the range. One thing to note in using the system is that if the statutory punishment for a crime is not a single type of sentence (e.g., imprisonment) but multiple types (e.g., imprisonment, detention, fine), users should first select the "main type of sentence," and then the system will provide sentencing recommendations based on the sentencing factors.

The courts view the system's positioning as having "only reference value[28]" or "only providing reference for court sentencing, as judges are independent in their judgments and not bound by it[29]." This is because the system has not yet conducted comprehensive statistics on various types of crimes and is limited by some data that cannot be quantified or insufficient sampling, thus still having shortcomings that cannot be overcome[30].

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[28] Supreme Court Criminal Judgment No. 3827, 112th Year of the Republic of China.

[29] Supreme Court Criminal Judgment No. 5205, 112th Year of the Republic of China. Additionally, please refer to "Supreme Court Criminal Judgment No. 5465, 112th Year of the Republic of China," "Supreme Court Criminal Judgment No. 2920, 112th Year of the Republic of China," and "Supreme Court Criminal Judgment No. 4932, 109th Year of the Republic of China."

[30] "Supreme Court Criminal Judgment No. 3367, 109th Year of the Republic of China," and "Supreme Court Criminal Judgment No. 2686, 108th Year of the Republic of China."

3.2.2 Smart Judicial Adjudication

In order to reduce the workload of judges and improve trial efficiency, the Judicial Yuan developed and completed the sentencing intelligence analysis system for two types of crimes, driving under the influence and accessory in fraud, from 2020 to 2021. Based on this, the Judicial Yuan began to develop the Artificial Intelligence Generated Content (AIGC) in April 2022 to generate draft judgments for the above two types of crimes for judges to refer to when making judgments; as for core matters such as determining facts, applying the law, and deciding sentencing, it is still entirely up to the judge to decide. After the aforementioned two crime AI generation systems passed the re-examination, the Criminal Department of the Judicial Yuan selected several courts for trial operation and evaluation before being fully launched. In addition, the Judicial Yuan's development project on using AI to write drug crime draft judgments has also been undergoing and was launched on a trial basis in December 2023. Since 2024, the Judicial Yuan has also planned to develop automatic generation and development cases of draft rulings on civil traffic damage compensation, debt cancellation, rehabilitation, liquidation, and other events to gradually implement the following five-year judicial digital policy.

The Judicial Yuan developed the AIGC system using the TMT5 language model architecture to perform supervised training and fine-tuning on the judgment generation task. In the AI model training stage, the indictment and paired judgment materials are mainly used; when the AI generates a draft, the corresponding indictment is primarily used as the generated material, and criminal facts, evidence and other paragraphs are analyzed in real-time to improve accuracy, readability, and interpretability of each judgment draft.

At the same time, the Judicial Yuan will refer to the "Reference Guidelines for the Use of Generative AI by the Executive Yuan and Affiliated Agencies (Institutions)" as key inspection items when developing each AI system and will formulate exclusive guidelines for the development of AI in the judicial system in due course to steadily develop various applications of AI.

4. COMPREHENSIVE JURISPRUDENTIAL REFLECTIONS

The digitalization of administration and justice (e-government and e-justice) can increase the efficacy and efficiency of the legal system and facilitate access to administrative and judicial processes. However, the efficacy-oriented approaches need to consider that administrative and justice systems in a democratic constitutional state should support values of the rule of law, such as equal access, transparency, respect for human rights, etc. On this basis, indicating some rule of law aspects about the digital administration and judiciary is just as important.

4.1 The Interaction between Digital Disparities and Digital Legal System

The main aim of e-justice is to improve access to justice through ICT. E-justice should be user-oriented and, therefore, offer technical options that are designed to be user-friendly. With a view to adequate legal protection, however, it must be assured that citizens can still communicate digitally with the courts. Differences in access to and use of ICTs (digital divide) must be taken into account, which could lead to de facto inequality. In addition, the speed of file and data transmission does not necessarily mean more effective legal protection. For citizens accustomed to dealing with traditional paper documents, the use of electronic documents would represent a barrier to access to communication with the judiciary. It is therefore questionable whether it complies with the principle of adequate legal protection if those involved and third parties are legally obliged to submit electronic documents to the court when maintaining files, i.e. if documents are only allowed to be submitted to the court in electronic form when keeping and handling files.

4.2 Digitalization of Government and Digital Constitutionalism

The digitization and intelligence of administration have brought about improvements in administrative efficiency and convenience in people’s lives. Technology can play an important role and provide a useful tool for creating informed and active citizens, thereby contributing to democracy from the ground up. The shift from e-governance to e-democracy has become an important example of the capacity of technology to influence public law as a whole. At the same time, the digitalization of administration also faces huge challenges in the rule of law, especially AI, which is characterized by high complexity, unpredictability, and autonomy in its decision-making and learning capacities. It can challenge traditional notions of legal personality, individual agency, and responsibility. The complexity of AI models combined with various forms of automation and algorithmic bias raises challenges for the transparency and accountability of machine learning and AI systems. Legal systems currently face an unprecedented range of AI-related challenges associated, among other things, with the need to prevent algorithmic bias, safeguard human control over the operation of automated intelligent systems and hold such intelligent systems accountable.

The higher the degree of administrative digitization, the stricter the requirements of the rule of law. Take one of the most important cases for example: the requirements for legal reservations for administrative use of digital tools should be increased; the obligation to explain reasons for digital administrative decisions should be increased (the principle of clarity of administrative actions and the principle of administrative transparency); the principle of openness in making digital administrative decisions and the need for public participation. Requirements should be raised (due process of law).

Except for public participation, the above applies to the judiciary, especially the principle of openness. As for the judicial independence that is unique to the judiciary, it needs to be pointed out that the principle that all people are equal before the law is particularly important for the judiciary, which presupposes an image of humans that everyone can think rationally, both the judge and all other parties involved. Because such images of humanity could be involved in digital transformation, it should be a concern for all those activities in the judiciary that adverse effects on adequate legal protection and judicial independence are avoided in the digitalization process. It must be clear that, to some extent, effective mechanisms should be introduced, especially with a view to protecting judicial independence and the judiciary's effectiveness. All judges should avoid decision-making that relies solely on ICT systems and protect the draft of any judgement from any undue interference. The more automated decision-making increases, the more important human judges are.

4.3 Problems and Perspectives on the Use of AI in Judicial Practice

AI has already been a trend in judicial practice rather than just a possibility of the future. AI has the massive potential for judicial decision making as an auxiliary and as the judge to serve in courts. On the other hand, for judicial practice, Taiwan made significant strides in conducting remote hearings, allowing courts to conduct hearings online during the pandemic. This indicates that AI might only serve as an auxiliary tool in the court. The impact AI brings to Taiwan's judicial still cannot be comprehensively evaluated yet. Currently, in the judicial of Taiwan, Human-Robot Cooperation (HRC) has been implemented. The doubt of whether AI will ultimately replace human work in the court has arisen. In terms of technology, AI can fulfil many tasks; nevertheless, this situation does not represent the replacement that will happen.

Indeed, machines could surpass humankind's concentration, thinking, and mastery of affairs. Technically, machines operate 24 hours without fatigue. On the contrary, human brains will get exhausted, and their capacity will always be limited. For example, although there are concerns about autonomous vehicles' accident rate and liability attribution, the accident rate is much lower due to their "rule-following settlement". Whereas humans often violate the rules, resulting in accidents such as hitting pedestrians or fatigued driving, which does not apply to autonomous driving. Therefore, the sample given above could lead to this conclusion: if the tasks were more suitable for AI in judicial practice, human work would inevitably be replaced, and opportunities for HRC would continue. However, human judges are unlikely to be replaced by AI judges by now.

In fact, the most likely development of AI is HRC from the aspect of assisting the judicial system. For instance, in the academic field, Al benefits a lot. Without AI, researchers have to search through books or journals one by one, which might require numerous times and labor work. AI can retrieve and summarize critical information, etc. This function is indisputable to provide researcher valuable time to conduct their research. Regarding judicial practice, making judgements causes a heavy workload for judges, and AI could help to reduce their burden. Nonetheless, AI conducts the paperwork quickly, and the quality might not be guaranteed since a complicated judgement relies on the analysis, legal deduction, and organization skills of the judge.

On the other hand, the reasons why AI is currently limited to "cooperation and collaboration" are still some other questions to ponder. Can our constitutional law allow judges to be replaced by AI? May our citizens accept judgments made by AI? Firstly, to become a judge, you must pass the magistrate exam in Taiwan. Secondly, how should we define the personal right of Al judges? Taking lay judges as an example, they need to acquire citizenship. Therefore, no matter whether judges or lay judges, only natural human beings can be qualified as judges. Whether a "non-human" could qualify for this position is a challenging issue. Apart from the questions mentioned above, letting AI replace natural humans might be unconstitutional in many other aspects. And it assuredly comes with a lot of amendments in law. Therefore, AI can assist but not replace human judgements at present.

Nonetheless, in the aspect of sentencing system, AI benefits us tremendously. AI is currently used in judicial practice, mainly as a sentencing trend recommendation system. Although it is still in the development stage, the sentencing system still has positive benefits in practice. By analyzing all past court judgments into data, organizing similar cases, and statistically predicting under what circumstances the court will consider sentencing in typical cases. This should have a positive effect on judges' considerations on sentencing in individual cases. However, potential problems may exist, such as whether hidden discriminatory factors or replication errors need attention and improvement. The sentencing trend recommendation system reduces the likelihood of judges blindly sentencing. For example, it is like a teacher grading a paper. The teacher knows the quality of the answers, but it is difficult to give an accurate score. If sentencing is similar to grading by teachers, judges certainly know how many years an offender should be sentenced if guilty. If the crime is more serious, the judge may sentence more. However, for the public, whether they are dissatisfied with the judge's judgment or think the judgment is unfair, this is a common human emotion.

Therefore, the benefit of the sentencing system lies in the fact that if a party feels dissatisfied with the judge's sentencing, there may be a more concrete standard to convince the citizens. The sentencing system derives its results through specific statistics and algorithms, and the penalties for similar cases in the past have been roughly similar. Therefore, for the parties involved, it is easier to understand or believe in the sentencing system or the results provided by the sentencing system, thereby enhancing their trust in judges and the judiciary while also improving efficiency. Conversely, if such a situation occurs in the future, the sentencing trend recommendation system can be regarded as a pursuit of fairness, which should assist.

Technology is constantly advancing, and it's a continuous process. Who should determine whether the parties are guilty or not in our judgment? If AI determines whether the parties are guilty today, regardless of whether the decision is a blind response, do humans need an AI to decide on their guilt? Much of our society's distrust of or criticism of the judiciary stems from criminal cases. Scholars may also make complex explanations regarding constitutive elements and criminal law theories. However, the reality is that ordinary people do not care or do not want to understand. People in the trial are only eager to know whether they are guilty or not and whether the sentence is heavy or light. Therefore, whether AI will be used in future judgments still needs to be observed. However, for all of that, it is inevitable for AI to cooperate and collaborate with judicial practice or act as an auxiliary tool.

5. CONCLUDING REMARKS

AI exists in various aspects and fields, making it impossible to construct a comprehensive, unit legal system to regulate every part simultaneously. According to the reason above, the EU Artificial Intelligence Act (AI Act) will not be the only system that regulates AI effectively. Conversely, the government should legislate Al law depending on every specific field. The critical and urgent issue right now is not how AI can do but what AI cannot do. If a new AI innovation comes out and is immediately banned, then it could not question whether our society allows this auxiliary tool, but we deny entirely use of it. Therefore, when the EU AI Act was passed on March 13, 2024, the most concerned issue was whether Chat GPT was included in the banned list. Even though it is not, the EU has regulated AI by law in many countries—each with its own restrictions. AI development is in its infancy, so exceeding suppression and restriction will drag down its development. AI artificial intelligence's actual requirement should be management rather than restriction. Oppression is never the right way for regulation.

The fundamental perspectives mentioned above are also applicable to e-governance and e-judiciary. Regarding implementing a citizen judge system to enhance the public's trust in the judiciary, it is necessary to address the use of AI collaboration and cooperation in Taiwan's judicial practice in this paper's conclusion by presenting several viewpoints. Both professional and lay judges coexist to enhance the public's trust in the judiciary. Previously, the public complained that "dinosaur judges" might be judges who judged cases hiding in their own space without understanding the case's background and public opinion. Nevertheless, people cannot demand that judges be familiar with many social matters; this still leads to poor public perception or low confidence in the judiciary. The introduction of lay judges should be able to play their role and power to make up for what the existing judicial system lacks. In addition, the sentencing issue is related to the trend of analyzing the AI sentencing system and national sentiment. Sometimes, sentencing is relative, whether light or heavy, depending on social concern and public sentiment. However, for professional judges, the participation of lay judges in the trial and decision-making bears certain similarities to professional judges using AI to make decisions. Nevertheless, if the judiciary truly seeks to gain the public's trust, the key lies not in whether there is societal involvement in the process of forming judicial decisions or whether the decision-making process is supported by algorithmic scientific evidence. Instead, it lies in whether the reasoning behind the decisions is rigorously argued and persuasive.

Someday, AI will surpass humans and become pioneers, just like the technology of cloning humans and sheep, but could this be why humans try to prohibit and restrict the development of AI and confine it just as a tool for humans? This question of value choice must be decided and borne together under a democratic system.

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