

Data Stewardship and Governance in the Singapore Department of Statistics

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Introduction

In recent decades, advancements in technology have led to a data explosion and the enlargement of the data ecosystem. Concomitant with the digitalisation of systems and the internet of things, government administrative data, big data and private sector data have grown, giving rise to new types of data and data services. These data and data services can in turn facilitate deeper understanding of the economy and society and enhance decision-making by the public and the government.

National Statistical Offices (NSOs) can seize the opportunity presented by this evolving trend to assume an expanded role in data stewardship and governance for the larger data ecosystem. Currently, NSOs are performing this role to some extent through their coordination of the national statistical system¹, where the key objective is to ensure good coordination between statistical agencies within countries (Fundamental Principles of Official Statistics²).

In the 2023 report³ of the Conference of European Statisticians (CES) Task Force on Data Stewardship, data stewardship is described as the act of ensuring

the ethical and responsible creation, collection, management, use and reuse of data so that they are useful for the public good and benefit the full community of data users; and data governance is defined as a system of decision rights and accountabilities for the management of the availability, usability, integrity and security of the data and information, and the resulting regulations, policies and frameworks that provide enforcement.

In Singapore, the legal framework and initiatives for data use and data sharing were enhanced in recent years under the direction of the Smart Nation and Digital Government Office (SNDGO), via the enactment of the Public Sector (Governance) Act (PSGA), the release of the Government Data Strategy (GDS) and the introduction of the Government Data Architecture (GDA).

This article elaborates on the Singapore Department of Statistics (DOS)'s evolving role and functions in data stewardship and governance for the Singapore Public Sector. It describes the expansion of DOS's role from undertaking traditional statistical activities to becoming a Capability Centre of Individual and Business Data⁴ (CapCen).

1 The Organisation for Economic Co-operation and Development (OECD). (2002, p.220) The national statistical system (NSS) is the ensemble of units of statistical organisations and units within a country that jointly collect, process and disseminate statistics on behalf of the national government.

2 The United Nations Statistics Division (UNSD). (2014) United Nations Fundamental Principles of Official Statistics.

3 CES. (2023) "Data Stewardship and the Role of National Statistical Offices in the New Data Ecosystem".

4 Not housed under the Centre of Excellence for Infocomm Technology & Smart Systems (ICT&SS).

Landscape for Statistical Production in Singapore

Singapore has adopted a decentralised statistical system since 1973, with DOS headed by the Chief Statistician, performing the role of Singapore's NSO.

Statistics are collected and compiled by DOS alongside Research and Statistics Units (RSUs) in the Government. DOS and RSUs in some Ministries and Statutory Boards are gazetted under the Statistics Act 1973 to collect data under their subject matter purview for statistical purposes, ensuring they are fit for purpose. Non-gazetted RSUs in other Ministries and Statutory Boards may collect data under administrative regulations or Acts of their parent organisations.

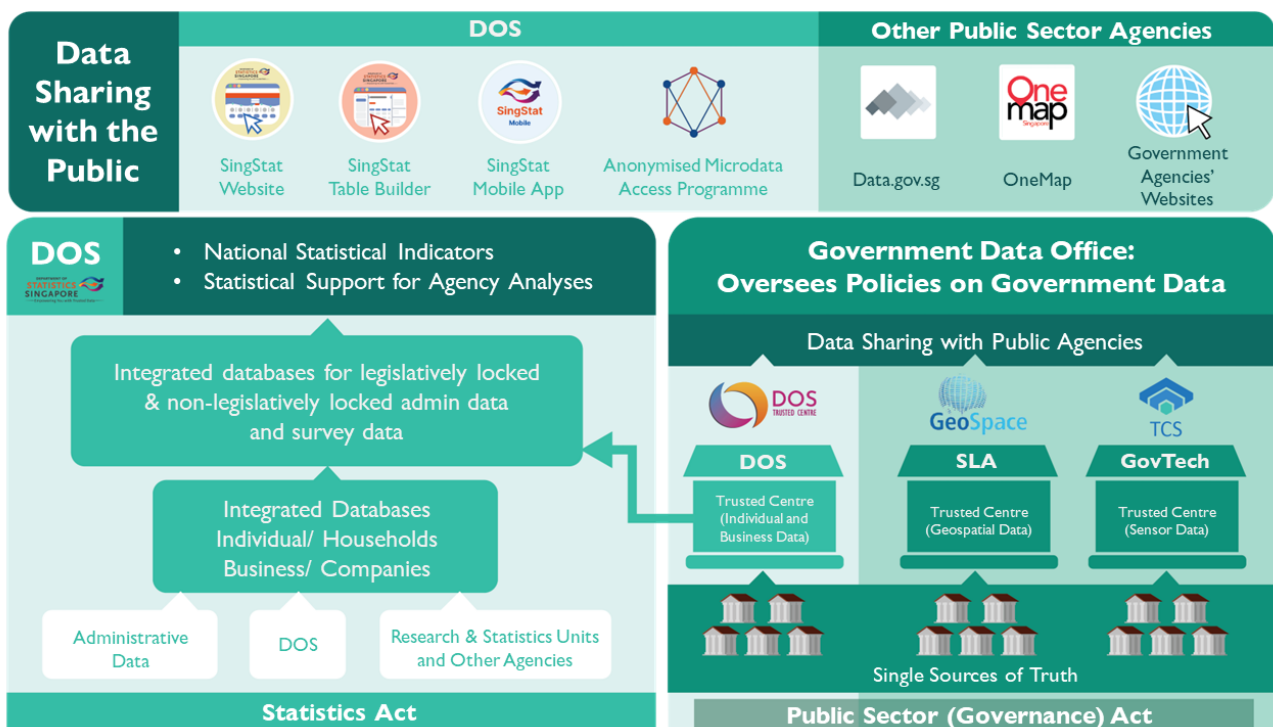
DOS, as the National Statistical Coordinator, works closely with RSUs and administrative data producers to minimise duplication of statistical activities and surveys, reduce respondent burden and improve data quality. Regular meetings with RSUs are held to discuss statistical coordination matters and promote an environment of learning and cross-sharing of best practices on statistical activities across the data value chain.

Trusted Centre for Individual and Business Data at DOS

In 2019, DOS was designated by SNDGO as the Trusted Centre for Individual and Business Data (DOS TC) to support the implementation of Singapore's GDS. DOS TC shares individual and business data within the government on a need basis under the PSGA, to facilitate the use of data for policy analysis and service delivery. This appointment is testimony to DOS's forte in working with data on individuals and businesses, including DOS's domain knowledge and competence in data management, integration, quality, security and confidentiality.

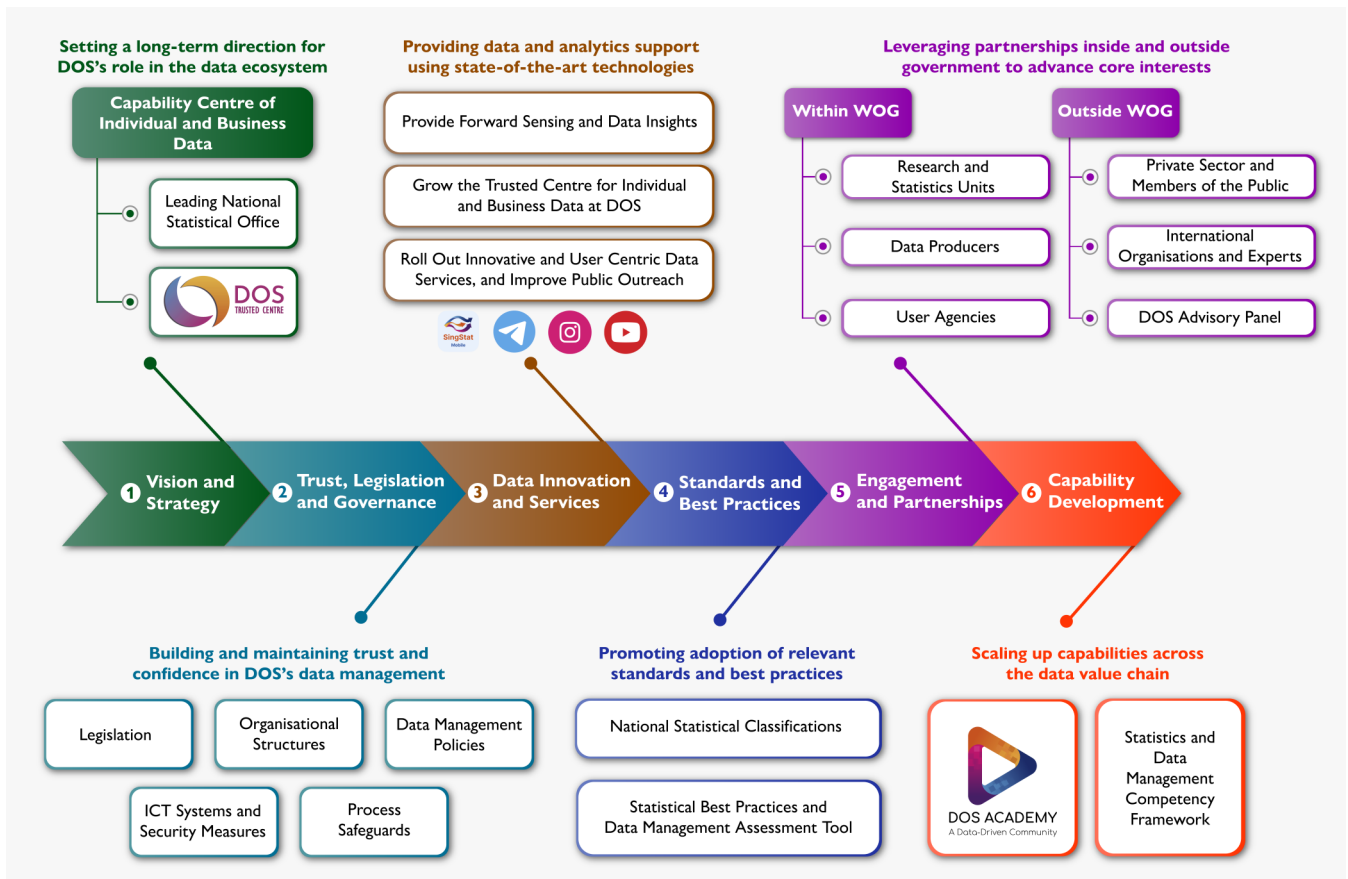
DOS TC's role has significant synergy with DOS being the NSO, resulting in DOS being the first stop for users to obtain data and data services⁵. Two other Trusted Centres for geospatial data and for sensor data were established in the Singapore Land Authority (SLA) and Government Technology Agency of Singapore (GovTech), respectively. Figure 1 illustrates the expanded data landscape in Singapore, encompassing the National Statistical System, and the broader data ecosystem, including integrated national databases under the Trusted Centres.

FIGURE 1 EXPANDED DATA LANDSCAPE IN SINGAPORE



⁵ Data services including data fusion, anonymisation, sampling, analytics, standards and data lab services etc.

FIGURE 2 DOS'S APPROACH TO DATA STEWARDSHIP AND GOVERNANCE



Data Stewardship and Governance in DOS

As the National Statistical Coordinator, DOS has been engaged in data stewardship and data governance with respect to the role of producing quality statistics, developing of national statistical standards and coordinating of statistical activities.

As DOS develops from the traditional role of a NSO to a CapCen, DOS's expanded role in data stewardship for the public service ensures the strategic use of data and information in making data-driven decisions and providing services for the public.

DOS took reference from the 2022 report on data stewardship by the CES Task Force and mapped the best practices against DOS's CapCen strategies to form a list of data stewardship functions that apply in DOS's context today (Figure 2).

Each component of the framework will be elaborated in the subsequent sections.

Vision and Strategy - Setting a Long-Term Direction for DOS's Role in the Data Ecosystem

As the NSO, DOS's vision is to develop and maintain a national statistical service of quality, integrity, and expertise.

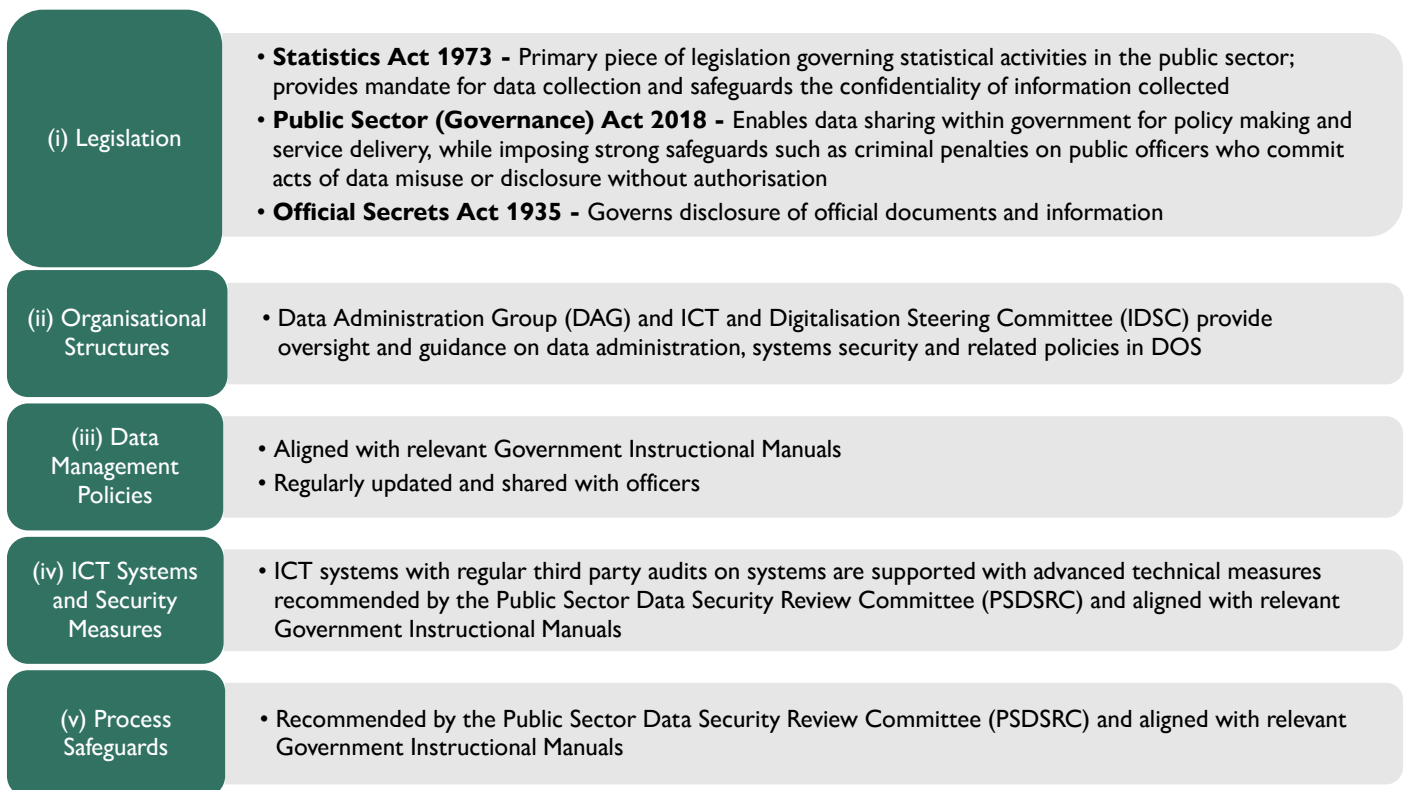
DOS's mission is to deliver insightful statistics and trusted services that empower decision making. Following DOS's appointment as a Trusted Centre, DOS embarked on the next bound of transformation as the CapCen (Figure 3) to:

- (i) stay relevant in the constantly changing economic and social landscape;
- (ii) keep up with ever-increasing data flows and new technologies; and
- (iii) unlock value and empower data-driven insights in support of evidence-based policy formulation and seamless service delivery to benefit residents and businesses in Singapore.

FIGURE 3 DOS AS CAPABILITY CENTRE OF INDIVIDUAL AND BUSINESS DATA (CAPCEN)

- (i) **Leading National Statistical Office:**
DOS compiles and disseminates national statistical indicators, provides statistical analyses with integrated data from diverse sources including administrative and survey data, develops national statistical standards and classifications, and coordinates and advises on statistical matters
- (ii) **Trusted Centre for Individual and Business Data at DOS:**
DOS enables Whole-of-Government (WOG) data sharing for policy analysis and planning, as well as agency operations and service delivery purposes

FIGURE 4 DOS'S DATA GOVERNANCE FRAMEWORK



Trust, Legislation and Governance - Building and Maintaining Trust and Confidence in DOS's Data Management

Maintaining high levels of public trust and confidence in DOS is critical to ensure continued public support for data sharing and uninterrupted flow of data from the public. DOS adopts a data governance framework with five main pillars, to protect and preserve the trust in DOS's management of data (Figure 4).

Data Innovation and Services - Providing Data and Analytics Support Using State-of-the-Art Technologies

DOS furnishes a wide range of economic and social data as well as data services to provide insights for

analyses and decision making by diverse user groups. DOS provides support to public sector agencies in in-depth policy evaluation by leveraging DOS's Integrated Databases viz. Business, Individual and Household Databases which are integrated with longitudinal data from administrative, survey and big data sources. To facilitate effective use of the integrated databases, DOS provides a comprehensive suite of statistical and research services e.g., shaping problem statements, providing advice on data selection, modelling, and interpretation and reporting of findings.

DOS TC ingests and processes a wide range of non-legislatively locked administrative core data on individuals and businesses from data custodians. With this integrated national database, the core data are distributed to the public agencies securely, on a need

basis under the PSGA, for them to carry out their analyses and service delivery.

As DOS's main public fronting communication and dissemination platform, the [SingStat Website](#) provides general users with a wide range of open data, statistical information and resources. DOS's e-Service – the [SingStat Table Builder](#) – facilitates access to over 2,200 data tables from 70 public sector agencies across economic and socio-demographic domains. More detailed data were made available on the SingStat Table Builder over the years. Likewise, more infographics, interactive dashboards and videos were released on the SingStat Website for the public to understand data and explore data trends. Curated content are placed in the Students' Corner on the SingStat Website and DOS engages academic institutions to raise students' awareness of DOS's data and data services through various publicity platforms.

To cater to a population with high usage of smartphones and social media, DOS developed the [SingStat Mobile App](#) and has presence on **social media channels** viz. Telegram, Instagram, YouTube and LinkedIn. The SingStat Mobile App provides users with fast, free and easy access to the latest key statistics while on-the-go and offers charting functions to visualise the data. The social media channels facilitate outreach in different ways to the social media generation.

In support of businesses, DOS developed the [Data for Businesses](#) webpage that provides a business performance benchmarking tool for firms to evaluate their business performance, as well as dashboards which provide firms with curated and contextualised data to address questions on their customers and industry. During the development of these business tools, DOS engaged the relevant public sector agencies and private sector users to obtain feedback on product features and content before the final launch.

DOS made available access to selected anonymised microdata through DOS's [Anonymised Microdata Access Programme](#) (AMAP), which enables researchers commissioned by government agencies and academic researchers from local Autonomous Universities to conduct deep-dive studies in approved data exploitation environments such as the **DOS Data Lab**. Many researchers have conducted studies on various economic, social and manpower topics using the anonymised microdata from DOS.

DOS TC supports [TRUST](#), a national platform that enables anonymised health-related research and real-world data to be brought together, accessed and used in an expeditious and secure manner. The platform supports health data analytics and innovation between public institutions, and between the public and private sectors to improve health outcomes.

Standards and Best Practices - Promoting Adoption of Relevant Standards and Best Practices

As the National Statistical Coordinator, DOS coordinates statistical activities across public sector agencies, develops the national statistical classifications (e.g., Singapore Standard Industrial Classification, Singapore Standard Occupational Classification), standards and statistical best practices, and promotes their adoption by public agencies.

The [Statistical Best Practices](#) (SBP) handbook guides public agencies in conducting surveys and utilising data from administrative sources. It serves as a useful resource for private sector organisations seeking to improve data quality. In addition, a Data Management Assessment Tool (DataMAT) is available for public agencies to assess the strengths and weaknesses of their statistical processes against the best practices in the SBP handbook.

Engagement and Partnerships - Leveraging Partnerships Inside and Outside Government to Advance Core Interests

DOS extensively engages data users in the Singapore Public Sector, RSUs and data producers in the administrative data source agencies, through WOG platforms and on a bilateral basis, to coordinate, synergise and prioritise cross-cutting data requirements, with the aim of reducing respondent burden.

Outside of the Singapore government, DOS establishes public-private partnerships by collaborating with private sector companies to advance common interests in data-related topics, such as the application of artificial intelligence, machine learning and privacy preservation, through bilateral sharing sessions and talent attachment programmes.

The DOS Advisory Panel (DAP) comprising local and international experts in the fields of statistics, data science and technology, was established in 2021 to guide DOS's strategic direction amidst the changing data and technology landscape.

DOS takes on leadership roles in both regional and international fora to be at the forefront of data developments e.g., Co-lead for the End Term Review of the ASEAN Community Statistical System Strategic Plan 2021-2025; Member and Rapporteur of the Bureau of the UN Economic and Social Commission for Asia and the Pacific Committee on Statistics; and Member of the High-level Group for Partnership, Coordination and Capacity-Building for Statistics for the 2030 Agenda for Sustainable Development 2023-2025.

Capability Development - Scaling Up Capabilities Across the Data Value Chain

As the CapCen, DOS aims to deepen data capabilities within DOS and across the Public Service. To this end, DOS is engaged in the following:

- i. Develop and implement a comprehensive Statistics and Data Management Competency Framework; elaborating on the essential areas of

skills and knowledge expected of data users and officers involved in statistical work to guide their development; and

- ii. Establish the DOS Academy as a platform for promoting statistical best practices and facilitating learning and development of statistical skills and data competencies.

Conclusion

The evolving data ecosystem presents DOS with opportunities for new strategies and capabilities, through expanding the role of DOS in data stewardship and governance for the public sector. This enables the government to better harness data to adopt data-driven approaches to improve policies to provide targeted and effective services and support to the public. Curated statistics are available via a broad range of touchpoints for personal use and business decision-making.

By engaging with our stakeholders, DOS ensures that we keep up-to-date with the latest needs and technological developments. DOS will continually work towards bolstering relevant data stewardship and governance frameworks and practices with partners in the government, private sector and international statistical community.

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