Fast-Tracking Digital Transformation:
A Framework for South Africa's Public Sector

Briefing Note

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Executive summary

This briefing note proposes a framework to fast-track digital transformation in South Africa's public sector, aiming to address the complexity of South Africa's digital transformation efforts and ultimately accelerate the achievement of the Sustainable Development Goals. Using the OECD's definition, digital transformation involves the societal and economic effects of digitisation and digitalisation, converting analogue data into digital formats, and using these technologies to innovate and improve existing processes.

The proposed framework has four dimensions:

- Leverage digitisation and digitalisation for positive socio-economic effects.
- Focus on societal outcomes like eradicating poverty, reducing inequality, and eliminating unemployment, supported by better services, accountable institutions, improved education, and engaged citizens.
- Establish effective governance and coordination mechanisms.
- Meet key institutional and infrastructure requirements.

Recommendations include empowering a central government entity to lead digital transformation, establishing an interministerial task force, and setting up a multistakeholder governance structure. Ensuring strong alignment between digital transformation and societal outcomes is essential. Efforts should focus on gathering citizens' input and using open data and software. Institutional requirements should be reviewed, including appointment criteria and procurement regulations, and officials should be equipped with foundational digital skills. Infrastructure needs involve creating a competitive internal digital transformation market, prioritising system interoperability and data security, and ensuring affordable data storage and computing resources.

This framework aims to guide South Africa's public sector towards a more effective and inclusive digital transformation, ultimately improving the lives of all citizens.
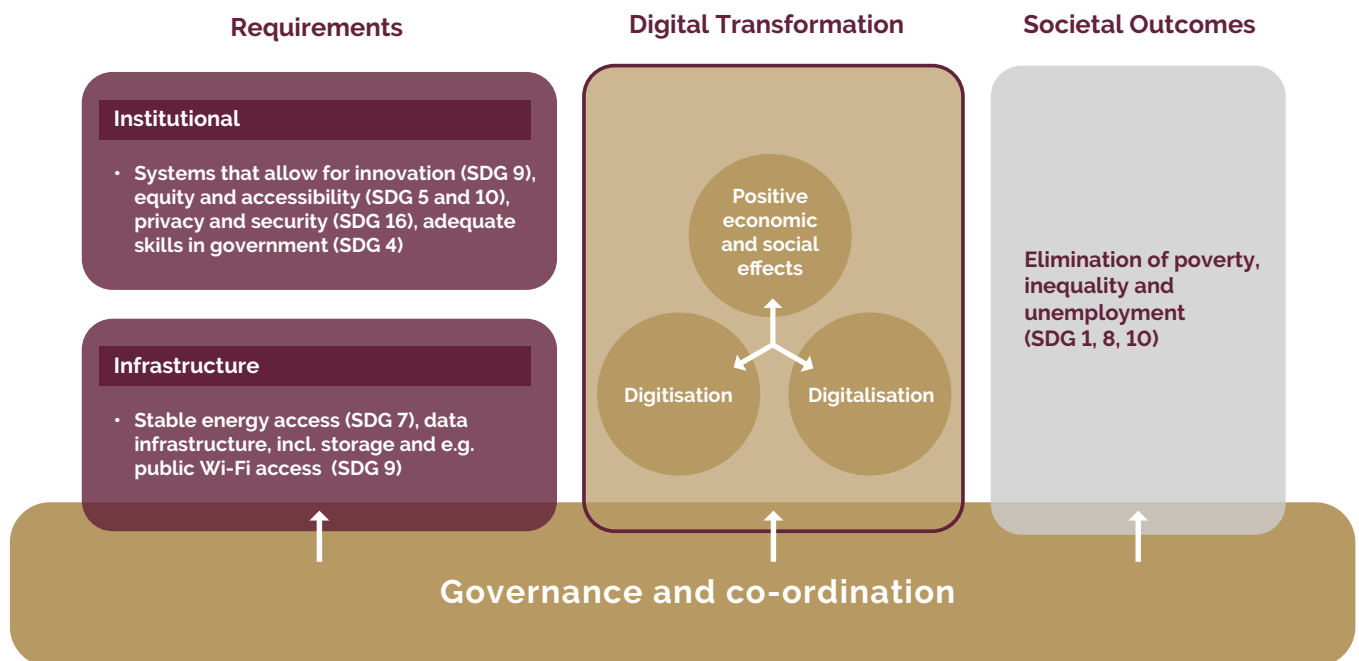

Figure 1: Framework for digital transformation in South Africa's public sector

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1. Introduction

Digital transformation can support the achievement of local, national, regional, and global development priorities. At the global level, it has been argued that 70% of all Sustainable Development Goal (SDG) targets will benefit from data and digital technologies, while 13% of the targets call directly for the use of these technologies (ITU, UNDP, 2023, p. 12).

This briefing note proposes a framework for fast-tracking digital transformation in South Africa's public sector to maximise its socio-economic impact and ultimately accelerate the achievement of the SDGs in South Africa.

Amid a plethora of definitions of digital transformation, the following definition of the Organisation for Economic Cooperation and Development (OECD) is used as a point of departure:

> *Digital transformation refers to the economic and societal effects of digitisation and digitalisation. Digitisation is the conversion of analogue data and processes into a machine-readable format. Digitalisation is the use of digital technologies and data as well as their interconnection that result in new activities or in changes to existing ones. Together, digitisation and digitalisation make up the digital transformation (OECD, 2019).*

Generally, digital technologies – one of the constituting elements of digital transformation – have three potential developmental impacts (ITU UNDP 2023, p. 14). By serving as a core channel for basic service delivery, digital technologies can help people "connect, collaborate, and engage" with one another and their government institutions. By providing actionable data and insights, digital tools often provide governments and citizens with access to new data sources or insights that allow for improved services. Lastly, by catalysing wider progress, digital technologies provide the foundation for developing further skills and innovations that can help citizens and governments achieve their developmental aspirations.

2. Navigating complexity: A challenge for digital transformation in South Africa's public sector

Even with the guidance of the definition by the OECD, digital transformation encompasses an exceptionally broad array of topics, programmes, priorities, structures, and institutions. This complexity is evident when one considers the large number of national policies and institutions in South Africa that touch on the topic of digital transformation.

Policy developments concerning digital governance have been spearheaded by the Department of Public Service and Administration (DPSA), the erstwhile Departments of Telecommunications and Postal Services (DTPS) and Communications (DOC), the State Security Agency (SSA), the Department of Home Affairs (DHA), the National Planning Commission (NPC), and the Department of Communications and Digital Technologies (DCDT). The main focuses have been regulating cybersecurity, digital identity, and data ownership and management. Most recently, the DCDT convened a meeting to discuss the adoption of South Africa's AI strategy.

Among South Africa's first digital government policies was "Electronic Government: The Digital Future." Since then, a number of instruments have been issued, as summarised in the infographic below.
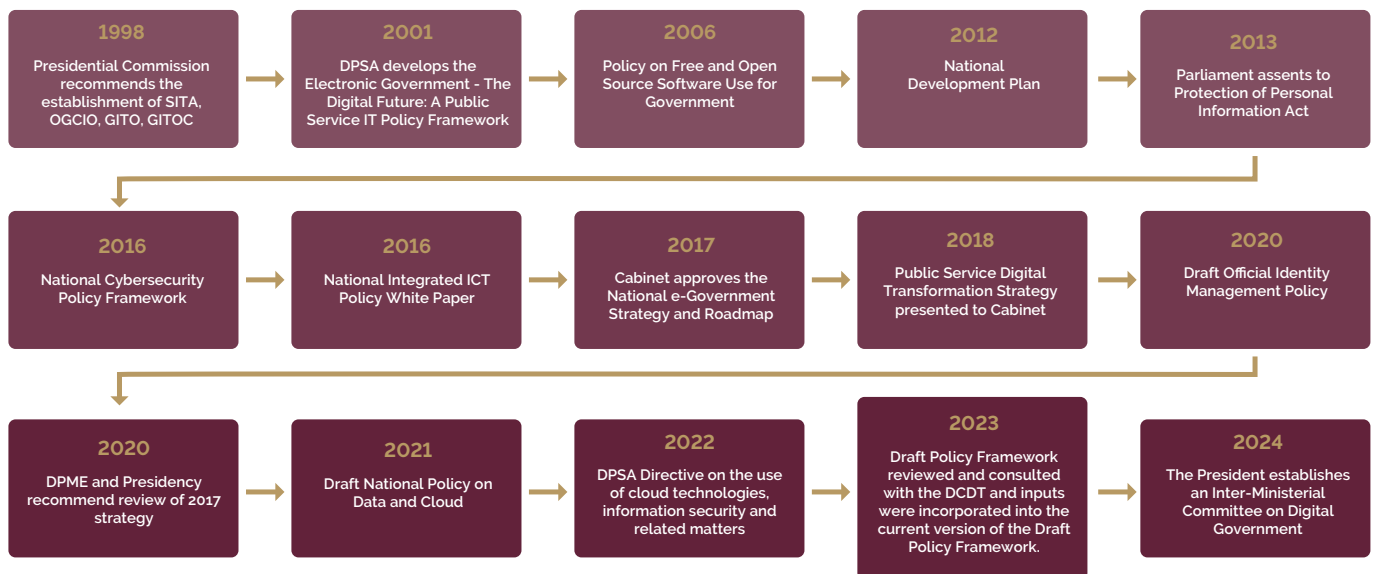
1998	**2001**	**2006**	**2012**	**2013**
Presidential Commission recommends the establishment of SITA, OGCIO, GITO, GITOC	DPSA develops the Electronic Government - The Digital Future: A Public Service IT Policy Framework	Policy on Free and Open Source Software Use for Government	National Development Plan	Parliament assents to Protection of Personal Information Act

2016	**2016**	**2017**	**2018**	**2020**
National Cybersecurity Policy Framework	National Integrated ICT Policy White Paper	Cabinet approves the National e-Government Strategy and Roadmap	Public Service Digital Transformation Strategy presented to Cabinet	Draft Official Identity Management Policy

2020	**2021**	**2022**	**2023**	**2024**
DPME and Presidency recommend review of 2017 strategy	Draft National Policy on Data and Cloud	DPSA Directive on the use of cloud technologies, information security and related matters	Draft Policy Framework reviewed and consulted with the DCDT and inputs were incorporated into the current version of the Draft Policy Framework.	The President establishes an Inter-Ministerial Committee on Digital Government

Figure 2: Key policy developments related to digital transformation in South Africa (adapted from DPSA 2024)

The complexity of digital transformation in the public sector is further illustrated by the large number of government departments and entities involved in digital governance and public service administration. The figure below details the roles of selected departments such as the DPSA, the Government Chief Information Officer (GCIO), and others in shaping the framework and operational standards of government functions. Each entry describes the agency's main focus areas and hierarchical structure within the broader governmental framework.

THE PRESIDENCY	DEPARTMENT OF PUBLIC SERVICE AND ADMINISTRATION	DEPARTMENT OF COMMUNICATIONS AND DIGITAL TECHNOLOGIES	DEPARTMENT OF SCIENCE AND INNOVATION
Plays an overarching coordination role.	Sets standards for government functioning, digital technology, labour relations, and service delivery efficiency.	Oversees key national digital policies, strategies and entities.	Provides leadership and funding in science, technology, and innovation.
Policy and Research Services branch Coordinates and leads the government-wide agenda on the digital transformation of the public sector.	**Government Information Technology Officers Council** An inter-departmental forum that guides IT and IM policies across government departments.	**State Information and Technology Agency** Consolidates and coordinates the government's information technology resources to achieve cost savings through scale, increase delivery capabilities and enhance interoperability.	**National Advisory Council on Innovation** Advisory body to government on science, technology and innovation, in a well-coordinated, responsive and functioning national system of innovation.
	Government Chief Information Officer Leads digital technology enablement and manages risks and stakeholder relations. Chairs GITOC.	**Presidential Commission on the Fourth Industrial Revolution** Proposes South Africa's overarching strategy for the Fourth Industrial Revolution and makes recommendations regarding instutional frameworks, roles and responsibilities.	**National Integrated Cyberinfrastructure System** The National Integrated Cyber Infrastructure System provides high-performance computing capability, high-speed network capacity and a national research data infrastructure integrated hierarchically into globally connected systems.
	Office of Standards and Compliance Monitors compliance with digital standards, focusing on interoperability and cybersecurity.		

Figure 3: Key institutional arrangements related to digital transformation in the public sector

In general, the various policies are anchored on four core principles of equity, accessibility, emphasis on end-user protection, and social development (Gillwald 2020, p. 28; Abrahams & Burke 2022, p. 6). Information and communications technology (ICT) services must be easily accessible to all citizens without any discrimination based on age, gender, race, or disability. The services rendered by ICT should be affordable, not exorbitantly priced, and must effectively protect and empower the end-users and should result in improving the quality of citizens' lives (Gillwald 2020, p. 28).

3. Building a better society: The primary outcome of digital transformation

When considering the definition of digital transformation, societal change is the primary outcome and organising principle of this process. In South Africa, stakeholders generally agree that the most urgent priorities in this regard are eradicating poverty, reducing inequality, and eliminating unemployment. These are also commonly referred to as the "triple challenge."

In international development terms, these South African imperatives can be translated into the achievement of targets associated with three sustainable development goals (SDGs), namely "No poverty" (SDG 1), "Reduced inequalities" (SDG 10), and "Decent work and economic growth" (SDG 8). Civil society's input during a workshop convened by the Policy Innovation Lab echoed this sentiment, emphasising the "three Ps" of digital transformation: people first, process second, and platform and technology third. If digital transformation is not primarily aimed at societal change, digitisation and digitalisation in the public sector run the risk of becoming ends in themselves, divorced from the end goal of improving South Africans' lives.

3.1 Opportunities

The opportunities related to the digital economy as an avenue for addressing the triple challenge are particularly promising in South Africa. Digital transformation opens new sectors and opportunities in the digital economy. As businesses adopt digital technologies, new roles emerge in areas such as cybersecurity, data analysis, digital marketing, and technology maintenance.

Digital platforms also optimise the job-matching process by using algorithms to connect job seekers with suitable employment opportunities based on their skills, experience, and preferences. This can reduce the duration of unemployment and help employers find the right candidates more efficiently and without bias. An example in this regard is the Swedish robot named Tengai, which performs job interviews, reducing biases in the recruitment process.

Digital tools can further empower entrepreneurs and owners of small businesses by providing them with access to markets, affordable marketing tools, streamlined logistics, and efficient customer relationship management systems. This can help stimulate economic growth and job creation at the local level. In Latvia, for instance, the chatbot UNA gives advice on business administration, while Latvian social media sites offer cheap ways to advertise to targeted customer groups. In addition, digital transformation has enabled remote work, opening up employment opportunities for those in locations with fewer job options. This can be

particularly impactful in rural or underserved areas, where job seekers can access global job markets without having to relocate.

To capitalise on these and other opportunities, there is an urgent need to upskill current workers and equip young people in the primary, secondary, and tertiary education systems with relevant ICT, STEM (science, technology, engineering, and mathematics), and data science skills. A systemic challenge identified is the tension between the rapid pace of technological development and the time it takes to update curricula in the education system. Workshop participants cited the introduction of coding as a subject in South African schools as an example: It is expected that new technological tools, such as large language models, might soon render coding skills irrelevant.

3.2 Risks

While the potential for positive outcomes is immense, digital transformation does not inherently produce positive societal outcomes. Many digital tools that benefit their users may be detrimental to society. Research has shown the potential negative effects across all SDGs, although the focus here is on the primary risks of unemployment, inequality, and security threats.

Even though digital transformation has seen many people securing new jobs in the field of data science, many others who perform work capable of being automated are already losing their jobs to AI systems. In addition to the obvious effect on unemployment, this also highlights the potential for inequality to increase: Jobs that tend to become automated are typically performed by lower-earning workers, and the new jobs being created require advanced education and access to computational resources. Inequality may also worsen at the country level as countries that can leverage digital tools for education or infrastructure development will develop faster than those that cannot. Finally, big data poses security threats both to individuals (whose private information may be unlawfully leaked or shared) and at a larger scale (as big data systems may be hacked and manipulated).

4. Ensuring effective governance and co-ordination: The cornerstone of digital transformation

Digital transformation is often couched in technical terms, yet its cornerstone is decidedly non-technical: effective governance and coordination.

At a conceptual level, two governance and co-ordination mechanisms are needed to drive effective digital transformation in the public sector (OECD/CAF, 2023):

- One government entity should drive all digital transformation policies and their implementation throughout the state. This entity is often called the organisation-in-charge.

- Entities responsible for institutional co-ordination and oversight should be positioned at the apex of government and should bring together ministers, the highest-ranking agencies, and the highest-ranking officials. Such entities are normally structured as steering committees, working groups or task forces.

How these two mechanisms play out in practice, is dependent on the structure of the government and society they need to serve. As shown in the table below, three institutional approaches are typically followed.

Table 2: Approaches to digital transformation across governments. Source: (OECD, 2021, p. 58).

THE DIGITAL TRANSFORMATION AGENCY APPROACH	Encompasses the creation of a public sector organisation that has the duty to supervise the digital transformation of the public administration and its services. It is aimed at fast gains for improving service quality but could face long-term organisational, economic, and cultural resistance due to its external nature.
THE CENTRAL CO-ORDINATION APPROACH	The central co-ordination approach encompasses the creation of powerful government-wide management with a central co-ordinating leading public sector organisation to implement measures. It is aimed at extensive changes but may be less agile in starting pilot initiatives or testing new methods.
THE DECENTRALISED CO-ORDINATION APPROACH	The decentralised co-ordination approach encompasses a co-ordinating public sector organisation with fewer mandatory demands and unifying top officials. It is aimed at offering more freedom to smaller public sector organisations to innovate and experiment but risks misalignment and lack of cohesion across the public sector.

It is instructive to take note of the experience in Latin America. The table below illustrates how the different governance models are applied in practice, as some countries opt for creating or using a central agency, others work from the centre of government, even other countries choose to work through co-ordinating ministries and a last group working through line ministries.

Table 2: Organisations in charge of digital government in selected Latin American countries. Source: OECD-CAF Going Digital Government in LAC Survey (2021)

| COUNTRY	NAME (ENGLISH)	INSTITUTIONAL SET-UP
Argentina	Secretariat of Technological Innovation of the Public Sector, Chief of the Cabinet of Ministers	Centre of Government
Bolivia	Agency for Electronic Government and Information and Communication Technologies (AGETIC)	Agency
Brazil	Secretary of Digital Government of the Ministry of Management and Innovation in Public Services	Co-ordinating Ministry
Chile	Digital Government Division, Ministry General Secretariat of the Presidency	Co-ordinating Ministry
Colombia	Digital Government Directorate, Vice Ministry of Digital Transformation, Ministry of Information and Communications Technologies	Line Ministry
Costa Rica	Digital Governance Directorate, Ministry of Science, Innovation, Technology and Telecommunications	Line Ministry
Dominican Republic	Government Office of Information and Communication Technologies (OGTIC)	Agency
Ecuador	Undersecretary of Electronic Government and Civil Registry, Ministry of Telecommunications and Information Society	Line Ministry
Mexico	National Digital Strategy Co-ordination, Office of the Presidency of the Republic of Mexico	Centre of Government
Panama	National Authority for Government Innovation (AIG)	Agency
Paraguay	General Directorate of Electronic Government, Vice Ministry of Information and Communication Technologies (ICT), Ministry of Information and Communication Technologies	Line Ministry
Peru	Secretariat of Government and Digital Transformation, Presidency of the Council of Ministers	Centre of Government
Uruguay	Agency for Electronic Government and the Information and Knowledge Society (AGESIC)	Agency

In countries where digital transformation is driven from the centre of government, these entities also have additional functions. In Argentina, digital transformation tasks are distributed among various sub-secretaries under the Secretariat of Public Innovation within the Public Sector. This body also oversees digital connectivity and telecommunications. In both Mexico and Peru, the primary institutions responsible for digital government likewise manage the broader digital agendas of their respective countries.

The OECD helpfully also categorises the stages of governance maturity, from basic to advanced as guideline for the institutional setup aimed at governing and co-ordinating digital transformation in the public sector, as shown in the table below.

Taken together, mature institutional setups for digital transformation governance are characterised by a well-defined, central organization with a clear and strong mandate. This entity possesses the authority to lead, initiate, design, allocate resources for, and ultimately coordinate the implementation of digital government policies and projects throughout the public sector. This leadership role is further bolstered by the organization's well-defined roles and responsibilities, covering robust coordination mechanisms, the provision of expert advisory services, and the authority to make critical decisions that drive advancements in digital government maturity.

Table 3: Stage of digital transformation institutional maturity. Source: (OECD, 2021)

	ADVANCED	INTERMEDIATE	BASIC
Approach	The institutional approach imbues the organisation-in-charge with the power to lead, initiate, design, allocate, implement and co-ordinate digital government policies and projects throughout the public sector efficiently and effectively. Objectives of the digital government strategy are achieved.	The institutional approach largely allows the organisation-in-charge to initiate, design, allocate, implement and co-ordinate digital policies and projects throughout the government and public sector, but with limited leadership, influence and accountability. Certain parts of the public sector are not aligned.	The institutional approach marginally enables the organisation-in-charge to lead, initiate, design, allocate, implement and co-ordinate digital government policies and projects throughout the public sector. Objectives of the digital government strategy are usually not optimally achieved. The public sector is not aligned in the implementation of the strategy.
Roles and responsibilities of the organisation in charge	The organisation-in-charge has well-developed co-ordination, advisory and decision-making responsibilities that impart and specify the powers and duties in bringing together and managing the working relations of various stakeholders for digital government policies, and in providing advice that is taken into consideration and making important decisions in the advancement of digital government maturity.	The organisation-in-charge has fairly developed co-ordination, advisory and decision-making responsibilities that impart and specify the powers and duties in bringing together and managing the working relations of various stakeholders for digital government policies, and in providing advice that is taken into consideration and making key decisions in the development of digital government maturity.	The organisation-in-charge has underdeveloped co-ordination, advisory and decision-making responsibilities that barely impart and specify the powers and duties in bringing together and managing the working relations of various stakeholders for digital government policies, and in providing advice that is taken into consideration and making decisions in the management of digital government.
High-level co-ordination	The high-level institutional stakeholders in the digital government ecosystem exhibit strong and positive alignment, collaboration and co-ordinate among themselves such that the policy cycle and process is smooth.	The high-level institutional stakeholders in the digital government ecosystem exhibit good and positive alignment, collaboration and co-ordinate among themselves such that the policy cycle and process is fairly smooth.	The high-level institutional stakeholders in the digital government ecosystem exhibit marginal alignment, collaboration and co-ordinate among themselves such that the policy cycle and process is not very smooth.
Organisational and technical co-operation	The organisational and technical stakeholders in the digital government ecosystem exhibit strong and positive alignment, collaboration and co-ordinate among themselves such that the policy cycle and process is smooth.	The organisational and technical stakeholders in the digital government ecosystem exhibit good and positive alignment, collaboration and co-ordinate among themselves such that the policy cycle and process is fairly smooth.	The organisational and technical stakeholders in the digital government ecosystem exhibit marginal alignment, collaboration and co-ordinate among themselves such that the policy cycle and process is not very smooth.
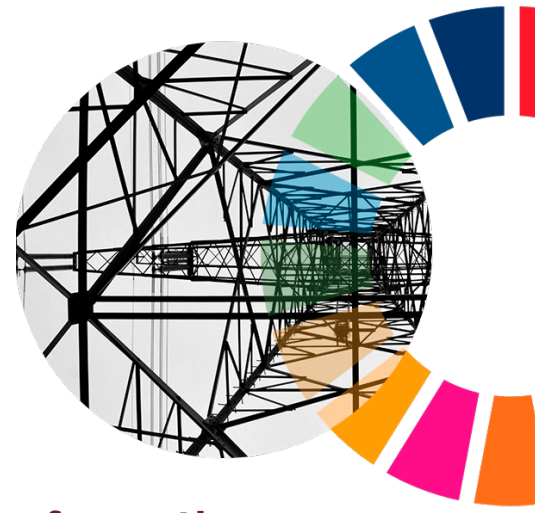
5. Overcoming barriers: Institutional and infrastructure requirements for digital transformation

Even with effective governance and coordination mechanisms in place, digital transformation will not reach its ultimate goal of societal transformation as a matter of course. According to our analysis, key institutional and infrastructure requirements need to be in place to effectively drive digital transformation.

5.1 Institutional requirements

In referring to the institutional requirements for digital transformation, it is important to note the sense in which the term "institution" is used. "Institution" in this briefing note refers to the "humanly devised constraints that structure political, economic, and social interaction" (North 1991). Institutions meant in this sense are not to be confused with concrete entities in the public sector. Rather, public-sector entities are viewed as the custodians of institutions, as often expressed in legislation, regulations, codes of conduct, and the like.

During a multistakeholder workshop convened by the Policy Innovation Lab, it was highlighted that *systems that allow for innovation* (SDG 9) are essential. At a technical level, a lack of interoperability of government data and systems hampers the potential to foster innovation. At the level of skills and personnel, stakeholders pointed out that current job specifications and the related organisational units and remuneration do not support the recruitment of data scientists with the necessary skills. Procurement legislation and policies restrict the government's ability to utilise the latest relevant technologies. An often-cited example is the restrictions on procuring cloud computing resources, as these resources are generally perceived as being meant for paying utilities rather than for more conventional information technology functions.

Throughout a workshop hosted by the Policy Innovation Lab, stakeholders strongly emphasised the need to actively ensure that digital transformation in the public sector is built on *equity and accessibility* (SDG 5 and SDG 10). This includes ensuring that digital transformation does not deepen existing racial and gender inequalities. Participants cited the example of how some AI tools struggle to recognise the faces of older black women, potentially excluding them from accessing social protection systems that rely on facial recognition.

With the advancement of data-driven technologies in South Africa, concerns around privacy breaches and the manipulation of data and AI systems by malicious actors are intensifying. To address these challenges, *privacy and security safeguards* (SDG 16) are of paramount importance.

There is a critical need for skilled personnel who can ensure compliance with the Protection of Personal Information Act (POPIA) across governmental and non-governmental entities. This is particularly important considering that modern AI models often utilise copyrighted data illicitly, heightening the risk of privacy violations. Ensuring robust data security and privacy measures, therefore, is not only about compliance but also about adapting swiftly to the evolving technological landscape.

To fully capitalise on the opportunities presented by digital transformation, *adequate skills in government* (SDG 4) are vital. Stakeholders of the Policy Innovation Lab highlight the lack of ICT and critical skills in the public service, such as software developers and data scientists. This has a direct impact on the efficient implementation of critical projects. Participants voiced the need to review government's hiring policies to be more flexible and allow for the absorption of the relevant technical skills required. In this regard, the DPSA has developed a human capacity strategy that is centred on reskilling/upskilling current workers and equipping public servants with basic technology skills (Parliamentary Monitoring Group 2024).

5.2 Infrastructure requirements

One of the most basic physical infrastructure requirements to make the most of the potential societal benefits of digital transformation is *stable and equitable access to energy* (SDG 7). Yet, the relationship between energy and digital transformation is complex: While digital technologies provide smart tools that can greatly enhance the efficiency of our energy production and delivery, many of them also make ever-increasing demands on energy infrastructure. Effective management, such as incentives for energy-intensive computations to be performed at night, can help manage this. Even where data is generated through non-digital measures, such as in-person surveys or physical tests or experiments, the physical servers on which data is stored require a stable electricity supply as well as disaster recovery mechanisms should a server fail.

In terms of *data infrastructure* (SDG 9), cloud computing or high-performance servers will allow for the use of machine learning tools that are otherwise often prohibitively expensive. The government should use South African computing resources and data servers to ensure greater protection of its citizens' data. In addition, South African data infrastructure ought to accommodate affordable data with enough bandwidth to download and upload large datasets at a reasonable speed.

Moreover, creating more Wi-Fi hotspots will not only offer equal access to digital government services but also greater opportunities for job creation and education. For example, installing Wi-Fi hotspots at schools will increase data access in rural areas while simultaneously creating opportunities for education, employment, and self-improvement.
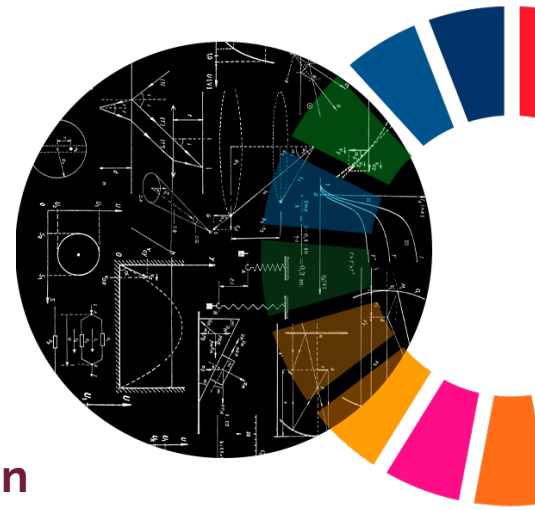
6. A framework for digital transformation in South Africa's public sector

This analysis of the public's expectations relating to public-sector digital transformation in South Africa yielded a framework comprising the following four dimensions.

- Digital transformation is enabled by the digitisation of analogue data and the use of this data to develop and use digital technologies. Digitisation and digitalisation should be leveraged for positive socioeconomic effects.

- In the South African context, the primary societal outcomes of digital transformation are eradicating poverty, reducing inequality, and eliminating unemployment. These primary outcomes are supported and enabled by the intermediate outcomes of better services, more accountable institutions, better education, and more engaged citizens.

- Without effective and fit-for-purpose governance and coordination mechanisms, the institutional, social, and infrastructure requirements of digital transformation are unlikely to yield the expected societal outcomes.

- To ensure that digital transformation leads to positive societal outcomes, certain institutional requirements need to be in place. These include privacy and security safeguards, equity and accessibility, adequate skills in government, and systems that allow for innovation. In addition, digital transformation and positive societal outcomes also hinge on certain key infrastructure requirements, including stable energy access and data infrastructure.
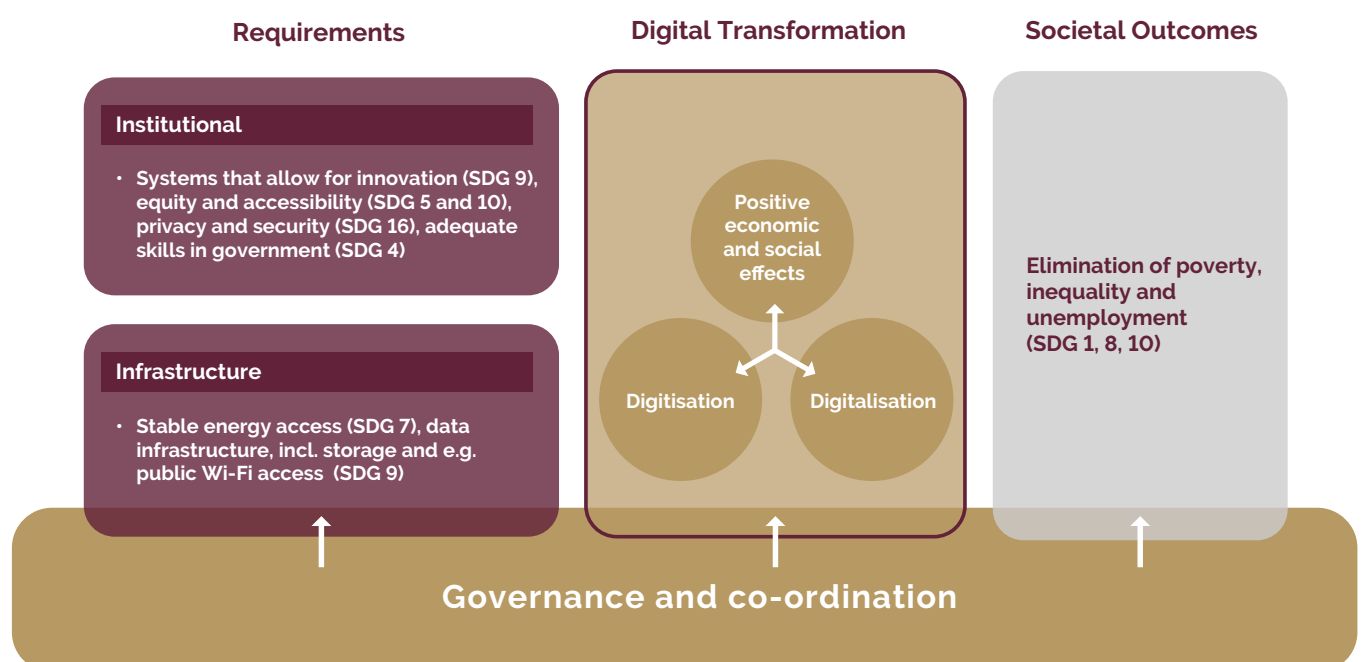
Requirements

Institutional
- Systems that allow for innovation (SDG 9), equity and accessibility (SDG 5 and 10), privacy and security (SDG 16), adequate skills in government (SDG 4)

Infrastructure
- Stable energy access (SDG 7), data infrastructure, incl. storage and e.g. public Wi-Fi access (SDG 9)

Digital Transformation

Positive economic and social effects

Digitisation   Digitalisation

Societal Outcomes

Elimination of poverty, inequality and unemployment (SDG 1, 8, 10)

Governance and co-ordination

Figure 4: Framework for digital transformation in South Africa's public sector

7. Recommendations

Based on the analysis and proposals put forth in this briefing note, the following recommendations are made:

Governance and co-ordination

- Empower a government entity, ideally at the centre of government, to lead digital transformation efforts. Ensure that the entity has the mandate and powers to lead, initiate, design, allocate, implement, and coordinate digital government policies and projects throughout the public sector efficiently and effectively.
- Establish an interministerial digital government task force with a strong oversight and coordination mandate and capabilities.
- Consider setting up a multistakeholder governance structure with representation from across society to monitor the impact, equity, as well as privacy and security of digital transformation in the public sector.

Societal outcomes

- Ensure strong and continued alignment between digital transformation and societal outcomes. This could include the mapping of structures, activities, and resources along the full value chain from digital transformation efforts through to ultimate societal outcomes.
- Ensure that governance structures oversee digital transformation with a view to achieving societal outcomes and not merely with the aim to monitor digitisation and digitalisation as ends in themselves.

Digital transformation

- Create a transversal digital transformation unit with the mandate, capacity, and funding to develop and test digital transformation initiatives within and across departments.
- Create digital transformation units in departments with a reporting line to the single transversal digital transformation unit.
- Focus digital transformation efforts by using innovative means to gather citizens' input on their needs and priorities.
- Use open data and open software to foster society-wide digitisation and digitalisation initiatives, which could be scaled in the public sector.

Institutional requirements

- Review, change, and where needed, discontinue the entities at the national level tasked with driving digital transformation.

- Review and change appointment criteria and remuneration to enable the appointment of suitably qualified data scientists in the public sector.

- Reform procurement regulations to allow for the cost-effective and responsible procurement of new technologies, tools, and products developed by societal actors.

- Through the National School of Government and partner institutions, equip government officials with foundational knowledge and skills relating to digital transformation.

- Ensure substantive equity in access to government services delivered through digital transformation efforts.

- Ensure privacy and security of all information submitted by citizens.

Infrastructure requirements

- Explore the creation of a competitive internal digital transformation market by procuring digital transformation tools and services from entities in addition to the State Information Technology Agency.

- Prioritise the interoperability of systems and data across government.

- Prioritise the security of the government's digital transformation systems and tools without delaying their deployment or using these systems and tools as the basis for the development of digital solutions.

- Make affordable data storage and computing resources available at scale throughout the government. This would likely include making use of cloud computing from private-sector providers, which could be done through a competitive internal cloud marketplace.

References

Abrahams, L. & Burke, M., 2022. *South African – European Union Dialogue Facility International Dialogue on Strengthening Open Digital Governance in South Africa Report on the South African Experience in Open Digital Governance*, Johannesburg: LINK Centre, University of Witwatersrand.

Centre., European Commission. Joint Research, 2020. *AI Watch, artificial intelligence in public services: overview of the use and impact of AI in public services in the EU.*. s.l.:Publications Office.

City of Cape Town, 2024. *The Economic Areas Management Programme ('ECAMP') Business Location Intelligence*. [Online]
Available at: https://web1.capetown.gov.za/web1/ECAMP/Home/About
[Accessed May 2024].

Department of Communications and Digital Technologies (DCDT), 2023. *South Africa's Artificial Intelligence Planning Adoption of AI by Government.*. [Online]
Available at: https://www.dcdt.gov.za/images/phocadownload/AI_Government_Summit/National_AI_Government_Summit_Discussion_Document.pdf
[Accessed 2024 May 8].

Department of Communications and Digital Transformation (DCDT), 2021. *Draft national policy on data and cloud*. [Online]
Available at: https://www.gov.za/sites/default/files/gcis_document/202104/44389gon206.pdf
[Accessed 8 May 2024].

Department of Home Affairs (DHA), 2020. *Draft official identity management policy. Public consultation version*. [Online]
Available at: https://www.gov.za/sites/default/files/gcis_document/202101/44048gon1425.pdf
[Accessed 8 May 2024].

Department of Public Service and Administration (DPSA), 2001. *Electronic government, The digital future. A public service IT policy framework*. [Online]
Available at: https://www.gov.za/sites/default/files/gcis_document/201409/it0.pdf
[Accessed 8 May 2024].

Department of Public Service and Administration (DPSA), 2006. *Policy on free and open-source software use for South African government.*. [Online]
Available at: https://www.gov.za/sites/default/files/gcis_document/201409/fosspolicy0.pdf
[Accessed 8 May 2024].

Department of Telecommunications & Postal Services (DTPS), 2016. *National Integrated ICT Policy White Paper*. [Online]
Available at: https://www.gov.za/sites/default/files/gcis_document/201610/40325gon1212.pdf
[Accessed 8 May 2024].

Dube, V. L. a. I., 2021. The Nexus Between Service Delivery, Artificial Intelligence and the Fourth Industrial Revolution. *Journal of Public Administration*, 56(4.1), pp. 1030-1038.

Gandhi, N., Armstrong, L. J. & Nandawadekar, M., 2017. *Application of data mining techniques for predicting rice crop yield in semi-arid climatic zone of India*. s.l., IEEE.

Gillwald, 2020. *Digital futures: South Africa's digital readiness for the 'fourth industrial revolution'*, s.l.: Research ICT Africa.

Hofisi, C. & Chigova, L. E., 2023. Rethinking the Role of Local Government in Service Delivery in South Africa: Towards Digital Transformation. *E-Journal of Humanities, Arts and Social Sciences*, December.p. 64–76.

ITU, UNDP, 2023. *SDG Digital Acceleration Agenda*, s.l.: s.n.

Jean, N. et al., 2016. Combining satellite imagery and machine learning to predict poverty. *Science*, August, Volume 353, p. 790–794.

Jones, N., 2018. How to stop data centres from gobbling up the world's electricity. *Nature*, September, Volume 561, p. 163–166.

National Planning Commission (NPC), 2012. *National Development Plan 2030*. [Online]
Available at: https://www.gov.za/sites/default/files/gcis_document/201409/ndp-2030-our-future-make-it-workr.pdf
[Accessed 8 May 2024].

North, D. C., 1991. Institutions. *Journal of Economic Perspectives*, 5(1), pp. 97-112.

OECD/CAF, 2023. *Digital Government Review of Latin America and the Caribbean: Building Inclusive and Responsive Public Services*. [Online]
Available at: https://doi.org/10.1787/29f32e64-en
[Accessed May 2024].

OECD, 2019. *Going Digital: Shaping Policies, Improving Lives*. Paris: OECD Publishing.

OECD, 2021. *The E-Leaders Handbook on the Governance of Digital Government*. [Online]
Available at: https://doi.org/10.1787/ac7f2531-en
[Accessed 8 May 2024].

Oxford Insights, 2023. *Government AI Readiness Index 2023*. [Online]
Available at: https://oxfordinsights.com/wp-content/uploads/2023/12/2023-Government-AI-Readiness-Index-1.pdf
[Accessed May 2024].

Shahbaz, F. et al., 2023. *Freedom on the Net 2023*, Freedom House: http://freedomonthenet.org/.

State Security Agency (SSA), 2012. *National Cybersecurity Policy Framework for South Africa*. [Online]
Available at: https://www.gov.za/sites/default/files/gcis_document/201512/39475gon609.pdf
[Accessed 8 May 2024].

Truby, J., 2018. Decarbonizing Bitcoin: Law and policy choices for reducing the energy consumption of Blockchain technologies and digital currencies. *Energy Research & Social Science*, October, Volume 44, p. 399–410.

UN DESA, 2022. *Highlights 2022-2023 Towards Sustainable Development for All*, New York: United Nations, Department of Economic and Social Affairs.