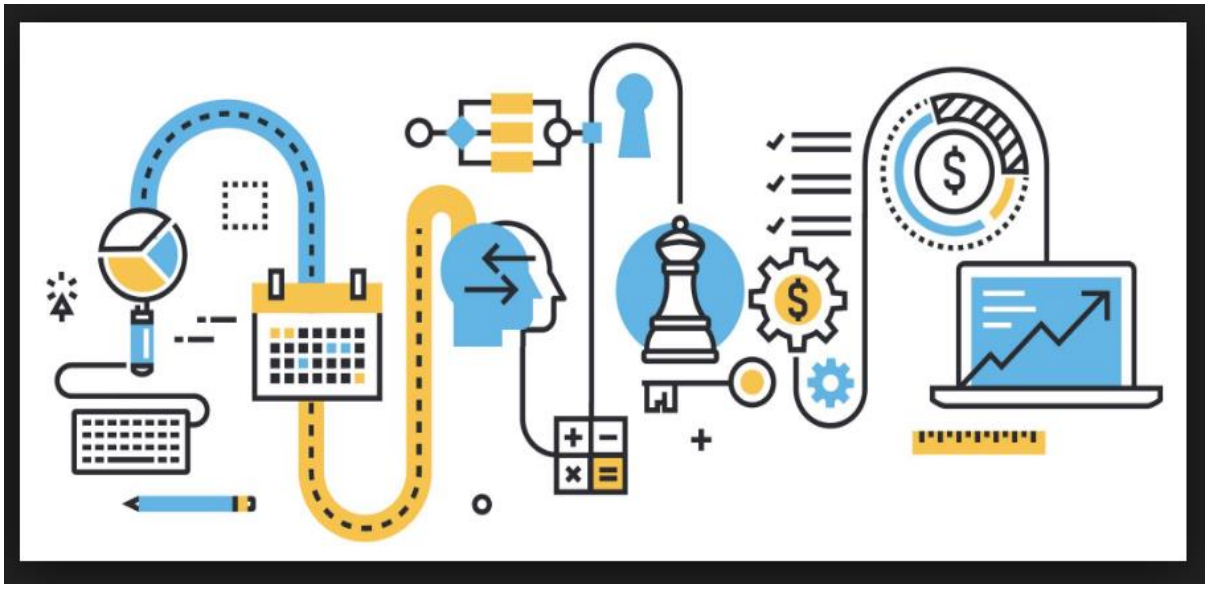
ICT for GOVERNANCE CLUSTER STRATEGY 2020-2024



6 December 2019

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Annex I – Implementation Action Plan, Monitoring and Evaluation Framework *(separate Excel Document)*
Annex II – Timelines for Implementation
Annex III – Systems Development Guidelines and Best Practices

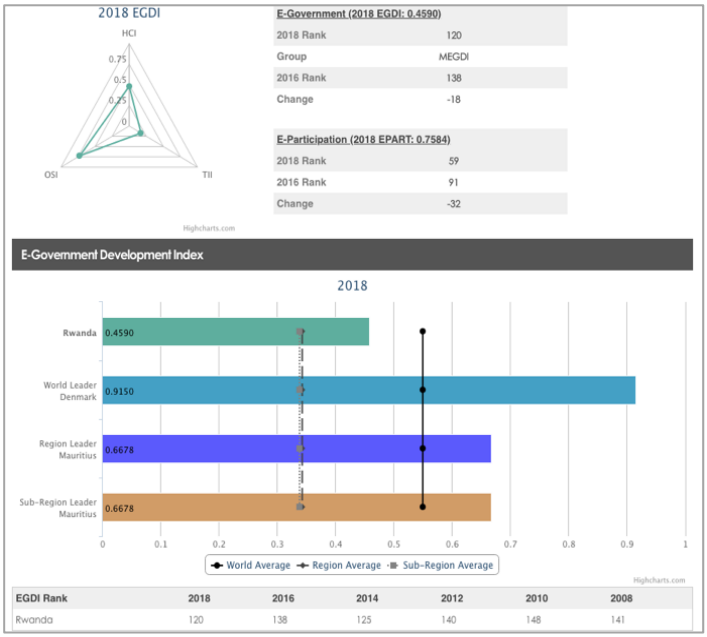
Executive Summary

Since 2000, the Government of Rwanda (GoR) has prioritized the advancement of digital transformation in Rwanda's economy and society. In this pursuit, it has completed the National Backbone Project of rolling out fiber optic cables nation-wide where today its mobile penetration stands at 77.1%[1] while its global rakings on the E-Government Development Index have improved from 138th in 2003 to 120th position in 2018. Today Rwandan citizens benefit from using their mobile money in daily transactions and 98 online services such as birth and marriage certificates, land registration, building permits, health insurance or notary services are available on the popular national e-service portal *Irembo*. On the African continent Rwanda is the co-founder and a signatory of the Smart Africa Initiative and internationally its capital has become a reputable hub for high-profile events such as the annual Transform Africa Summit among others.

The *ICT for Governance Cluster Strategy 2020-2024* is thus opportunely timed. It is introduced at a time when Rwandan citizens in tandem with global trends increasingly understand, use and benefit from the transformational power of information communication technologies (ICT) in their everyday lives. At the same time, with rapid innovation in the sector, to remain current, competitive and digitally inclusive, GoR needs to advance further by offering its citizens and businesses an expanding range of online services, support for innovation and ICT-enabled socio-economic empowerment.

The *ICT for Governance Cluster Strategy 2020-2024* complements and reinforces the implementation of national priorities set out in the *National Strategy for Transformation (NST1) 2017 – 2024, in the Smart Rwanda 2020 Master Plan, ICT Sector Strategic Plan 2018-2024,* in the *National Digital Talent Policy* and future oriented Rwanda's *Vision 2035* and 2050. The aforementioned policies and strategies set ambitious goals for Rwanda's future. Their common vision is to sustain Rwanda's transformation from an agrarian to a competitive, knowledge-based, innovation-driven economy and a service-oriented, modern, accountable and real-time (SMART) Government.

Rwanda's Rankings on the E-government Development Index



Architecting and implementing e-government solutions requires an ongoing commitment with progressively gained benefits. Centered on the transformative potential of Governance Cluster (GC) institutions, the *ICT4 Governance Cluster Strategy 2020-2024* seeks to steer Rwanda's digital transformation in a sustainable and ambitious direction through *five* cross-cutting principles, *five* strategically prioritized Focus Areas and *seventeen* actionable initiatives.

The *five* principles that represent key cross-cutting values of the strategy include *User Centricity, Once-Only, Inclusiveness, Data Privacy,* and *ICT as an Investment rather than an Expenditure*. On the operational side, the *five* mutually reinforcing Focus Areas include:

[1] Rwanda Utilities Regulatory Authority (RURA). Statistics Report for Telecom, Media and Postal Sector, First Quarter of 2019. https://rura.rw/fileadmin/Documents/ICT/statistics/Quarterly_Telecom_Statistics_report_as_of_March_2019_.pdf

FOCUS AREA 1: Building Digital Government Systems
FOCUS AREA 2: Digital Government Enablers
FOCUS AREA 3: Transparent and Data-Driven Government
FOCUS AREA 4: Advancing Accountability and Participatory Tools
FOCUS AREA 5: Digital Skills Development.

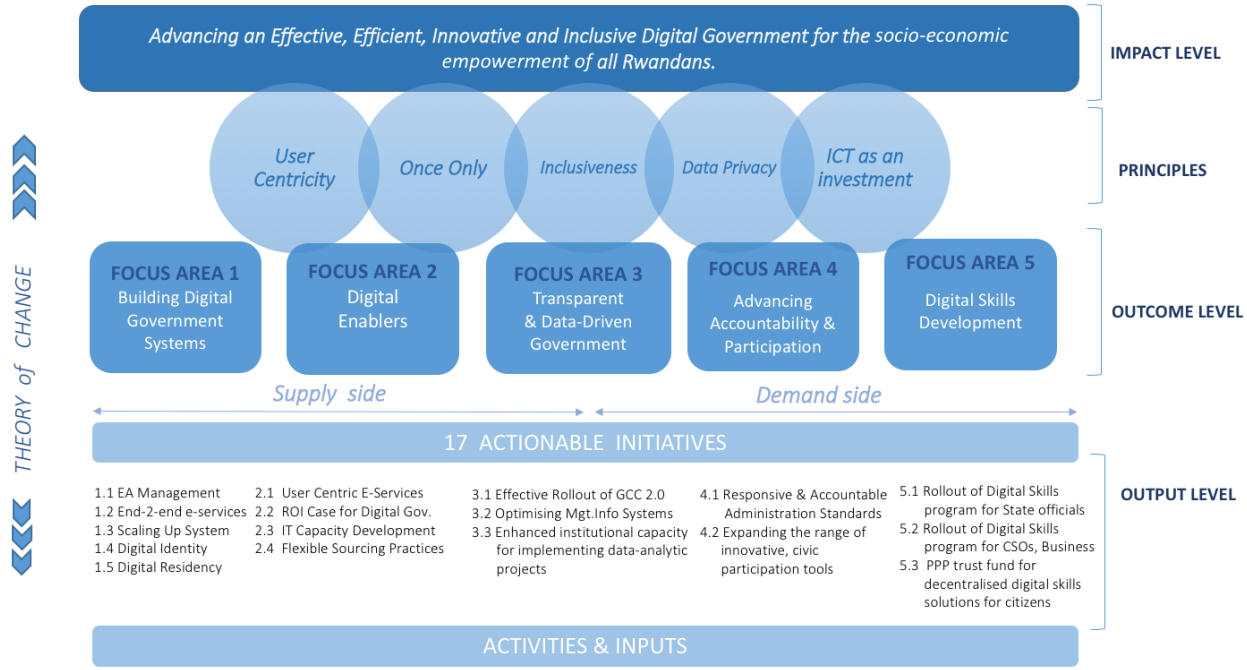
Operationalizing the 5 Focus Areas, the 17 actionable initiatives seek to ensure that technological change, innovation and access to services without discrimination for geography, gender or income serve and empower all Rwandan citizens, businesses, civic organisations, national as well as local public authorities. Together, all of these stakeholders are important sustainability drivers of any digital transformation ecosystem. Recognizing their importance, the *ICT4GC Strategy 2020-24* thus addresses both the *supply* as well as the *demand* vectors of digital transformation in Rwanda.

On the *supply side*, the Strategy reinforces the foundational building blocks for effective and efficient digital government architecture with a focus on expanded access and accountable, user centered e-services, well-built enterprise architecture, interoperability solutions and development of SMART skills among government officials but also among businesses, educational institutions and citizens in line with contemporary demands. Simultaneously it seeks to boost data-analytics and effective knowledge management as critical drivers of SMART government within the Governance Cluster institutions.

On the *demand side*, stimulating social innovation in ICT-enabled transparency, accountability, civic participation and inclusive service delivery to the rural and most vulnerable populations also form an important building block of the Strategy. As rural dwellers form over 80% of Rwanda's population, empowering them with relevant skills and equal access to ICT opportunities is critical for the success of Rwanda's digital transformation. Here, to capitalize on the collaborative and catalytic roles, resources and active participation of the private sector, universities, civil society and youth will be harnessed.

In summary, an overarching visual overview of the *ICT4 Governance Cluster Strategy 2020-2024* and its focal building blocks is illustrated in Figure 1 below.

Figure 1. ICT for Governance Cluster Strategy 2020-2024 Overview



It will take the concerted effort of all stakeholder institutions within the Governance Cluster and beyond to effectively implement the Strategy's targeted initiatives. If successful, these efforts will not go unrewarded as they will bring catalytic modernization, efficiency and effectiveness to Rwanda's government, boost competitiveness of Rwanda's digital economy but most importantly, they will indiscriminately offer choices for *all* Rwandans' to improve their quality of life and well-being in the modern era.

1. INTRODUCTION

1.1. Scope

The *ICT for Governance Cluster Strategy 2020-2024* ('Strategy' here after) is a practical instrument for results-based implementation, support and monitoring of Government of Rwanda's digital transformation initiatives, focusing on the Governance Sector specifically. At the macro-level, the Strategy aligns with SDG Goal 9 (A,B,C)[2] and operationalizes Governance priorities set out in the *National Strategy for Transformation,* the *Smart Rwanda Master Plan* and the *ICT Sector Strategic Plan (2018-2024)*. Simultaneously, it also supports the implementation of the *National Digital Talent Policy (2016)*, the *National Data Revolution Policy (2017)* and the promotion of *Home Grown Solutions.*[3]

1.2 Objectives

Through five mutually reinforcing Focus Areas and 17 actionable initiatives, *ICT4 Gov Cluster Strategy 2020-2024* (Strategy here after) will strategically steer Rwanda's digital transformation in a sustainable, ambitious, modern direction. It will ensure that technological change, innovation and access to services without discrimination for geography, gender or income benefit all Rwandan citizens, businesses and public administration authorities. To this effect the Strategy's 5 Focus Areas will strive toward the advancement of Rwanda's G2G, G2C, G2B e-government capacities through:

FOCUS AREA 1: Building Digital Government Systems
FOCUS AREA 2: Digital Government Enablers
FOCUS AREA 3: Transparent and Data-Driven Government
FOCUS AREA 4: Advancing Accountability and Participatory Tools
FOCUS AREA 5: Digital Skills Development.

At the impact and outcome level, these five mutually reinforcing areas will:

[2] SDG Goal 9 Stipulates Building resilient infrastructure, promoting inclusive and sustainable industrialization and fostering innovation. 9A. *Facilitate sustainable and resilient infrastructure development in developing countries through enhanced financial, technological and technical support to African countries, least developed countries, landlocked developing countries and small island developing States. 9B. Support domestic technology development, research and innovation in developing countries, including by ensuring a conducive policy environment for, inter alia, industrial diversification and value addition to commodities. 9C. Significantly increase access to information and communications technology and strive to provide universal and affordable access to the Internet in least developed countries by 2020.* https://sustainabledevelopment.un.org/sdg9.

[3] https://rwandatrade.rw/media/2016%20MINICT%20Digital%20Talent%20Policy.pdf
http://statistics.gov.rw/publication/rwanda-national-data-revolution-and-big-data.

2. METHODOLOGY

The 5 Focus Areas and 17 strategic initiatives were jointly identified by members of the Governance Cluster Technical Committee through a rigorous situational analysis and facilitated strategic planning process from June to September 2019. The Governance Cluster Technical Committee is Chaired by the Ministry of Local Government and Co-Chaired by the Rwanda Information Society Authority. The Technical committee is further composed of the following 13 ministries and state agencies:

- Ministry of Local Government (MINALOC)
- Local Administrative Entities Development Agency (LODA)
- National Identification Agency (NIDA)
- Ministry of Justice (MINIJUST)
- Rwanda Information Society Agency (RISA)
- Ministry of ICT and Innovation (MINICT)
- Ministry of Public Service and Labor (MIFOTRA)
- Ministry of Defence (MINADEF)
- Office of the Ombudsman
- Rwanda Governance Board (RGB)
- Rwanda Land Management and Use Authority (RLMUA)
- National Online Services Platform (IREMBO)
- Ministry of Agriculture (MINAGRI)

The inception phase for the strategy included the following series of preparatory activities:

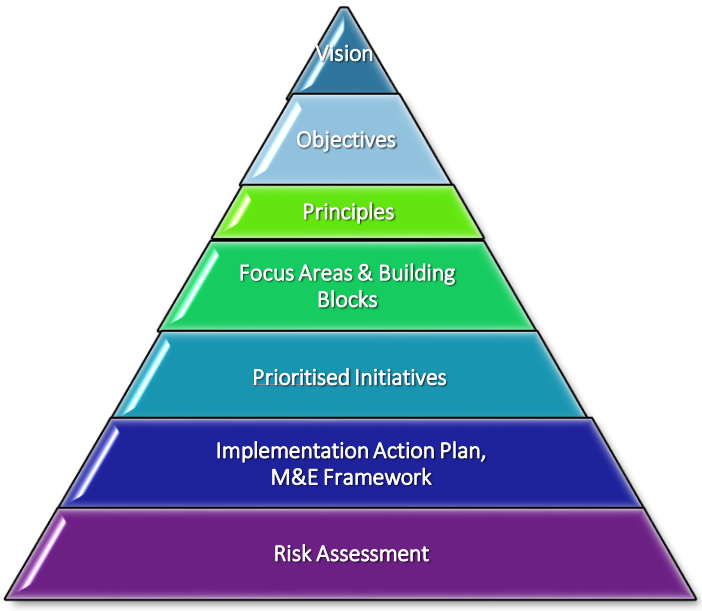
i) Development of a Concept Paper.

ii) Situational analysis based on a desktop review of existing and planned legislation, national policies as well as Governance Cluster members' strategic plans for forthcoming years.

iii) Qualitative analysis conducted through structured interviews and three facilitated one-day workshops with strategic stakeholders and institutions.

iv) Focus group discussions and strategic planning methods (SWOT, weighed projections by resource allocation, risk analysis etc.) were used to derive existing gaps, lessons learned, opportunities as well as stakeholders' strategic recommendations for 2020-2024.

ICT for Governance Cluster Strategy 2020-24 : Structural Dimensions



v) Rigorous empirical baseline analysis was also planned but due to the insufficient readiness of relevant data within respective institutions, the latter was compiled using a 'best fit' modality. As rigorous baselines in all focus areas are essential for effective progress monitoring, baseline assessments have been systematically integrated as one of the first activities within the

respective initiatives.

Structure of the Strategy. The *ICT4 Governance Cluster Strategy 2020-2024* is structured in two key parts. PART I narratively outlines the: i) introduction and methodological approach (Sections 1,2), ii) key findings of the situational assessment (Section 3), iii) cross-cutting principles, the five focus areas, their rationale and key expected outputs (Sections 4,5), and lastly iv) the coordination, governance modalities and risk mitigation (Sections 6,7). PART II of the Strategy then proceeds to elaborate the implementation modalities including the Implementation Action Plan with activities, performance indicators, allocation of responsibilities and budget. Section 2 in PART II further indicates estimated timelines for listed activities, implementation guidelines for key activities and international best practices linked to the five focus areas. Overall, it is expected that the strategy will be used as a meta document on the basis of which individual institutions within the Governance Cluster (GC) will conduct their own internal strategic planning and budgeting processes to effectively internalize the strategy at an operational level.

3. SITUATIONAL ASSESSMENT

3.1 National Policy Priorities and Alignment

Since 2000, through *Vision 2020*, *EDPRS I - II*, and *NICI I-III*, the Government of Rwanda (GOR) has placed a high priority on advancing ICT as a driver of socio-economic growth and thereby aiming to transform Rwanda into a modern, competitive, knowledge-based society.

The *ICT for Governance Cluster Strategy 2020-2024* is thus opportunely timed. It is being introduced at a time when Rwandans in tandem with global trends increasingly understand, use and benefit from the transformational power of ICT in their daily lives. It is also opportune as the *Vision 2020, EDPRS II* and its associated Sector Strategic Plans and District Development Plans are in the process of completion and the new *National Strategy for Transformation (NST1) 2017 – 2024* that strategically aligns with Rwanda's *Vision 2035* and *Vision 2050* propels into high gear.

The aforementioned strategies and plans continue to set ambitious goals for Rwanda's future and its sustained transformation from an agrarian to a knowledge-driven economy. The *Vision 2050* sees Rwanda attaining five specific socio-economic goals: i) high quality and standards of life, ii) to develop modern infrastructure and livelihoods, iii) to catalyze transformation for prosperity, iv) values for Vision 2050, and v) international cooperation and positioning. The *Smart Rwanda 2020 Master Plan* sets an aspiration of taking Rwanda « Towards a Knowledge Based Society », while the *ICT Sector Strategic Plan 2018-2024* charts a way forward for establishing a Service-oriented, Modern, Accountable and Real-Time (SMART) Government that will drive Rwanda's global competitiveness and job creation through agile, open and innovative smart economy.[4]

[4] National Strategy for Transformation 2017-2024. http://www.minecofin.gov.rw/
SRMP 2015-2020. http://www.minecofin.gov.rw/fileadmin/templates/documents/sector_strategic_plan/ICT_SSP__SMART_Rwanda_Master_Plan_.pdf. ICT Sector Strategic Plan (2018-2024).http://www.kayonza.gov.rw/fileadmin/templates/Tenders/ICT_SECTOR_STRATEGIC_PLAN_2018-2024.pdf.

The *ICT for Governance Cluster Strategy 2020*-2024 thus strategically aligns with, complements and builds on the mentioned strategies. Specifically, it focuses on the Governance sector's transformative potential and targeted priorities set out in the national policies.

Observably, the common denominator in the mentioned national strategies is a prioritized focus on the *supply side*: modernization, integration of information and corresponding management systems for more effective, innovative and efficient public service delivery; integrating necessary security measures for information systems and their assets thus increasing citizens', public authorities' and business' trust in them. Empowering home grown solutions and public institutions' in-house capacity to manage optimized acquisition, development and use of ICT for better public administration.

While it is critical to secure the technological modernization of public administration systems, the national policies equally place an emphasis on the *human, demand side*. After all, ICT are only catalytic and transformative if their *human* users have equal access to them, actively use and equitably benefit from them. Hence on the *demand side*, cross-cuttingly the national strategies also aspire to the enhancement of Rwandans' digital skills development – specifically, among civil servants, citizens but also businesses and civil society. Below pertinent priorities of national strategies are listed in some more detail.

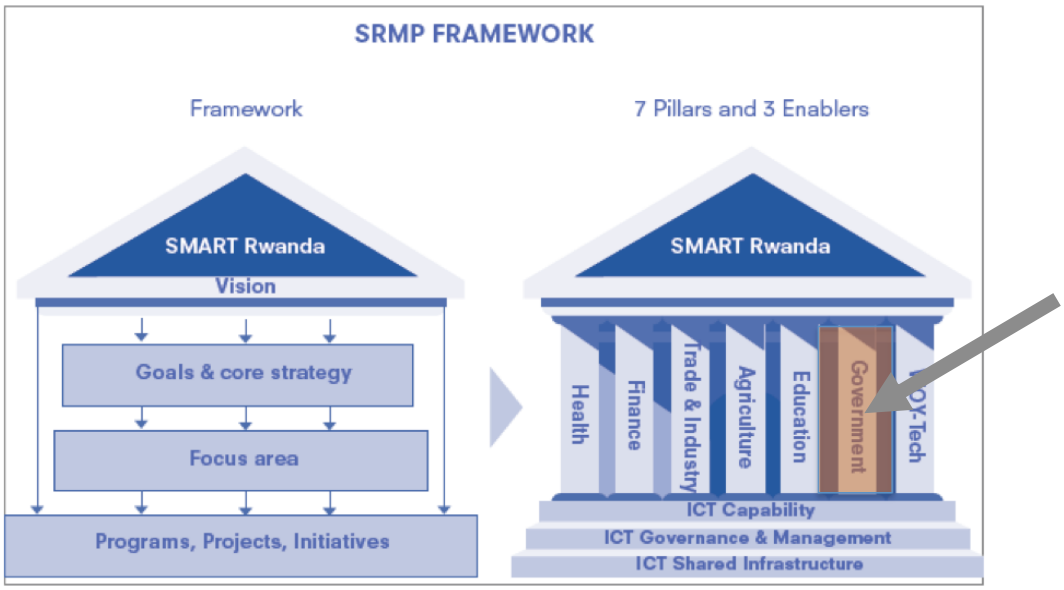
National Strategy for Transformation 1

Priority Areas (PA)	Activities
Economic Pillar PA 3: Establish Rwanda as a Globally Competitive Knowledge-based Economy	• (13) Operationalize the innovation fund to support firms in the innovation and technology industry. • (14) Ensure digital literacy for all youth (16 to 30 years) by 2024 through implementation of a national digital literacy program with the objective of achieving digital literacy of at least 60% among adults by 2024. This will be supplemented by initiatives to develop local contents and facilitate citizens (including people with disabilities) to access digital devices that will enable them use online services.
Social Transformation Pillar PA 5: Moving Towards a Modern Rwandan Household	▪ (72) Scale up broadband coverage to all citizens through the roll out of the 4G network, promoting Internet of things and increase smart devices penetration. Collaborate with the private sector through off-grid connections and investments in grid expansion.
Transformational Governance Pillar PA1: Reinforce Rwandan culture, values as a foundation for peace, unity	• (81) Strengthen and promote gender equality and ensure equal opportunities for all Rwandans by fostering the culture of solidarity and support to vulnerable groups; through mainstreaming gender across sectors, district strategies and investments. • (91) Reform the Judiciary to tackle backlog cases…. Unconventional methods to be adopted to reduce backlog of cases at the Ombudsman.
PA4: Strengthen Justice, Law and Order	• (92). Improve Access to quality justice by modernizing the Criminal, Commercial and Civil Justice System, enhancing professionalism….The Integrated Electronic case management system will be fully operationalized and used in relevant institutions with case management. • (96)Strengthen the capacity of the Ombudsman to investigate corruption.
PA 5: Strengthen Capacity, Service delivery and Accountability of public Institutions	• (98) Mainstream governance for production across sectors and enhance capacities of public institutions and performance. …enshrining a culture of dedicated service to citizens for fast and effective service delivery. Percentage of citizens satisfied with service delivery will increase from 67.7% (2016 RGS) to 90% by 2024. • (99) Ensure all Government services are delivered online by 2024.

PA 6: Increase citizens' participation, engagement and partnerships in development	• (104) Build capacities of media, NGOs, FBOs, and the private sector to effectively engage in and contribute to national development. • (105) Reinforce mechanisms at decentralized levels for citizens particularly women and youth to effectively contribute to districts planning and prioritization. Develop and utilize online platforms, social media to interact with citizens on the national development agenda. • (107) Consolidate and develop home-grown solutions, innovations.
Cross-Cutting Areas Capacity Development	5.4 Public and private institutions will undertake capacity development initiatives for their workforce. This will be done through examining capacity gaps and preparation of annual capacity development plans with strategies required for enhanced delivery. Emphasis will be put in appropriate coordination at the institutional level through setting standards in providing trainings, promoting innovation and learning, and using the RBM policy framework for monitoring and evaluation. 5.5 The focus for Capacity Development under NST1 will be on current and emerging sectors that are key economic drivers with the potential to contribute significantly to job creation and productive employment. Priority sectors include energy, agriculture; private sector development; and ICT.

SMART Rwanda Master Plan (SRMP)

Within the SRMP's overarching goal - to accelerate Rwanda's progress toward knowledge based society - the *ICT for Governance Cluster Strategy 2020-24* aligns with the implementation of the *Government* pillar (see Figure below) and its Core Objectives 6,7, 9, 10 which seeks to strengthen: Accountable Governance, *Improvement and expanded access to ICT skills and innovation capacity, Advancement of women and youths' social economic empowerment through ICT, Enhancement of the national ICT Governance and Regulatory structure*, *Transformation of digital Government through e-governance and effective service delivery*.



Lastly, the *ICT for Governance Cluster Strategy 2020-2024* will also align with and support the *ICT Sector Strategic Plan 2018-2024* where the listed priorities include.

Government operational efficiency and citizens satisfaction improved.	
Act 6.2:	Implement "Digital Government Platform Program" by implementing back end systems, Enterprise Service Bus and CVRS project.
Act 6.3:	Promote efficiency through end to end digitization of G2C, G2B, G2G services by modernizing laws and business processes.
Act 6.4:	Improve accessibility to digital education information and content.
Act 6.5:	Operationalize Intranet for local information exchanges.
Act 6.6:	Implement One Digital ID Program for enabling shared services across all critical sectors like health, insurance, education and civil status.
Area 7.	Rwanda's cyber space and information assets secured.

3.2 Online Services

With regard to the status of e-services and maturity level of ICT system in select Governance Cluster institutions the following observations were made during the situational assessment (July – August 2019):

Rwanda ONLINE - Irembo

According to the IREMBO management, 98 services are being currently (2019) offered online to Rwandan citizens. For citizens and the GoR, *Irembo* e-services are popularly recognized as important. They represent an important first wave or generation of e-services through which the public was able to experience online service provision for the very first time. *Irembo* e-services further promote transparency in service delivery for citizens and help the local government to successfully track all revenues (transaction fees) registered from service provision[5]. Yet a recent evaluation of their overall performance, by the Rwanda Governance Board's *2018 Service Delivery Monitoring Report,* lists *Irembo* e-services' performance rating stands at only at 44.11% satisfaction level. Within the 13 Governance Cluster (GC) institutions specifically, *institutional performance* of online services ranges from 33% to 68%[6]. Other observations and recommendations made in this regard also include:

Current status	Challenges
1. Infrastructure and connectivity issues are problematic and need to be resolved, especially at sector and cell level in peri-urban and rural areas[7].	• The system frequently encounters network connection downtimes and failures which delays service delivery; power shortages are also reportedly problematic. • Low level of awareness on the side of citizens about *Irembo* services.
2. It is necessary to continue adding new services.	▪ Absence of a comprehensive, documented and approved roadmap – National E-services Catalogue for the complete digitalisation of services which prevents the government from 'knowing' what '100% of online services' means.

[5] GIZ, (2017). Findings from Suggestion Boxes in 42 Sectors in 6 Districts in Rwanda, p.10. https://www.tirwanda.org/IMG/pdf/findings_from_suggestion_boxes_in_42_sectors.pdf.

[6] Rwanda Governance Board. *Service Delivery Monitoring Report: Assessment of Service delivery in the Public Sector.* February, 2018, p.7-8.

[7] GIZ (2017) Study – Ibid.

	▪ Absence of a documented process for the selection, prioritization of existing and future e-services. ▪ Often internal low capacity in public administration agencies is an obstacle to implement online services (it is impossible to create integrated customer-centric services if back-office systems are not supported by interoperability or if they are not fully automated).
3. Services often are not integrated, meaning that in order to get the service a person needs to provide additional information/ certificates/ proofs from other public sector agencies. This goes against the *'once-only'* principle, where the state effectively re-uses all data already available in the public registers.	▪ Interoperability framework and a platform is in its early stage of development. Approved plans for rollout are not available. ▪ Attempts to approach interoperability in the systemic way assessment of the needs of customers through building profiles and profile requirements. Like that, current development is public administration centric and opportunistic and it is not driven by the demand.

Based on the above observations, while the first generation of e-services via the Irembo platform is important and popularly valued by the public and government, in order for the GC institutions to comply with *NST I*'s vision of 100% online services provision by 2024 thus leaves room for improvement.

3.3. Back Office Systems

There are many back-end IT systems among Government Cluster institutions, which are developed, operational and successful. Remarkably successful systems include:

- National Identification system (managed by NIDA) contains 90% of population (source: Global Findex Database 2017, World Bank).
- Case management system within the Justice sector (according RGS 5th edition 2018 use of ICT in this sector is amongst most improving indicators = 8,55%).
- Service delivery in Local Administration (according RGS 5th edition 2018 this indicator is amongst most improving indicators = 11,3%) is supported by IT systems in LODA.

In addition, the Rwanda Social Security Board (RSSB) uses a remarkable IT system, which is supporting the delivery of social security services; RSSB is also working on modernizing and improving the quality of they current IT system.

Complementary to base registries in other clusters (e.g. immigration, health, social etc.) the following have been noted as operational within the Governance cluster institutions:

- Citizens and related identification documents (NIDA)
- Driver licenses (produced in NIDA, service delivery to end-users in Rwanda National Police)
- Land Cadastre (Rwanda Land Management and Use Authority)
- Local Administrative Entities Development Agency (LODA, MINALOC)
- Rwanda Social Security Board (RSSB).

Among the Governance Cluster members also several first-generation, basic service delivery automation systems operate as per the following analysis:

Current status	Challenges
Initial implementation of core business processes automation	▪ Not all core business processes are included. ▪ Limited flexibility due to hard-coded software architecture. ▪ Effectiveness/efficiency may be improved remarkably if integration with external systems could be established. ▪ Limited/ non-existing personalisation of online services. ▪ Software is not possible to re-use by similar but slightly different business process. ▪ Every change in the system relates to additional development work, which requires highly skilled technical staff. ▪ Limited reporting and analysis capabilities. ▪ Functionality is not optimised for use in mobile devices (which might be important on the managerial level).
Initial implementation of self-service based service delivery to external citizens, business, other governmental agencies.	▪ Scope is limited to certificates (see definitions section above explaining why certificates are not really e-services) ▪ Services are not personalized. ▪ No Single Electronic Window for specialized segments of users (Single Electronic Window refers to targeted end-user profile app, which contains only services, regularly needed by users of this profile – hence the app acting as a Single Window for access to services and personalization features). ▪ Implementation of 'once only' modality is incomplete.
Basic management information system.	▪ Reports are hardcoded with very minimal options for the creation of different analytical reports using available data. ▪ No published open-data interfaces for external users.

3.4 Interoperability

Current Levels	Challenges
Legislative Level: Existing legislation enables information exchange between different agencies.	No clear legislative norms on enabling data sharing between public administration agencies for user-friendly and efficient public service delivery. Data sharing between two agencies should be supported by the following stipulations in legislation: 1) when agencies can share data and when they cannot 2) data sharing responsibilities among parties 3) security aspects of data exchange and usage in the information consumer agency 4) parties' readiness assessment for data sharing 5) organizational format, semantic interoperability for data exchange 6) finance mobilization for data sharing 7) designation of a monitoring authority for reviewing data sharing protocols in semantic interoperability and overall efficiency of the information exchange 8) list of existing services for reuse

	Currently there is no legislation to regulate these aspects. A draft is reportedly in the MINICT's pipeline yet its contents were not possible to analyze.
Organisational level: organisational processes are coordinated mostly bilaterally.	There are no administrative patterns and norms for improving of effectiveness and efficiency of administrative business processes through implementation of interoperability.
Semantic level: there is an agreed precise meaning of exchanged information, which is understood in the same way by all involved into the information exchange parties.	There is no national meta-data management system, hence the need to develop a system to support semantic interoperability between agencies on national scale. Such system shall contain at least the following elements: 1) environment for maintaining national master data 2) review process of all specifications to ensure consistency of information exchange with national master data (classification) 3) environment of managing existing interfaces to facilitate reuse and usage of services.
Technical interoperability: Existing framework of tools, infrastructure and guidelines in place, which enable easy-to-establish connectivity between two or many IT systems in different agencies.	• Need to develop a general Governmental Technical Interoperability Framework, which defines overall requirements for the implementation of data sharing. • No readily available technical components, enabling a vendor-neutral technical integration between systems. Such component should support Java, Python and .NET, and should be readily available for any developer free of charge with appropriate manuals, instructions and testing environment.

3.5 Digital Identity

Currently Rwanda has an established and operational national Public Key Infrastructure (PKI) system, which includes:

- Legislation enabling the usage of digital signatures is in place.
- National Registration Authority (RA) and Certification Authority (CA) are in place; the CA is operated by Rwanda Utilities Regulatory Authority (RURA), it is active and delivers certificates.
- Registration Authority and CA (e.g. for e-procurement) are operated by RISA.
- Separate Certificates are issued for individuals and companies.
- National Identification IT system, contains 90% of population
- there is at least one state entity, the e-procurement system, which already uses digital signatures.

At the same time, while the basic infrastructure is in place, the following challenges facing the efficacy of the national eID system were identified:

- Very limited usage of PKI based authentication services (used only in back office by public servants for certain services on Rwanda Online/ Irembo).
- Very limited usage of PKI based digital signature – used only in the e-Procurement system
- Usage of company certificates is actually redundant duplication of authorisation information, which is already available, in existing registers of state and non-entities (commercial).
- There is no digital signing available to everyone free of charge with appropriate guidelines for usage and supported by a Call Centre or chatbots.
- There is no digital signing Portal system available to everyone free of charge with appropriate guidelines for usage and supported by a Call Centre or chatbots.

- Active use of fully secure and convenient means for handling private keys is absent.
- Minimal use of PKI-based security services in the process of online service delivery to citizens by *Irembo*, the main online services delivery system.
- Very low existing capacity to deliver secure PKI-based authentication and rollout digital signature to the general population on massive scale (no RA at sector level across the country).
- Business registry is not supporting instant online authorisation check for individuals to authenticate their authority to act on behalf of a company.

When it comes to security measures related to national eID system the following issues were identified:

- Currently governmental e-services are accessed by citizens mainly through the use of passwords; this is an unacceptably insecure authentication method. While so far there has been reportedly low number of fraudulent incidents (e.g. identity thefts), in future, with the advancement of e-services the existing security measures will not suffice.
- To prevent future fraudulent misuse of cyber criminals' access to personal data and users' identity, the Government should immediately begin strengthening the means of security authentication to citizens through:
    - PKI-based Mobile ID, with private key that can be securely stored on SIM cards
    - PKI-based Smart ID, with private key securely managed in a way, that enables to use smart phones (e.g. SplitKey by Estonian company Cybernetica is well documented and officially certified by several countries).

Due to the high complexity of citizens' capacity to handle secure PKI certificates, it is strongly discouraged to have different systems for different segments of users. For example, currently in Rwanda, the private sector (online banking) is using its own, government officials (in internal systems) are using their own and citizens are using yet another. Instead, there should be a unified system used by all citizens, business, government in all use cases (business or government services).

3.6 Enterprise Architecture

Fully institutionalized and operational Enterprise Architecture (EA) management process currently does not exist within the Governance Cluster institutions. While initial steps are being taken within RISA in this direction, currently there is no officially assigned role of Enterprise Architects within institutions. Furthermore, there is no overarching clear IT governance model for the integrated Digital Government development and its maintenance – an area which needs to be significantly improved and advanced if integrated, efficient and effective online services delivery is to be ensured in the future.

3.7 Digital Inclusion and Digital Literacy

Universal access, affordability and digital literacy to use and benefit from ICT are key drivers of digital inclusion. Over the past decade, with the rollout of 4G optic fiber cables, the GoR spent significant amount of resources to improve Rwandan citizens' access to Internet nation-wide. Mobile penetration has also steadily increased with current rates at 77.1%[8]. At the same time, digital divides persist when it comes to households' access to Internet and personal computers where only 3.3% of households owned a computer and only 17.2% had access to Internet (see Table below). The urban-rural divide in Internet access is also notable as only 12% rural households have Internet access compared to 38% urban households[9].

[8] Rwanda Utilities Regulatory Authority (RURA) 2019, www.rura.rw.
[9] National Institute of Statistics. *Statistical Yearbook 2018: ICT Section*. NISR, www.statistics.gov.rw.

	2005/06	2010/11	2013/14	2016/17
	EICV2	EICV3	EICV4	EICV5
% of households owning computer	0.3	1.7	2.5	3.3
% of households with access to internet	3.7	9.3		17.2
% of households owning mobile phone	6.2	45.2	63.6	66.9

Source: STATISTICAL YEARBOOK-2018, National Institute for Statistics of Rwanda

Certain segments of citizens and businesses, namely women, people with disabilities and people or businesses operating in rural areas are particularly disadvantaged in their inability to afford smart devices, cost of Internet for downloading/ uploading transactions, or have insufficient digital literacy to benefit from their use. While pilot programs such as Digital Ambassadors and government's expansion of Service Access Points have been commendably rolled out, they have been unable to reach out to all Rwandan citizens. Moreover, comprehensive, demographically disaggregated analysis on digital inclusion and digital literacy would be beneficial as reliable data in these areas are not readily available to draw evidence-based conclusions. Still, based on stakeholder interviews, the mentioned are considered as the top factors preventing digital inclusion which in turn prompts the sub-optimal uptake of e-services.

3.8 Data-driven SMART Government and Institutional Knowledge Management

With the advent of a big data era, data-driven or SMART Government is becoming a staple attribute of all modern public administrations. User-friendly self-service, open data platforms and dashboards which civil servants, citizens, businesses and civic entities can openly access and use for their own decision-making needs are paving the way for data-driven public services. This sector will only expand in the near future. Hence it is essential for governments to effectively prepare for this reality through relevant structural changes, integration of user friendly data management tools and by acquiring or training their staff with relevant skills.

Digital Dashboards. The GoR has invested into data-management initiatives such as the establishment of the Government Command Centre 1.0 (GCC). Implemented by the Rwanda Information Society Authority (RISA) in collaboration with the Prime Minister's Office and Ministry of Economy and Finance, the GCC aims to improve government's internal monitoring and decision making processes through real time data reporting, analytics and visualization[10]. The GCC is currently being extended into its 2.0 version. The interactive Open Data Portal[11] hosted and managed by the National Institute of Statistics of Rwanda is another important in SMART initiative introduced in Rwanda.

Management Information Systems and Government's Accountability. Other notable management information systems in place include LODA's *Monitoring and Evaluation Information System* with large deposits of useful data for decentralized service delivery and strategic planning purposes while MINALOC's *E-Citizen, IFMIS,* MIFOTRA's *Integrated Payroll and Personnel Information (IPPIS)* self-service portal or MINIJUST's case management systems with visualization capacities and the *Abunzi Management Information System* at grass roots level are other such examples. At the same time, while these systems are commendably in place, the situational assessment pointed to the following challenges that prevent their optimal data management practices and efficiency gains:

- Fragmentation and varied efficiency (structural, procedural, staff capacity) of Management Information Systems within government departments.

[10] Terms of Reference for Services to Design, Develop and Implement a Performance Monitoring System for the Government of Rwanda "Government Command Center" (Rwanda Development Board 2013).
[11] http://www.statistics.gov.rw/data-portals

- Upstream, downstream complexities, inefficiencies of data aggregation (e.g. *Imihigo* paper-based data collection).
- Low levels of data entry, processing, sharing and quality assurance standards and protocols.
- Low data analytical capacity among government staff.
- High data processing inefficiencies and duplication of data.

It is thus unclear the extent to which current MIS systems *can* and *are* used to produce meaningful performance diagnostics and visual analytics for strategic data-driven planning, effective service delivery, monitoring and evaluation or public outreach. If the GoR is committed to the notion of *SMART government*, serious improvements in this direction are required. Awareness and understanding within line ministries and government agencies about the GCC and the concept of the self-service data analytics also needs to increase. Streamlining and optimization of existing Management Information Systems, institutionalization of quality control standards for decentralized (upstream and downstream) data entry and relevant change management processes also need to be actioned in the future.

Open Data Culture. Purposive publishing, use and re-use of data within GC institutions is also only in its beginning stages. While it is commendable that GoR has adopted the *National Data Revolution Policy* 2017 and is in the process of implementing it through the Open Data Portal and the Big Data Unit at the National Institute of Statistics (NISR), situational assessment's findings show that:

- Government institutions' understanding of *open by default* principles and practice is still low.
- Rate of publishing of government datasets is too slow.
- Downstream institutionalisation of SMART data analytic units and absorption of new skills are still inchoate.
- Geospatially referenced datasets which can produce useful visual analytics are insufficiently available.

Therefore, of Rwanda desires to become a competitive, knowledge based economy with SMART government, it will then significantly need to step up its promotion of a data-driven government culture that effectively manages knowledge for innovative public and business purposes in compliance with its existing laws and policies.

3.9 Accountability and Participatory Governance

The integration and pro-active use of transparency enhancing, accountability and interactive participatory instruments by governments *(supply side)* but also by civic actors and citizens *(demand side)* are globally recognized as important good governance practices that can improve service delivery, enhance the vibrancy of democratic processes and reduce corruption. ICT-enabled one-to-many and many-to-many tools open new opportunities for citizens and governments to interact and to gain 24/7 access to public information. Interactive open budgeting and performance tracking platforms, e-petitions, e-polling, social media discussion forums, open data portals and solutions, or crowdsourcing platforms are some examples of these new sets of instruments which are changing the ways how citizens and governments interact and how citizens engage in public decision-making processes.

Currently in Rwanda, *on the supply side* the GoR and most line ministries provide basic access to information and interactivity for citizens through:

- Legislatively set citizens' right to information through the *2013 Access to Information Act* which stipulates the procedural aspects in Rwandans' access to information, but lacks binding standards for authorities' accountability and compliance in regards to responsiveness to requests.
- Online feedback forms and offline suggestion boxes where citizens can lodge their queries and grievances – e.g. citizen feedback and grievance filing systems launched by MINALOC *E-Citizen,*

Ministry of Justice or the Ombudsman Office's online feedback and Report Corruption - *Garagaza Ahari Ruswa* forms, among others[12].

- While government's responsiveness standards are in place for e-Services, they are absent for citizens' requests for information; there are no set standards for time responsiveness compliance for public authorities when providing information to citizens.
- Interactive Open Data Portal hosted by the National Institute for Statistics of Rwanda.

Analysis on the percentage, frequency and how citizens actually use the existing online and offline feedback mechanisms is unclear. The *National Strategy for Transformation* (NST 1) observes that case resolution backlogs for MINALOC, MINJUSTICE, RLUA and Ombudsman's Office are particularly high. Stakeholders interviewed, also noted that the uptake and use of online feedback forms, apps and platforms is sub-optimal, hence more tracking and monitoring is required to better understand their usage.

On the demand side

- Most upstream (C2G) interaction and participatory input is generated via the *Imihigo* mechanism and process which is for the most part facilitated offline, in a paper-based and oral format.
- Emerging use of applications such as the NGO's *Rwanda Initiative for Sustainable Development ICT4D Abunzi Justice System* that enables community mediators in mapping, monitoring, analyzing and reporting land related disputes and mediation mechanisms at grassroots level[13] or the *sobanukirwa.rw portal* facilitates navigation when citizens or civic entities lodge access to information requests-
- An interactive civic society platform for advocacy and networking exists but it's functionalities in practice are yet unclear.
- The *sobanukirwa.rw portal* (facilitating civic entities' access to information) lists only 245 requests for information since its launch in 2015 (approximately 50 requests per year).
- NGOs and CBOs lack capacity and ICT-enhanced tools to optimize their constituency outreach, advocacy and operations (though more research is required).
- Evident gender exclusion from ICT empowerment has been voiced by NGOs interviewed during the situational assessment.
- Modern ICT enabled instruments such as electronic petitions, polls, public servants' performance meters, voter advice applications or electronic public consultations that facilitate inputs in urban planning and policy making are not yet available in Rwanda.

While diverse participatory initiatives currently in place are good first steps, they point to a rather sparse and typically uni-directional availability of supply-driven rather than diverse forms of two-way - G2C and C2G - interactive online tools. G2C and C2G accountability and interaction is thus rather limited and to a great extent paper-based. Therefore, it is proposed that more is done to optimize existing processes (e.g. introduce ICT-enabled *Imihigo* elements), to diversify the range of available government accountability and civic engagement tools as well as to better engage NGOs and CSOs in ICT empowerment and related capacity development activities.

[12] http://ombudsman.gov.rw/?page=report_corruption.
[13] https://www.newtimes.co.rw/section/read/206386.

4. PRINCIPLES

In line with international standards and based on the situational review of key digital government sectors in Rwanda mentioned above, in order to effectively move Rwanda into the future, the ICT for Governance Cluster Strategy 2020-2024 is based on the following five integral principles:

4.1 User centricity

Digital Government must be built for and benefit the end user. Users are citizens from all walks of life, businesses and government entities, among others. Design of public services in Rwanda will be thus based on rigorous user profiling in order to address different users' needs. Services will be adjusted based on extensive personalized user experience analysis. There will be no generic services – all services will target specific segment of users and be tailored to specific needs or problems. Prototyping will be an cross-cutting technique embedded into all projects.

4.2 Once-only

In order to provide quick and user-friendly public services to citizens and businesses, public administration agencies must adopt convenient customer-centric approaches and respectively readjust the ways of service delivery. One way to achieve efficiency and increase user-friendliness is through the 'once-only principle'. Instead of redundantly asking citizens for information multiple times, Rwandese public administration entities should efficiently reuse the information databases and state registries they already have. To this effect, integrated and interoperable base registries, as the authentic sources of data for public administration, will be one of the basic building blocks of public services and will be the key to making the once-only principle a reality.

4.3 Inclusiveness

Affordable ICT infrastructure, devices and services are essential building blocks for digital inclusion where businesses and citizens indiscriminately of their socio-economic standing, gender or geographic location are enabled to participate in and benefit from the digital economy and digital society in order to increase their personal holistic well-being. Ease and affordability of access to digital opportunities in Rwanda will be based on flexible, diversified financing models, products for different customer segments, ensuring that the most vulnerable are served and are able afford ICT devices.

4.4 Data Privacy

As more data becomes digitized and more information is shared online, data privacy is taking on greater importance. In the digital age, data privacy will be applied through official classification systems pertaining to critical personal information, also known as personally identifiable information (PII) and personal health information (PHI). This can include social security numbers, health and medical records, financial and banking data and even basic, yet sensitive information, such as full names, gender, addresses and birthdates. Rwanda's modern digital government must ensure that adequate data protection measures are in place to enable its citizens, public authorities but also private sector actors to conduct their online transactions securely with the maximum protection of their privacy.

4.5 Digital Government as an Investment

Empowering government administration, businesses and social entities to pro-actively use and benefit from ICT is without a doubt a longer-term commitment and investment for any modern government. It is essential, however, for the Government of Rwanda, namely the Ministry of Economy and Finance and respective line ministries' fiscal departments consider ICT not as an expenditure but rather as an

opportunity and investment. Seeing digital government as an investment will also mean that the Government of Rwanda will not only pro-actively invest in, harness but it will also track its return on investments related to ICT initiatives. Transversal financing models and budget allocations will factor in and reflect this philosophy.

5. STRATEGIC FOCUS AREAS

In synergy with the Strategy's principles and its objective to provide actionable directions for the future of digital government in Rwanda, the ICT4 Governance Cluster Strategy 2020-2024 is divided into 5 focus areas as elaborated below.

5.1 FOCUS AREA 1 – Building a Digital Government System

The primary intention of this strategy is to build Digital Government systems. Effective Architecture is an essential building block of a modern digital government. It enables the delivery of personalized, easy-to-use end-to-end online services that can improve the quality of life for the citizens of Rwanda. Putting effective digital government systems into place will decrease the cost of a public service delivery through paper-less internal processes and on-demand personalized delivery.

In the aggregate, building a Digital Government will further boost the growth of Rwandan ICT industry by increasing the demand for the home-grown development of new software as a service products as well as indirectly creating more demand for telecommunication and commercial digital services.

Development of Digital Government systems starts with a comprehensive Roadmap, continues with the implementation of back-end systems, an interoperability governance platform for integrated services, and business processes digital interfaces for online G2C and G2B services on IREMBO. It is important to underline, that the governance cluster strategy holistically targets all user groups, including foreigners who have investment interests in Rwanda.

Majority of institutions within the Governance Cluster (GC) already have solid back-end information systems in place. This strategy hence builds on the capacity, which already exists, fast-tracks system development and modernisation of business processes through innovative techniques to manage the development process.

Introduction of the interoperability platform will enable user-centric integration of all online services into personalized digital apps. Simultaneously, efforts will be made in the area of information security management to upgrade the security level of the Digital Identity of citizens and ensure that the overall governmental data processing is reliable, robust and secure. To this effect and in sum, the overarching objective of Focus Area 1 with detailed activities and performance metrics elaborated in Appendix I:

OBJECTIVE FOCUS AREA 1: To build inclusive online services for all main user groups in Rwanda with end-to-end service delivery capabilities and personalized user experience.

THEORY OF CHANGE: Fast and parallel development of back-end systems and online government services is enabled and optimized by applying clear enterprise architecture guidelines. Consequently, inclusive delivery of personalized end-to-end online services to all Rwandans is ensured.

FOCUS AREA 1 – EXPECTED OUTPUTS

EXPECTED OUTPUT	PERFORMANCE INDICATOR
1.1 Enterprise Architecture Management System in place	# of institutions with budgeted, implemented BNAs, action plans for E-service delivery.
	# of new personalised, end2end EA compliant e-services implemented using the National Service Catalogue, # targeting Ubudehe 1 & 2.
1.2 Back-end Systems Modernisation	# of government institutions/ agencies operationally integrated in ESB, # of published back-end services.
	Module on Change Management for back-end systems development of middle level management developed and taught, # of management staff trained.
1.3 Scaled Up and Decentralised Digital Government	Institutional performance in online e-services delivery - # of Back-end API endpoints for online e-services.
	Fully operational national cloud for hosting government back-end systems in place.
1.4 Scaled Up and Decentralised Digital Government	Citizen satisfaction, level trust in the secure use of public services.
	Digital Government services for business and citizens are using one unified eID.
	Unified Digital Government Back Office eID authentication is used for internal (G2G) as well as for external a services for business and citizens.
1.5 Digital Residency	100 million USD in tax revenue from registered digital foreign investors.

5.2 FOCUS AREA 2 – Digital Enablers

Digital Government initiatives need to be supported by mutually reinforcing systemic enablers which are in the interest of the whole Government but are particularly critical for the successful implementation of the *ICT4 Governance Cluster Strategy 2020-2024*. The Objective of Focus Area 2 identifies these as follows:

OBJECTIVE FOCUS AREA 2: To create a foundation for scalable and affordable digital government of Rwanda whereby it becomes a leader in Africa and directly supports the growth of prosperity of all Rwandan citizens and businesses.

THEORY OF CHANGE: By embedding a user centric system of online services and pro-active support as well as tracking of its performance, by 2024, the number of online services will increase by 300%, ICT industry's contribution to Rwanda's GDP will be 5% and Rwanda's e-government rankings in international indices will significantly improve.

FOCUS AREA 2 – EXPECTED OUTPUTS

EXPECTED OUTPUT	PERFORMANCE INDICATOR
2.1 Ensuring User Centric Design of Online Services	# of new, personalised e-services introduced through user-centric profiling.
	Level of user Satisfaction and Institutional Performance in E-service Delivery (in %, < 85%).
2.2 Developing an evidence based business case for digital government	% contribution of eGovernment to Rwanda's GDP.
	Rwanda's rise in UN E-government Development Index rankings.
	% increase of university / technical institutes graduates from Applied Mathematics, Informatics, Public Innovation, E-government.
2.3 Capacity Development to drive digitalisation projects in line ministries	# of Ministerial Project Management Offices with official mandate to implement modernisation activities in the Ministry and subordinated agencies.
2.4 Flexible Sourcing Practices for digital government.	Implementation Plan for modernisation in all Ministries in the Governance sector in place.
	In Portfolio of reusable products at least two products, which are available for export.

The overall modernisation and transformative digitalization of the Governance Cluster institutions in 2020-2024 will require systemic thinking and systematic commitment of sufficient resources over time. It will also require seamless performance tracking of digitalisation initiatives. Such monitoring will be evidence-based and embedded into daily operations of every public servant and every level of the public administration, starting from cells up to the central government. Creating a well functioning motivational model for all stakeholders involved to ensure the best possible deliver of quality online services will also need to be developed.

Second important enabler is to build an executive mindset that digitalisation of the Government is not an expense but an investment. The GC will work closely with MINECOFIN to ensure that such approach is properly addressed in the budget.

All organisations in the GC will review and update their IT units' capacity to handle the implemented digitalisation changes in line with high quality standards. Also, the GC will openly include and engage all business units of organisations in the change implementation process through flexible sourcing practices. In particular, the following initiatives will be implemented in close cooperation with the private sector:

- Empowering the local software development industry by strengthening its capacity to develop Digital Government products for internal consumption as well as for international export.
- Facilitating the training and access for all potential end-users in the country.

To support the acquisition of very complex IT systems, when it is not possible to define their scope, requirements and cost upfront, exploratory financing options will be identified.

5.3 FOCUS AREA 3 - Transparent and Data-Driven Government

Benefits of transparent and data-driven government are many. Transparency, availability and impactful use of data are essential pillars of contemporary and future government architecture. ICT enabled government transparency provides citizens and businesses convenient 24/7 access to government information, enabling them to better understand service provision processes, requirements and their own responsibilities. Data-driven government offers actionable, real-time information for internal and public strategic planning or decision-making processes helping to bring tangible solutions to service delivery challenges. Geospatially referenced data are particularly useful for: powerful, SMART real-time analytics to track service delivery performance, (e.g. heat maps - location referenced quick performance reviews of public entities schools, hospitals, farming areas etc.), for strengthening inter-agency data sharing for problem solving, reducing costs, improving quality of services or developing new ones, decreasing corruption, detecting, mitigating, preventing errors, and fostering future trends that for SMART evidence-based policy-making.

SMART Government in Rwanda is envisioned in the *National Strategy for Transformation I*, the *Smart Rwanda Master Plan*, the *ICT Sector Strategy*, the *National Data Revolution Policy* and in the *Access to Information Act.* The situational analysis showed that the current systems possess vast amounts of valuable information but are being sub-optimally used for diverse forms of evidence-based predictive analytics, strategic planning, decision and policy making, public innovation and problem solving by government and wider civil society, universities and business user communities.

Hence Focus Area 3 dedicates series of ambitious activities to stimulate and cultivate a purposive data analytics practice and data-driven culture with relevant support systems within the Governance Cluster institutions in order to drive Rwanda's SMART, data-driven Government forward.

OBJECTIVE FOCUS AREA 3: To advance a data-driven decision-making public innovation and knowledge management culture within the Governance Cluster institutions by developing their institutional data management systems and know-how in purposive data-driven analytics for diverse uses.

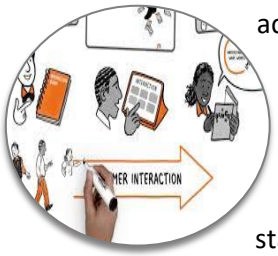
THEORY OF CHANGE AND EXPECTED RESULT(S): A comprehensive change management process to enhance data management systems, skills and performance incentives will improve multi level data analytics literacy and readiness for self-service in the effective planning, implementation and monitoring of impactful data science projects.

FOCUS AREA 3 – EXPECTED OUTPUTS

EXPECTED OUTPUT	PERFORMANCE INDICATOR
3.1 Development of a decentralised, accurate, real-time, user-friendly Government Command Center (GCC) 2.0 system and its active usage.	Performance Satisfaction of GC members' compliance with GCC Quality Assurance Guidelines (reduction in % of rejected NISR Annual audits, # of PMO, MINECOFIN decisions based on GCC).
3.2 Rationalisation and quality of decentralised MIS is optimised.	# of GC institutions with implemented MIS Optimisation Action Plans.
3.3 Institutional capacity in implementing data-analytics projects and knowledge products, is strengthened.	# of GC Ministries/ Agencies with institutionalised (funded, staffed) SMART Data Management Units.
	# of GC quality data sets published on integrated on Open data portal, ready for analysis.

	# and impact (qualitative) of successful innovative home grown data-driven solutions, projects launched , # of users.

5.4 FOCUS AREA 4: ADVANCING ACCOUNTABILITY AND CIVIC PARTICIPATION



Due responsiveness to citizens' demands and queries is an integral part of government's accountability toward its citizens. Equally, enabling citizens to actively participate in public planning and decision-making processes is globally correlated with better informed policies and better targeted service delivery. Both are requisite ingredients for good modern governance. Focus Area 5 will advance ICT-enhanced good governance at two levels. On the one level, it will enhance GoR's accountability towards Rwandan citizens (G2C) through improved authorities' responsiveness standards and compliance with them. On the other, it seeks to empower (C2G, B2G, C2C) social innovation, the role of civil society and citizens' constructive enabled civic engagement in public decision and policy making through a more diversified use of ICT participatory tools.

OBJECTIVE FOCUS AREA 4: To increase the availability and use of innovative, user-centric, ICT-enabled accountability measures to improve government's accountability toward citizens as well as the use of participatory tools for C2G impactful participation in public decision making.

THEORY OF CHANGE – FOCUS AREA 4. Stimulated development and piloting of innovative, user-centric, ICT-enabled but also blended (online-offline) accountability and participatory tools will not only advance government's greater accountability toward citizens, and citizens' more-proactive engagement in public decision-making and social innovation, it will also contribute to better informed policies and public decisions. Rolled out capacity development of government, civic organisations, business and citizens will act as sustainability safeguards for newly developed tools and practices. Online-offline blending approaches and focus on processes as much as on tools will ensure multi-channel access and social inclusion whereby all stakeholders and citizens can benefit equally.

FOCUS AREA 4 – EXPECTED UTPUTS

EXPECTED OUTPUT	PERFORMANCE INDICATOR
4.1 Legislative standards on government's responsiveness to citizens' access to information are adopted (Access to Information Act 2013 amended).	Adopted legislation and Action Plan to standardize government responsiveness in access to Information.
	# GC institutions with instituted responsiveness standards.
	Citizen satisfaction with responsiveness over time.
4.2 Increased availability, use of ICT-enabled participatory tools and public awareness about them.	# type civic engagement tools, ICT enabled civic advocacy campaigns to influence policy, planning processes.
	# legislation/ policies adopted, adjusted (as needed) to enable new participatory practices.

	10% of population uses participatory tools, trends/ growth over time.

5.5 FOCUS AREA 5 - DIGITAL SKILLS DEVELOPMENT

Digital inclusion is a core element of good e-governance and enabler for the attainment of United Nations' SDGs, especially SDG 9[14] by 2030. It ensures that all Rwandans, irrespective of their geographic location, gender and income are entitled to equal access, connectivity and benefits from the use of information and communication technologies (ICTs). No Rwandan should be left behind when it comes to benefiting from ICT enabled access to information, online healthcare services, transport and mobility, paying for goods via mobile phones or in accessing life-saving disaster warnings.

In Rwanda, country-wide rollout of the optic cable significantly improved Rwandan citizens' access to the Internet where by March 2019, national mobile phone penetration has reached 77.1% and on-net communication prevails[15]. *Moving towards a modern Rwandan Household in ensuring universal access to affordable and adequate infrastructure and services* is also pursued in NST1. While 4G coverage is available country wide, only 12% rural households actually have Internet access compared to 38% households in urban areas[16]. As people living rural areas constitute more than 80% of Rwanda's population, these figures point to the urban-rural digital divides when it comes to access. People with specific needs, lower education, rural dwellers, persons with disabilities, women are also often more disadvantaged than others in their access to ICT and e-services due to affordability and lower digital literacy.

Simultaneously, it has been shown that public administrators, civil society and private sector can also be affected by digital skills gaps when trying to keep up with rapid innovation in ICT. Mitigation of digital divides through creative, tailored, cost-effective capacity development programs targeting public officials, but also CSOs and businesses thus remains on top of the agenda in the *ICT for Governance Cluster Strategy 2020-2024*. While pioneering pilots such as the *Digital Ambassadors* implemented by the Ministry of ICT are important initiatives, they need to be amplified and sustained in order to reduce the digital divides to ensure that all Rwandans benefit equally from opportunities availed by ICTs to better their lives.

OBJECTIVE – FOCUS AREA 5: To develop and sustain evidence-based, decentralized and cost-effective digital skills enhancement on both the *supply* – government side as well as on the *demand* – citizens, civil society and business side.

[14] SDG 9: Build resilient infrastructure, promote *inclusive* and sustainable industrialization and foster innovation, Footnote 2.
[15] Rwanda Utilities Regulatory Authority. (March 2019) *Statistics Report for Telecom, Media, and Postal Sector, First Quarter 2019*. https://rura.rw/fileadmin/Documents/ICT/statistics/Quarterly_Telecom_Statistics_report_as_of_March_2019_.pdf
[16] Ibid.

THEORY OF CHANGE – FOCUS AREA 5. Sufficient digital skills and digital self-efficacy are an essential building block of sustainable digital transformation. Through evidence based, multi-track and decentralized approach (e.g. using *UNESCO's Digital Learning Global Framework*[17]*Assessment)* – Focus Area 5 will augment modern digital skills on *the supply side* (civil servants) as well as on the *demand side* (citizen, civic actors and business) of Rwanda's digital transformation ecosystem. Activities undertaken will contribute to Rwandans' empowerment to seize digital opportunities in pursuits of well-being, to increase their uptake of online services hence contributing to the overall mitigation of digital divides in Rwanda.

FOCUS AREA 5 – EXPECTED OUTPUTS

EXPECTED OUTPUT	OUTPUT INDICATOR
5.1 Rollout of Digital Skills Development Program for state officials (developed, instituted, funded).	Digital Skills Development Action Plan (AP) adopted, funded, implemented in each GC Ministry/ Agency.
	# of public officials, citizens, CSO private sector reps trained, national improvement in DLGF ranking.
5.2 Rollout of Sustainable Model for Digital Skills Development for CSOs, businesses.	#of cost-effective, decentralised digital skills development TOT projects implemented, # of CSOs, businesses trained.
5.3 IPPP trust fund for decentralized Digital Skills Development solutions for citizens.	# of cost-effective solutions on Digital Literacy targeting citizens (urban, rural, women, farmers, disabled, youth, elderly etc.).
	% increase in (impact on) e-services uptake by targeted populations, # users.

6. IMPLEMENTATION MODALITIES

The *ICT4 Governance Cluster Strategy 2020-2024* presents ambitious goals. They cannot be implemented without the concerted effort and joint coordination of the line ministries and agencies within the Governance Cluster and beyond. To monitor and strategically steer the progress of the Strategy's implementation, the following activities will be coordinated and structures put in place:

6.1 Governance and Coordination Mechanism

High Level Steering Committee (HLSC) for the Governance Cluster will be formed. It will comprise i) an *Executive Board* co-chaired by the Ministers and/or Permanent Secretaries of MINALOC, MINICT, Justice Sector, MINECOFIN, membership of key IT/ Telecom CEOs should be also considered, and ii) *General Assembly* comprising appointed representatives from all 40 GC institutions, business and civil society.

- The HLSC *Executive Board* will meet twice a year to strategically steer and review the progress of implementation, to act as an executive advocate for the *ICT4GC Strategy 2020-2024* and for digital transformation at executive levels of government, ensuring alignment with national strategies (and changes to them) as well as to ensure sufficient funding for envisioned activities.
    - First session of the HCSC should be held in the first Quarter 2020 during which WG Committee Heads and members are to be appointed.

[17] http://uis.unesco.org/sites/default/files/documents/ip51-global-framework-reference-digital-literacy-skills-2018-en.pdf

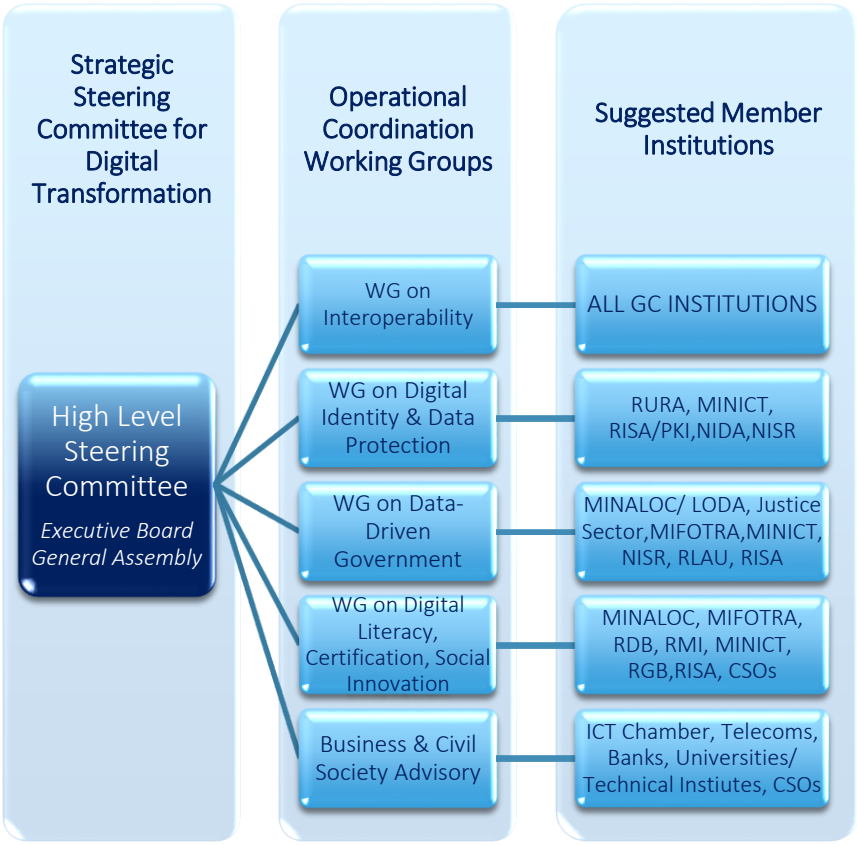
- The HLSC *General Assembly (GA)* will meet quarterly to track the operational progress and coordination of thematic working groups more hands on, to identify gaps, risks and troubleshooting strategies where needed. The GA will provide pragmatic progress reports to the Executive Board. First session of the *HLSC GA* should be held during the first Quarter 2020.

Founding Charter. It is advisable that a pragmatic Founding Charter which delineates the vision, purpose of the HLSC and Working Group composition is developed by the HLSC in the first year (2020) of its tenure. The Charter should also include a means for a systematic communication strategy (e.g. semi-annual newsletters) through which the GC can communicate with other Clusters and line ministries, government agencies that fall outside of the scope of the GC. The Charter should be jointly drafted by the GA and approved by the HLSC.

Thematic Working Groups (WGs) will serve as subsidiary coordination organs (of the General Assembly) for the implementation of targeted outputs envisioned in the *ICT4GC Strategy 2020-2024*. Chairmanshop of the WGs will be appointed in the first Quarter of 2020 by the HLSC. The thematic WGs will meet on a monthly basis. For efficiency and coordination purposes, WG membership will derive from GC members' institutional competencies linked to the WG's specific thematic. Based on thematic interests and pertinent responsibilities, institutions can be members of several WGs. Some suggestions for membership are outlined below. To ensure effective results, it is advised that appointed institutional representatives to WG are appointed based on their relevant competencies and thematic linkage of a given WG.

Business & Civil Society Advisory WGs. To maintain pro-active relations with the private and civil society organisations and to harness their inputs and coordination, a separate dedicated advisory group/ working group will form. Terms of engagement for the consultative, advisory status of the WG or 2 WGs can be determined by the HSLC during its first or second session. As part of their functions, WGs should draft and share operational progress reports with the HSLC's Executive Board.

Governance & Coordination Structure for Implementation



6.2 New Financing Models and Change in Mindsets

Despite ICT and innovation being considered as instrumental drivers for achieving NST 1, SRMP and the ICT Sector Strategic Plan 2020-2024, finding sufficient financing for ICT projects can be challenging. Sectoral stakeholders note that financing of the sector continues to be considered as an 'expenditure' rather than an 'investment'. It is therefore proposed that as part of the *ICT4 Governance Cluster Strategy 2020-2024:*

- New dynamic financing Models are developed – specifically targeting Public Private Partnerships and Corporate Social Responsibility with pro-active cooperation of financial institutions and Telecommunication companies who have a vested interest in the successful implementation of Digital Transformation in Rwanda;
- An active practice of tracking aggregate (national), evidence-based and disaggregated (within each line ministry) return on investment (ROI) linked to the implementation of e-government initiatives is commenced; this will make it easier to make a 'business case' for digital transformation initiatives:
- Evidence based Annual ROI Assessments and Business Case for e-Governance financing is systematically made and communicated to MINECOFIN, PMO, media, among others.

Fully itemized budget for different activities envisioned by the Strategy is elaborated in Appendix I in the Implementation Action Plan and Monitoring and Evaluation Framework.

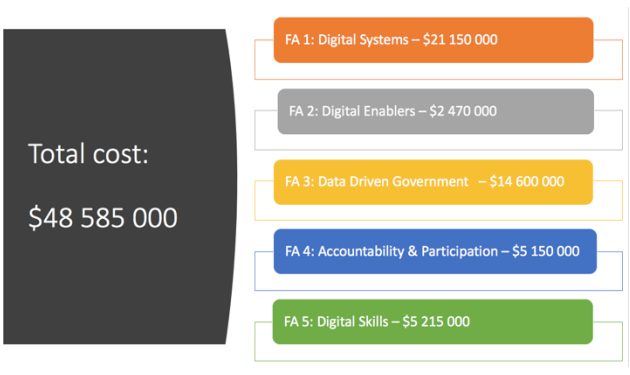
6.3 Implementation, Monitoring and Evaluation Framework

Detailed Implementation Plan and Monitoring and Evaluation Framework for the Strategy is elaborated separately in Appendix II. As part of setting up the governance structure for the coordination of Strategy, it is highly advised that the *HLSC* and *General Assembly* conduct a facilitated Strategic Planning retreat in the first Quarter of 2020. The Strategic Planning retreat would contribute to setting the coordination modalities of joint institutional activities where different state agencies are involved. It will also assist the GC and individual institutions to set the pace and maintain 'momentum', discuss budget and gain ownership in the early phases of the process. Such processes have proven to be highly successful in other strategy development contexts.

At the strategic, macro level, it will be the role of *High Level Steering Committee (HLSC) for the Governance Cluster* to monitor the implementation progress and to strategically troubleshoot and steer it, as needed. Simultaneously, ministries and agencies are advised to form focused M&E teams or technical working groups in collaboration with their SPIU in order to meet on a periodic basis, troubleshoot and efficiently coordinate with other institutions.

6.4 Budget

Sustained sufficient budget allocation will be a critical determinant for the success of the Strategy's implementation. Preliminary detailed budget estimates are provided in Annex I – in the Implementation Action Plan, while an overall estimate is provided to the right. Yet, similarly as with an M&E Framework it is recommended that a separate budget planning session is held. It is then expected that the budget validation process will continue within individual institutions before it is submitted to MINECOFIN for financing.



7. ASSUMPTIONS, POTENTIAL RISKS AND THEIR MITIGATION

E-government projects are unique undertakings that involve degree of uncertainty and are inherently risky as well as resource heavy. With e-government projects being complex and as they have a broad scope risks can be found in diverse areas.

ASSUMPTIONS & POTENTIAL RISKS	RISK MITIGATION
1.Resistance to change from top management, public servants, citizens/ community.	▪ Concrete change management plans are put in place within each institution in the Governance Cluster, awareness building activities (teaching, workshop etc.) and enforcement strategies are systematically built into key initiatives.
2.Respective ministries and agencies are not able to secure relevant funding for all strategic initiatives envisioned.	▪ MINECOFIN is engaged in early stages of Strategy's rollout. ▪ Activities fit for PPP funding are clearly outlined and outreach to Banks and Telecom partners is extended in the first stages of the Strategy's rollout – dynamic financing model is derived and implemented. ▪ Respective ministries make financial contingency plans where feasible.
3. Coordination and cooperation among Governance Cluster members remains strong and results oriented.	▪ High Level Steering Committee (HLSC) for the Governance Cluster (GC) is instituted without delays. ▪ M&E Reports for Strategy Implementation are published and circulated to all GC members and are open to the public.
4. Ministries/ agencies within the cluster develop their EA, interoperability and institutional capacities asymmetrically and not in line with implementation plans, causing delays.	▪ Strategic Action Plans for Governance Cluster members are developed and mutually synchronized. ▪ Strong mentorship and capacity building support system to be instituted in early on and throughout the implementation cycle. ▪ Periodic progress monitoring practice is ensured and proactive troubleshooting is applied.
5.Lack of leadership, timely and 'on budget' execution of planned initiatives prevents desired performance.	▪ Senior management is sufficiently familiarized with plans. ▪ Periodic progress monitoring practice in line with the M&E framework is ensured and proactive troubleshooting is applied; benchmarks to be integrated in IMIHIGO. ▪ Sufficient human resources are allocated to tasks and solid project management leadership is ensured.
6. Staff and leadership is sufficiently competent to implement tasks.	▪ Baseline skills assessments are conducted in early stages of implementation, gaps are filled via tailored trainings.
7.Complex sourcing, tendering procedures and unsatisfactory vendor performance will cause delays.	▪ Tendering, vendor selection processes are effectively planned, monitoring of various projects' progress is ensured.

ACRONYMS

API	Application Programming Interface
BPR	Business Process Reengineering
CSR	Corporate Social Responsibility
CV	Curriculum Vitae
DA	Data-Analytics
EA	Enterprise Architecture
EGDI	eGovernment Development Index
ESB	Enterprise Service Bus
FBO	Fixed Base Operator
FDT	Facilitated Development Team
FGD	Focus Group Discussions
GaaP	Government-as-a-Platform
GC	Governance Cluster
GCC	Government Command Center
GIP	Government Interoperability Platform
GIZ	Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH
GOR	Government of Rwanda
G2G	Government-to-Government
G2C	Government-to-Citizen
G2B	Government-to-Business
HLSC	High Level Steering Committee
ICT	Information Communication Technologies
IFMIS	Integrated Financial Management System(s)
IPPIS	Integrated Payroll and Personnel Information
IREMBO	Rwanda online – National Portal for Electronic Administrative Services
ITIL	Information Technology Infrastructure Library
ITU	International Telecommunications Union
KPI	Key Performance Indicators
KM	Knowledge Management
LODA	Local Development Agency
M&E	Monitoring and Evaluation
MEIS	Monitoring and Evaluation Information System
MIFOTRA	Ministry of Public Service and Labour
MINADEF	Ministry of Defense
MINAGRI	Ministry of Agriculture
MINALOC	Ministry of Local Government
MINICT	Ministry of Information Communication Technologies and Innovation
MINIJUST	Ministry of Justice
MIGEPROF	Ministry of Gender and Family Promotion
MoU	Memorandum of Understanding
NIDA	National Identification Agency

NST	National Strategy for Transformation
OpEx	Operating Expense
PFMS	Public Financial Management Systems
PKI	Public Key Infrastructure
PMO	Prime Minister's Office
PPP	Public Private Partnership
RDB-RIAM	Rwanda Development Board
RGB	Rwanda Governance Board
ROI	Return on Investment
RISA	Rwanda Information Society Authority
RURA	Rwanda Utilities Regulatory Authority
SAP	Service Access Points
SDG	Sustainability Development Goals
SLA	Service Level Agreement
SEW	Single Electronic Window
SMART	Service-oriented, Modern, Accountable and Real-Time Government
SRMP	Smart Rwanda Master Plan
TOGAF	The Open Group Architecture Framework
TOR	Terms of Reference
UCD	User Centric Design
WG	Working Group

DEFINITIONS

Authentic source - is an information that is stored only once in an authorized public agency and which is believed to be correct, so can serve as a basis for usage.

'Base registry' refers to a trusted and authentic source of information under the control of a public administration or organisationappointed by government. Base registries are reliable sources of basic information on areas such as persons, companies, vehicles, licences, buildings, locations and roads and are authentic, authoritative and form, separately or in combination, the cornerstone of public services'[18].

'Base registry owner' refers to the organization that is the appointed controller of data in the base registry.

Basic data: Base registries' data is sometimes referred to as 'basic data'.

Big Data refers to extremely large volume of data or datasets in structured, semi-structured and unstructured format that may be computationally analyzed to reveal patterns, trends, and associations using machine learning projects and other advanced analytics applications.

Building-Block Approach. An approach to building information systems from architecture to implementation in which the information system is designed as an assembly or aggregation of components that encapsulate data and functionalities in groups that can also be reused as 'building blocks' to build other public services or information systems.

Business Process Reengineering (BPR) is a business management strategy focusing on the analysis and design of workflows and business processes within an organisation. BPR aimed to help organisations fundamentally rethink how they do their work in order to improve customer service, cut operational costs, and become better Government for a country.

Change Management is an IT services management strategy in which a systematic approach ensures the efficient and seamless flow of change in an organization's IT infrastructure and related processes. These may include systems, standard operating procedures, organizational structure, job roles. Change management helps all involved parties, individuals and teams, to move from a current state to the next desired state. Change management also helps to minimize the impact of related incidents on service.

Chief Data Officer public employee that oversees data governance, improves data quality and data analytics, promotes data-driven government excellence, innovation and digital data analytics literacy within and across institutions.

Cybersecurity or information technology security (IT security) is the protection of computer systems from the theft of or damage to their hardware, software, or electronic data, as well as from the disruption or misdirection of the services they provide. Information security management of the Digital Government shall be based on the requirements established by the ISO/IEC 27001:2013 standard.

Data Privacy or information privacy is the relationship between the collection and dissemination of data, technology, the public expectation of privacy, legal and political issues surrounding them. The objective of data privacy is to enable appropriate use of data while protecting an individual's privacy preferences and their personally identifiable information.

Data Protection legislation should be enacted by the Parliament and should aim to protect the privacy and personal data of individuals. It should regulate the process personal information is acquired, kept, used or disclosed by data controllers and data processors by requiring compliance with certain data protection

[18] Source: European Interoperability Framework 2.0.

principles. Non-compliance with provisions of the legislation should attract either civil liability, or criminal sanctions, or both, depending on the nature of the infraction.

Data analytics is the process of transforming, organizing and extracting meaning from raw data into usable and meaningful information for a targeted purpose using specialized computer systems and data-handling methods.

Data-driven government is the use of actionable, purposeful data by government to make critical decisions when and where needed.

Data visualization is the graphical representation of raw data and information using visual elements like charts, graphs, infographics, heatmaps, data visualization tools in order to provide an accessible way to see and understand trends, outliers, and patterns in (government-generated) data.

Digital Inclusion means empowering people, especially those with special needs or the socio-economically disadvantaged, people living in rural areas, persons with disabilities, women and youth through the promotion of accessible, affordable and easy to use ICT.

Digital Literacy the ability to access, manage, understand, integrate, communicate, evaluate and create information safely and appropriately through digital devices and networked technologies for participation in economic and social life. UNESCO's Digital Literacy Global Framework (DLGF) is used to national levels of digital literacy.

Digital Skills refer to an advanced level of digital proficiency that allows an individual to perform specialized and complex functions in Information and Communication Technology and related fields.

E-Governance is a composite term for the regulation, policy frameworks, systems and practices that enable ICT to support government administration, government interactions with citizens and private sector, but also for improving democratic processes.

E-Government is the integrated and implemented use of ICT to pursue effectiveness and efficiency in the execution of a full range of government functions and operations namely linked to the delivery of government services to citizens and businesses.

Electronic Identification (eID) is a digital solution for proof of identity of citizens or other individuals in view to access online services provided by government or private sector entities (banks, e-commerce etc). Apart from online authentication and login, electronic identity services also should give users the option to sign electronic documents with a digital signature. Technically, a digital identity is information on an entity used by computer systems to represent an external agent (individual). PKI technology must be used to secure the digital identity information. The information contained in a digital identity allows for assessment and authentication of a user interacting with a business system on the web, without the involvement of human operators. Digital identities allow access to computers and the services they provide to be automated, and make it possible for computers to mediate relationships.

Enterprise Architecture. Enterprise Architecture is about the coherent design and modelling of all organisational perspectives:

- Business Perspective (processes, roles, abstract business objects such as citizen, company, subsidy etc.)
- IT Perspective (IT systems, data, programs, IT integration, data transport, etc.)
- Physical Perspective (hardware, network, data centre, physical goods, tools, transport, etc.)

An 'enterprise' is a coherent landscape that can be divided in business, application and technology layers (roughly: people, software and hardware) and Enterprise Architecture is a discipline about modelling and managing all of them.

End-to-end. The notion behind the end-to-end principle is that, for two processes communicating with each other via communication means, the reliability obtained from that means cannot be expected to be perfectly aligned with the reliability requirements of the processes. Business service, which is delivered in the end-to-end fashion is aligning all involved processes into seamless sequential process hiding complexity from user and providing end-result as soon as possible without interruptions.

E-Service. Electronic services are services which use of information and communication technologies (ICTs). The three main components of e-services are- service provider, service receiver and the channels of service delivery (i.e., technology). In our context public agencies are the service provider and individuals as well as businesses are the service receiver. The channel of service delivery is the third requirement of e-service. Internet is the main channel of e-service delivery while other channels (e.g. telephone, call centre, public kiosk, USSD mobile phone, television) are also considered.
Electronic record is structured information in electronic form produced by a software application or as a result of digitisation, e.g. paper scanning.

Interoperability is an ability of disparate and diverse organisations to interact towards mutually beneficial and agreed upon common goals, involving the mutual sharing of information and knowledge, through the business processes they support, by means of the exchange of data between their respective ICT systems.

Interoperability framework refers to a set of rules for interoperability among organisations that wish to work together towards the joint delivery of public services. It specifies a set of common elements such as vocabulary, concepts, principles, policies, guidelines, recommendations, standards, specifications and practices. Interoperability addresses needs for:

1. **cooperation** among public administrations with the aim to establish public services;
2. **exchange of** information to fulfil legal requirements or political commitments;
3. **sharing** and reusing information to increase administrative efficiency and cut red tape for citizens and businesses.

Interoperability Governance covers the ownership, definition, development, maintenance, monitoring, promoting and implementing of interoperability frameworks in the context of multiple organisations working together to provide (public) services. It is a high-level function providing leadership, organisational structures and processes to ensure that the interoperability frameworks sustain and extend the organisations' strategies and objectives.

Knowledge Management is the practice of identifying, creating, capturing, evaluating, sharing and managing the knowledge and information assets of an organisationto achieve organisational goals. Information assets may include databases, documents, reports, policies but also staff expertise, captured experience and institutional learning from policy and program implementation.

Once Only principle is an e-government concept that aims to ensure that citizens, institutions, and companies only have to provide certain standard information to the authorities and administrations once. By incorporating data protection regulations and the explicit consent of the users, the public administration is allowed to re-use and exchange the data with each other. The once-only principle helps to reduce administrative burdens in public administration, as exchanging information that has already been collected is cheaper and less burdensome than collecting and storing

Open Data is the publication of data in order for it to be freely accessed, used, modified and shared by anyone for any purpose. *Legally open* refers to data being available under an open (data) license with the conditions for re-use being limited to designated attribution while *technically open*: refers to data that is machine readable and in non-proprietary format, hence free to access for anybody with the file format and its content not being restricted to a particular non-open source software tool.

Prototyping. A prototype is an early sample, model, or release of a product built to test a concept or process. In the process of developing Digital Government it is necessary to prepare and agree with end users as early as possible a Visual Prototype of target solution. Such prototype should represent the appearance (but not the functionality) of the intended design – this is the only reliable way to ensure common understanding of requirements between user and developer.

Public Key Infrastructure. A public key infrastructure (PKI) is a set of roles, policies, hardware, software and procedures needed to create, manage, distribute, use, store and revoke digital certificates and manage public-key encryption. The purpose of a PKI is to facilitate the secure electronic transfer of information for network activities. It is required for activities where simple passwords are an inadequate authentication method and more rigorous proof is required to confirm the identity of the parties involved in the communication and to validate the information being transferred. PKI consists of:

- A certificate authority (CA) that stores, issues and signs the digital certificates
- A registration authority (RA) which verifies the identity of entities requesting their digital certificates to be stored at the CA
- A central directory – a secure location in which to store and index keys
- A certificate management system managing things like the access to stored certificates or the delivery of the certificates to be issued.
- A certificate policy stating the PKI's requirements concerning its procedures; its purpose is to allow outsiders to analyse the PKI's trustworthiness.

Service. Issuing a certificate is not a service. A service is something that brings actual value to a user. A certificate is only needed to prove some important fact, for instance:

- According to law, person A can receive service B from agency X only if he or she proves some important fact C, which is stored in agency Y.
- In order to do that, person A goes to agency Y, which issues a certificate regarding fact C (that can be done using online service as well).
- Person A then goes back to agency X to submit certificate C, and receives the service B.

If we want to simplify administration and use the once-only principal, then agency X should look up the fact C directly in agency Y's database when person A requires service B.

Smart Government uses ICT to facilitate and support better planning and decision making, including the improvement of democratic processes and transforming the ways that public services are delivered. Smart Government is citizen centric, data driven, performance focused, calling for the use of innovative policies, business models, and technology to address the financial, environmental, and service challenges facing public sector organizations.

Smart Procurement is the process of finding and agreeing to terms, and acquiring goods, services, or works from an external source, via bidding process, which is enabling to find:

1. optimal solution for very complex IT systems and components of Digital Government and
2. sustainable cost and quality control over complete life-cycle of the solution
3. means for appropriate knowledge transfer to public administration

Smart Procurement is based on the understanding that often due to the complexity of IT systems in public sector purchaser has only vague idea about needed target solution and enables to apply iterative process of cooperation with potential providers sequentially elaborating and testing different aspects of emerging solution.

Software Architecture is a fundamental structure of a software system and the process of creating such structures and systems. Each structure comprises software elements, relations among them, and properties of both elements and relations. Software architecture as a process aiming to convert software characteristics

such as flexibility, scalability, feasibility, reusability, and security into a structured solution that meets the technical and the business expectations.

Trustworthiness is a degree to which a system (including the components that are used to build the system) can be expected to preserve the confidentiality, integrity, and availability of the information being processed, stored, or transmitted by the system across the full range of threats. A trustworthy information system is a system that is believed to be capable of operating within defined levels of risk despite the environmental disruptions, human errors, structural failures, and purposeful attacks that are expected to occur in its environment of operation.

User Centered Design (UCD): outlines phases throughout a design and development life-cycle of a public service all while focusing on gaining a deep understanding of who will be using the product and focusing on security and convenience, and the site's compliance with international standards of accessibility. Regulated under ISO 9241-210:2010.

User Experience (UX) refers to a person's emotions and attitudes about using a particular product, system or service. It includes the practical, experiential, affective, meaningful and valuable aspects of human–computer interaction and product ownership. Additionally, it includes a person's perceptions of system aspects such as utility, ease of use and efficiency. User experience is subjective in nature to the degree that it is about individual perception and is always with respect to a system. Also, user experience is about how a user interacts with, and experiences, a product.