

SUMMARY FINDINGS FROM NATIONAL CONSULTATION IN KENYA



This report summarizes inputs gathered from participants in the EAC Digital Strategy National Consultation meeting that took place in Nairobi in January 2023. Information is supplemented by additional material online where available.

The report is organized into sections as follows:

- **Policy and regulatory environment** - highlights existing strategies, policies and laws
- **Key stakeholders** - lists key institutions and their roles with respect ICTs
- **Overview of digital assets and capabilities** - provides a high level narrative of assets and capabilities around digital applications and service architecture, as well as data collection, management, use
- **Detailed inventory of digital assets by sector** - full list of priorities, applications, and tools for developing digital applications
- **Technology and workforce considerations** - describes basic power, connectivity, and workforce considerations that relate to the enabling environment for digital applications

Information gathered through the national consultation will inform the EAC Regional Digital Strategy by allowing identification of existing assets that may contribute to regional digital applications, identification of common needs across countries, shared priorities for future investments, and existing resources to inform feasibility of a regional digital platform. Please review and provide suggested edits or additional information in “Suggesting” mode no later than **March 14, 2023**.

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EAC DIGITAL STRATEGY NATIONAL CONSULTATION:

KENYA

Summary: The Government of Kenya has developed numerous resources to support the use and evolution of digital applications and services in the public sector. The ICT Authority (ICTA), which is under the Ministry of ICT, plays a large role in the design, development and implementation of ICT projects, including developing and managing the Government Enterprise Architecture Framework. Sectors rely on ICTA resources and existing laws, policies, and guidelines to support digital development; none have produced separate, sector-specific enterprise architectures to date. Kenya continues to develop its regulatory environment for ICTs. The recently established Office of Data Protection Commissioner operationalized the Data Protection Act, 2019 to regulate the processing of personal data, provide data privacy, protection, and provide data subjects with rights and remedies with continuing efforts to support compliance. Kenya continues to invest in extending electricity to rural areas and increasing digital infrastructure and has made significant strides towards increasing ICT literacy, capacity, and innovation through a variety of public and private initiatives.

Policy and Regulatory Environment for ICTs

Kenya has multiple national foundational documents guiding policy and investments in ICT and relevant aspects of the enabling environment. The Kenya Vision 2030 underpins all sectors activities towards the goal of becoming an “industrialized middle income country offering a high quality of life to all our citizens.” The Vision is being implemented through successive five-year medium term plans and is in the [Third Medium Term Plan \(2018-2022\)](#) (MTP III).

The [Kenya Digital Master Plan 2022-2032](#) (KDMP) builds on the MTP III to further develop and strengthen Kenya’s ICT ecosystem. The KDMP, also known as the Kenya Digital Blueprint articulates the current 10 year plan for ICT development. It follows from numerous previous policy documents supporting ICT advancement, including the ICT Master Plan (2014-2017), the National ICT Policy (2020) and the Digital Economy Blueprint (2019). The KDMP includes many strategic objectives built around four pillars: 1. digital infrastructure, 2. digital government service, product and Data Management, 3. digital skills, and 4. digital innovation. There are also two strategic themes, 1. policy, legal and regulatory framework and research and development and 2. information security, cyber management and emerging technologies.

The KDMP is fully costed for the 10 years and outlines the sources of funding, including domestic resources, PPPs, allocations from Kenya’s Universal Service fund and continued support from development partners. The KDMP proposes government structure changes and an institutional framework for Kenya National Digital Master Plan Governance to include Ministries, Counties, and Agencies (MCAs) and the coordination of many Government departments, public and private institutions as well as the civil society.

Data protection policies. Kenya has a data protection policy that culminated in and passed a Data Protection Act in 2019 to codify general data protections. In 2020 Kenya established and operationalized the Office of Data Protection Commissioner (ODPC). The Commissioner immediately

began drafting the current [Strategic Plan \(2022/23 - 2024/25\)](#). The key strategic areas are awareness creation, regulatory services, institutional capacity development with several sub-strategies such as a resource mobilization strategy and a phasing and sequencing strategy among others.

Regulations guiding the ODPC require persons processing personal data to comply with the principles in the 2019 Data Protection Act as well as a series of regulations that followed in 2021. This includes a specific regulation that requires those sharing public data to register with the ODPC as a data controller or data processor prior to sharing data. The ODPC is also responsible for assessing public or private bodies compliance and carrying out inspections of public and private entities to evaluate compliance of the processing of personal data.

The ODPC has a Data Protection Impact Assessment (DPIA), which is performed when there is a “high risk to the rights and freedoms of data subjects” from data processing. The DPIA describes a process designed to identify risks arising out of the processing of personal data and to minimize these risks as far and as early as possible. There are also guideline documents and a process to file a data protection and privacy complaint.

The Data Protection Act and its regulations set out requirements for [sharing personal data across borders](#), which generally require that recipients can adhere to comparable data protection levels as set for in the act. For certain data, including data from identity and civil registration systems, electronic payment systems, revenue administration, and management of health data, at least one copy needs to be stored in a data center within Kenya’s borders. Digital applications sharing Kenya MCDA’s data to support regional data-driven applications would need to comply with ODPC policies mechanisms, particularly registering as controllers and data processors with ODPC.

The [Computer Misuses and Cybercrimes Act, 2021](#) protects the confidentiality, integrity and availability of computer systems and data to prevent the unlawful use of computer systems, to provide procedures to be used when investigating cybercrimes, and to create the framework and outlines the procedures for regional and international cooperation in investigations into cyber-crimes. The Act defines certain crimes as 'computer' and 'cybercrimes', and offenses.

Governance Bodies and Key Stakeholders

There are multiple key stakeholders and governing bodies in Kenya for ICT and the development of digital services within the public sector. Several key agencies that would be involved in the development and implementation of new digital applications and integration with a regional platform include:

- **Ministry of Information Communication and the Digital Economy**, which is in charge of formulating policies and laws that regulate standards and services in the ICT sector, as well as developing and administering ICT standards; while providing oversight of the key Semi Autonomous Government Agency (SAGAs) under the Ministry;
- **Ministry of Education’s Kenya National Innovation Agency (KeNIA)**: manages the national innovation system, which includes significant digital innovation;
- **Communication Authority of Kenya (CAK)**: primary regulatory body for communications sector;
- **Office of the Data Commissioner (ODPC)**: newly commissioned office that plays a key role in implementing data protections;
- **ICT Authority (ICTA)**, which is under the MICT and in charge of streamlining government ICT functions. It is the primary agency mandated to develop and enforce ICT standards in government and enhance the supervision of its electronic communication, along with

implementing the newly approved KDMP. ICTA plays a large role in the design, development and implementation of critical ICT projects, including developing and managing the Government Enterprise Architecture Framework. They also promote ICT literacy, capacity, and innovation and employ and manage all public service ICT staff. This is done through the coordination of a robust number of departments including: Dept. of Standards, Dept. of Innovation, Dept. of ICT Capacity, the Digital Literacy Program (DLP), Dept. of Information Security, Application and Systems Department, and the ICT Infrastructure Department.

Outside of government, a key stakeholder in the digital ecosystem is Kenya Private Sector Alliance (**KEPSA**) as they represent the private sector's interest with government, development partners and other stakeholders on cross-cutting policy issues and programs for Social – Economic Development of the Country. They support businesses with opportunities for training, networking, financial linkages, access to markets along with sectoral representation with each sector of government, acting similar to a parastatal organization.

OVERVIEW: DIGITAL ASSETS AND READINESS

CONSIDERATIONS

eGovernment resources and enterprise architectures. The KDMP provides an overall plan for the country with ICTA acting as the implementing enforcing agency. ICTA developed the [Government's Enterprise Architecture \(GEA\) Framework](#) which defines the minimum components of an ICT Plan, and provides a generic and minimum standards to be applied across MCAs. The GEA provides detailed principles for sectors to adopt across all EA domains, and defines compliance requirements for design, installations and management of all government software and applications. Additional supporting GEA documentation includes the following guidelines: Infrastructure Standard (Networks, Cloud, End user Computing Device, Data Centre), Information Security Standard, Electronic Records and Data Management Standard, IT Governance Standard, Systems and Application Standard, and ICT Human Capacity Development Standard. These are widely used by specific sectors as detailed further below.

Architectures to guide development of digital services and applications. National consultation participants reported using ICTA's GEA in the development of digital services and applications. Further contextualization of this framework for specific sectors has not been done. All sectors have multiple scaled applications, aside from Climate, which are located in the Sector-Specific Priorities and Assets table below.

Sector-specific digital strategies. The health, education, and eCommerce sectors have sector-specific strategies or policies that offer additional guidance on the development and use of the digital applications within their sectors. Further, multiple sectors are using the guidance in the GEA. The health sector has the longest history with digital strategies and is utilizing the [Kenya National e-Health Strategy \(2011-2017\)](#). The strategy articulates the development of a health Enterprise Architecture framework by 2012. While the MOH has not yet developed a health-specific EA, it is following ICTA mandated ICT standards and guidelines.

The Education sector developed the [Policy on Information and Communication Technology in Education and Training](#) in 2021, guiding ICT integration in education and training. Implementation is ongoing under the mandate of the Ministry of Education (MoE). The policy applies to all pre-primary, primary and secondary schools, as well as vocational training institutions and universities.

The Ministry of Industrialization, Trade and Enterprise Development (MoITED) has a draft Kenya National E-Commerce Strategy that is currently being circulated for comment. Six core pillars underpin the strategy: law and regulation, information technology, telecommunications and power, trade facilitation and logistics, e-payments, skills and human capacity, and access to finance.

The agriculture sector has not yet developed a digital strategy though participants at national consultations referenced efforts to develop an Agriculture Coordination and Digitisation Strategy. The climate sector does not yet have a sector specific strategy or plan around ICT.

Interoperability. ICTA's [Government Standards - Systems and Application Standards](#), Second Edition 2019 provides detailed guidelines for MCDAs to develop both an Interoperability Framework and Systems Integration Standards.

The health sector is the only sector with an interoperability framework, which is currently under review. The [Kenya Health Information Systems Interoperability Framework](#) (KHSIF) lays out principles, governance structures, the legal and regulatory environment, standards, oversight and accountability structures and processes.

The Kenya Revenue Authority (KRA) is the only organization with an implemented ESB as revenue data sharing is required with the various MDCAs and the over 200 government e-services. However, all sectors have a practice of sharing system data through APIs with internal stakeholders and other MCDAs. Absent APIs, sectors share data using Excel and CSV files via email.

Data governance. No sector has specific data governance mechanisms in place. However, the ODPC is developing legislation to support data governance. The legislation will likely support the ODPC's current strategic objectives, which include an effort to implement a citizen services charter, which may be particularly relevant for emerging services relying on citizen-generated data.

Data management processes. All sectors aside from Agriculture and Education lack a sectoral data management strategy or policy. [The Ministry of Agriculture, Livestock, Fisheries and Cooperatives \(MoALFC\) 2022 - Data Governance Framework](#) follows guidelines in the Data Protection Act and policies set forth at ODPC. The Data Governance Framework contains guiding principles and policies for data collection, handling, processing and sharing amongst stakeholders while ensuring personal farmer data is secure and kept confidential. Agriculture is the only Ministry with a Data Governance Framework.

All MDAs in Education have data management guidelines and SOPs to support data collection. The data management guidelines are aligned to the Data Protection Act, 2019 and corresponding regulations. The operational guidelines are fully implemented and consistently enforced to ensure data collected are clean and factual to support decision making.

The trade sector reported using a combination of data management strategies from the Ministry of ICT and localized data management strategies from International Trade Centre.

Data quality and utilization. Most sectors collect data manually and electronically with standardized procedures and protocols in place. Education data quality mechanisms include Data Stewards who ensure that data quality checks are performed. Additionally, periodic data quality reviews are conducted throughout the sector. Due to challenges of “dirty” data on civil registration data, e.g., birth certificate duplicates, the sector is unable to consistently rely on data for pupil registration. The Education consistently utilizes data through the use of dashboards (visualization charts), PowerBI, and various reports on capitation for pupils and schools.

The Health sector utilizes aggregate data stored in DHIS2 through DHIS2 analytics and dashboards. Additionally, annual statistical reports are generated and utilized according to international agreements with donors. Trade, Climate, and Agriculture did not report data quality mechanisms; however, reports of data utilization were mentioned.

National data sharing mechanisms. Following the introduction of the Data Protection Act and its implementation, sharing of personal data is subject to additional regulations. The ODPC offers templates and documentation to guide a protocol for sharing data between data controllers and processors sharing data with external parties. All sectors represented at the National Consultation were aware of the existence of ODPC and its requirements for registering data handlers and processors. Templates and guiding documentation is available on the ODPC website to assist sectoral data users with national data sharing policies and processes. Due to the recent operationalization of the ODPC, it has yet to create the compliance mechanisms.

Sectoral data sharing. All sectors including agriculture and climate receive data sharing guidance from the ODPC in lieu of a sector-specific data sharing policy or standardized agreement. Participants from some sectoral ministries acknowledged the need for additional resources and/or sector specific guidance. For example, health is currently drafting a health-specific data protection policy, though they are compliant with the broad data protection laws and regulations. The education sector recognizes the need to develop structured agreements for data exchange between institutions, pointing to the need of the ODPC to operationalize awareness and compliance mechanisms.

Nonetheless, there are multiple examples of data sharing between ministries already occurring. The education sector has agreed with the Ministry of Health on programs with data that could be shared e.g., pupil health records (deworming), insurance. The Trade sector has an MOU between African Trade Observatory and The State Department for Trade and KRA on the sharing of data and a MoU between Kenya National Bureau of Statistics (KNBS) and the KRA on exchange and dissemination of trade data.

Kenya-EAC Data Sharing. There are several instances of sharing data between line ministries in Kenya and EAC bodies. Trade is sharing data with the EAC for its Single Customs Territory (SCT) platform. The Education sector acknowledged agreements among the Council of Ministers to share data among member states. There are two (2) entities of IUCEA and EASTECO under the education sector which share and collaborate on several data requirements in the fulfillment of their mandate. Within the health sector, Kenya shared negative COVID-19 test data of truck drivers with EAC to facilitate movement of goods across borders (though health data outside this instance is not routinely shared). The agriculture and climate sector representatives were unaware of any data sharing with the EAC.

Data Centers and Servers. Each sector has differing data servers fulfilling its needs and are detailed below in the Sector-Specific Priorities and Assets table. The [Konza National Data Center](#) hosts public

and private data data in a Tier III data facility. ICTA also hosts MCDA data. Some sectors use their own data servers in conjunction with other government or partner hosting entities.

RELEVANT PRIORITIES AND ASSETS FOR A REGIONAL DIGITAL PLATFORM

Country-level assets and resources can offer critical foundations for the development of a regional platform following an enterprise architecture approach. This section provides a snapshot of several types of such assets, including:

- **Key strategic documents** that outline specific EA resource documents that may serve as models for the region, as well as any sector-specific priorities that can inform selection of use cases for the platform.
- **Existing applications** already in use in-country that could be considered for further scale or inform similar regionally relevant applications.
- **Tools or building blocks** that can support future application development such as:
 - resources for **creating interoperability** between digital system such as registries, data dictionaries, and interoperability frameworks
 - resources to **support sharing data across systems** including data sharing protocols, data standards, and data security standards
 - **infrastructure that could support existing and future digital applications** including data warehouses, data centers, and relevant infrastructure standards that may be helpful for harmonizing infrastructure-sharing agreements.

The tables below capture assets at a national, sector-agnostic level, as well as those within specific sectors.

Sector-Agnostic Resources

Asset	Details
Overarching guidance for e-Services applicable to all sectors	
Government Enterprise Architecture	Defines Government-wide Enterprise Architecture principles and provides guidelines on how to implement the GEA Framework in MCAs.
Systems and Application Standards	Describes standards for developing (or purchasing and installing) and maintaining/ managing computer applications for administrative purposes in Government
National digital identity	Kenya National ID Registry collects biodata for national residents
IT Governance Standard	Sets out principles, definitions and a high-level framework that Kenya's MDAs can use to better align their use of IT to meet their legal, regulatory and ethical obligations.

ICT Human Capacity Development Standard	<p>This Standard enhances the opportunities for Outlines the specifications required in setting up Government data centers. Specifying designs of physical locations, cabling infrastructure, physical security, and environment (Cooling, power and lightning, fire detection and suppression) interoperability of public service ICT resources ensures uniformity in skills and competencies and guaranteeing the uniform quality of government services everywhere and all the time.</p>
Tools to support the development of digital services and applications	
Data management resources	Electronic Records and Data Management Standard
Interoperability platforms or frameworks	ICTA's Government Standards - Systems and Application Standards include guidance for interoperability .
Data security resources	Information Security Standard
Technology infrastructure	<p>Technology Infrastructure Standards:</p> <ul style="list-style-type: none"> • Infrastructure Standard (Networks, Cloud, End user Computing Device, Data Centre) <p>Data Centers and Servers</p> <ul style="list-style-type: none"> • Data Centre Standard: Outlines the specifications required in setting up Government data centers. Specifies designs of physical locations, cabling infrastructure, physical security, and environment (e.g., cooling, power and lightning, fire detection and suppression)

Agriculture & Climate

**Assets from the agriculture and climate sectors are combined in the table below given that climate change and adaptation activities are often related to agriculture objectives and climate is relatively nascent as a sector. Where there were any specific assets related to climate change or adaptation reported, they are highlighted in green below.*

Asset	Details
Sector-specific digital priorities and strategies	

<p>Draft Agriculture Coordination and Digitisation Strategy - <i>unable to confirm status or review</i></p>	<p>The strategy seeks to address three key challenges:</p> <ul style="list-style-type: none"> ● Catalyzing the research and innovation space in agriculture, including around use of big data and advanced analytics (AA) ● Enabling more reliable access to usable and shareable data ● Demanding for quality analyses to support evidence-based decisions on performance management, M&E, research, and policy.
<p>Agriculture Sector Transformation and Growth Strategy (ASTGS) 2019-2029</p>	<p>Priorities related to digital are to ensure that agriculture data is available, usable, timely, and interoperable.</p> <p>It recognizes the importance of having both traditional data such as censuses and surveys in addition to other innovative data sources.</p>
<p>State Department for Livestock Strategic Plan 2018-2022</p>	<p>The Strategic plan is embedded in the Ministry of Agriculture Livestock, Fisheries and Cooperatives. There are no specific priorities for digitalization of the sector.</p> <p>However, there is mention of the following:</p> <ul style="list-style-type: none"> ● Promotion of adoption of new technologies in livestock production ● Promotion of technology uptake and commercialization ● Digitization of farmer registration, livestock market information system, certification and livestock identification and traceability. There are no strategic objectives related to these efforts.
<p>Ministry of Environment and Forestry Strategic Plan 2018-2022</p>	<p>The newly created Ministry of Environment, Climate Change and Forestry does not yet have a digital strategy. There is no mention of technology or digital transformation in the strategic plan. The Ministry is in the Process of reviewing the Strategic plan in line with the Digitization agenda, Environmental Multilateral Agreements, Climate Change policies and World Meteorological Organization Convention.</p>
<p>Services or functionalities to be digitized (Agriculture)</p>	<ul style="list-style-type: none"> ● Warehousing receipt generation ● Farmer registration ● Livestock tagging ● Foodstock cooperatives registration ● Breeder's registration ● Digitization of Kenya Dairy Board data (e.g., on a dashboard)

Services or functionalities to be digitized (Climate)	<ul style="list-style-type: none"> • Environmental management functions • e-waste regulations
Notable digital applications	
Mobile Farmer Applications	<p>The Kenya Agricultural and Livestock Research Organisation has developed a list of 58 mobile farmer applications to assist in the production of crops and livestock and market platforms. The site reports on version history, number of downloads, required permissions, but does not record active usage or user reviews. A sample of apps are listed below:</p> <ul style="list-style-type: none"> • Beans Platform • Control MZN Disease • Kenya AgriObservatory Platform • KALRO Vaccine Expat
Kenya Agricultural Observatory Platform (KAOP)	Provides weather forecasts, agronomics content for farmers, and actionable information and predictions that help farmers make better decisions.
KEFRI App	The Kenya Forestry Research Institute has developed a tree species to site matching tool to help farmers plant the correct tree species to the environment.
Kenya Agro-Weather & Market Advisory System (KAMAS)	KAMAS provides the same data as KAOP with an addition of market data to assist farmers in increasing their access to markets and secure benefits from commercialization.
Catalog of Pollutants	The National Environment Management Authority has a portal (registered users only) with a catalog of pollutants.
Tools to support development of digital services and applications	
Registries	National Farmer Registry National Land Registry Crop Registry
Interoperability Platforms or Frameworks	ICTA provides MCDAs to adopt a Government Interoperability Framework (GIF) from the Government ICT Standards document, See Annex 7: Interoperability.
Data Sharing Mechanisms	Agriculture and climate receive data sharing guidance from the ODPC in lieu of a sector-specific data sharing policy or standardized agreements.

Data Standards	Agriculture and climate acknowledged they have not adopted data standards from the GEA; however, they adopt some international data standards as needed.
Data Servers and Centers	Agriculture hosts data at the Konza National Data Center. Agriculture is also hosting data in-country using SATA server technology.
Sector-Specific Technology Infrastructure	The sectors are following the approved Communications Authority (CA) specifications and process for "type approving and accepting communications equipment meant for use" in the sectors.

Health

Asset	Details
Sector-specific digital priorities and strategies	
Kenya National e-Health Strategy (2011-2017)	<p>The following five key strategic areas form the pillars of the e-Health Strategy:</p> <ul style="list-style-type: none"> ● Telemedicine ● Health Information Systems ● Information for Citizens ● M-Health ● E- Learning <p>The pillars are divided into five functional domains:</p> <ul style="list-style-type: none"> ● Patient Centric Information ● Pharmacy and Medical Supply Chain Information Management ● Financial Information, including Insurance and Payments ● Health Workforce Management, and Training ● Regulation <p>The health sector adopted the OpenHIE framework in the Interoperability Framework to further contextualize the application architecture for the health sector. There are no imminent plans to develop a full Enterprise Architecture Framework.</p>

Data quality and data use	<p>The Kenya Health Sector Data Quality Assurance Protocol (2014) provides data quality protocols. Participants advised the document requires updating to encompass digital systems.</p> <p>DHIS2 provides aggregate health data through embedded analytics and dashboards to visualize the data collected. Annual statistical reports are also done</p> <p>The Kenya Health and Research Observatory (KHRO) provides a portal “to improve the availability and use of information, evidence on health status and trends for policy dialogue, and to monitor, and evaluate the implementation of national strategies and plans.”</p>
Services or functionalities to be digitized	<ul style="list-style-type: none"> • Digitize a collection of digital health applications and services, e.g., a digital health platform • Unique patient identification
Notable digital applications	
KHIS	<ul style="list-style-type: none"> • Collects routine aggregate health data from the community and health facility level.
KHIS-Tracker	<ul style="list-style-type: none"> • Collects important events at health facilities, e.g., event data on morbidity and mortality, adverse events following immunization, maternal and perinatal death.
Chanjo	<ul style="list-style-type: none"> • Collects covid-19 vaccination data; patient-level vaccination data is collected for longitudinal data.
M-dharura	<ul style="list-style-type: none"> • An event based surveillance system collecting ad hoc data on occurrences of diseases, conditions and any events of public health. • It also assesses and interprets the events data
EARS	<ul style="list-style-type: none"> • Collects occurrence of diseases, conditions and any events of public health to respond to emergencies that occur at personal level.
DAMU	<ul style="list-style-type: none"> • An integrated blood information system collecting blood donor, donor recipient, and blood data.
Tibu	<ul style="list-style-type: none"> • A TB EMR management system providing longitudinal patient level data for TB treatment.
Health applications under development	<ul style="list-style-type: none"> • Upgrade of kenya master facility list to a registry

	<ul style="list-style-type: none"> • Terminology Services, to be the National Data Dictionary for Kenya • Digitization of Integrated Disease Surveillance and response tools to ride in the Kenya Health Information System. • Unique Patient Identification (UPI) system.UPI Framework
Tools to support development of digital services and applications	
Registries	<ul style="list-style-type: none"> • Kenya Master Health Facility list (not digitized) • Kenya Master Community List <p>Under Development:</p> <ul style="list-style-type: none"> • Digitization of Integrated Disease Surveillance and Response (IDSR) tools with integration with Kenya Health Information System • Shared Health Record • Health Workforce Registry • Kenya Master Health Facility Registry • Stakeholder and Partners' Registry • Health Product & Technologies Registry • Client Registry
Digital data collection tools	<ul style="list-style-type: none"> • Key health data is collected manually during routine health service delivery at health facilities and at the community level. • Key health data is reported into the Kenya Health Information System.
Interoperability platforms or frameworks	<ul style="list-style-type: none"> • The Kenya Health Information Systems Interoperability Framework (KHSIF) lays out principles, governance structures, the legal and regulatory environment, standards, oversight, architectural specifications, and accountability structures and processes. • Compliance with the KHISIF is mandatory for all HIS system owners, meaning all HIS system owners are required to use those technical specifications (based on OpenHIE) and matured common services, guidelines, shared health digital infrastructure, and procedures specifications listed in the KHISIF document library. • The Health Informatics TWG coordinates the certification process for all HIS through the Kenya HIS certification framework.
Data sharing mechanisms	<ul style="list-style-type: none"> • Relies on guidance from ODPC.
Data standards	<ul style="list-style-type: none"> • The Kenya Standards and Guidelines for (2107) mHealth Systems regulatory framework provides the basis for

	<p>coordination and implementation of robust mHealth solutions.</p> <ul style="list-style-type: none"> Standardization includes: communication protocols, device interfaces, applications and operating systems.
Sector-specific technology infrastructure	<p>Data Servers and Centers</p> <ul style="list-style-type: none"> MoH developed and maintained data center, managed by the Ministry through ICT staff seconded from ICTA. <p>Telecommunications Infrastructure Standards</p> <ul style="list-style-type: none"> No sectoral-specific technology initiatives were shared, however, the health sector is utilizing the Communications Authority (CA) specifications and processes for "type approving and accepting communications equipment" as mandated by CA.

Education

Asset	Details
Sector-specific digital priorities and strategies	
Policy on Information and Communication Technology in Education and Training in 2021	<ul style="list-style-type: none"> Guides ICT integration in education and training. Applicable to all pre-primary, primary and secondary schools, ACE, TVET, teacher training colleges, technical training colleges, universities and SAGAs within MoE. <p>The policy objectives are as follows:</p> <ul style="list-style-type: none"> Promote an inclusive enabling environment for ICT in education, training and management Enhance curriculum development, implementation, assessment and quality assurance through ICT Promote acquisition of relevant skills that support ICT integration in education and training Promote research and innovation through ICT To enhance safe, secure and ethical use of ICT To empower parents and communities to support the use of ICT in education and training Enhance resource mobilization to support ICT in education and training

	<ul style="list-style-type: none"> • Provide a framework for governance, coordination of ICT initiatives, and training <p>Implementation of the policy is ongoing.</p>
Services or functionalities to be digitized	<ul style="list-style-type: none"> • University education management services. • Basic education curriculum.
Notable digital applications	
National Educational Management Information System (NEMIS)	<ul style="list-style-type: none"> • Information management system for learners from early child development, pre-primary, primary, secondary, tertiary and teacher training institutions. • Collects learners biodata, teachers information, learner capitation, placement to Form 1, Teacher training colleges, school feeding programmers, quality assurance monitoring, performance assessment, Parent/Guardian contacts, learning materials, learners health insurance cover, and Edu Afya.
Research Management Information System (RIMS)	<ul style="list-style-type: none"> • Collects Researchers Biodata, Principal investigators, Affiliate research institutions, research disciplines/area, application and grant dates, research budgets, research period research license.
National Qualifications Framework Grading of Qualifications (KNQF)	<ul style="list-style-type: none"> • Based on the Kenya National Qualifications Framework. • Enables standardization and harmonization of learner qualifications. • Provides an online application process to apply for Recognition, Equation and Verification of Qualifications. • Recognized qualified learning obtained outside the country. • Collects: prior learning applicants' biodata, assessment of qualifications and skills.
Teacher management Information System (TMIS)	<ul style="list-style-type: none"> • Registers all Kenyan licensed teachers • Collects teachers' biodata, teacher performance management, qualifications, teachers professional development
Tools to support development of digital services and applications	
Registries	<ul style="list-style-type: none"> • National Civil Registry: collects births and deaths data • Universal Pupil Identification (UPI): collects pupils and students biodata

	<ul style="list-style-type: none"> ● Teachers Registry: collects teacher biodata ● Research Registry: collects researchers and research institution ● Qualifications Registry: collects qualifications mapping data to qualifications framework ● Research Fund and Publication Registry: collects data of researchers who have received funding from the National Research Fund ● Innovations Registry contains a registry of innovations identified in the country, innovators biodata, innovations developed, seed capital awarded, etc. ● Technical and Vocational Educational Training (TVET) Tracer Registry contains a registry of graduates, including graduate biodata, registration of TVET institutions and employers, and industry work placement of graduates
Interoperability Platforms or Frameworks	None. APIs are developed to share data with specific systems within the sector and outside of the sector.
Data Sharing Mechanisms	Relies on guidance from ODPC. The education sector has agreed with the Ministry of Health on programs that could be shared e.g., pupil health records (deworming), insurance.
Sector-Specific Technology Infrastructure	<p>Data centers and servers</p> <ul style="list-style-type: none"> ● The Education sector is primarily supported by the Kenya Education Network Trust (KENET). KENET host member data; however, members manage their individual data stored on the hosted servers. ● Education has Tier II and III data centers at the University of Nairobi, United States International University - Africa (USIU_A), and Catholic University of Eastern Africa (CUEA). These data centers are for community cloud hosting for online training and collaborative platforms. Examples include big blue button and ICT officers training on cybersecurity. ● The sector connects to the National Data Center as well. <p>Technology Infrastructure Standards</p> <ul style="list-style-type: none"> ● Communication Standards exist, and quality of service metrics have been developed and enforced. The Communications Authority has documented standards to adapt sectoral based on user needs and requirements.

	CA standards are enforced when equipment is imported and with local equipment manufacturers.
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Trade/eCommerce

Asset	Details
Sector-specific digital priorities and strategies	
Kenya National E-Commerce Strategy <i>(draft circulating for comment)</i>	<p>Six strategic goals</p> <ul style="list-style-type: none"> ● Law and Regulation: building trust in e-commerce through increased awareness of and compliance in strengthened e-commerce law, regulations, and standards ● ICT and Power: provide universal access to ICT services by consumer and merchants, including women and disadvantaged groups groups, businesses, and rural areas ● Trade facilitation and logistics: Create policies, law and trade agreements that enable rapid and efficient delivery of e-commerce packages in all areas of Kenya, and minimize friction at borders. ● E-payments: provide low-cost, reliable and secure payment services that inspire trust in trade at a distance, for both domestic and cross-border trade. ● Skills and human capacity: increasing skills and human capacity to the overwhelming majority of the population and businesses to buy and sell goods and services through e-commerce. ● Access to financing: Create a financial sector with the requisite laws and regulations with developed financial packages for financing e-commerce businesses of all sizes, for and for women. <p>Included in the draft strategic plan:</p> <ul style="list-style-type: none"> ● Institutional Framework ● M&E Framework ● Implementation Plan

The National Payments Strategy 2022–2025	<ul style="list-style-type: none"> • The strategy builds on several foundational acts and systems, notably, the Central Bank of Kenya (CBK) payments mandate of establishing, regulating and supervising an efficient and effective payment, clearing and settlement system.
The National Trade Policy 2017	<ul style="list-style-type: none"> • The policy objectives are: <ul style="list-style-type: none"> ○ The pursuit of more open, competitive and export oriented policies that are compatible with the Country's National development objectives ○ The creation of an enabling environment for trade and investment to thrive ○ The promotion of Counties as centers of trade and investment
The East African Community (EAC) E-Commerce Strategy	Utilized to help contextualize and harmonize with the Kenyan National E-Commerce strategy.
Services or functionalities to be digitized	None reported
Notable digital applications	
Integrated Financial Management System (IFMIS)	<ul style="list-style-type: none"> • National enterprise resource planning system
InfoTrade	<ul style="list-style-type: none"> • National import and systems
Single Window System	<ul style="list-style-type: none"> • National import and export systems with transport cargo data
M-PESA	<ul style="list-style-type: none"> • Leading mobile money transfer service in Africa, 50 million active users, most prevalent e-payment method for e-commerce
Tools to support development of digital services and applications	
Registries	<ul style="list-style-type: none"> • Business Registration Service: provides company and business data • InfoTrade: An import and export registry • Kenya Industrial Property Institute • Trademark Registry • Kenya Copyright Board Copyright Registry

Digital Data Collection Tools	<ul style="list-style-type: none"> • Data Collected: import and export data, copyright and illicit/counterfeit data, business registration data • Data Collection Tools and Procedures: primarily utilizing digitized tools with some manual data collection.
Interoperability Platforms or Frameworks	<ul style="list-style-type: none"> • Data is shared and exchanged using APIs as an interoperability framework or platform does not exist.
Data Sharing Mechanisms	<ul style="list-style-type: none"> • MOUs are utilized to share data with MCDAs.
Data Standards	<ul style="list-style-type: none"> • Adopted WTO/ITC standards.
Sector-specific technology infrastructure	<p>Data centers and servers</p> <ul style="list-style-type: none"> • The sector itself does not possess data servers or a data center, as trade/e-commerce data is stored by the institution collecting data. For example: <ul style="list-style-type: none"> • KRA stores import and export data. • Kenya Industrial Property Institute stores IPR data. • Kenya Copyright Board Stores Copyright data.

TECHNOLOGY INFRASTRUCTURE AND WORKFORCE: COUNTRY CONTEXT AND INVESTMENTS

Power and Electrification Projects

Current Context: Kenya has aggressively tried to increase access to the power grid, having more than doubled electricity access from 32% in 2013 to 75% of households in 2022. The access rate for urban areas stands at 100%, while rural Kenya stands at 65%. Several on-going projects to further strengthen electrification across the country include:

- The Ministry of Energy's **Kenya Off-Grid Solar Access Project (KOSAP)** is constructing 120 Mini grids in the 14 marginalized counties to provide two million Kenyans access to clean energy. KOSAP is financed by the World Bank, and jointly implemented by the Ministry of Energy, Kenya Power (KP), the Rural Electrification, and Renewable Energy Corporation (REREC).
- Kenya's Rural Electrification and Renewable Energy Corporation (REREC) has several power and electrification projects underway, including a solar power plant project and the **Electrification of Public Facilities** project, focused on electrifying public secondary schools, trading centers, and health centers.
- The East African Energy Sector has several projects underway in Kenya:
 - EAC Energy Sector The EAC East African Power Master Plan
 - Collaboration and Partnerships with Regional Organisations working in the Power sub-sector to foster regional power trade

- Cross-Border Electrification Programme
- East African Power Pool to allow sale of power and Kenya purchases agreement are in place between Kenya and Uganda

Digital Infrastructure Projects

Current Context: Kenya has significantly improved its communications infrastructure, a key ingredient to its digital transformation efforts. The [2022 GSMA report](#) indicates that 75% of the population has broadband connections, 98% have access to 3G. Internet penetration stands [at 42%](#). The government of Kenya is undertaking several initiatives to continue to improve its communication infrastructure. The initiatives include:

- The Ministry of ICT is implementing a “digital superhighway” project to create 25,000 public Wi-Fi hotspots. The project is scheduled to be completed by 2027 and is implemented as part of the **Kenya Digital Economy Acceleration Program** and supported by the World Bank’s Digital Economy Moonshot Project. This includes extending the fiber network by 100,000 KM (52,000km by the government and 48,000km by the private sector) of Fibre Optic to upscale Universal broadband in the Country. The project also includes extending fiber to neighboring Ethiopia and Uganda to ensure communication costs affordable to citizens.
- The **National Fibre-Optic Backbone Infrastructure (NOFBI)** through the Digital Superhighway seeks to interconnect all government institutions and public buildings to Terrestrial Fibre optic, Network Devices Installation, Testing, and Commissioning.
 - NOFBI I began implementation in 2012, connecting 18 counties
 - NOFBI II connected all 47 counties
 - NOFBI III and IV are ongoing to expand NOFBII to connect all sub-counties.
- Universal Service Fund created in 2009 to support widespread access to ICT services and promote capacity building and innovation in ICT services. Funding sources include levies on licensees, government appropriations, grants, and donations.
- KENET, through the Kenya Digital Economy Acceleration Program (KDEAP), is expected to expand the national fiber backbone and enable last-mile connectivity to schools, universities, and TVETs through incentivizing more significant private investment.
- Liquid Intelligent Technologies has partnered with Nokia to deploy transport network technology in the new terrestrial fiber route connecting Mombasa (Kenya) to Johannesburg (South Africa). The announcement made in February 2023 coincides with the launch of a new terrestrial data superhighway built by Liquid, connecting Kenya and South Africa. The terrestrial route is exceptionally beneficial for many EAC Partner States as it provides 12 terabits of capacity for carriers and service providers in Kenya, Uganda, Rwanda, and the DRC.

ICT Workforce

Current context: All sectors aside from Education reported unmet human resource needs to support increased digitization in their sectors. Participants from the trade sector rely on the ICT Authority (ICTA) and the Kenya National Bureau of Statistics to second staff for digitization and data analytics needs. Specifically, challenges reported included unavailable training resources, absence of a capacity-building plan and change management practices or procedures, and insufficient government salaries to

attract and maintain top ICT talent required for digitalization e.g., Computer Programmers, developers, and data analysts. Programs and resources available to strengthen ICT workforce include:

- The ICTA has developed a [Human Capital and Workforce Development](#) standard for strengthening the capacity of ICT officers in the public sector.
- In the education sector, the [Policy on Information and Communication Technology in Education and Training](#), drafted and approved in 2021, is being implemented in stages with the Teachers Service Commission enforcing the continuous professional development (CPD) programme for all teachers. In addition, the MDAs have developed an organizational-wide annual training schedule informed by a Training Needs Assessment (TNA) and gaps identified during the annual performance appraisal process.
- The [Kenya National Digital Masterplan](#) specifies several initiatives associated with skills development. Including:
 - Establishment of 1450 Village digital hubs for citizen digital literacy training and public access to government services
 - Conducting digital literacy capacity-building programmes for citizens, ICT professionals, public servants, and teachers providing them with appropriate levels of expertise and awareness to use technology in their businesses and access government services.
 - Establishment of digital literacy programmes to accelerate technology integration in teaching and learning in learning institutions.
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- The [Presidential Digital Talent Programme](#) is a PPP Programme focused on ICT skill development, on-the-job coaching, mentorship, training, certification, and innovations. The twelve (12) month internship program aims to develop high-end ICT skills in recent graduates, offer a platform for structured training, coaching, and mentoring, and promote ICT innovation and solutions development.
- [AJIRA](#), which is a collaboration between KEPSA and GoK, provides online courses and certifications to increase ICT skills in both the public and private sector.
- **eMobilis Kenya**, developed by the Ministry of Education, is a training institution that teaches individuals how to develop software programs.
- The Ministry of Health has developed the [Kenya Ministry of Health Virtual Academy](#) an eLearning platform for inservice virtual training, continuous professional development courses, certifications, and several others courses, e.g., DHIS2, Aggregate Reporting, KenyaEMR and, HIS Security Management, COVID Training for HCW, etc.