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Accelerating National Development

Civil Registration as a Building Block of
Digital Public Infrastructure in Rwanda

Executive Summary

Rwanda is actively pursuing a comprehensive digital transformation, strategically building its Digital Public Infrastructure (DPI) as a cornerstone of national development. With 85% of all government services now digitalized, a robust DPI has proven essential for providing efficient and secure user access to both public and private sector services.

Central to this digital ecosystem was the transition of Rwanda's Civil Registration and Vital Statistics (CRVS) system from paper-based to fully digital, enabling integration into the national DPI. This shift created a trusted and verifiable source of legal identity and recognition for all residents of Rwanda, while facilitating access to public and private sector services. The transition was realized through a supportive governance and legal framework, a centralized population registry, political commitment and ownership, and information technology systems that allow real-time data sharing with other DPI components.

The impact of this integration has resulted in improved service access and efficiency across private and public sector services, including the health, social protection, and financial sectors, while building trust.

The following are examples of services that have improved due to the integration of CRVS into the DPI of Rwanda:

Immunization and Nutrition Services

- Health facilities moved from paper-based to electronic registers for the immunization and nutrition program that provide real-time, child-level information throughout the vaccination schedule.
- With timely registration of births increasing from 78% in 2019 to near universal completeness in 2025, the registration of new births automatically triggers the generation of electronic vaccination cards and growth monitoring charts.
- Such system linkages now make it easier to monitor nutrition data and vaccination program implementation.

Social Protection Services

- Fragmented paper-based systems were replaced with real-time validation of unique identification numbers, substantially improving the ability to reach target beneficiaries.
- Automatic enrollment in social protection programs is now based on verified identity data, reducing errors and strengthening targeting of rightful recipients.

Private Sector Services

- Manual paper processes were eliminated in favor of real-time online authentication, enabling seamless, trusted, and secure verification of individual identity for banks, insurance providers, and telecommunications companies.
- Fraud risk was reduced, operational costs lowered, and services expanded to reach previously underserved populations with streamlined access to mobile wallets, e-loans, and insurance benefits.

Rwanda's experience demonstrates that integrating CRVS/ID system into DPI depends on strong political leadership, clear governance, and a phased, user-centered approach supported by reliable infrastructure and interoperability. Some challenges such as limited digital literacy and underutilized integration capabilities continue to limit effectiveness and remain to be addressed. Rwanda is advancing a government-led integration of CRVS/ID system into DPI to improve service delivery and drive digital transformation.

Background

In Rwanda, digital transformation is positioned as a key driver of effective governance and sustainable, inclusive growth, focusing on three primary objectives: accelerating a knowledge-based economy, facilitating universal access to smart devices and basic technology, and enhancing digital service delivery.

Over the past 15 years, Rwanda has strategically invested in DPI to advance these objectives, leveraging emerging technologies and establishing innovative foundational systems that improve service delivery and empower individuals, including:

- Expanding electricity access to over 80% of households through a combination of national grid connections and off-grid solutions.
- Achieving near-universal internet coverage through the deployment of fiber-optic cables nationwide.
- Establishing more efficient and localized internet exchange capabilities.
- Developing a national e-payment infrastructure to enhance financial inclusion.
- Providing secure data exchange platforms that allow institutions to share verified information efficiently and reliably.
- Rolling out a digital identity system that enables fully online transactions.

Further, the country aims to raise digital literacy to 100% so all individuals in Rwanda can benefit from digitalization. To support this goal, in partnership with the private sector, the government introduced tax exemptions on selected information and computer technology equipment, including computers and mobile phones, to expand smart device ownership and accelerate the adoption of digital services and technologies.

As a result of these efforts, the proportion of digitalized government services increased from 40% in 2017 to 85% in 2024, representing a total of 892 public services delivered through digital platforms.

The focus on digital transformation has been supported by legal reforms aligned with Rwanda's broader e-governance agenda, which is articulated in the Five-Year Economic Development and Poverty Reduction Strategy (2013–2018) and the National Strategy for Transformation (2017–2024). Within this context, civil registration reform was prioritized, including the digitalization of civil registration services.

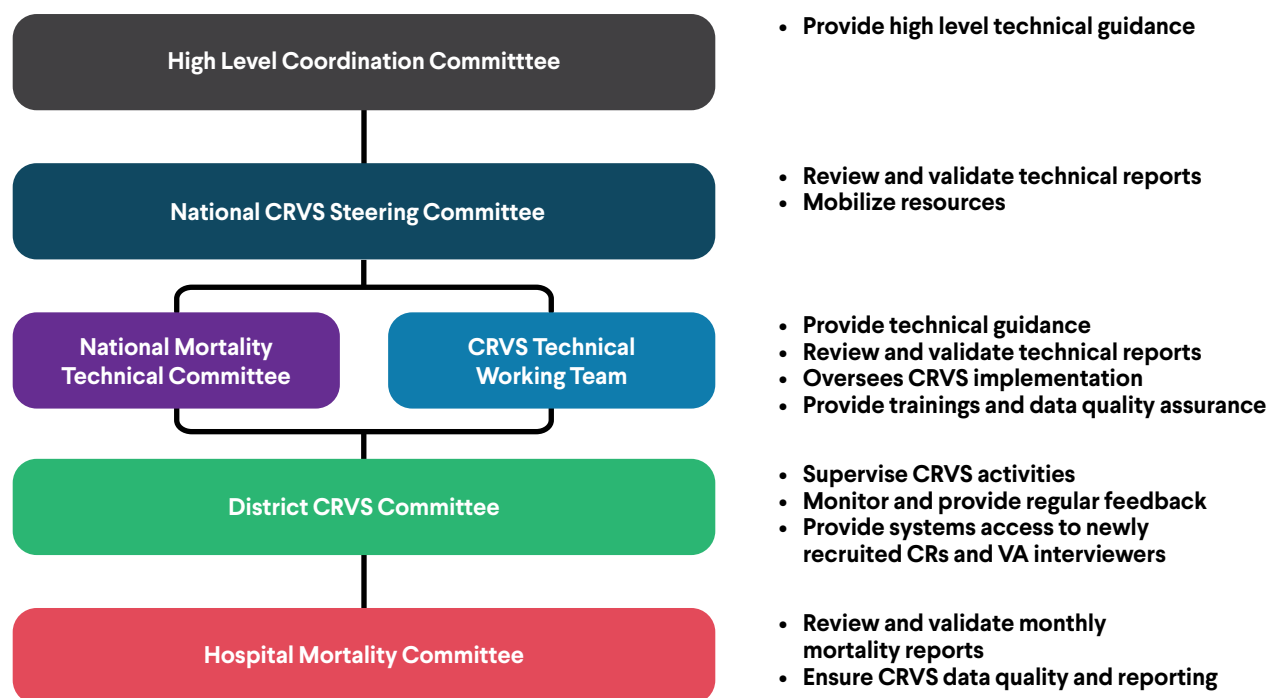
Civil Registration as a Digital Public Infrastructure Building Block

The CRVS system provides legal proof of identity through the registration of vital life events like birth, marriage, and death, and provides crucial data for policy and planning. Rwanda's journey to integrate CRVS into the DPI was supported by five critical enabling factors.

Championing of Efforts and Support at the Highest Levels

Rwanda's digital transformation of its CRVS system was accelerated by a robust political commitment from a high-level coordination committee made up of ministers from key sectors, including Local Government, Gender and Family Promotion, Justice, Health, and ICT and Innovation, who provided strategic oversight. This high-level support provided the authority to align stakeholders, establish clear mandates, mobilize resources, and drive legal and regulatory reforms essential for CRVS system modernization and integration into the DPI. Robust technical and operational governance structures were also established, ensuring effective leadership, coordination, and accountability across national and sub-national levels with clearly defined mandates critical to enhancing efficiency, consistency, and sustainability (Figure 1).

Figure 1: CRVS Governance and Coordination Structures



Application of the DPI Approach to the CRVS System

Rwanda employed a comprehensive DPI approach to CRVS reform and system expansion, prioritizing data exchange standards and interoperability with the broader digital ecosystem across government and non-government platforms. Seamless and secure information exchange enabled the national transition from a paper-based system to a fully digitalized platform ensuring that every resident has a unique, verified ID number from birth.

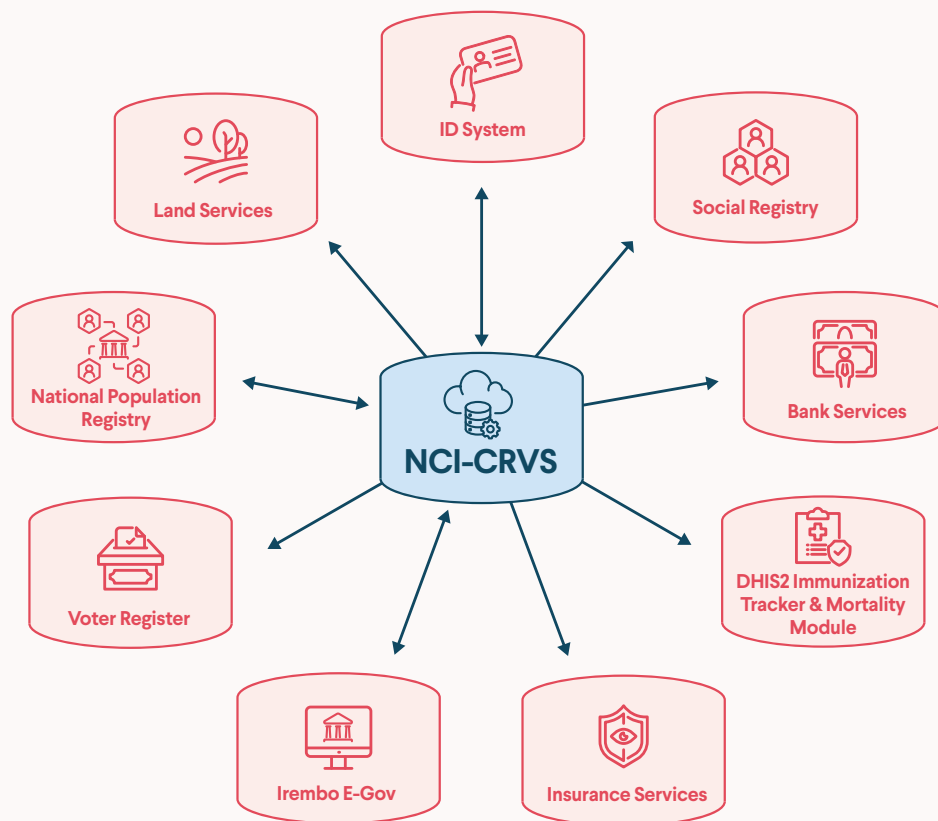
The DPI approach was enabled by:

- A supportive governance and legal framework enacted through 2020 legislative reforms supporting decentralization and digitization;
- A centralized population registry linking CRVS with the national identity system;
- Information technology systems using open standards and APIs that allow accurate, real-time data sharing; and
- Data protection regulations covering requirements for data controllers and facilitating data sharing between agencies.

Simultaneously Digitalizing CRVS System and Interoperability with ID System and Access to Services

While Rwanda's digitalization journey began in 2015 with the introduction of a CRVS web-based system, which captured data from civil registration books for statistical purposes as a proof of concept, it was the 2020 legislative reforms that laid the groundwork for system integration with other national systems to improve accessibility, data quality, and service delivery. This integration did not wait for individual systems to be fully optimized, but rather linked CRVS, the ID system, and service delivery platforms early in the digitalization process, improving overall system completeness and reliability. Currently, the digital CRVS system is integrated with the National Identity System and National Population Registry, social protection programs, health management information systems (including the Electronic Immunization Registry), telecommunications services, banking and insurance platforms, and various other public and private service platforms, creating a holistic, identity-based service delivery ecosystem (Figure 2).

Figure 2: The National Centralized and Integrated CRVS Information Technology System (NCI-CRVS) and its Linkages



Streamlining Processes Before Digitalizing Them

Rwanda focused on simplifying civil registration processes and procedures before and after digitalization, shifting responsibility from families to agencies by embedding registration services into routine functions of the health facilities for birth and death events.

Other key process improvements included:

- Automatically assigning National Identification Numbers (NIN) at birth and sending them to parents or guardians via email or telephone;
- Linking vaccination services with the CRVS system to enable electronic immunization cards;
- Connecting Imibereho Social Registry System with the CRVS/IDsystem to authenticate individual identity support automatic beneficiary enrollment; and
- Linking death registration to the retirement of identities in the population registry.

Dedicating Resources to CRVS Digitalization

Rwanda recognized CRVS digitalization as a strategic investment, securing financing and resources for the development of information technology infrastructure, improved connectivity and hosting services, as well as the digitalization of historical records. Following the passage of the Births and Deaths Order in 2020 and the establishment of a functional governance structure, the Government of Rwanda and the World Bank Global Financing Facility co-funded CRVS improvement activities with approximately 70% of the resources committed by the government. Investments in CRVS improvement occurred against the backdrop of and leveraged broader investments in digital connectivity, such as extensive investment in internet broadband infrastructure.

Use Cases: Demonstrating Key Benefits of the CRVS-DPI Integration

Rwanda's CRVS integration into the DPI enabled real-time identity verification and data sharing across previously siloed sectors, yielding core benefits including improved service access, efficiency, and trust—along with higher quality data for policymaking. The following examples illustrate the impact of the integration on health, social protection, and financial services in Rwanda.

Benefits of the CRVS-DPI Integration for Immunization and Nutrition Services			
Before	Health facilities relied on paper-based registers to track newborn details, vaccination history, nutrition, and growth monitoring data. Vaccination cards were easily lost or misplaced. It was difficult to determine which vaccines a child had received and when subsequent doses were due, resulting in missed vaccinations, incomplete immunization schedules, and challenges in forecasting vaccine supply needs. Monthly immunization reports were manually aggregated into DHIS2, risking data entry errors and reporting delays. Essential nutrition data was difficult to access.	Birth and death data is seamlessly passed from the digital civil registration system to the Electronic Immunization Registry (EIR) to facilitate immunization and nutrition services. The DHIS2-based EIR provides real-time, child-level information at every clinic visit throughout the vaccination schedule. The integration between the EIR and the CRVS/ ID system helps identify 'zero-dose' and partially vaccinated children. System linkages make it easier to monitor nutrition and growth data and connect with social protection programs to address malnutrition and stunting when needed.	After
Impact			
• Nearly universal timely child registration (99%) in the CRVS system, supporting automatic generation of electronic vaccination cards and growth monitoring charts. • Unique NIN automatically assigned at birth for every child and sent to parents or guardians, ensuring accurate record tracking and enabling continuity of care. • Improved immunization completeness through automated vaccination reminder messages sent to parents or guardians. • Enhanced data accuracy and timeliness through digital collection and reporting systems.			



June 11, 2025. Musanze District, Rwanda – A security officer assists members of the public in locating a birth record from the paper archives at the Civil Registration Office in Musanze District. Photo Credit: Juan Arredondo.

Benefits of the CRVS-DPI Integration for Social Protection Services

Before

National social protection programs relied on **paper-based and fragmented systems operating in silos without unique verifiable beneficiary identification**. This undermined the ability to correctly identify, monitor, and transfer benefits to rightful recipients.

CRVS/ID integration and the resulting availability of data by key government agencies enables **real-time validation of unique identification numbers**, reducing exclusionary errors and improving targeting.

Recipients are **automatically enrolled** in social protection programs based on identity data verified by civil registration and other data from health services.

After

Impact

- **Improvement in beneficiary targeting** in the fortified blended food program - using the paper-based system, only 35% of the target population was able to receive certain benefits of this program because of issues with the identity data; this problem could be nearly eliminated with the automated integration of systems.
- **Automatic enrollment** in social protection programs based on verified identity and health monitoring data.
- **Reduced exclusionary errors** and strengthened targeting of rightful beneficiaries.

Benefits of the CRVS-DPI Integration for Private Sector Services			
Before	Financial institutions and other private sector services, including banks, insurance providers, and telecommunications providers, required clients or beneficiaries to manually complete paper forms and submit photocopies of their national identification documents to open accounts or get mobile subscriptions, as well as physical documentation to confirm deaths. These processes lacked mechanisms for verifying identity and document authenticity, making them costly, time-consuming, and highly vulnerable to fraud or loss.	Financial institutions are connected to the CRVS/ID system for real-time online authentication, enhancing service delivery efficiency for both institutions and clients. The NIN is the primary unique identifier for banks, enabling seamless account opening and secure financial transactions across digital platforms. CRVS/ID integration also allows insurance providers to more accurately verify and deliver benefits. Telecommunications companies linked SIM card registration and mobile wallets to the CRVS/ID system, facilitating secure mobile-based services such as e-loans, e-payments, and other digital financial transactions.	After
Impact			
• Reduced fraud risk and enhanced transaction security across the financial sector. • Lower operational costs and improved risk management for financial institutions through real-time identity verification. • Expanded financial inclusion through increased confidence in digital financial services, providing previously underserved populations with access to credit, insurance, and mobile money services. • Faster, more secure service delivery for clients, including streamlined account opening and protection against identity theft.			

Learnings

The Rwanda experience highlights a number of learnings regarding the importance of CRVS digitalization as a national priority, and the need to follow an iterative and user-centered approach, while enabling interoperability and open standards.

- **Strong leadership and political commitment are essential** for successful and sustained integration of the CRVS/ID system into the broader DPI ecosystem.
- **Effective governance and coordination mechanisms** with clearly defined stakeholder roles and responsibilities are critical for driving CRVS-DPI integration.
- **Digital transformation requires a phased and iterative approach**, starting with small-scale initiatives, capturing lessons at each stage, and making continuous improvements to ensure scalability and sustainability.
- **Basic infrastructure** such as internet connectivity, energy, and other functions within the DPI (e.g., data exchange platforms and government e-service delivery platforms) are enablers for strengthening CRVS systems and ensuring interoperability with other service delivery platforms.
- A **fully operational CRVS information technology system** requires timely and simple death notification, integration with case management systems, interoperability with public service platforms, and the presence of digital archives.



June 11, 2025. Musanze District, Rwanda – Jean Claude Dukunsane, a registration clerk, searches through paper archives to locate a birth record requested by a local resident at the Civil Registration Office in Musanze District. Photo Credit: Juan Arredondo.

Challenges

Despite significant achievements, several challenges continue to affect the efficiency and effectiveness of CRVS/ID and DPI integration in Rwanda, including:

- **External vendor dependencies** create complex conditionalities that restrict some further integration.
- **Lack of digital literacy** reduces effective use of digital platforms and diminishes impact.
- Limited **digital systems maturity** and **lack of understanding** of the benefits are roadblocks to full integration.
- **Ongoing funding and support** are needed to maintain and sustain a CRVS system in order to regularly incorporate emerging practices and user feedback.
- **Underutilization of integration capabilities** leads to duplicative verification processes and operational bottlenecks.
- **Develop institutional awareness** around how digital systems integration can enhance efficiency and service delivery.
- **Enforce the adoption of open standards, APIs, and data exchange protocols** to enable seamless integration between the CRVS and other DPI systems.
- **Build local technical capacity** for systems development and maintenance to reduce reliance on external vendors.
- **Establish sustainable financing models** to support long-term integration.
- **Conduct comprehensive interoperability audits** to eliminate redundant verification processes and fully leverage existing system capabilities.
- **Build a CRVS/ID and DPI integration** using trusted verifiable credentials to enable secure cross-border movement, trade, and commerce under the East Africa Community Common Market and the African Continental Free Trade Area.

Next Steps

Further progress can be made, and the remaining challenges addressed, through the adoption and implementation of a few priority actions:

- **Strengthen public engagement and use of digital services** by implementing a nationwide digital literacy campaign to build awareness and foundational digital skills.

Rwanda is implementing a strategic and government-led approach to integrating civil registration with DPI to catalyze digital transformation and improve lives. By treating CRVS not as a standalone system but as the foundational source of legal identity, Rwanda has built an ecosystem that enhances the efficiency, inclusivity, and security of service delivery across all facets of society. The journey is ongoing and addressing the remaining challenges—particularly around full interoperability, system resilience, and digital literacy—will be crucial for achieving the country’s digital transformation and development goals.

Acknowledgment

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Front cover:

June 11, 2025. Musanze District, Rwanda – Individuals, sort through the paper archives searching for birth and death registration at the Civil Registration Office in Musanze District. Photo Credit: Juan Arredondo.

Back cover:

June 20, 2025. Kigali, Rwanda – Data entry clerks scan, digitize, and cross-verify information from paper-based civil registration records as part of Rwanda's national digital transformation initiative. Photo Credit: Juan Arredondo



Republic of Rwanda
National Identification
Agency