



ID4D

Country Diagnostic: Rwanda

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About ID4D

The World Bank Group's Identification for Development (ID4D) initiative uses global knowledge and expertise across sectors to help countries realize the transformational potential of digital identification systems to achieve the Sustainable Development Goals. It operates across the World Bank Group with global practices and units working on digital development, social protection, health, financial inclusion, governance, gender, and legal, among others.

The mission of ID4D is to enable all people to access services and exercise their rights, by increasing the number of people who have an official form of identification. ID4D makes this happen through its three pillars of work: thought leadership and analytics to generate evidence and fill knowledge gaps; global platforms and convening to amplify good practices, collaborate, and raise awareness; and country and regional engagement to provide financial and technical assistance for the implementation of robust, inclusive, and responsible digital identification systems that are integrated with civil registration.

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To find out more about ID4D, visit worldbank.org/id4d.

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About this report

On the occasion of ID4Africa 2nd Annual Meeting May 24–26, 2016, held in Kigali, we present to the esteemed delegates of the forum the case study of the identity ecosystem of Rwanda. Over the last decade the country has developed an exemplary identification ecosystem and has accumulated practical knowledge and experience that deserve to be shared with other African nations who may find it useful and inspiring as they attempt to build their own identification schemes. While the report is based on in-country research and interviews with identity stakeholders, conducted by the author in support of an official development program in early 2015, it is an independent outcome. It is issued by ID4Africa in the spirit of documenting and promoting knowledge transfer of good practices among African nations. It did not seek official approval or endorsement from any government or development agency. The author remains responsible for the opinions expressed herein, and for any inaccuracies or omissions that may have slipped through, for which apologies are presented in advance.

Overview and executive summary

As this report details, the identity ecosystem in Rwanda is in a very good overall state of development and supports the daily personal identification needs in the physical world today, and should be capable of supporting the digital transformation aspirations of the country down the line. Under the vision of Digital Rwanda (*Irembo*, see Figure 1) more and more services and economic transactions are being delivered electronically¹ for the increased convenience of the population and for improved efficiency and transparency, and over time those will require a *bona fide* e-ID, like what the country has put in place.

Today the country possesses several identity assets, which are harmonized (or in the process of being harmonized), and which in their ensemble allow for the universal identification of the population so they can assert their rights at all stages of their life, and which can help government agencies improve delivery of services and benefits such as social protection. In addition, the country has already established a well-functioning, independent and sustainable institution, *the National Identity Agency*—NIDA² that is focused on identity matters in the country.

More specifically, NIDA is the institution that maintains a **National Population Register (NPR)** with an impressive coverage of the population including children. Based on the NPR, it issues a biometric **National Identity Card (NID)** for those 16 years and over. The NID system achieves robustness at three levels: at the identity onboarding stage, at the level of the credential itself, and through the online identity verification services. In addition, it attributes to each identity a **National Identity Number (NIN)** that can serve as a unified interface between a unique individual and any agency of the government or commercial enterprise for life.

These identity assets (NPR, NID, NIN) have already achieved high business value. They are relied upon by a large number of other entities (we have identified at least three dozen to date), and many processes in the country would break down in the absence of these assets. For example, the NID register is the basis upon which the new Electoral Register (ER) is derived, as NIDA provides the National Electoral Commission (NEC) with the list of all individuals that attain the voting age of 18 and performs an online verification of voters seeking to register with NEC. In 2016, the registration process itself has migrated online, thanks in

Figure 1: Irembo Is Rwanda's Electronic Service Delivery Platform and Answer to e-Government
The word in Kinyarwanda means Access, Service, and Openness—the equivalent of Aadhaar in India.



1 See Rwanda's e-Government Portal Irembo, which was launched in 2015. <https://irembo.gov.rw/rolportal/>

2 NIDA website [http://nid.gov.rw/index.php?id=21&tx_ttnews\[tt_news\]=9&cHash=7ca279a65d0db58c139424244c74c541](http://nid.gov.rw/index.php?id=21&tx_ttnews[tt_news]=9&cHash=7ca279a65d0db58c139424244c74c541)

part to the NID. Also, since January 1, 2014, the NID has been accepted as a travel document to facilitate the movement of Rwandans to the other members of the East African Community, Uganda, and Kenya—with Tanzania and Burundi expected to join the arrangement in the future. Virtually all banking transactions now require the NID, and sectors such as justice, social security, social protection, taxation, and finance are inextricably dependent on the NID and the services of NIDA.

The emergence of a robust ID environment was helped in part by Rwanda's highly developed and decentralized administrative structure that has direct and permanent points of contact with the population. These touch points with local knowledge of the population ensure the accuracy and reliability of identifying data during the enrollment phase and keep information current over time.

But the ecosystem does not stop there. The country, under the Local Administrative Entities Agency (LODA), maintains an exhaustive social register of the population. This so-called Ubudehe register groups all people in Rwanda under households and attributes to them a poverty or vulnerability score. It is used to target and manage the identity of beneficiaries in order to ensure improved equity and effectiveness of safety net programs, in support of a developing national policy on social protection.³ The NPR and the Ubudehe, while they were developed independently, are now being harmonized (through the use of the NIN) which improves their value and reinforces the overall identity ecosystem.

It is worth noting that NIDA has attained self-sufficiency in that it does not burden the people with high fees nor does it require allocation of government funds for its operations. For several years now, NIDA has been operating at a break-even level, where their entire budget is covered from the services they offer. They are able to do this while maintaining a subsidized identity card, by using their infrastructure to offer other types of IDs at a higher price to those who need and can afford them (such as driver's licenses, foreigner IDs, and Integrated Smart Card IDs with multiple applications).

If there is an area of weakness in the current ecosystem it is in civil registration, which has room for improvement. While birth registration coverage is about 25 percent over the Sub-Saharan average, two in five children still go unregistered by the age of 5⁴ in Rwanda. Interestingly, while the civil register itself remains on paper ledgers distributed throughout the country, NIDA collects this information and integrates it electronically into the NPR on an ongoing basis in a manner that overcomes the challenges and limitations of the paper register. This administrative procedure could serve as a stop-gap model for integration between paper-based civil registration processes and the electronic national population registers, which may be worth exploring in other African contexts.

Finally, the country has embarked on the review and planning for a five-year project to reform its civil registration processes to move them to a digital platform and to ensure that they are in-line with the

Figure 2: The United Nations Sustainable Development Goal 16.9

This goal calls for providing legal identity for all, including birth registration by 2030, and is a guiding principle for countries, such as Rwanda, as they look to reinforce their identity ecosystem.



3 The Country has been recognized as a model for building strong social safety nets by the World Bank Group, which has been assisting Rwanda to improve its social protection system. <http://www.worldbank.org/en/news/press-release/2015/01/22/world-bank-group-rwanda-social-protection-system>

4 See UNICEF country statistics http://www.unicef.org/infobycountry/rwanda_statistics.html

Top 10 reasons why the Rwanda identity ecosystem is remarkable

1. A **National Population Register** covering over 95 percent of the population.
2. A **Unified Social Register** (Ubudehe) covering 2.3–2.5 million households (the entire population).
3. Extensive administrative processes for linking civil registration events to NPR and for updating the NPR and the Social Register.
4. Robust **national identity card (NID)** in the hands of more than 6.5 million people (over 90 percent of adults 16 and over) and a **unique identifying number (NIN)** which can be used for administration.
5. The **cost** of the mandatory NID is the **lowest in Africa** (under 1 USD).
6. An **optional e-ID offered** to those that need it and can afford it.
7. The **Electoral Register is supported** by the NID.
8. The NID can be used as a travel document in the East African Community.
9. **Online identity verification** services already in place.
10. **Sustainable self-sufficient National Identity Agency** which covers its operating costs from the services it offers without burdening the population or the public treasury.

Sustainable Development Goal SDG 16.9, which calls for providing legal identity for all including birth registration by 2030.⁵

Organization of the report

This report is organized as follows: Section 1: Gives the essential guide to identity ecosystems and what matters in identity. Section 2: Provides a holistic overview of what exists in Rwanda and how the elements relate to one another. Sections 3, 4, and 5: Provide a detailed description of the foundational identity registers and schemes, such as the civil register and the National Population Register, the National Identity (NID) Card, and the Ubudehe Social Register. Section 6: Provides lessons learned for consideration aimed at other African identity authorities desirous of building or reinforcing their legal identity ecosystems. Finally, the Annex gives, for reference, a summary of the legal framework governing the identity ecosystem in Rwanda.

Goal

This report presents Rwanda as a model for a robust, harmonized, multi-element identity ecosystem, which provides several lessons that could be useful for other African countries. The objective is to facilitate South-South information flow within the context of the ID4Africa operational mission.

5 See <http://www.un.org/sustainabledevelopment/sustainable-development-goals/>

1. The identity ecosystem in general

The elements of an ecosystem

The identity ecosystem in a country ideally consists of several components (or assets) that have to work together coherently to **support the end-to-end identification process and empower people to be visible and exercise their rights**. There are a lot of variations from country to country in terms of the participating assets and the institutional arrangements that develop and maintain them. But generally speaking a healthy ecosystem consists of the elements listed in Table 1.

Table 1. The Components of a Typical Well Developed Identity Ecosystem

Element	Description
Registration Processes	The mechanisms by which populations are registered or enrolled into identity schemes. These include the actual enrollment platforms, the data communication mechanisms, and the administrative points of contact with the population (centers of enrollment).
Registers (identity databases)	<p>These are databases which contain core identifying data. There are many types of identity registers, which can be multipurpose (foundational) or specific to a program (functional). Among the types of registers encountered are:</p> <ul style="list-style-type: none">▪ Civil register (CR): records of birth, death, marriage, divorce.▪ National Population Register (NPR): exhaustive list of all individuals that have the right to reside in the country (including citizens and legal residents) of all ages without exception.▪ Register of the National Identity Card (NID): a legal register that contains the identities of every individual that has received a national ID card.▪ Electoral Register (ER): a legal register containing the identities of those who have exercised their right to vote through voter registration.▪ Household Register (HHR): an administrative national population register grouped into households.▪ Social Register (SR): a register of identities (individual or household) that also contains socioeconomic data permitting classification of identities into poverty or vulnerability groups.▪ Beneficiaries rosters: lists of individuals that are entitled to participate in social protection or other benefits program.▪ Passports and driver's licenses registers.
Credentials (identity cards and certificates)	Identity credentials are proofs that an individual is registered and is recognized in an identity database. They include: identity numbers (unique general purpose or specific to the identity program); secure identity cards; electronic certificates that can be carried on mobile phones, stored in the cloud, or on a smart card, as well as traditional birth certificate documents, nationality certificates, etc.
Authentication Mechanisms	Mechanisms used to verify personal identity, either by matching identity against what is on the card (manual or automated) or via online services.

This means that under ideal circumstances, the country would have a dense set of points of contact with the population. Through these bureaus, all vital events are declared and registered in a timely fashion in the civil register, which guarantees every new birth entry into the realm of legal rights all the way until they exit upon death. Along the way, their identities appear in many registers, some are legal and some are administrative, and receive credentials that facilitate the assertion of rights at points of service (authentication mechanisms).

Legal identity

While Sustainable Development Goal #16.9 calls on nations to provide legal identity for all, including birth registration, the concept of legal identity is not universal and is still emerging. Nevertheless, one can come up with operational definitions that are faithful to the intent of SDG 16.9 by tying the concept of legal identity to the extent of being empowered to exercise the legal rights that should be protected in a country (e.g., right to vote, right to be elected, right to reside in the country, right to own property, right to education, right to work, right to social protection, etc.). Clearly, the set of legal rights varies from country to country and from culture to culture. In some countries, social protection and universal health coverage are viewed as legal rights that must be provided to every citizen by the government. In others they are considered a privilege facilitated by the government. Irrespective of the variation in the scope of legal rights, legal identity could be operationally tied to being “in the system” or to being present at a minimum in an attestable fashion in any one of the legal registers in place. A proof of legal registration (attestation) could be in the form of a legal credential such as a birth certificate, a voter card, or a national ID card (or in possession of an ID in the cloud).

Legal identity registers

A legal register is an identity list that confers legal rights on those who appear in it. It could include but not be limited to:

- The Birth Register,
- The Voter Register, and
- The National ID Register.

Measuring progress: Indicators for legal identity coverage?

An indicator that measures the percent of the population that is in possession of any one of the legal credentials would provide an accurate measure of the state of development of the legal identity ecosystem in a country. This can be estimated through spot surveys of a statistically representative sample of the population to determine the percentage of people that hold any one of the documents or means that can be used for attesting to their identity; or it can be extracted by comparing National Population Register data against statistical census data. Either way, maximizing such indicators for legal identity coverage supports a rights-based approach to identity, where each individual has the right to be recognized by their legal identity and have access without bias or discrimination to the full range of rights conferred by the law.

Going beyond legal registers: The social register

Legal registers are not the only critical ingredients for a healthy identity ecosystem. Many administrative registers are required to facilitate management of population needs and to improve the efficiency and efficacy of delivering services to them. One of the most critical ones in this category is the so-called Social Register (SR).

The SR in its basic form is a database for exhaustively identifying the country's low-income population, who are viewed as potential beneficiaries of a system of social programs. It would cover a very significant fraction or even the entire population.

There are several flavors of social registers in a country. The SR may be fragmented in the sense that each sector has its own variant and its own targeted segment of the population. Or it may be a single consolidated database at the national level or may consist of several databases that are harmonized or linked via the use of a unique identifying number consistently across them. In the case where there is only one Social Register, it is called the Unified Social Register (USR) or the Unique Social Register (USR). It is this flavor of a SR that would exist in the ideal ecosystem.

The bottom line is, the SR (or the USR) is an administrative tool that allows responsible authorities to identify the most pressing needs of the poor segment of the population, to tailor and deliver the programs and services required by this segment, and to select the beneficiaries for each program. This tool helps improve the effectiveness, equity, and integration of social programs. A country that has well developed legal registers only, may not be one that is capable of protecting all segments of its population and providing for their needs.

Social registers

A Social Register is a database and an associated Management Information System (MIS) that is capable of collecting, analyzing, and storing the following information:

- Personally Identifiable data (either at an individual level or grouped into family or households), or
- Socioeconomic data that can be used to classify the registered units (individual, family, or household) into poverty or vulnerability classifications in order to support targeting for social protection interventions (scoring algorithms such as Proxy Means Test (PMT) or community scoring are often used).

The MIS register can perform targeting, scoring, selection, onboarding, identification, and verification, all linked to identity.

Examples of countries with social registers

There are many countries today that have developed and that maintain unique social registers. We highlight some of those in Table 2.

Table 2. Examples of Countries with Unique Social Registers

Country	Program
Brazil	Unified Social Registry (Cadastro Unico in Portuguese). This was put in place as the Bolsa Familia Program and consolidated all programs. Covers about 20 million families (about 1/3 of the population and supports about 28 programs).
Rwanda	Ubudehe. This is a household database that is constructed through period (once every 3 years now) social censuses and covers 100 percent of the population and attributes to each household a numerical score of 1, 2, 3, 4 to characterize their poverty or vulnerability.
Colombia	SISBEN covers over 70 percent of the population and supports 31 programs.
Pakistan	BISP covers 27 million households across the country.
Indonesia	TNP2K poverty database, which covers the bottom 40 percent of the population or 100 million people (grouped into households).

We note that Rwanda is on that list, which bodes well for the country’s identity ecosystem.

What matters in the identity ecosystem?

In assessing a country’s identity ecosystem, one needs to examine two fundamental aspects:

- The completeness and gaps that exist in the overall system (e.g., lack of civil register, lack of Social Register) in relationship to identification needs.
- The fitness of what is existing (a multidimensional inquiry—see below).

On the question of gaps, the assessment needs to take the country context into account to determine what needs to be in place in order to ensure that legal rights are attributed to identity and are recognized and that individuals can function in that context with dignity and respect by having their basic daily needs met without undue burden. The analysis examines the obstacles that may be in place that may impede the exercise of these rights. Generally speaking, there is not yet an international standard for scoring the gaps, although SDG 16.9 is expected to stimulate the interest and dialogue toward that ultimate goal.

As for the fitness of the elements of the identity ecosystem, there has been significant progress in that regard. The World Health Organization, UNSD, and UNICEF, working with other partners, have developed significant resources and toolkits that can be used to assess and to improve the programmatic aspect of civil registration, while the World Bank Group has focused on developing tools for assessing all other

Table 3. Assessing an Identity Scheme Can Be Performed by Examining at a Minimum, These Four Indicators, Based on the IMSA Tool of the World Bank Group

Indicator	Description
Accessibility	Evaluates the extent of coverage of the ID of the entire population. It explores how accessible it is to the individual, how costly, and what barriers may be encountered by any individual or groups. In this regard, the best ID system is one that is universally available to every individual at a negligible cost.
Robustness	Assesses how resilient the system is to fraud (uniqueness of identity), duplication of credentials, and security breaches; and whether the ID is a system within a framework of trust to verify or authenticate identity at the time of use.
Integration	Assesses the interoperability of the identity across multiple applications and the extensiveness of the links between identity registers. It also assesses how well updates in identity information flow from points of declarations to central registers.
Legal and Institutional Frameworks	Evaluates how developed the country's laws are regarding privacy, data protection, and protection of individual rights. It also takes into account capacity of the organizations tasked with the provision of identity in the performance of their function. This includes also the capacity of organization that enforces compliance with the legal frameworks (such as privacy commissioners or authorities).

identity systems beyond civil registration. For Africa the resources include the World Bank's Digital Identity Toolkit: A Guide for Stakeholders in Africa,⁶ the Spotlight on Digital Identity within the World Development Report 2016⁷ and the Identity Management Systems Analysis (IMSA)⁸ tool. Under the IMSA tool there are four indicators that are assessed (Table 3).

6 See *World Bank Digital Identity Toolkit: A Guide for Stakeholders in Africa, 2014*, which can be retrieved from <http://documents.worldbank.org/curated/en/2014/06/20272197/digital-identity-toolkit-guide-stakeholdersafrica>

7 The full report can be retrieved from <http://www.worldbank.org/en/publication/wdr2016>

8 This is an internal tool that builds on the pioneering work of Robert Palacios at the World Bank and has been used by now in about two dozen assessment missions, with more than half in Africa. ID4Africa is proud to have contributed significantly to the development and use of that tool, and to have participated in Africa in its application to a list of countries that include: Rwanda, Chad, DR Congo, Liberia, Sierra Leone, Côte d'Ivoire, Madagascar, Niger, Algeria, and Morocco.

2. Overview of Rwanda's identity ecosystem

Country context

The Republic of Rwanda is a sovereign state in central and east Africa in the part usually known as the “Great Lakes Region.” It shares borders with Tanzania in the East, the Democratic Republic of Congo in the West, Uganda in the North and with Burundi in the South. Its particularly mountainous topography has led Rwanda to be known as the “Land of a Thousand Hills.” While it is a relatively small country with about 26,000 km² surface area (about the size of Israel or the U.S. State of New Jersey), it has a high population density of about 420 inhabitants per km², for a total estimated population of over 12 million.



Over the last ten years, the government of Rwanda has been systematically modernizing the country's population registers and identity systems to bring them in line with what is needed for improved service delivery, security, and convenience for its citizens. The country leveraged a highly developed administrative structure to affect the initial registration and maintenance of vital information contained in these registers.

The identity stakeholders

Identity concerns everyone in Rwanda and as such, many government agencies have paid attention to their identity needs. However, generally speaking, there are two types of stakeholders: identity providers and identity users or consumers (relying parties). The identity providers are agencies that own foundational identity assets which could provide identity services or attestations of identity (e.g., identity cards) to relying parties or identity users. In Rwanda there are two principal identity providers that can be considered as the stakeholders. Those are:

- The National Identification Agency (NIDA)
- Local Administrative Entities Agency (LODA)

Figure 3: The National Identity Agency (NIDA) and the Local Administrative Entities Agency (LODA) Are Independent Agencies Reporting into the Ministry of Local Government (MINALOC), and Are Considered the Main Foundational Identity Stakeholders in the Country



NIDA focuses on individual identity registers, while LODA on the Ubudehe household register, which is a unified social register as defined above. Both agencies report under the Ministry of Local Government (MINALOC).

The assets

Between the two agencies, Rwanda has a portfolio of important assets that work together to support a robust identity ecosystem. These will be discussed in details in the following sections and are listed in summary form in Table 4.

Table 4. The Assets That Rwanda Leverages to Reinforce Its Identity Ecosystem

Type of Asset	Description
Administrative	<ul style="list-style-type: none">▪ Administrative government centers that can be used for enrollment or identity data collection▪ A mobile enrollment capability that is deployable on calendar schedule to cover the whole country
Information Update Procedures	<ul style="list-style-type: none">▪ Procedures put in place by NIDA for ongoing updates of vital information. These also effectively link the CR with the NPR▪ Periodic surveys put together by LODA that can be used to update household databases
Identity Registers	<ul style="list-style-type: none">▪ National Population Register (NPR)▪ National ID (NID) Database▪ Ubudehe household database
Credentials	<ul style="list-style-type: none">▪ Secure National ID Card
Unique Identifying Numbers	<ul style="list-style-type: none">▪ National Identity Number (NIN)▪ NPR Application Number (AN)▪ Household Number (HHN)

The supporting assets in Table 4 are considered foundational in the sense that they support general purpose identity systems (enroll once; use multiple times) that can meet the needs for identification of many other relying programs. This is to be contrasted with functional identity assets, which are systems that are built to serve one specific application (e.g., identification of health care recipients). In Rwanda there are other functional databases and schemes (not listed above), that contain identifiers in addition to detailed information relevant to the services of the organizations concerned (needed for Know-Your-Customer). Those include lists of passport holders, health care recipients, tax payers, social security and pension recipients, education, electoral list, and more specialized identity databases associated with the National Assistance Fund for Needy Survivors of Genocide (FARG) and Rwanda Demobilization and Reintegration Commission (RDRC). Increasingly these functional databases have become dependent on the NPR and NID, as they should be in a well-developed ecosystem.

The administrative structure and culture in support of identity

Before we discuss how identity registration works in Rwanda, it helps to understand how the country is structured administratively since this impacts the coverage and accessibility of ID schemes.

The administration is highly decentralized and divides the country into the structures shown in Table 5.

Table 5. The Administrative Structures in the Service of Identity in Rwanda

Administrative Unit	Total Number	Av. No. of People Served	Av. No. of Households Served	Governance
Provinces (intara)	5	2,000,000	400,000	Each headed by a governor and a full administrative staff. Has the responsibility of coordinating governance issues as well as monitoring and evaluation.
Districts (akarere)	30	360,000	72,000	Paid Government Administrators and fully developed institutions for offering services.
Sectors (imirenge)	416	26,000	5,200	<ul style="list-style-type: none"> ▪ Paid Government Administrators including Executive President & Secretary (paid) ▪ Sector Council (unpaid)
Cells (utugari)	2,148	5,000	1,000	<ul style="list-style-type: none"> ▪ Cell Council (unpaid) ▪ Cell Executive Committee (elected by Council, unpaid) ▪ Cell secretariat (2 paid positions)
Villages (imidugudu)	14,842	750	150	<ul style="list-style-type: none"> ▪ Village Council (unpaid) ▪ Village Executive Committee (elected by the Council, unpaid)

Figure 4: The Administrative Districts of Rwanda Where Consolidation of Identity Data Collected Is Ultimately Done



Within the lowest two tiers (villages and cells), those that have the most direct contact with the population, governance is provided by a Council (which includes everyone over the age of 18 in that structure) as well as an Executive Committee consisting of individuals elected by the Council and that are each focused on a certain narrow responsibility (e.g., social affairs, security, migration, development, education, etc.). All of those individuals are unpaid. The members of the Village and Cell Executive Committee as well as the Councils carry out their work voluntarily within the framework of self-development, good governance, and social development (See Figure 5). Apart from two positions in the Secretariat at the cell level, it is at the Sector level where we begin to see a significant number of career government employees appearing, alongside the Council (which is still a volunteer body). The presidential order that set up this structure also provided for detailed reporting channels which successively funnel information from the village all the way to the district level.

The implications of this highly developed and hierarchical administrative structure are very significant to identity systems. It means:

- The country has significant permanent points of contact with the population that it can use in order to get high enrollment coverage as well as to keep its identity information up to date as vital information changes.
- Identity knowledge is derived from personal knowledge of the people (at the level of the village and the cell) making it difficult for someone to commit identity fraud, since as we often heard in Rwanda “everyone knows everyone else.” This is a remarkable form of **Know-Your-Population (KYP)** that is derived from robust administrative processes that can be relied upon to ensure uniqueness of the identity and its authenticity.

Figure 5: Citizen Engagement at the Village Level Is Remarkable in Rwanda and It Helps Make the Points of Contact More Effective for Public Awareness and for Participation in Governance and the Administration of Local Affairs

The country has a Umuganda day each month, which can be translated as ‘coming together in common purpose to achieve an outcome’. Once a month the whole country mobilizes to do public works in their local area. In traditional Rwandan culture, members of the community would call upon family, friends, and neighbors to work together. This culture does have a very positive impact on collective frameworks such as population registrations and ID systems.



3. Civil registration and the national population register

Overview

From the outset, we should point out that the Civil Register (CR) in Rwanda is in need of modernization to address two important issues. First the rate of registration, is not yet up to par with developed countries; and second the registration process itself relies heavily on tedious manual steps. According to UNICEF's most recent figures, the percentage of children under the age of five that are registered in the CR is estimated at 63.2 percent as compared to 38 percent for the Sub-Saharan African average,⁹ and 75 percent for the world average.

Interestingly, while the civil register itself remains on paper ledgers distributed throughout the country, as described below, NIDA has put in place manual data collection processes for recovering the declaration information and integrating it electronically into the NPR on an ongoing basis in a manner that overcomes the challenges and limitations of the paper register. These procedures are essential for maintaining the health of the identity ecosystem.

Registration processes

Civil registration processes in Rwanda are defined through the original Civil Code adopted in 1988 and which was codified further in Law n°14/2008 of 04/6/2008 governing registration of the population. Nevertheless, it remains somewhat vague in certain areas¹⁰ and there is currently legislation to update the law and provide more detailed provisions, but more importantly to simplify the legal registration. In this section we will discuss the Civil Register (CR) and the registration procedures that are currently in force, keeping in mind some may change in the near future.

While, the CR is not computerized yet and hence difficult to search, the ensemble of ledgers and records in the country is very valuable since it is based on rigorous recording of vital information taking place at many points of contact with the population. These are the sector offices and there are 416 of them around the country (each serving on average about 25,000 people). They serve as initial entry points into the register as well as for updating vital information in order to keep the civil status of each individual as current as possible within the legally allowable reporting delay periods.

Because of the civil war in the early 1990s, historical civil registration records in the country were damaged or lost. Active attempts at restarting civil registration began in 1998. Today the CR consists of documenting the vital information declarations into a large number of annual volumes (each kept in duplicate) in each Sector office (416 of them around the country). The responsibility for registration falls under the Sector Executive Secretary (or an acceptable assistant or designate) who is considered the Civil Register Officer in that Sector.

The physical registers or ledgers kept at the Sector level include the bound volumes shown in Table 6.

⁹ See http://www.unicef.org/infobycountry/rwanda_statistics.html

¹⁰ The vagueness of the Civil Code was anticipated in the Code itself. In fact, Article 3 gave the Court, in areas where applicable legislative provision is absent, the authority to apply customary laws, and in the absence of a custom to use the rules a judge would make if called on to legislate.

Table 6. The Civil Register Volumes Available in Each Sector

Volume	Purpose
Birth (legal)	Register of births within a Sector as declared by three people no later than 15 days of occurrence. Three individuals need to be present to sign the register for the registration to be valid.
Death (legal)	The death declaration is done either by the spouse, children, parents, close relatives, or any other person who witnessed the event, saw his/her dead body or burial. The death declaration shall be made within a period not exceeding thirty (30) days from the date of death.
Sector Exit (administrative)	When someone intends to leave the Sector they are required to register their exit (change of address) Must notify leaders of the former sector 7 days prior to being registered in the new sector
Sector Entry (administrative)	When someone intends to move into a new Sector they are required to register their entry into the new sector (registering their new address) Registration into the new Sector must be done within 15 days.
Marital Status (legal)	Marriage and divorce.
Population Ledger (administrative)	Register of everyone in the Birth register but also those that could not make the 15 day required deadline. Extensive list of people in the Sector includes all children and adults. The Population ledger is supposed to cover at least four categories as stipulated by the language of the law 1. "Citizens register 2. Foreigners register 3. Register for children with unknown parents 4. Adopter children register" Registration is obligatory for all categories. Registration requires a birth certificate. If that is not available, then an attestation of birth signed by the Cell Executive Secretary as well as the Village leader can be used.

Naming tradition in Rwanda

It should be noted that the naming system adopted in the Civil Code does not use the concept of family names. This is why on official documents one finds "Names" listed instead of "First Name" and "Family Name," for example. The concept of family name does not exist in Rwanda, which causes confusion when attempting to transcribe Rwandan names into Western Format.

By tradition and custom, the father chooses a name, the so-called given name, for each one of his children and by the Civil Code of 1988, that name must be different than the father or mother's name or the name already given to another child in the family: the name must be unique within the family. This name by tradition is often expressive in its meaning: it evokes bravery, strength, gratitude, confidence, etc.

An individual can have several other names, so-called chosen names or baptism names. Thus from a name one cannot glean any familial relationships. This goes both ways, in the sense that siblings will always have completely different names, while unrelated people may have the same given or full name accidentally.

As we discuss below, this makes the case for electronic identification (eID) even more compelling, where the individual is identified via a unique NIN.

Transfer of information to NIDA

While the CR continues to be kept on paper ledgers (sometimes two or three volumes per year depending on the Sector), there is an important process that has been adopted which allows the transfer of the CR information to the National Population Register, which is an electronic database centrally located at the NIDA facility in Kigali.

The procedure is low tech and tedious but it works for the moment. It involves the generation of a NIDA notification form every time a page is written in any one of the paper registers in Table 6. For example, if a birth occurs and is documented in a birth register, a separate loose paper form is filled notifying NIDA of the event. These forms are collected on an ongoing basis by NIDA and are brought to a central facility in Kigali where data is entered by a staff of about 30 people that work in a computer room with software specifically created for this purpose.

This mechanism is very valuable because it ensures that the data kept centrally are up to date, a feature that enhances the value of identity repositories.

Credentials/certificates issued

The Civil Register office at the District level issues several types of documents. The most interesting for our purposes are those shown in Table 7.

Table 7. Birth Certification Documents Used in Rwanda

Document	Description
Birth Certificate (acte de naissance)	<p>This is a legal document, valid for life. It is free to obtain but can only be obtained if someone registers within the 15 days allowed by the law and in accordance with the registration requirements.</p> <p>It is estimated that only 2–5 percent of all Rwandans have this birth certificate according to officials. This is blamed on the onerous birth registration requirements (< 15 days, two witnesses, and parents, etc.). The proposed Civil Code currently under deliberation is supposed to ease these requirements (e.g., 30 days instead of 15).</p>
Attestation of Birth (attestation de naissance)	<p>This is an administrative document, valid only for 90 days. It costs 500 RwF. It can be used to validate the birth information, but before it can become a legal document it would require a court judgement.</p>

Figure 6: The Attestation of Birth (far left—an administrative document) Is Very Easy to Obtain from a Sector Office

It requires a signed personal information form (immediate left) from the executive secretary of the cell. The two documents are not secured; they are simply stamped and signed.



The National Population Register (NPR)

The electronic National Population Register (NPR) is kept at the National Identification Agency (NIDA) data center and it is the repository that contains a comprehensive list of everyone in the country.

Since the country's historical identity records were destroyed during the conflict, the country resorted to conducting a one-time campaign for registration of the population to serve as a baseline. During a three-day weekend (Friday to Sunday) in 2007, the government asked everyone to stay put where they were while thousands of civil servants went door-to-door and registered at that time what amounted to 9.2 million people. This information was entered into a computerized database and constituted their baseline population register.

Data contained in the NPR

The identity data contained in the NPR is a minimal set of searchable alphanumeric fields which includes name, date of birth, place of birth, sex, address, name of parents, etc. It does NOT include any sensitive data such as race, ethnicity, religion, social origin, beliefs, group memberships, physical or mental disability, or health status; nor does it include biometric information. Biometrics are included in the National Identity (NID) Card database as explained in Section 4.

Each entry to the NPR is attributed an 8-digit number called the NPR Application Number (AN). Unlike the National Identity Number (NIN) which is printed on the ID card (see below) and attributed to those 16 years of age and above, the AN is not printed anywhere even though it is unique. This number is supposed to be for internal purposes only. But given that children less than 16 years of age, do not have a NIN this number could play an important role.

The procedures for update outlined above have kept this database growing and the vital information that it contains up to date. In early 2015 it contained an estimated 10.7 million people, and today we estimate it to be over 11 million. The database continues to grow at the rate of 220-250 thousand, which tracks the rate of annual births at this stage in time.

Registration is obligatory not just for Rwandans but also for foreigners and refugees for all age groups, including children who must be registered by their parents or guardian as prescribed by the law.

Reforming civil registration and vital statistics (CRVS) in Rwanda

The CR continues to be dependent on manual data entry into bound paper books and on the transmission through paper forms of any information that is updated or documented in the CR. This is labor intensive and requires a certain degree of rigor in order to avoid recording errors or gaps. In addition, the business processes required by law for the registration is very onerous (e.g., requiring registration within 15 days and having two individuals, in addition to the parents, act as witnesses) and has been blamed for the continued less than optimal registration rates.

The country recognized these weaknesses and had begun exploring a reform plan. Recently, it has even experimented with online registration at health institutions (web-based pilot registration was launched in 2014 by the National Institute of Statistics of Rwanda (NISR) in coordination with NIDA). But reforming the

civil registration process in Rwanda is a complex matter. Among many things, it has to overcome two major obstacles before an operational plan could be constructed:

- Reform the legal framework in order to simplify the business process for registration
- Develop consensus on the national strategy for reform among over 20 agencies and organizations that consider themselves as CRVS stakeholders.

On the legal side, there is a new draft law that has been under consideration. It should accommodate what is required for simplification, as well as for the computerization of the CRVS or the electronic registration of birth, death, marriage, divorce, adoption, and recognition; and the issuance of a unique identifier and family code during birth and marriage declarations, respectively.

On the strategy of modernization, it touches on how to achieve the following tasks:

- Simplification of the declaration and registration processes.
- Upgrade and modernization of the infrastructure of civil registration bureaus to allow for electronic data entry and for automatic linkage between these bureaus and the central National Population Register (NPR) to ensure timely updates.
- Preparation and delivery of birth certificates to every Rwandan citizen in conformity with NIDA's data and replace all old birth, marriage, divorce, adoption, and recognition certificates by certificates with security features.
- The sensitization of the population so that they get familiar with registration of all Civil Status events in accordance with the provisions of the law.
- Improving engagement with the population through the adoption of electronic means (e-mail, SIM address added to the NPR or CR).

We believe the modernization of the CR in Rwanda to bring it to where it needs to be is a five-year project post adoption of legal framework and strategy. It represents a considerable effort, but it can be justified economically (cost savings from improved efficiency) and on the basis of protection of legal rights of people from the start. We have not seen a detailed plan yet for the end-to-end overhaul of the entire civil registration system, but we believe the country has decided to perform an APAI-CRVS¹¹ assessment before committing to a plan.

¹¹ See http://www.uneca.org/sites/default/files/images/apai_crvs_23-august-final-formatted.pdf for a description of the Africa Programme on Accelerated Improvement of Civil Registration and Vital Statistics (APAI-CRVS).

4. The National Identity (NID) System

The database (aka production database)

In addition to the NPR, which covers the entire population of all ages, there is another database at NIDA which only covers those who are 16 years and over and has biometric data. These individuals are required to visit an enrollment center within six months of turning 16 to affect their biometric enrollment (including two fingerprints and a photograph) and to request a National ID Card. Currently there are about 6.5 million distinct people in this National ID Database.

Two thumbs are used to perform a deduplication using a state of the art Automated Fingerprint Identification System (AFIS). In our assessment this may be an extra deterrent since the administrative registration procedures discussed earlier already make it very difficult for anyone to enroll twice in the population register. In fact, we have been told that the deduplication has yielded less than a half of a percentage point of potential duplicates, and in most cases these were legitimate errors and not attempts at defrauding the system. Nevertheless, we believe the use of AFIS is a core security component in protecting the NID system from potential fraud, rare as it may be.

Biometric enrollment kits

While the country has 416 registration offices (Sector level), there are only 163 enrollment kits. Each kit consists of a laptop, camera for capturing the face image, single finger live scanner for capturing the two thumbs, and a signature pad.

This number of kits is more than sufficient since they are shared among the Sector offices, which publish the availability of biometric enrollment on a calendar.

The National Identity Card: The baseline

Upon successful registration in the National ID Database, an individual is issued a National ID Card. The card is a standard ID-1 (ISO/IEC 7810) size card (85.6 mm length, 54 mm width, 0.76 mm thickness).

The card is made of waterproof synthetic material (Teslin laminated) and is well secured by holograms and micro-printing elements. In addition, the information listed in Table 8 is printed on the card recto and verso.

Figure 7: Example of Rwandan National Identity Card



Table 8. Information Printed on the Rwandan National ID Card

Front	<ul style="list-style-type: none">▪ Names▪ Date of Birth▪ Sex▪ Place of Issue▪ Signature▪ National ID Number (NIN)▪ Two photographs of its holder, one primary on the left and in color and the other is a reduced ghost photo in black and white
Back	<ul style="list-style-type: none">▪ Another instance of the reduced ghost photo of the holder▪ Text: “If found please return this card to the nearest police station” in Kinyarwanda & English▪ Text “Whoever uses this card contrary to the law will be punished” in Kinyarwanda & English▪ 2D bar code which contains all the information on the front in addition to one thumb in proprietary minutiae format (Cogent format). The bar code is a rectangle 7.5 mm in length and 1.9 mm in width. It uses standard PDF417 format to code the information.

The identity card is considered as personal property and has to be applied for in person at the Sector office where the person has been registered in the NPR. As for processing and issuance time, it can be as little as two days for expedited handling (normally reserved to those from the diaspora passing through to retrieve their card). Normal times are one week to one month for remote areas. The issued card produced centrally at NIDA’s secure facility is sent to the Sector offices where it can be claimed by its rightful owner.¹² If the card is not claimed within a certain period of time, (normally 90 days, but sometimes even 6 months) it is returned to NIDA where it is kept in one of the 416 cabinets corresponding to the Sectors until its rightful owner can claim it. At any given time, there are about 20,000 unclaimed cards in these cabinets.¹³

NIDA also issues the same kind of card to residents and refugees and issues them a unique identifying number. As we shall discuss below, the first digit of the identity number can be 1, 2, or 3 depending on whether the card is a national ID, a foreigner’s ID, or a refugee ID. It is our understanding that NIDA issues about 250,000 baseline ID cards per year, the majority of which are actually carrying a first digit of 1.

12 A four-digit code of the administrative cell is printed in small print on the back of the card in order to allow the cards to be grouped into Cells for easier retrieval.

13 There is also a set of cabinets that correspond to the prisons in the country. Apparently once an individual is incarcerated, their National Identity Card is confiscated and sent to NIDA, where it is kept in one of these prison cabinets. When these individuals are released from prison, they must bring their discharge paperwork and reclaim their ID card at NIDA before they are able to be reintegrated into society. It is not clear if this is symbolic or it is done for security reasons: someone escaping jail without an ID card cannot survive in society, since everything requires an ID in Rwanda.

Authentication ready

The 2D bar code on the NID contains biometric and biographic data. It can be read by a terminal or a handheld device, and the identity stored on the card can be confirmed against the live identity of a claimant at a point of service. This is an important feature as it adds another dimension of authentication capability typically found with more expensive chip-based ID cards. At the moment we are not aware of any authentication applications that have been launched using this feature.¹⁴

Cost to individual

Each individual is required to pay 500 Rwf (~72 US cents) for the identity card (which is clearly below its market or actual cost and what the vendor charges for personalization per card). ***This cost to an individual is by far the lowest we have seen anywhere in Africa if not the world,*** which is a further testament to good identity policy.

It is interesting to note that Rwanda sees this small fee as a collective tax that must be paid by every person whenever (Article 6 of Ministerial order n° 012/07.01 of 17/07/2008):

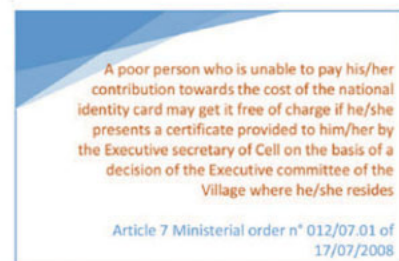
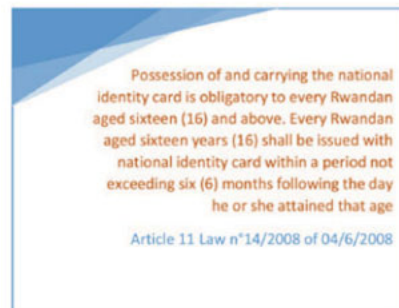
1. The person has attained sixteen years of age;
2. The card has been lost;
3. The card has been deteriorated at the point to not identify the possessor.

While the cost is relatively low, the same Ministerial order provides for a mechanism to waive the fee for poor individuals, thus eliminating any barrier to anyone getting access to the National ID.

The National Identity Number (NIN)

The 16-digit National Identity Number (NIN) printed on the front of the card is an important identifier in Rwanda. It is an example of the administrative unique identity numbers that have become ever more popular throughout the world (such as the Aadhaar number in India). It is attributed to a single individual for life. The intention behind this is to provide a unique interface between a unique person and the government agencies and to simplify and improve efficiency of service management and administration. While not all government agencies are currently using it in Rwanda, this is changing rapidly. It is expected that over the next five years there would be a total reliance on this number across all government agencies and services. It is also expected that the traditional census will be abrogated going forward and would be replaced by an output from an MIS system that would tally the active NINs geographically around the country.

The NIN is structured according to a defined logic which codes for gender, year of birth, and production control and has a 7-digit serial number. It uses two hash digits at the end to check for validity of the number to minimize data entry. The hashing algorithm is kept secret, as it is viewed as part of the security features of the NIN and the NID card. The structure of the rest of the number is publicly known or is easy to guess, but this does not undermine its security in any way, since it is the hash function that provides its security.



¹⁴ This is a typical situation found in many countries that have national ID cards that contain biometrics either stored on an IC chip or on a 2D bar code (for example Morocco and Chad). While the information is there, the authentication infrastructure is lagging behind, and hence the card is not used as an electronic ID yet.

It is important to note that while the NIN is made up of 16 digits, only the first 13 digits are immutable for life, as the Production Control Code as well as the hash digits change upon reissuance of the card. The Production Control Code is simply a number which starts at 0, denoting original card, and augments every time the card has been replaced, which is not that often. In a total of 6.2 million cards issued up to 2015, it is estimated that only 100,000 cards were replacement cards, so for the most part the Production Control Code is 0 for 98 percent of the cards.

We should emphasize that the NIN seems to play a more significant role in Rwanda than in other places around the world since, as mentioned earlier, the naming system in Rwanda does not permit constructing familial relationships which make it more challenging to document identity. With a NIN it becomes easier to identify people uniquely without resorting to their names (which lack uniqueness).

Use of the NID and NIN: Integration

The NPR as well as the NID system were truly designed, from their inception in 2007, as foundational systems that would serve the general identification needs of the country. Today, an increasing number of programs, applications, and institutions rely on these identities. This can be through the reliance on the National Identity Number (NIN) as a unique administrative identifier, the use of the NID card, or through the use of the identity verification services online. Overall, we find the NIDA assets ready and capable to be integrated into all other programs that need robust identification. If that has not happened in Rwanda in a universal way yet, it is because of lack of capacity on the part of the would be relying institutions and not because of technology or systems limitations on NIDA's side. It is only a matter of time where the NID and NPR are used for all applications. The legal framework is already there to promote that, as the law makes registration in NPR and possession of identity credential obligatory, so no one can claim they do not have them.

Parties relying on NIN/NID

Currently there are many programs at many institutions that use the NIN as a customer identifier. These include virtually all government organizations, the electoral commission, police, notaries at District and Sector Levels, and virtually all banking institutions in the country as well as the Telecom operators and service providers.

More specifically, the NID and the NIN have already achieved an impressive status close to being universal identifiers, with an ever increasing number of institutions, public and private, relying on it (see box for relying parties). We expect integration to continue to increase as Rwanda enters into the era of e-government and more of its services would need to be securely delivered online. The Rwanda Development Board (RDB), the organization reporting directly to the President, and that is charged with bringing Rwandan government service delivery online, has been conducting an exercise in Enterprise Architecture covering the entire government. We expect their findings will integrate the existing assets (such as the NIN) even more within the fabric of government information systems. It would be safe to conclude that the NID and the NIN in Rwanda are mission critical assets and that the daily function of society depends on them.

The driver's license and the integrated smart identity card (e-ID)

In addition to the baseline ID card, NIDA has also been producing the driver's license (production estimated at 40,000 per year). This is an important source of revenue for NIDA as the driver's license costs 100 times the cost of the baseline ID card. In a way, the driver's license subsidizes the national ID, which lowers the burden on the average person and achieves a price for a national ID below anything we have seen anywhere.

Soon, NIDA will begin issuing an integrated smart national ID card for a much higher price. This card can carry the following seven identification applications:

Personal Identification	Driver's License	Passport	Family Dependents
Social Security (RSSB)	Health Insurance	Tax Identification	

While the baseline card is compulsory for all citizens aged 16 years and over, the integrated smart ID card is optional. This puts the identity ecosystem in a hybrid environment where, for those who desire and can afford it, it issues an e-ID, while for the rest the ID credential remains nonelectronic. In the meantime, as more applications emerge for e-ID with more infrastructure to support them, and as the cost of the e-ID drops, the proposition will become more compelling for an ever increasing number of people that will migrate toward the e-ID. This way of introducing e-ID in a phased manner is worthy of exploration as a model to emulate in other African contexts.

Business model

NIDA has applied the practice of identity management to its fullest extent. It understood very well that its role, as a keeper of the foundational identity data, is to serve the legitimate needs of other governmental and nongovernmental organizations for verified identity. In order to achieve that, NIDA put in place the following mechanisms:

- A service charter signed January 31, 2013, defining rules of engagement with its customers.
- A legal framework to enable delivery of service (MOUs are signed with relying parties).
- Security standards and certification that are required before a relying party would be granted access.
- The technical mechanisms needed (web services) for the delivery of online identity verification services.

The model is well thought through and their list of customers continues to grow. In that regard we distinguish two types of customers.

- Those that rely on the NIN and ID card only. No link to NIDA is required.
- Those that access the online identity verification services and hence have signed the required MOU.

The first category is nearing universal coverage of the country's institutions, while the second is rapidly growing as NIDA continues to sign MOUs granting access to qualified and certified institutions. Under this list they count the Traffic Police, Immigration, Rwanda Central Bank "BNR," Revenue Authority "RRA," National Public Prosecution Authority "NPPA," Rwanda National Resources Authority "RNRA," National Elections Commission, and private institutions such as banks and telecommunication companies as customers for online services.

NIDA also reports that their operational cost, which includes fixed as well as variable cost (proportional to the number of consumables for the ID cards issued) was covered entirely by the revenue that they generate (multimillion dollars). This sustainable self-sufficiency is a significant achievement. NIDA accomplished it without raising the cost of the basic national identity card, by offering other high value identity cards mentioned above.

There is an upside in NIDA's business model. Today, NIDA does not charge for the online identity verification services. But at some point they could legitimately begin to charge a transaction fee for such services (We have been told that NIDA has no plans at all to charge for such services. This statement represents the author's opinion only as to the value of the service provided.).

A model that merits emulation

This business model is a major departure from other national identity card models that we have seen elsewhere in Africa. Most models rely on offering one type of identity card and have no diversified revenue opportunities. Often the central government has to allocate a budget to supplement the revenue from the card fees in order to provide adequate operating funds to sustain these identity authorities or agencies.

NIDA's clients, whether the private sector (telecom companies wanting to do SIM registration, banks trying to ensure KYC) or public authorities trying to eliminate fraud (revenue authority, pension administrators, etc.), will see in NIDA's identity services significant value in helping them reduce the cost of fraud and hence would be willing to pay a transaction fee. Even if NIDA decides to charge this fee only to the private sector while maintaining it free to the public agencies, this could become an important source of revenue in the future, as transaction volumes grow and the country moves into a more digital world.

In addition, NIDA is also interested in leveraging their existing secure credential production facility to issue other desirable credentials in the country, such as diplomas and professional certificates, and perhaps even the national electronic passport.

Governance

NIDA was setup by Law No 43/2011 of 31/10/2011 establishing the National Identification Agency and determining its mission, organization, and functioning. Before this date, NIDA was a project whose existence was approved by the cabinet meeting held on 13/08/2006. For implementation of this project, a technical committee was set up on 08/08/2007 by the cabinet.

While the law places NIDA under the supervision of MINALOC, it is governed by an independent 7-member Board of Directors, including the Chairperson, and hence has a fair amount of autonomy in the conduct of its business. The members of the board are chosen from private and public sector institutions and generally have business and finance experience. They are appointed through a Presidential Order (subject to the requirement that at least 30 percent of members shall be female) and serve for three-year terms. The structure of the Board and its competence, responsibilities, and functions is further governed by Prime Minister's order No. 83/03 of 08/10/2012.

Infrastructure and capacity at NIDA

What makes the identity data at NIDA even more valuable for the country is the fact that it is contained within a well-developed infrastructure and is supported by significant technical capacity. In fact, our assessment of that infrastructure revealed the following:

- State of the art data center that supports enrollment, identification, verification, and identity data storage.
- Scalable operations that can handle high throughputs.
- Strong built-in security mechanisms (secure facility, secure access to information and data, role-based access control) that protect against theft of identity data and malicious access and malfeasance.
- Built-in redundancy, backup, and disaster recovery.
- State of the art applications: AFIS for deduplication, identity verification web services, identity card personalization, and production application.
- Well organized and structured identity card production facility with quality control incorporated.
- A significant number of trained IT professionals supporting the operations of all the components.
- In addition to the high overall technical quality of the NPR and the NID, we note the strong alignment between the IT investment that is being made and the required business functions. No system at NIDA sits idle or obsolete. The ensemble of subsystems (and there are at least six to eight that we have identified) are well orchestrated together to deliver a valuable business function.

Put together with the data that NIDA already has collected and the procedures for updating that data what emerges is a state-of-the-art identity system containing valuable information and capable of responding to the identification needs of all other programs in the country into the foreseeable future, including those concerned with social protection as we see in Section 5.

Legal support for the NID: Criminalizing misuse of the NID card

The NID is a legal instrument, regulated and protected by Law n°14/2008 of 04/6/2008, which is comprehensive in its governance of all aspects of population registration and the issuance of a NID. It is worth pointing out that the law goes the extra distance to reinforce the trust in the NID by imposing explicit penalties for any attempts at fraud or abuse. Of pertinence are Article 12 that explicitly sets out punishment for any person proven to have given false information during registration in the population register, and Article 13 (see box) which make misuse or tampering of an ID card a criminal offense.

Shall be liable to a prison sentence ranging from one (1) month to three (3) months and a fine ranging from twenty thousand (Rwf 20.000) to two hundred thousand (Rwf 200.000) Rwanda Francs or one of these punishments, any person who shall:

1. Give his/her identity card to another person who subsequently uses it to deceive the authority;
2. Falsify the identity card;
3. Issue an identity card to a person who is not legally entitled to it;
4. Receive the identity card knowing that he/she is not eligible for it.

Article 13: Law n°14/2008 of 04/6/2008

5. The unified household register—Ubudehe

Generally speaking, a register based on individual identity is sufficient for most applications in a country with the exception of social protection programs, which often require the identification of households and knowledge of socioeconomic status for poverty and vulnerability targeting. Often it happens that social registers focused on households are developed independently and without coordination with the National Population Registers or the National ID programs in a country. This is the case in Rwanda where LODA over the years has developed its own foundational social register, which it makes available for social protection and safety net programs for selection of beneficiaries based on eligibility criteria. While this register was developed independently, a policy adopted in 2015 calls for the harmonization between it and the National Identity Card database, through the use of the NIN.

The social register (Ubudehe database)

The social register of Rwanda or the Ubudehe is a very valuable database that is constructed through periodic social surveys, conducted at the village level, and which collects the following information from each household:

- Identity information pertaining to the head of the household.
- The composition of the household and their identities (more recently the NIN for each member 16 years and older).
- A basic set of socioeconomic variables related to shelter, food, and occupation of members of the household.
- The Ubudehe score (Ubudehe Poverty Category).

Each household is identified by a unique identifying number called the HHN (Household Number), which is made up of 12 digits, the first eight are administrative and identify the village, and the last four are attributed to the household in each village (villages typically have on the order of 150 households, so four digits are more than enough to cover all households over the years). Even in big cities like Kigali, households are grouped into villages within the city, so the structure works across urban and rural areas.

Eligibility for a range of programs in Rwanda—including most Safety Nets and a number of social protection benefits, notably in health and education—is based on households' Ubudehe poverty category score. During the social survey (the so-called Ubudehe update) a community-based methodology is used to publicly attribute to each household a score of 1, 2, 3, or 4 corresponding to the four income and poverty categories differentiated by a set of qualitative criteria (prior to the 2015 survey the categories were six in number instead of four). In other words, village-level communities identify in their midst who is poor, who is vulnerable, who is middle class, and who is to be considered rich; and they do this with total transparency. This valuable input identifies for the administration the poorest and most vulnerable households that are in need of income support, and hence it makes targeting for social protection and safety nets more accurate and fair.

Currently the database contains a complete register of over 2.3–2.5 million unique households.

The social survey: The operations

In the past, the Ubudehe survey used to occur once every two years, but given the cost involved, LODA in 2015 adopted the policy of updating the Ubudehe once every three years. The surveys are conducted at the village level in a public forum where trained agents document on a single sheet of paper declarations from heads of households or their delegates, as well as community input as to the income score. It takes approximately 20 minutes per household to capture the necessary data. The completed forms are collected from the villages and are sent to the relevant District where a team of 70–80 government employees work on data entry.

Computerized data entry is done using open source software packages such as CPro at the District (recall 30 locations). Some amount of quality control takes place there, and if missing information or errors are detected the forms are sent back to the Village for completion and correction. Then the data is exported in Excel spreadsheets and transferred via e-mail to a central LODA facility in Kigali. There, a certain additional degree of quality control takes place. The data are then imported into a MySQL database, housed at the National Data Center in Kigali, where the data are permanently stored and consolidated for the whole country.

In order to analyze this cleaned data, it is subsequently exported into 416 Excel files, one for each Sector. The files are provided to statisticians that code their analytical functions onto the Excel sheets to extract knowledge from the data.

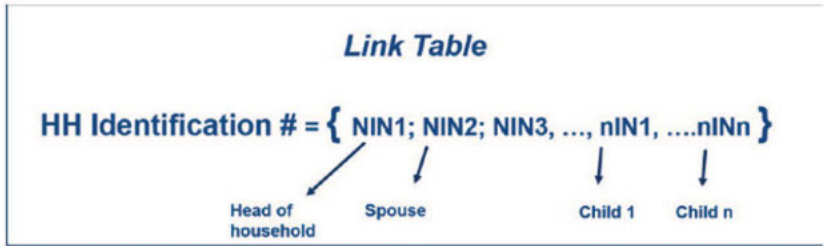
The process involves several manual data collection and entry steps when it comes to identity information, which in the absence of a concerted effort could lead to errors. For example, prior to the 2015 survey, while the NIN was supposed to be recorded for all adults, it was sometimes missing or entered in error, partly because at that time it was not relied upon as an identifier and hence it was entered casually. Additionally, there was no formal NIN verification procedure established which required the individual to present their National ID Card to be verified by the survey agent. Informal sampling of the data showed that there were significant errors (visible ones such as wrong number of digits recorded) that needed data cleaning.

The manual nature and associated errors and high cost (inefficiencies, high labor costs, etc.) of this system prompted LODA to explore a tighter dependence on the NIN and potential linkages with the well-developed, quality controlled NID system. It has also developed a web-based register MIS to improve not only data entry, but also processing and analysis. The harmonization between the Ubudehe and the National Identity Database and the NPR is a significant development. It is still ongoing and is far from complete. But upon completion, it is expected to reinforce the identity ecosystem and make it cheaper to maintain over time. Within this arrangement, NIDA focuses on providing identity data (either in the form of robust ID cards with NIN covering the entire adult population or as online identification services into which LODA could link electronically) while LODA focuses on collecting and analyzing socioeconomic data, relying on the NIDA framework for identification of household members. This division of labor makes sense since the NPR and NID are better equipped to handle updates in identity information because they have the mechanisms to keep their foundational data current on an ongoing basis, unlike the Ubudehe, which can only update each time there is a survey (now once every three years). In addition, the arrangement for cooperation has significant advantages for the Ubudehe process, which include reducing surveying effort, improving quality control of identifying data, and ability to focus the survey agents on socioeconomic data. Within this framework, the primary mandate of the Ubudehe is to determine poverty status of households and collect basic socioeconomic information for determining eligibility.

This linkage between the two systems would provide an excellent example for how to harmonize and synchronize the different foundational databases in any country that has social protection policies. The harmonization (see Figure 8) ensures that individuals appear consistently across the registers (same names, same NIN, etc.) while synchronization ensures vital information changes and updates at the NPR flow in a timely fashion to update the Ubudehe.

Figure 8: Example of a Harmonized Data Structure between Ubudehe and the NPR

In this case the harmonization takes the form of a link table, which groups NINs (assigned by NIDA) for members of a household under a unique Household ID assigned in the Ubudehe by LODA.



6. Lessons learned

The success and experience of Rwanda with its identity ecosystem provides a number of valuable lessons that could guide other identity authorities in Africa in their attempts to build performant identity schemes. In this section we summarize the most salient among them, in no particular order:

Lesson	Explanation	The Situation in Rwanda
Remove any financial barriers to entry by adopting a rights-based approach to the provision of identity	Ensure that registration in the civil or national population registers is free and that the ID card is issued at a cost that does not inhibit citizen participation. This may mean subsidizing the NID or figuring out a business model where it is paid for through other government services (or even tax). Having legal identity should be a right and it is the government's responsibility to make it ubiquitously available to its citizens.	There is no barrier for anyone to obtain an NID or an attestation of birth in Rwanda. The cost, for each, is relatively low (500 Rwf) and is free to those who get a certificate from the Village Executive Committee stating their inability to pay for the ID card. Registrations in the NPR and the Ubudehe are free.
Maintain significant points of contact with the population—Know-Your-Population (KYP):	To identify the population, one needs to know the population, and for that there needs to be mechanisms of proximity that allow the flow of identity data in a manner that is convenient to the citizens. Leveraging an administrative structure that is already viewed by the population as go-to service points increases the density of the points of contact with the population that are supportive of identity onboarding and updates.	The administration of identity uses the Cells (over 2,100 of them) to achieve KYP and the District (416 of them) to distribute credentials. With such dense coverage the population does not have to go far to get its legal identity needs met.
Develop a supportive legal framework and enforce compliance by making it a criminal offense to misuse the ID ecosystem	For success of the identity ecosystem requires laws that: <ul style="list-style-type: none"> ▪ Motivate the population to seek legal identity by linking their right to identity to tangible benefits ▪ Deter abuse of the system by providing penalties and sanctions for all attempts to undermine the national identity through fraud. 	The legal framework of Rwanda summarized in the Annex achieves both. The law requires registration for all, as well as having the NID Card starting from 16 years of age, so everyone is compelled to register in the Sector within which they reside. The country makes it a criminal offense for any abuse of the identity system. For example, Article 12 of Law No. 14/2008 explicitly sets out punishment for any person proven to have given false information during registration in the NPR (prison time as well as financial penalties) as well as Article 13 of same Law that establishes criminal penalties for misuse of identity cards. What is missing is a data protection and privacy law, that assures that there are adequate safeguards around personally identifying data.

(continued)

Lesson	Explanation	The Situation in Rwanda
Pay attention to the institutional arrangement and governance of the identity agency or authority	The national strategy for identification and the coordination of identification activities in a country are best entrusted to a go-to organization that is empowered and held accountable for the overall state of the ID ecosystem. This identity authority or agency needs to have enough independence that it would be accepted by all sectors as a neutral service provider not controlled or biased by the needs of any single sector. Having a board of directors that represents a cross-section of the relying parties ensures that the organization is responsive to customer needs.	NIDA Rwanda is the organization empowered by law to be the caretaker of foundational identity. It is for all intents and purposes independent and is governed by a board of directors.
Don't launch an ID scheme until convinced that it will have a high business value to the population and relying parties.	Legal identity needs to have tangible benefits to the population and NOT just to the administration and authorities. The public needs to know from the get-go what benefits an ID could bring to their lives.	In Rwanda the NIN and the NID have achieved high business value with dozens of applications and institutions relying on them daily for the delivery of services to their customers. It simplifies the lives of the population and ensures that they count. It is difficult to conceive business functions in Rwanda in the absence of NIN or NID.
Adopt a charter for the identity agency that makes it clear that it is for the service of people	The mission of the identity agency should be to help people get recognition of the legal rights conferred by identity. It should be in the service of people and not for their control. Applying customer service metrics to assess performance of that agency should be a priority.	NIDA has adopted a service charter that makes it clear that its clients are the people and the organizations that depend on their services.
Establish a social register (SR)	Having an NPR and an NID is not enough in a developing country. To truly protect and serve the population, a country needs to add a social register to its identity ecosystem.	Rwanda understood that and has invested in developing an exhaustive household social register—the Ubudehe.
Harmonize identity between the NPR and the SR	As the SR and the NPR cover the same population, this synergy should be exploited to minimize cost and reinforce the two registers.	Ubudehe now pays attention to recording the NIN of the head of household and down the line will have an active link to the NPR to verify identity and to ensure that an individual appears consistently across the two registers.
Linkage between a paper-based CR and an electronic NPR (and consequently the NID) is possible	In general, linkage between a CR and a NPR is highly desirable to ensure the robust and consistent provisioning of identity from cradle to grave. This task is much harder if the registers or at least one of them is on paper, which is often the case in the African context, where the CR in many places is still paper-based. This leads to a lost opportunity, where authorities wait for the modernization of the CR before they attempt to link it to the NPR.	While the CR in Rwanda remains on paper and in need of modernization, NIDA has put in place administrative processes to ensure the link, at least from the CR to the NPR. While the link is not automatic at this stage as it involves several manual steps, it is a stopgap measure that is effective in linking paper-based registration to computerized systems, until an electronic CR emerges.

Lesson	Explanation	The Situation in Rwanda
Consider a hybrid credential strategy for a phased migration toward e-ID	While an identity should be unique and attributed to a single NIN for life, there is value in giving people the choice of how they want that identity attested. The choices could include low-cost ID card, a multiapplication smart ID card, mobile credentials, ID in the cloud, etc.	NIDA is among the first (if not the first) in the world to offer its customers a choice between a baseline ID card and an integrated smart ID card. This hybrid model allows NIDA to generate more revenue from the value-added offerings to subsidize its baseline services.
Integrate biometrics in a measured way to compliment Know-Your-Population (KYP)	Biometric technologies are useful for ensuring uniqueness and enhancing robustness. But they should not be the driver dictating the design of the identity scheme, nor should they detract from the need to implement KYP processes by leveraging the valuable local contacts with the population.	NIDA has adopted biometrics in a balanced manner. They only use two fingerprints to enhance their already built-in robustness that is coming from the KYP provided by the Cells.
Establish online identity services as an integral part of the offerings	The online identity services are the ultimate fraud combating tool in any identity ecosystem. Even if the NID card is falsified, the falsification would be detected at the level of the online identity verification, since no unauthorized alteration can take place to the database. These services are also essential for facilitating the electronic integration of different registers. For example, the Electoral Register could be linked to the NPR via the online identity verification services that can be used to verify the true identity of a potential voter seeking to enroll in the voter roll.	NIDA has put in place a scalable identity verification service that it makes available for its relying parties that pass NIDA's required information security certification.

Annex: The legal framework

The identity ecosystem in Rwanda is governed and regulated by the laws and decrees shown in Table 9.

While these laws provide an excellent foundation, they are in need for amendment for two reasons. First, the Civil Code needs to be amended to accommodate the modernization of the civil register. Second, they lack one element which has become indispensable for a modern legal framework for identity systems, and that is the explicit recognition of people's right to privacy and the protection of their personal data. This is an important issue, since the identity repositories in the country continue to grow and continue to contain more and more personally identifying data and information. What is needed is a framework that defines what data are allowed to be collected and for what purpose and for how long the data can be kept. A data protection and privacy law, similar to what ECOWAS has encouraged its member states to adopt, would be a very valuable enhancement to the identity ecosystem in Rwanda. The law, in addition to delineating which type of identity data are legitimately available to which institutions and for which purpose, would empower a Data Protection Authority to enforce the law.

Table 9. Laws and Regulations Impacting Identity Systems in Rwanda

Law/Regulations	Purpose and Description
Civil Code	Adopted 1988 (and some of the updates from the Code de La Famille of 01/01/1989)
Law n°14/2008 of 04/6/2008	Governing registration of the population and issuance of the national identity card (Official Gazette special number of 16/07/2008)
Ministerial order n° 012/07.01 of 17/07/2008	Determining the characteristics of the national identity card and the amount of contribution toward the cost of the identity card.
Presidential order n° 57/01 of 15/10/2006	Determining the structure and functioning of village, cell, and sector.
Law n°43/2011 of 31/10/2011	Establishing the National Identification Agency and determining its mission, organization, and functioning.
Prime Minister's order n°83/03 of 08/10/2012	Determining the competence, responsibilities, and functioning of the Board of Directors of the National Identification Agency (NIDA) and the term of office for Board members.

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