A Strategic Roadmap for Developing Digital Identification in Nigeria

Approved Report

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Contents

Executive Summary

In April 2017, the Federal Government of Nigeria (FGN) issued the Economic Recovery and Growth Plan (ERGP) as its overall strategy to drive the country's economic development. The ERGP aims to re-position Nigeria as a major player in the global economy. As part of ERGP, the FGN plans to deliver key government services to people in Nigeria, including safety net, agriculture, food security, energy, transport, and enterprise development, while strengthening the macro fiscal environment, investing in people, and developing a local digital economy.

Identification is central to realizing ERGP. Without knowing who the people are, the FGN may not be able to effectively deliver important government services to people. Key government programs of social safety net, financial inclusion and elections rely on good identification. Firms, aiming to scale up the country's digital economy, may not be able to offer innovative products and services to consumers, without good identification. The FGN's plans to strengthen fiscal management, and promote good governance and transparency, similarly require knowing who is who. Identification is a requisite for the country's economic, social and political progress, and works hand in hand with greater use of internet, payments, and skills for a vibrant digital economy in Nigeria.

The Need for a Strategic Roadmap

Despite the urgent need, identification remains underdeveloped in Nigeria. Currently, about 38% of people in Nigeria have any form of ID. About 13 or more Federal agencies, and another 3 or more State agencies, offer ID services in Nigeria. Each government agency collects the same biometric information of people, overlapping efforts within government, at a high fiscal cost. Important government agencies are involved in identification, including National Identity Management Commission (NIMC), National Population Commission (NPopC), Central Bank of Nigeria (CBN), Independent Election Commission (INEC), and National Communications Commission (NCC), amongst others. Despite a fragmented ID ecosystem, the FGN is on track to spend US$4.3 billion on identification, with US$1.2 billion spent, and another US$3.2 billion to be spent, based on analysis done in 2015.

This report provides a strategic roadmap for developing identification in Nigeria. The roadmap is intended to offer a credible pathway for the FGN to develop identification, at a low cost and fast pace. As part of the roadmap, the report provides policy, institutional, and operational choices for the FGN. The roadmap proposes a modified approach to developing identification, leveraging the FGN's existing institutions, capacities and systems. The strategic roadmap emanates from a high-level policy roundtable held on identification in Abuja, Nigeria, in December 2016. In preparing the report, extensive consultations were held with stakeholders of identification in Nigeria in the year 2017, and prior studies were utilized on identification in Nigeria and on best practices of identification in developing countries.

The Government's Vision of Digital Identification

The FGN may aim to simplify its approach on identification by offering a unique identity to every person in Nigeria—on the soil of Nigeria, or of Nigerian origin—within a defined timeframe of 3-5 years. The greater the coverage of unique ID, the more equipped the FGN may be to serve people. The objective of identification may be to empower people, helping them rise out of poverty and achieve greater prosperity. People may thus be the principal stakeholders and beneficiaries of identification. To determine the unique identity of each person, the FGN may use digital technologies, such as biometrics, while linking its efforts with digitized civil registration. The FGN may promote use of identification, by enabling people to obtain a physical proof of identity, developing ways to digitally verify an ID anytime or anywhere in

Nigeria, and linking with regional use of ID, as being advanced by the Economic Community of West African States (ECOWAS).

To drive greater adoption and use, the FGN may prioritize important use-cases, such as social safety net, financial inclusion, and elections, of identification. These use-cases may be amongst the first users of the digital identification program. The program may be developed to ensure that a unique identity is available at speed to people in priority government programs.

Setting Government Policy

Setting the FGN's policy on identification may be a first step. Currently, government agencies in Nigeria overlap in function in offering identification. The FGN's ongoing efforts of harmonization involve collecting data from different government agencies into one place, with the aim to speed up the issuance of a national identity number (NIN) to people. The approach is useful, though poses technical and legal considerations. Given parallel efforts of identification across government agencies, the scale and speed of identification may not be readily achieved, while incurring a high fiscal cost.

The FGN may re-examine its approach of harmonization. Instead of collecting the functions of ID in one government agency, the FGN may consider "federating," or distributing, the functions of ID across government agencies. Based on this model, one government agency may offer unique ID to people in Nigeria, while other government agencies may collect and maintain their own use-specific systems of identification, linked with the unique ID. In this way, each government agency in the current identity ecosystem of Nigeria can play an important role going forward. The FGN can leverage its collective government capacity and systems to develop the future of digital identification in Nigeria.

The FGN's new policy on identification will need to be reflected into law. The FGN may require a review of its current legal environment (as it relates to NIMC but also to the broader group of agencies working on identification and sensitive personal biometric and biographic data), to determine possible gaps and areas of development. The FGN may need to enact or amend legislations on identification, and on security and privacy of information.

Building Organization

Digital identification may need to be a "government agenda" in Nigeria, untied to a single government agency. Given the transformational benefits of identification, and the cross-government nature of its development, top-level government ownership may be necessary. The high-level ownership may help steer the development of identification across government agencies, and provide much-needed governance and coordination, lowering cost and hastening development.

The FGN may consider three tiers of organization: an ID Coordination Unit within the Office of the Vice President to provide overall governance and coordination, an ID Implementation Unit within NIMC to drive implementation and to work with NPopC on digitization of civil registration, and functional ID agencies to drive demand and use of ID.

Strengthening Implementation

The steps for implementing digital identification may require an update. Broadly, three areas determine the cost and speed of identification in Nigeria: data collected for unique ID, the approach to collecting data, and the way a proof of unique ID is offered to people.

First, the FGN would need to carefully examine what data to collect per person to establish a unique ID. The more data is collected, the more expensive the overall ID program, and the slower the development. The FGN may consider focusing on collecting minimal demographic data per person, and multiple modes of biometrics to enhance accuracy of unique ID.

Second, the FGN may re-examine how data is collected from people across the country. Enrollment, or collecting data, is a gargantuan and expensive exercise. Currently, several government agencies have capacity to collect data of people, though no agency exhibits the capacity to do nationwide enrollment. The FGN may have two ways: (a) build the capacity of one government agency to do nationwide enrollment; or (b) leverage the existing ecosystem of government agencies to do nationwide enrollment, dividing work across agencies, while coordinating the work. The FGN may be suited to pursue the ecosystem approach of enrollment for sake of cost and speed.

Third, the FGN may review how a proof of ID is given to people. Currently, the FGN offers a digital proof of unique ID, in form of a NIN, and a multi-purpose smartcard. NIMC manages the entire supply-chain in house of printing, customizing and issuing cards. Given capacity challenges, NIMC has produced 1 million cards and issued about 0.5 million cards since 2014. Going forward, the FGN may offer a digital proof of unique ID to every person in Nigeria, and facilitate a competitive marketplace of firms that offer credentials as a physical proof of unique ID to people, per laws and regulations of Nigeria.

In addition, the FGN may require linking unique ID with digitized civil registration. A national registry of unique IDs would be robust when linked with a digital registry of births and deaths. The FGN would thus know when a child is born or a person may have expired, to reflect in the unique ID record of the person. Currently, the coverage of birth and death registration in Nigeria is low, at about 37% and 5% respectively. NPopC, responsible for birth and death registration, has prepared a strategic plan to reform civil registration and vital statistics (CRVS). Linking unique ID with civil registration would require building foundations for a digitized civil registration, with a digital registry of births and deaths, digitization of historic birth and death records for a defined timeframe, updated procedures for birth and death registration, and capacity building.

Planning for Development

Developing digital identification in Nigeria is achievable within 3-5 years, and may cost US$433 million to US$2.3 billion, depending on the policy, institutional and operational choices made by the FGN. The FGN may need to stage development, by first strengthening the current identification program, then scaling up for nationwide rollout. The report provides different cost scenarios for pursuing development.

Digital identification can be transformational for Nigeria, though it is a substantial undertaking, requiring clear government policy, well-defined roles of government agencies, key champions within the FGN, a top caliber organization, funding and resources, a viable partnership strategy, and an effective public awareness campaign.

Introduction

1. ***Nigeria has long known the importance of identification, though has wrestled with developing a robust identity program:*** The efforts taken by the Federal Government of Nigeria (FGN) to develop identification date back four decades. In 1978, the Department of National Civil Registration (DNCR) was set up within the Federal Ministry of Interior (FMI). DNCR was tasked with issuing national identity cards. The program lasted 18 months. In 2001, DNCR contracted a private partner to enroll people, and issue national identity cards, at a fiscal cost of US$236.8 million. The program ran for 5 years, issued national identity cards to 37.3 million people, and was shelved. The system was not re-used. In 2007, the government passed a law, the National Identity Management Commission (NIMC) Act, and set up NIMC as the government agency responsible for identification in Nigeria. Today, 13 or more government agencies at the Federal level offer identification services in Nigeria, though coverage remains low.

2. ***In 2015, the FGN revived the Harmonization Committee to consolidate data from multiple identity programs in Nigeria:*** In January 2015, the FGN convened a Harmonization Committee with the mandate to integrate the ID systems in Nigeria, and to speed up the rollout of official ID in the country. Led by NIMC, the harmonization exercise is ongoing, and is collecting ID information of people from different ID programs in the country into the national ID database of NIMC.

3. ***During December 2016, the FGN organized a high-level policy roundtable to discuss a forward-looking approach for identification in Nigeria:*** The FGN, led by NIMC, with support from the World Bank, held a high-level policy workshop on identification in Abuja, Nigeria, in December 2016. The workshop highlighted the role of digitally-enabled identity in Nigeria's economic and social development, and possible options and steps to developing identification in Nigeria. The workshop noted preparing a strategic roadmap for Nigeria's identity program as an important next step.

4. ***This strategic roadmap emanates from the policy roundtable on identification, and aims to offer a viable plan for developing identification in Nigeria:*** Following the policy roundtable, the FGN has partnered with the World Bank to prepare a strategic roadmap for identification in Nigeria. The roadmap is intended to provide a practical plan for developing ID in the country over the next 3-5 years, by laying out a clear vision, defining government's offering of ID to people, delineating the roles of different government agencies, building the government's capacity to deliver, formulating an action plan, setting a timetable and milestones, and optimizing the cost of identification in the country. The strategic roadmap, as conceived, varies from the current plan of action of the FGN, and is intended to expedite development. Based on the roadmap, the FGN may redirect its efforts, mobilize necessary funding and resources, and achieve the transformational benefits of realizing ID, once for all, for every person in the country.

5. ***In preparing the strategic roadmap, the FGN and the World Bank held consultations with government agencies, stakeholders and partners involved in identification in Nigeria, and leveraged past work done on identification:*** In 2015, the World Bank carried out a review of the identification ecosystem of Nigeria.[1] The World Bank has additionally produced relevant studies on identification, including *Digital Identity Toolkit for Africa*,[2] and *Principles on Identification for Sustainable Development*.[3] In March 2017, the Harmonization Committee prepared a draft business plan for harmonization of ID in Nigeria, and a review of the legal environment of ID in the country. During April-June 2017, the FGN and the World Bank held consultations in Abuja with government agencies and stakeholders involved in

[1] The World Bank. 2015. *Identity Ecosystem of Nigeria*. Washington, DC.
[2] The World Bank. 2014. *Digital Identity Toolkit: A Guide for Stakeholders in Africa*. Washington, DC.
[3] The World Bank. 2017. *Principles on Identification for Sustainable Development: Toward the Digital Age*. Washington, DC.

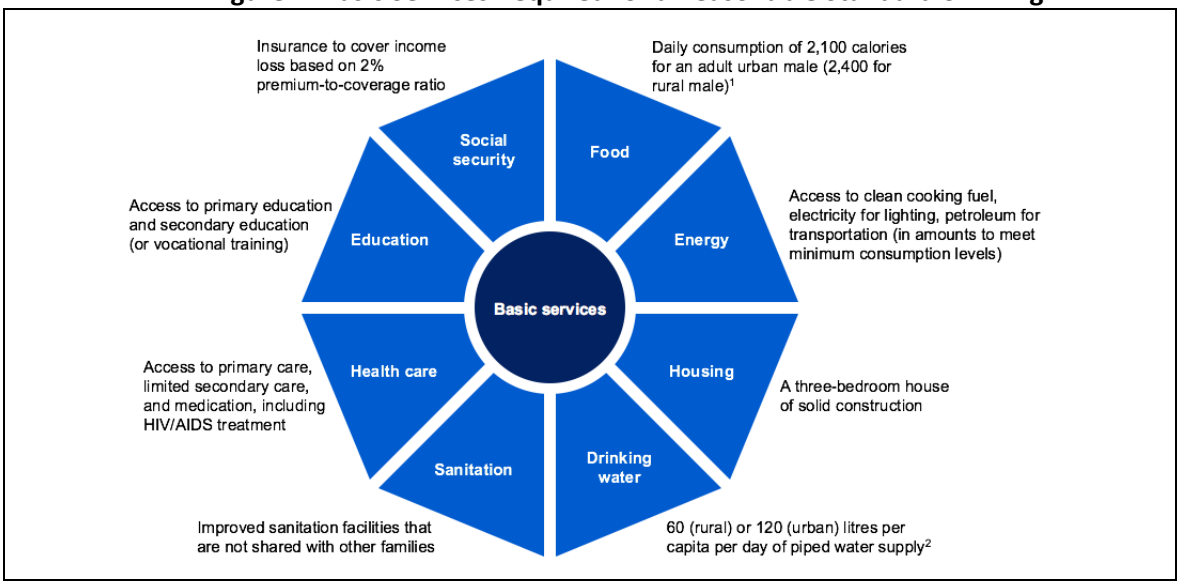
identification in Nigeria. The strategic roadmap has benefited from the studies and consultations, and has been funded by the Identification for Development (ID4D) program of the World Bank.

The Problem: Not Knowing Who is Who

6. ***Nigeria's development challenges require knowing who is who:*** The Economic Recovery and Growth Plan (ERGP), prepared by the FGN in April 2017, highlights the complex development challenges faced by the government in Nigeria. With a population size of 185.9 million people,[4] Nigeria grapples with poverty, inequality, youth unemployment, and an undiversified economy. Currently, 61% of people live below the poverty line. 22% of labor force involve the unemployed youth. 95% of exports are from the oil sector, with manufacturing accounting for less than 1% of the country's exports. The economic downturn is further precipitated by weak infrastructure, challenges in fiscal management, and transparency and accountability. For the FGN to realize ERGP and deliver key services to people, it needs to know who the people are. Identification is necessary for the country's economic, social and political progress.

7. ***Poverty in Nigeria is aggravated by a weak standard of living, compounding the urgent need for reliable identification:*** Based on an estimate of the standard of living in Nigeria,[5] denoted by income required for basic services (see **Figure 1**), such as social security, food, energy, housing, drinking water, sanitation, healthcare and education, 74% of the population (or 129 million people) do not possess the necessary means to afford a basic standard of living.[6] This population constitutes 81% of people in rural areas (or 69 million people) and 68% of people in urban areas (or 60 million people).[7] As the FGN helps people in Nigeria to rise out of poverty and achieve greater prosperity, identification poses a significant development hurdle.

Figure 1: Basic Services Required for a Reasonable Standard of Living



Source: McKinsey (2014)

[4] Source: World Bank WDI (2017).

[5] McKinsey estimates the standard of living, as a MGI Empowerment Line, to be the income needed to afford eight essentials for a decent standard of living, after consideration of taxes and subsidies and assuming the necessary goods and services are accessible.

[6] McKinsey. 2014. *Nigeria's renewal: Delivering inclusive growth in Africa's largest economy.* Abuja, Nigeria.

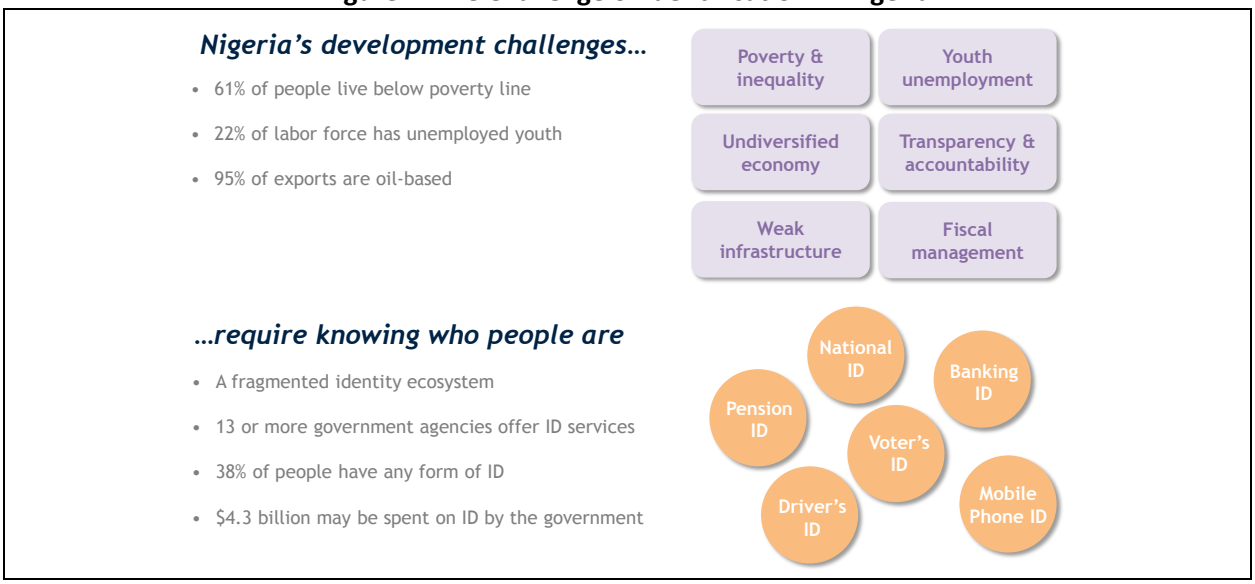
[7] *Ibid.*

8. ***Despite the urgent need, Nigeria's identification program is under-developed and fragmented, with low coverage, and duplication across government agencies:*** Currently, the coverage of unique, official ID to people in Nigeria is low (see **Figure 2**). At best, 38% of people have some form of ID.[8] About 9% of people have a national identity number (NIN), offered by NIMC, and less than 1% of people have a national identity card.[9] The identity ecosystem of Nigeria consists of 13 or more government agencies offering ID services at the Federal level, and another 3-4 at the State level (see **Box 1**). Given a fragmented program, all government agencies collect the same biometric information of people, duplicating efforts across agencies. People in Nigeria carry multiple ID cards, without having a robust form of unique ID.[10]

9. ***The ongoing harmonization may help speed up issuance of unique IDs, while posing technical and legal considerations:*** The FGN's ongoing efforts to collect data of people from different ID programs into the national ID registry of NIMC has the potential to offer speed in issuing unique ID numbers, i.e. NINs. The resulting ID registry may be a good resource to validate the unique IDs of people. The current exercise of harmonization poses some technical and legal considerations for the FGN.[11]

10. ***The FGN's current course of action may incur a fiscal cost of US$4.3 billion, while falling short of achieving full coverage of ID and improving the fragmented identification program:*** Based on an illustrative analysis done by the World Bank in 2015, the FGN is on track to spend US$4.3 billion on identification in Nigeria, via the different ID systems run by Ministries, Departments and Agencies (MDAs). Of the total amount, US$1.2 billion has been spent, and another US$3.1 billion may be spent, following the current approach of developing identification in Nigeria.[12] The FGN faces an opportunity to re-examine its approach, rationalize and lower cost, and expedite the delivery of ID in the country.

Figure 2: The Challenge of Identification in Nigeria



Source: Nigeria ERGP (2017), World Bank (2015)

[8] The estimate is based on the number of people given a voter's ID card, as a proxy for coverage of ID.
[9] Source: NIMC (2017).
[10] The World Bank. 2015. *Identity Ecosystem of Nigeria*. Washington, DC.
[11] Technically, merging multiple relational databases into one can affect the quality of data in the resulting database. Legally, transferring a person's data from one government agency to another, for purposes other than the original use of data for which the person consented to give data, may require a review of privacy of data.
[12] *Ibid.*

11. ***Identity is today a public good, and a requisite for modern development:*** The ability to prove one's identity is critical for individuals to participate in economic, social and political life. Equipped with a verifiable, digital form of identity, individuals can prove and assert their identity in an instantaneous, paperless manner, anytime or anywhere in the country. They can thus become an integral part of the national digital economy. This "connectedness" can empower people, to access benefits and services, claim entitlements, and conduct a range of activities. When each person has a proof of identity, the government can be better equipped to do fiscal management, revenue generation, and accountability and transparency. The use of ID in the government's social expenditure can help remove fake and duplicate entries, and enable direct delivery of benefits and services to individuals at their doorstep.

Box 1: Stakeholders of Identity Ecosystem of Nigeria

Foundational ID: A foundational ID helps explain "who you are." Two government agencies are involved in Nigeria for foundational ID.

- *Nigeria Identity Management Commission (NIMC)*: Lead agency for ID in Nigeria, as per law.
- *Nigeria Population Commission (NPopC):* Lead agency for registering births and deaths in Nigeria, as per law.

Functional ID: A functional ID helps explain "whether you are eligible for a specific benefit." Several government agencies are involved in Nigeria for functional ID.

- *Central Bank of Nigeria (CBN):* Operates a registry of people who use banking services.
- *Independent National Election Commission (INEC):* Operates a registry of people who are eligible to vote.
- *National Communications Commission (NCC):* Operates a registry of mobile phone users.
- *National Health Insurance Scheme (NHIS):* Operates a registry of people who subscribe to health insurance.
- *Federal Inland Revenue Service (FIRS):* Operates a registry of people for taxation.
- *Joint Tax Board (Customs):* Operates a registry of people for excise and custom duties.
- *National Pensions Commission (PENCOM):* Operates a registry of people entitled to pension by the FGN.
- *National Social Safety Net Project (NASSP):* Operates a registry of poor and vulnerable people in Nigeria.
- *Federal Ministry of Agriculture and Rural Development (FMARD):* Operates a registry of farmers entitled to agriculture benefits from the FGN.
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Security agencies: Security agencies rely on ID to carry out security services in Nigeria.

- *Ministry of Defense (MoD):* Responsible for national security of Nigeria.
- *National Immigration Service (NIS):* Operates a registry of people with a valid passport or travel document.
- *Federal Road Safety Corps (FRSC):* Operates a registry of drivers.
- *Nigeria Prison Service (NPS):* Operates a registry of prisoners, both past and present.
- *Nigeria Police Force (NPF):* Operates a registry of people in conflict with the law.

State agencies: Government agencies at the State level, and within Local Government Agency (LGA) and wards, rely on ID to offer services to people and to carry out State-level government functions.

Private sector: Firms in the private sector rely on ID to offer services to consumers.

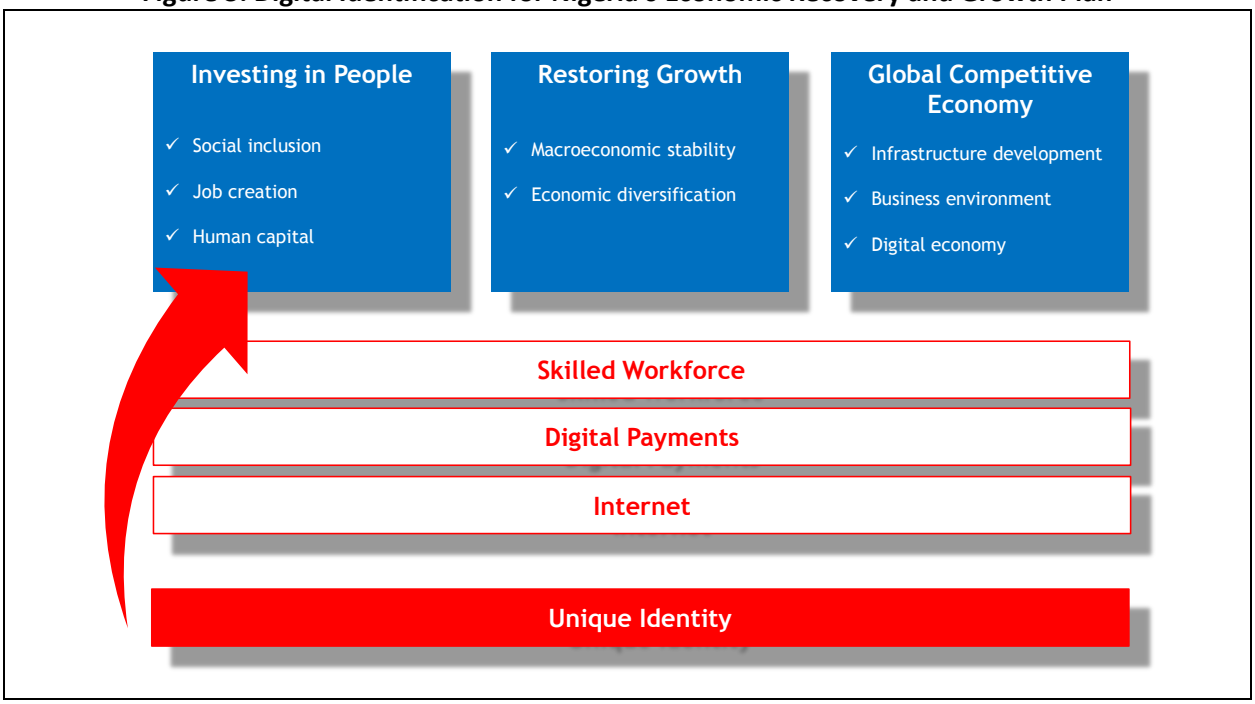
- *Financial institutions*
- *Telecommunications service providers*
- *Healthcare service providers (including health insurance companies)*

Regional bodies: Economic Community of West African States (ECOWAS) is promoting the regional use of ID for greater regional integration in West Africa.

The Solution: Using Digital Identification

12. ***A well-developed digital identification program may help deliver the FGN's development agenda, and provide for key government services, such as safety net, financial inclusion and agriculture:*** The ERGP aims to achieve progress by: (a) investing in people; (b) restoring growth; and (c) developing a global competitive economy (see **Figure 3**). As part of this plan, the FGN aims to offer key government services to people in Nigeria, including social safety net, financial inclusion, digital payments, employee pensions, agricultural services, healthcare, education, skill development and employment, law-enforcement, land reforms, elections and census. The plan requires efficiency in the way services are offered to people, and diversifying the country's oil-based economy. As Nigeria turns towards digital delivery of services, and fosters a national digital economy, it would require a digital identification program to uniquely know who the people are. A viable digital economy would require additional elements, including ubiquitous internet, electronic payments, and a skilled workforce.

Figure 3: Digital Identification for Nigeria's Economic Recovery and Growth Plan

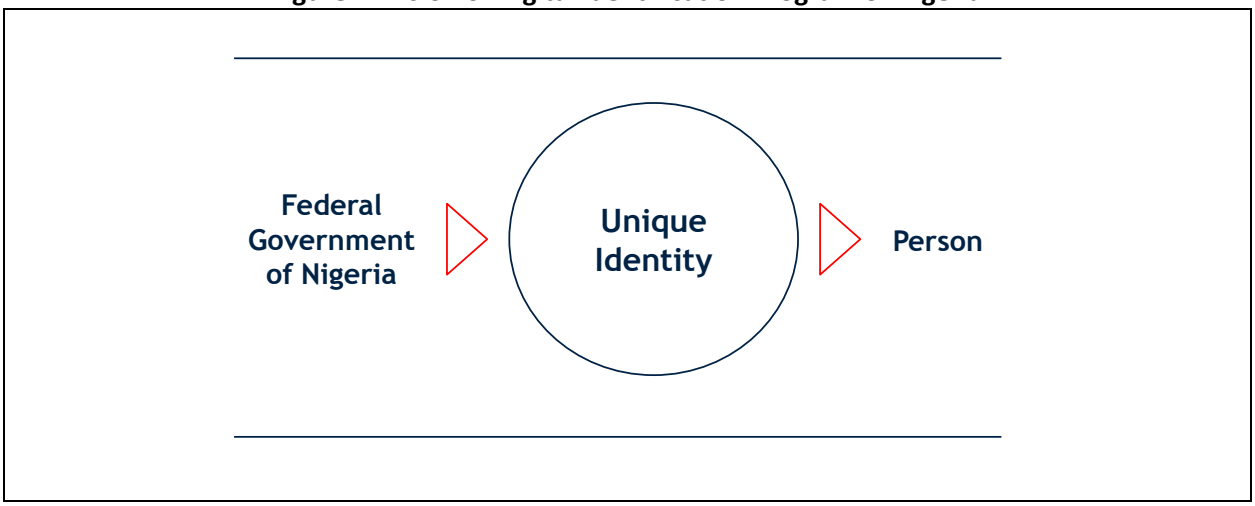


Source: Nigeria ERGP (2017), World Bank (2017)

13. ***To develop digital identification, the FGN may need to simplify its approach, and set an objective of universal coverage of ID within 3-5 years:*** From the outset, the FGN may set a renewed vision of offering a unique, official identity to every person in the country within 3-5 years (see **Figure 4**). The aim may be to empower people, and to improve the delivery of services, both public and private. Equipped with a unique ID, each person in Nigeria would be able to prove his or her identity, for obtaining easy access to benefits and services. The digital identification program of Nigeria would be fully harmonized,

consisting of a unique ID system at the center, and functional ID systems of individual government agencies, all linked with one another. The strategic roadmap, presented in this report, provides the necessary steps to realize this objective, with proposed modifications to the current course of action.

Figure 4: Vision of Digital Identification Program of Nigeria



14. ***For the digital identification program, the people of Nigeria may be the chief stakeholder and the primary beneficiary:*** The digital identification program may be designed with people at its center. The FGN's offering of a unique ID to every person may help empower people—enabling them to rise from poverty and achieve greater prosperity. A digital identity program, with people at its center, may thus be transformational for Nigeria's economic, social and political development.

15. ***In developing the program, the FGN may leverage existing capacities and systems of government agencies involved in identification in Nigeria:*** The FGN has spent considerable effort and resources in developing ID systems, currently being managed by NIMC, NPopC, CBN, INEC and NCC, amongst others, and in building government capacity. The FGN may aim to leverage existing ID systems and operational capacities, including facilities to enroll people, in developing digital identification in Nigeria. The program may benefit from a collaborative approach to develop digital identification.

16. ***The FGN may use digital technologies, such as biometrics, to establish the uniqueness of each person, with great accuracy, while linking with civil registration:*** To establish the uniqueness of each person in the country, the FGN may employ digital technologies, such as biometrics, and provisioning for linkage with civil registration.[13] In building the digital identification program, the FGN may take a two-prong approach: (a) use digital technologies to establish the uniqueness of everyone in the country; and (b) build foundations for linking the unique ID with a digital registry of births and deaths in Nigeria. To establish uniqueness of people, given a population size of 185.9 million people, the FGN may require using multiple modes of biometrics (iris, fingerprints and photographs) to achieve a high degree of accuracy.

17. ***The FGN may support widespread use of ID, with an ID credential, digital facilities for verification, and prioritized use cases, such as for safety net, financial inclusion and elections:*** The FGN

[13] In developed countries, birth certificates are used to determine the uniqueness of a person. In developing countries, since a low percentage of children are registered at birth, and birth certificates, when available, are not always reliable, biometrics are increasingly used to uniquely identify people.

may use a competitive marketplace of firms to offer a credential as a proof of ID to people. To promote widespread use of ID, the FGN may offer facilities by which to digitally verify a person's unique ID. Since a major purpose of the digital identification program is to improve the delivery of key government services, the FGN may prioritize the development of the program with important use cases, such as safety net, financial inclusion, and elections. The use cases would help drive the adoption and success of the program.

18. ***Linkage with user agencies, including security services, the private sector, and ECOWAS, would be important:*** The digital identification program would require linkages with important use cases. Security agencies, including defense, immigration, police and prisons, require a way to verify the ID of a person. The private sector, including banks, telecommunications service providers, and health centers, similarly require authentication services. Nigeria's digital identification program also requires linkage with regional use of ID, currently being undertaken by ECOWAS, to promote cross-border free movement of people, regional trade and commerce, and a regional digital economy.

19. ***Partnerships may lower the cost, alleviate capacity, and promote sustainability of the program:*** Developing a modern, robust identification program is a gargantuan undertaking for a government. The development can pose a fiscal burden on the FGN, capacity constraints on government's limited technical capacity, and risks on the longer-term sustainability of the program. The FGN may leverage partnerships, with government agencies, ecosystem players, and the private sector, to expedite the development and lower the cost of the program.

Strengthening the Enabling Environment

20. ***The FGN's objective of the digital identification program would require setting a new policy and updating the legislative environment for identification:*** The FGN's policy on identification dictates how identification services are offered to people, which government agencies play a role in identification, how information collected of people is kept private and secure, and how longer-term sustainability is achieved. The FGN's policy needs to be reflected in the country's legislations, to ensure that the digital identification program, as designed and rolled out by the FGN, is backed by law. Currently, about 17 laws of Nigeria deal with government agencies involved in issuing or using identification services in the country (see **Box 2**). The FGN may benefit from re-examining its overall policy for identification, aligning it with objectives for identification, and updating the country's laws to harmonize the identity program in Nigeria.

Box 2: Legislative Framework of Identification in Nigeria

- The Central Bank of Nigeria Act of 1958 (as amended by the 2007 Act)
- The Nigeria Immigration Act of 1963
- The Nigerian Prison Act of 1972
- The Nigerian Police Act of 1974
- The National Population Commission Act No. 23 of 1988
- The Corporate Affairs Commission Act No. 1 of 1990
- Births, Deaths, etc. (Compulsory Registration) Act of 1992
- The National Health Insurance Scheme Act No. 35 of 1999
- The Nigerian Communications Commission Act of 2003
- The Pension Reform Act of 2004
- The Joint Tax Board Act of 2004
- The Economic and Financial Crimes Act No. 1 of 2004
- The National Identity Management Commission Act (No.23 of 2007)

- The Federal Inland Revenue Service Act No. 13 of 2007
- The Federal Road Safety Act of 2007
- The National Information Technology Development Agency Act of 2007
- The Electoral Act of 2010 (and subsequent amendments in 2011, 2012)

21. ***As part of policy and legal review, the FGN may aim to have broad consultations with stakeholders and partners involved in identification in Nigeria:*** Building collaborations across governmental organizations, regulatory bodies, the private sector, and the civil society requires a wide consultation strategy that not only identifies and involves appropriate stakeholders, but also allocates them specific roles to ensure that a national coverage of identification is possible within a defined timeframe. A strengthened policy and legal environment, involving the government agencies, the private sector and civil society, can help bring about a harmonized identification program in Nigeria. This legal and policy review should cover the enabling environment for both the foundational identification system (NIMC and NPopC) as well as the broader agencies and stakeholders involved in identification.

22. ***As policy, the FGN may aim to offer an ID to everyone in Nigeria:*** The scope of who gets an ID in Nigeria defines the scale of work for the program, and the respective roles of government agencies. The FGN's objective may be to provide a lifetime, unique ID to every person on the soil of Nigeria, or of Nigerian origin, without discrimination, based on age, gender, tribe, religion, citizenship, income level, health status, etc. By knowing who is who in all population segments, the FGN may craft specific policies and develop specialized programs to serve the needs of each segment. Full coverage of ID is thus beneficial. A system of ubiquitous digital verifiability of individuals can permit a seamless delivery of a whole range of services in Nigeria, based on the rights and entitlements, granted separately by individual MDA. Specific segments of populations require attention: children (starting at birth), adult resident citizens, diaspora, foreign legal residents, refugees, internally displaced persons (IDPs), and undocumented people.

Figure 5: Population Segments to be Covered by ID

23. ***To harmonize the existing fragmented ID systems, the FGN may "federate" the functions of ID across government agencies:*** The FGN may simplify its approach for harmonization, such that the scale up of unique ID in Nigeria can be accelerated, the work done on ID in recent years in Nigeria can be leveraged, and the role of government agencies involved in ID in Nigeria can be acknowledged and strengthened. The FGN may pursue a "federated" approach to developing digital identification, such that the functions of ID are distributed across government agencies and the private sector (see **Table 1**).

Harmonization, in this context, may entail "linking" existing ID programs, as opposed to accumulating information from different programs into one place. Digital identification in Nigeria would thus showcase a cross-government agenda, requiring a coordinated approach and clear responsibilities by agency.

Table 1: Approaches of Harmonization

Levels of Harmonization	Centralized Approach	Federated Approach
Law	One law defines ID	Laws related to ID are harmonized
Institution	One agency offers all ID functions	Multiple agencies share ID functions
Data	One agency stores all ID data	Multiple agencies store ID data, with one agency storing data for unique IDs, and other agencies storing demographic data for use-specific functional IDs
Systems	One agency has an ID registry	Multiple agencies have ID registries, with one agency having a registry of unique IDs, and other agencies having registries of use-specific functional IDs
Integration	Integration is implicit, as data and systems are under one agency	Integration is based on linkage of all ID systems, using unique ID as index
Physical location	One agency keeps data and systems in one physical location	Multiple agencies keep data and systems in respective physical locations

24. ***As part of the federated approach, the FGN would need to clarify the distinct roles of individual government agencies involved in identification as a critical next step:*** The success of the program would rest on clear, distinct roles of individual government agencies, and a coordinated approach to developing identification in the country. **Table 2** shows a possible delineation of roles of government agencies, based on services given by the FGN during the lifetime of a person. According to this delineation, NPopC and NIMC may play a foundational role, and MDAs may play a functional role in developing identification in Nigeria. NPopC may register birth and death of people, and issue the respective birth and death certificates bearing the unique ID number given by NIMC. NIMC may regulate data collection for unique ID across Nigeria, store data for unique ID, issue a unique ID number per person, regulate issuance of ID credentials given to people, and verify unique IDs. MDAs may use unique IDs for the sake of offering use-specific services, such as safety net, payments, electoral voting, mobile phone usage, passports, driving licenses, health insurance, pension, and others. Each MDA may operate its own functional ID system, containing demographic data per person, specific to their respective use-case, linked by the unique ID number of the person. NPopC and MDAs may also participate in data collection of unique ID, as part of an ecosystem approach (discussed later in the report), regulated by NIMC.

Table 2: Selected Functions of ID Distributed by Government Agencies

Services Offered	NPopC	NIMC	CBN	INEC	NCC	Others
Register birth	✓					
Issue birth certificate[14]	✓					
Regulate data collection for ID[15]		✓				

[14] NPopC may issue a birth certificate, bearing a NIN issued separately by NIMC.
[15] The regulation of data collection should be for unique ID only, in line with the strategic roadmap.

Services Offered	NPopC	NIMC	CBN	INEC	NCC	Others
Collect data for unique ID[16]	✓		✓	✓	✓	✓
Store data for unique ID[17]		✓				
Issue unique ID number		✓				
Regulate credential offering[18]		✓				
Issue payment services			✓			
Issue voter identification				✓		
Issue SIM for mobile phone					✓	
Issue passport or citizenship						✓[19]
Issue driving license						✓[20]
Issue health insurance						✓[21]
Issue pension						✓[22]
Verify unique ID		✓				
Register death	✓					

25. ***The FGN should aim to collect minimal data per person to establish a unique ID:*** The amount of information collected per person to establish a unique ID is expensive and time-consuming, and determines the viability of the overall ID program. With "inclusiveness" as its motto, NIMC may consider to collect minimal demographic data per person, along with requisite biometric information, to create and assign a unique ID number (or a NIN) to an individual. As the FGN may require, MDAs may separately collect additional demographic data per person, as per law, to generate a functional ID per person, linked to the unique ID number of NIMC. In an inter-linked, interoperable ID system, all information pertaining to an individual, across ID systems within government, may be available to the FGN, should such information be required for legal purposes, and may be made shareable, per legal procedures.

26. ***To collect data for unique ID, the FGN may leverage the existing capacity of government agencies and stakeholders, as an ecosystem approach to enrollment:*** The FGN may collect data per person, for establishing unique ID, by leveraging existing enrolment facilities of MDAs, States, LGAs and wards, or by building new capacity. Currently, no governmental agency in Nigeria possesses the institutional capacity to carry out nationwide enrolment of people under an "agency approach," within a defined timeframe and at reasonable cost. The FGN may consider an "ecosystem approach," using a standards-based, scale-up method, to undertake enrolment of people across Nigeria, involving multiple government agencies and stakeholders. The ecosystem approach, as discussed in implementation of the digital identification program, may render scale and speed in capturing data of people nationwide.

[16] The data collected for unique ID should consist of biometric data and minimal demographic data only, regulated by NIMC, in line with the strategic roadmap. Government agencies may opt to collect additional demographic data as per their needs separately.

[17] The data stored by NIMC for unique ID should consist of biometric data and minimal demographic data only, in line with the strategic roadmap. Government agencies may store additional demographic data per person in their systems separately.

[18] The credentials should be for unique ID only, in line with the strategic roadmap.

[19] NIS is responsible for issuing passport and citizenship in Nigeria.

[20] Federal Road Safety Corps (FRSC) is responsible for issuing driver's licenses in Nigeria.

[21] National Health Insurance Scheme (NHIS) is responsible for providing health insurance in Nigeria.

[22] Pension Commission (Pencom) is responsible for offering pension services in Nigeria.

27. ***For privacy and security of people's information, the FGN would require legal, operational and technological safeguards:*** The safety and privacy of people's information instils trust in the ID program, and is vital for the success of the digital identification program of Nigeria. Privacy and security of sensitive personal data needs to be built by design, enshrined by law, managed by operational control, and protected by technology. The safeguards to ensure privacy and security of data must kick in starting at the first step of enrolment, and diligently continue at every step, throughout the lifecycle of digital ID. Legally, the country's laws must safeguard privacy and security of information. Operationally, strong operational controls need to be instituted in every agency responsible for the collection, transit, storage or management of sensitive personal data. Technologically, all sensitive personal data should remain encrypted at rest (when not being processed for uniqueness or verification) using appropriate technologies for secure transactions and using state-of-the-art encryption techniques.[23] It is also essential that strict access control is instituted for any access or view of sensitive personal data, according to the country's laws and regulations, without exception. For example, an external agency (such as a firm operating an automated biometric information system, or ABIS) tasked with checking the uniqueness of a person's identity should be given biometric data stripped of demographic details so that the agency does not know whose data it may be processing. The FGN may avoid proprietary technology solutions that jeopardize access to data, and consider a multi-ABIS environment to strengthen safeguards.

28. ***The FGN should employ technology- and vendor-neutral solutions for ID systems, based on international standards, while addressing cost, capacity, and sustainability:*** A digital identification program is technology intensive, and requires care in cost, capacity and sustainability for the success of the program. If done well, the program can yield great rewards. Conversely, the program can pose great risks. The digital identification program in Nigeria needs to be developed with an emphasis on low-cost technology solutions, capable of offering national scale, and next-generation technology solutions, based on international standards. The approach has the potential to offer future-proof, modern services, which do not go obsolete quickly. The FGN should promote ID systems that are technology-neutral and vendor-neutral, so that access to information is protected, longer-term maintenance is easily done, and changes to the systems do not require a complete overhaul of the system. Along with in-house technical capabilities for core functions, the FGN may consider public-private partnerships, based on transparent, competitive tendering, to relieve cost and capacity constraints.

29. ***The FGN should promote digital verification of ID anytime and anywhere in Nigeria:*** To ensure that the program has widespread use, the FGN should help ensure that the unique ID can be digitally verified anytime or anywhere in Nigeria.

Organizing the Program

30. ***The digital identification program may be a government agenda in Nigeria, untied to a single government agency:*** Given the transformational benefits of ID, and the cross-government nature of developing ID in Nigeria, the FGN's ownership of the identification agenda at the top level is important. The identity landscape in Nigeria currently consists of multiple important government agencies. The FGN may consider to leverage the existing ecosystem of identity players to develop the future of identification in Nigeria. A high-level ownership of the ID agenda may help steer the development of identity services across government agencies in Nigeria, and bring much-needed coordination to lower cost and hasten development. The implementation of the program may be done by individual government agencies.

[23] The use of encryption ties in with operational control where keys to the data need to be under strict control.

31. ***The development of digital identification may be tiered in three organizational layers, for governance, implementation and use:*** The FGN may consider the following organizational framework in developing the digital identification program (see **Figure 6**):

a) *Governance and coordination:* An ID Coordination Unit, within the Office of the Vice President (OVP), may provide oversight and coordination to the digital identification program, spread across multiple government agencies, the private sector, and civil society in Nigeria, and with linkages to regional and international bodies. The Unit may liaise with the Ministry of Finance, the Office of the Secretary to the Government of the Federation, and State-level agencies, within the scope of the ID program. The Unit may also liaise with a Harmonization Board or Committee, once it is formalized, for representative ownership of the program.[24]

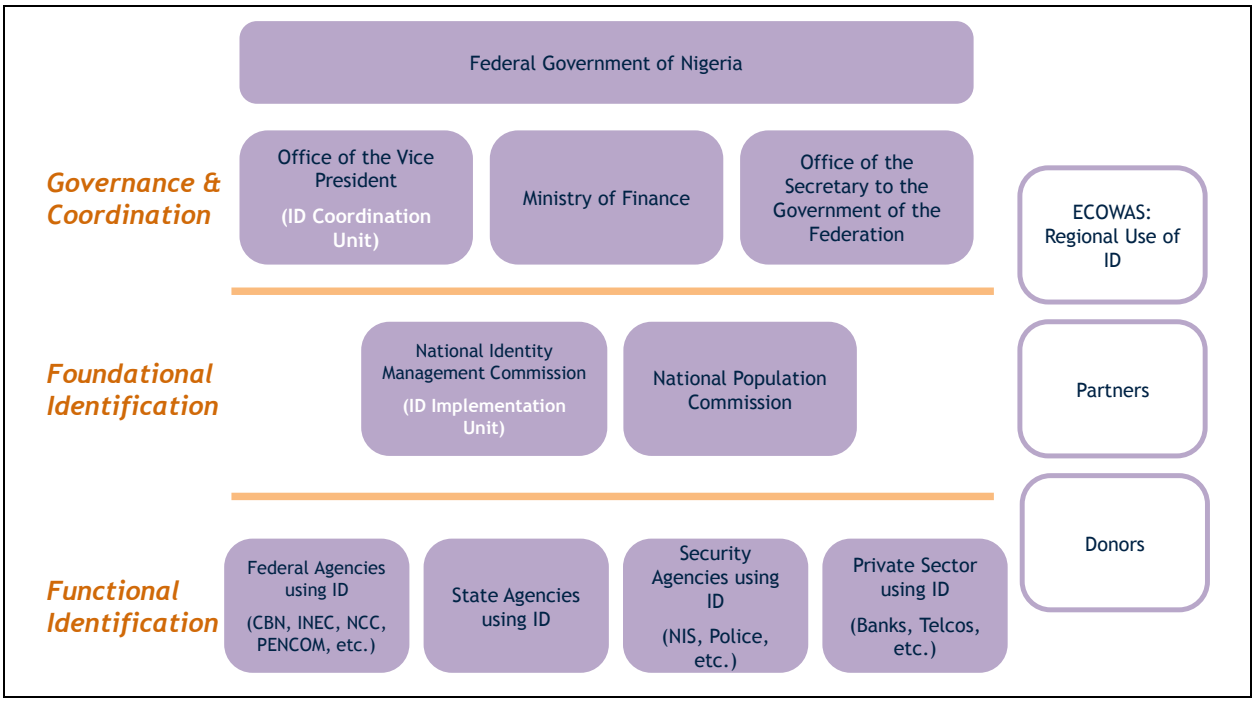
b) *Development of foundational ID:* An ID Implementation Unit, within NIMC, may provide a core team of experts to drive the implementation of unique ID in Nigeria. The Unit may work across organizations within NIMC, and with partners of NIMC, including for enrollment, issuance of ID credentials, and digital verification. The Unit would work closely with the ID Coordination Unit within OVP. The linkage of the unique ID with civil registration may be achieved by building foundations to digitally capture birth and death registration within NPopC.

c) *Development of functional ID:* Foundational ID may spearhead the use of ID across government agencies and the private sector in Nigeria, using unique ID as a common identifier of people. Federal, state and security agencies may be able to build their respective functional ID registries, to retain demographic information of people, based on specific use cases, as per their respective mandate, linked with the unique ID of NIMC. The government and the private sector may be able to use ID, by digitally verifying the unique ID of each person.

32. ***The digital identification program in Nigeria would require linkages with regional ID, being developed by ECOWAS:*** In addition to achieving a harmonized ID program within Nigeria, the digital identification program would require provisions for linking with regional ID being developed by ECOWAS. The linkage would allow greater use of ID within West Africa, for cross-border movement of people, cross-border trade, realizing a regional digital economy, and ultimately achieving greater regional integration.

Figure 6: Organizing the Digital Identification Program

[24] A top-level Harmonization Board (or Committee) of ID could bring a representative view of stakeholders of ID in Nigeria. The Board may comprise of a core team of principals, with rotating membership, drawn from government agencies, the private sector, and consumer groups.



Structuring Implementation

33. ***Developing digital identification in Nigeria broadly constitutes four steps, to strengthen the ID program, scale up enrollment, issue unique IDs, and promote the use of ID:*** The FGN would require the following steps to develop the digital identification program in Nigeria (see **Figure 7**):

a) *Strengthening the ID program:* Before undertaking nationwide enrollment of people for unique ID, the FGN may dedicate to strengthening the current ID program. This would entail refining the objectives of ID, preparing a viable business case, raising financing and resources, carrying out a policy and legal review, organizing the ID program, updating technology, systems and operations, and launching a nationwide public awareness campaign. While it strengthens the existing ID program, the FGN may continue with the ongoing harmonization of the current ID systems, to pave way for a scaled-up ID registry and use for validation.

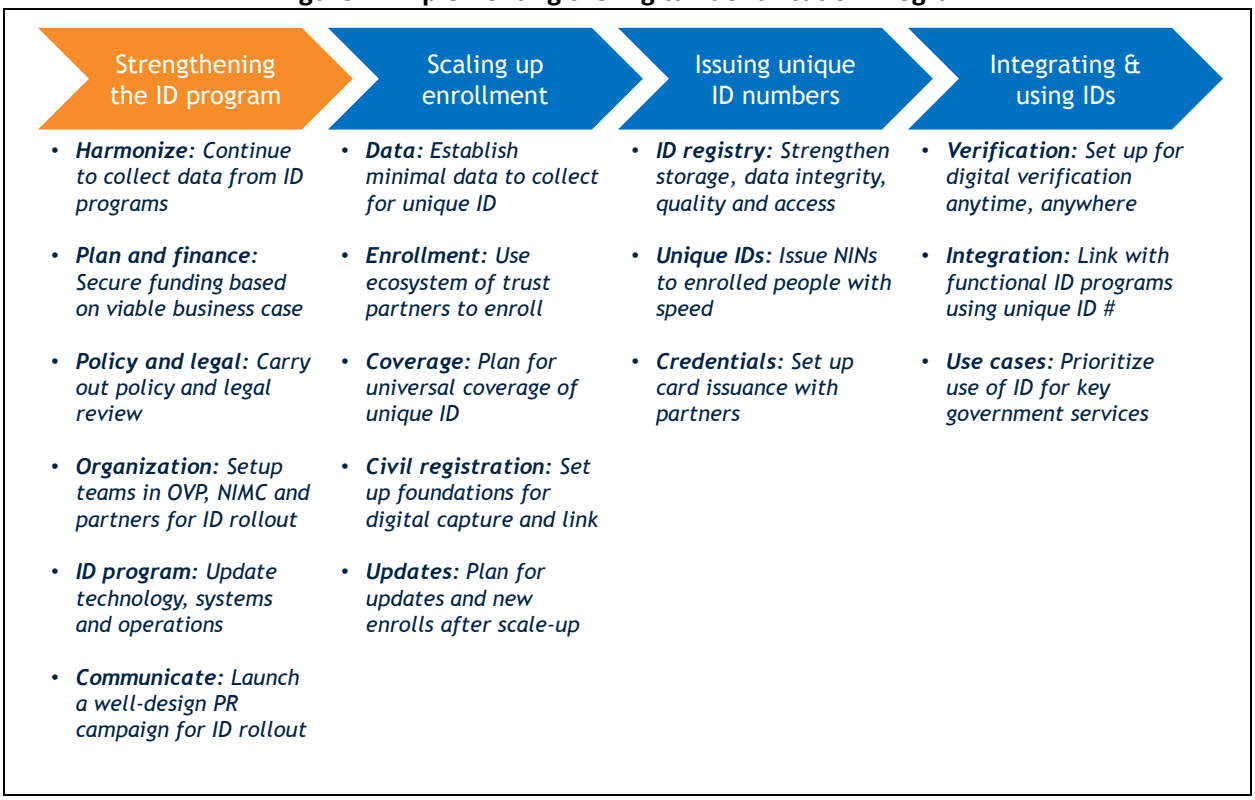
b) *Scaling up enrollment:* The pivotal task before the FGN is to scale up enrollment of 185.9 million people in Nigeria, offering each a unique ID, at low cost and with great speed. To achieve rapid enrollment, the FGN would require establishing minimum data to collect per person, developing a coordinated approach for enrollment using the ecosystem of existing players, planning for universal coverage of ID, and setting up foundations for linkage with civil registration. The FGN should also consider leveraging private sector actors as enrollment agents as part of the broader identification ecosystem. Finally, the FGN would additionally require planning for updates and new enrollments after a full scale-up of existing population is achieved.

c) *Issuing unique ID numbers:* The FGN would require further developing its national ID registry, strengthening storage, integrity, quality, and access of information in its registry. As new

people are enrolled, the FGN would need to offer a unique ID to each. The FGN may also promote issuance of ID credentials to people, using a marketplace of firms.

d) *Integrating and using IDs:* To promote the use of ID anytime and anywhere in Nigeria, the FGN would require setting up facilities for digital verification of IDs in Nigeria. The availability of digital verification would help functional ID programs in Nigeria to use ID, by linking their respective functional ID systems with the unique ID offered by NIMC. To further drive the demand and success of IDs in Nigeria, the FGN may consider prioritizing the use of ID for key government services, such as safety net, financial inclusion, and elections.

Figure 7: Implementing the Digital Identification Program



Establishing Minimal Data per Unique ID

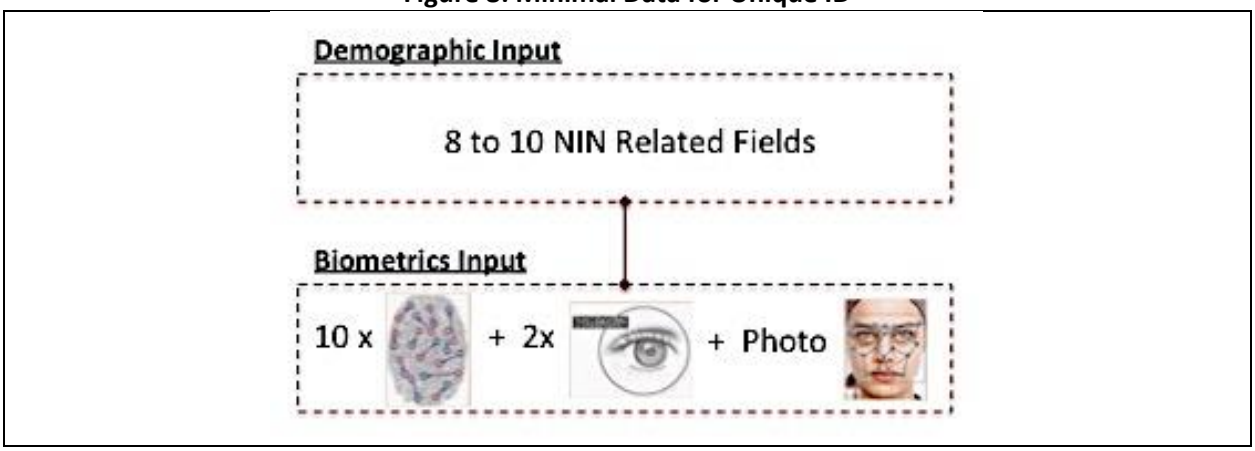
34. ***The FGN may re-examine minimal data collected per person to establish unique ID:*** In an ID program, collecting data of people is expensive and time-consuming. The speed and cost directly depend upon the amount of data collected per person. Currently, NIMC collects 70 or more fields of data per person to establish a unique ID. Not all fields are always collected. Enrolling a single person in this way can take 20-30 minutes,[25] significantly slowing down enrollment and increasing the cost of the overall ID program. Keeping all fields up to date can also be a gargantuan task. Based on the work being done with the Harmonization Committee, NIMC plans to reduce the number of fields to less than 20, for sake of harmonization. Following the policy and legal review of ID in Nigeria, the FGN may consider collecting the following information per person to establish a unique ID (see **Figure 8**):

[25] Assuming a standard amount of time to collect a single field of information, not accounting for pre-enrollment.

a) *Demographic data:* 10 or fewer fields of information (such as name, gender, date of birth, place of birth, address) per person deemed necessary to establish a unique ID.

b) *Biometric data:* 10 finger prints, two Iris, and one facial photo per person.[26] With a population size of 185.9 million people in Nigeria, the accuracy of biometrics would approach nearly 100% in establishing unique ID when multiple modes of biometrics are collected per person. The FGN may thus consider to include iris in biometric data collection.

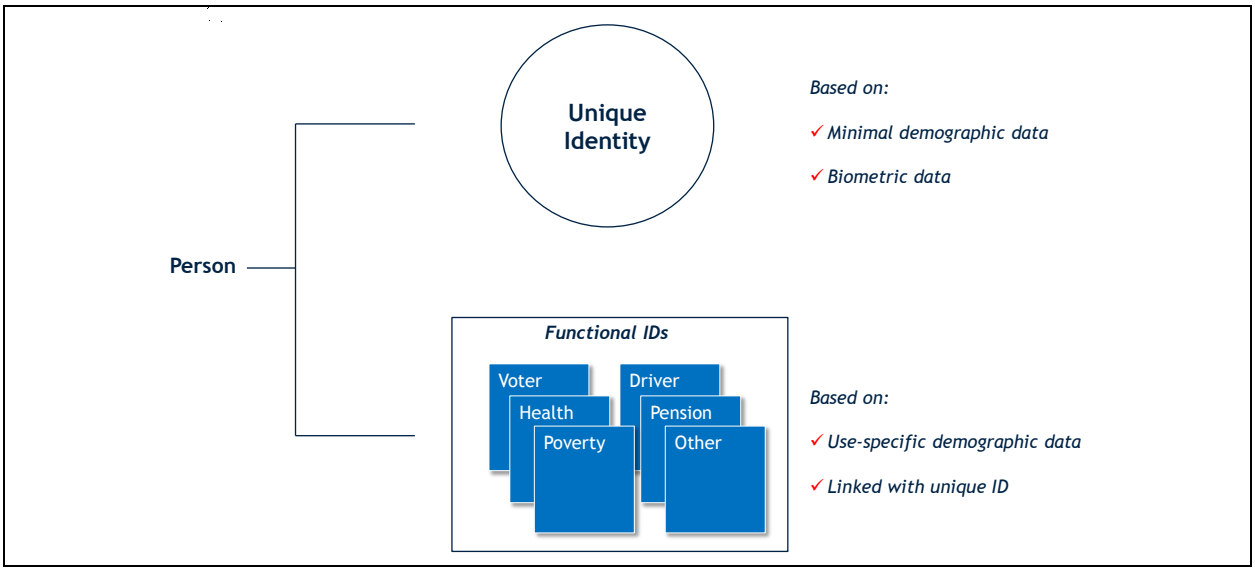
Figure 8: Minimal Data for Unique ID



35. ***As part of a federated approach of the ID program, use-specific demographic data per person may be separated from unique ID:*** As per policy and law, the FGN may separate data collected by agency. NIMC may be responsible for collecting and storing minimal data for unique ID only. Other government agencies may be responsible for collecting and storing demographic data only for specific use cases of ID, as per their respective mandate, linked with unique ID. From the FGN standpoint, data per person may provide a composite snapshot of information, spread across government agencies (see **Figure 9**).

Figure 9: Federated Approach to Data for Identification

[26] The ten fingerprints may need to be collected as four fingers taken together, then a thumb, per hand.



Collaborating to Collect Data

36. ***To achieve rapid scale-up of nationwide enrollment, the FGN may consider an ecosystem approach, leveraging the capacities of existing government agencies and partners:*** Currently, NIMC is the lead agency for collecting biometric and demographic information of people in Nigeria. NIMC has significantly improved its enrollment capacity, now covering 497 LGAs in 36 states and the Federal Capital Territory (FCT), with an enrollment staff of 2,524. Other government agencies, such as NPopC, INEC, CBN and NCC, have additional capacity to enroll people in Nigeria. Despite the extensive work done by the FGN on ID, no government agency currently has the requisite capacity to do nationwide enrollment in Nigeria. To speed up enrollment, the FGN has two alternatives: (a) pursue an agency approach of enrollment, by rapidly improving the capacity of a single government agency, at a significant effort and cost; or (b) pursue an ecosystem approach of enrollment, by leveraging the capacities of existing government agencies, and relevant partners, while coordinating the effort as a government-led initiative. Moreover, these government agencies could in turn leverage an ecosystem of private partners to assist in data collection, and pay these agents per enrollment. The FGN may greatly improve the cost and speed of data collection by pursuing an ecosystem approach.

37. ***The ecosystem approach of enrollment may constitute trusted partners, and a pay-per-play model for successful enrollments:*** The purpose of the ecosystem approach may be to leverage existing enrollment facilities of government agencies and partners in Nigeria, as opposed to building new ones. The ecosystem approach may constitute of the following building blocks (see **Figure 10**):

a) *NIMC:* NIMC may lead enrollment in Nigeria, by strengthening its capacity as a facilitator and regulator of enrollment, while supporting other agencies to do enrollment.

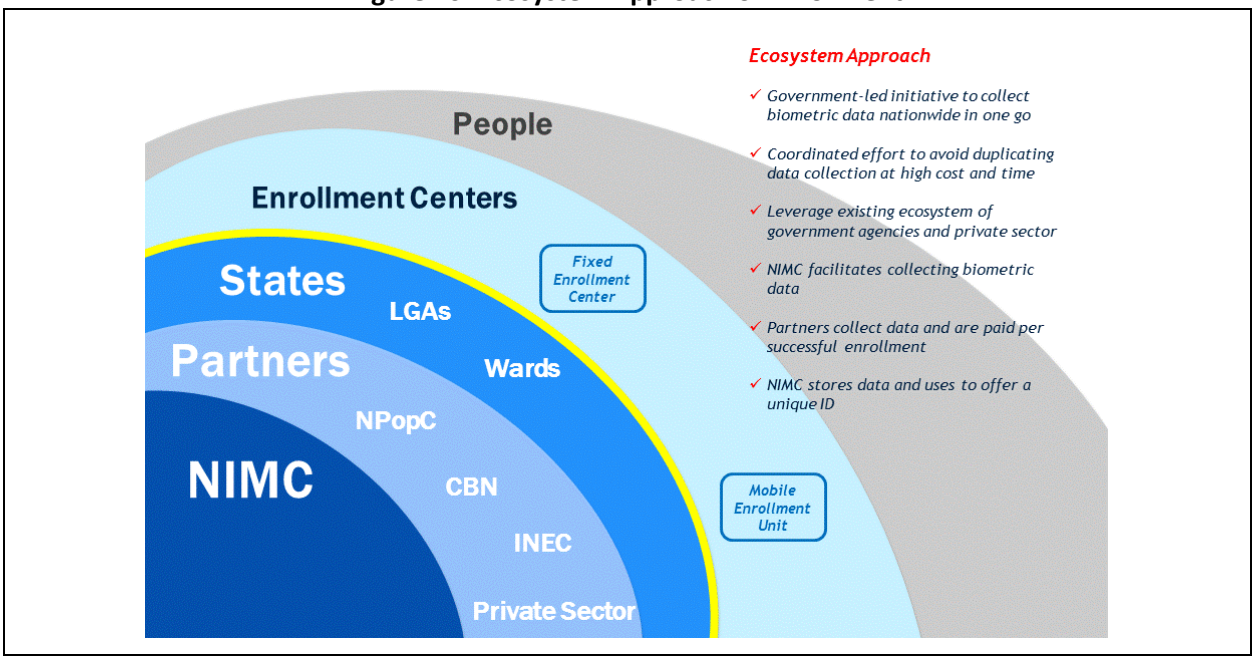
b) *Trusted partners:* The trusted partners may enroll people in Nigeria using their enrollment centers. NIMC may engage trusted partners by establishing a memorandum of understanding (MOU) with each participating government agency (such as NPopC, INEC, NCC, CBN, postal office, LGA, ward, community organization), or a contract with each participating firm (such as a mobile phone operators, bank, microfinance institution). Each partner would bring near-ready footprint of enrollment centers, with physical facilities, systems and staff, within States,

LGAs and wards. They could also contract out the activities of enrollment to private partners if needed.

c) *Enrollment centers:* Each trusted partner could operate or contract out operation of enrollment centers, both fixed (i.e. a physical office with enrollment staff in a building) or mobile (i.e. enrollment staff with mobile devices who go to communities to enroll). Fixed enrollment centers would require high-speed internet links with NIMC. Mobile enrollment units may be online or offline, and may transmit information through fixed enrollment centers.

d) *Pay-per-play:* As part of the MOU or contract, NIMC may pay the trusted partner an agreed fee for each successful enrollment of person, upon issuance of a valid unique ID number (or NIN). NIMC may stage enrollment based on priority, such as by starting with poor and vulnerable households, eligible voters, or specific geographic segments. In turn, these trusted partners could pay private enrollment partners to manage contact with residents and pay them per enrollment if desired. As per the MOU or contract, NIMC may provide to each trusted partner a terms of reference of who to register (in a given State, LGA, ward and community), the data to be collected, the standards for ensuring data integrity and quality, the technology systems to be used, the performance metrics to be achieved, any trainings required of staff, and pricing specifications to be met. In return, the trusted partner would collect data for unique ID and provide to NIMC, as per the technical and operational requirements.

Figure 10: Ecosystem Approach of Enrollment



Planning for Universal Coverage

38. ***To achieve universal coverage of ID, the FGN may consider extending enrolment to children, diaspora, foreign residents, refugees, IDPs, and undocumented persons.*** Though work is ongoing to

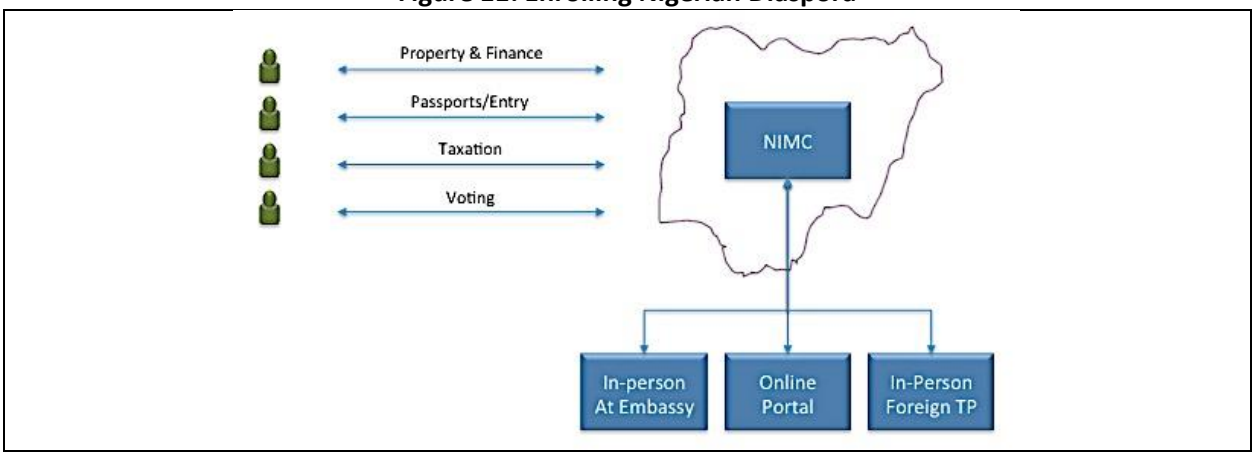
enroll adults in Nigeria, certain segments of the population may not be adequately addressed at present. The FGN may consider a comprehensive coverage of people to be enrolled:

a) *Children:* Registering children, and giving them a lifelong, unique ID, is important for providing quality healthcare, including immunizations. Registration of children may require an updated approach, as discussed in the section on *Linking with Civil Registration*.

b) *Resident adults:* The ecosystem approach for enrollment may provide a way for NIMC to enroll, through its trusted partners, resident adults in Nigeria, including resident citizens, foreign legal residents, refugees, internally displaced people, and undocumented people. NIMC may design specific enrollment requirements for each population segment, and define supporting documents required for each segment.

c) *Diaspora:* In addition to enrolling people in Nigeria, the FGN may consider registering diaspora, as per Nigerian law. Diaspora may require an official ID for sake of property ownership, immigration, taxation, and voting, amongst others. NIMC may need to examine its approach for registering diaspora, and consider multiple avenues (see **Figure 11**), such as in-person enrollment at Nigerian Embassies, partial enrollment to collect demographic data using an online portal (potentially through the Nigeria Immigration Service), and in-person enrollment using trusted partners in foreign countries.

Figure 11: Enrolling Nigerian Diaspora



Linking with Civil Registration

39. ***For a robust digital identification program, linking unique IDs with civil registration is important:*** A robust digital identification program relies on accurate data. Biometric technologies offer an alternative to birth certificates to uniquely determine who is who. However, once people are biometrically enrolled, some people may expire, while others (children) may be born. The digital identification program needs to know birth and death of such people. By not knowing, the information in the unique ID registry may become inaccurate or outdated over time, adversely affecting the robustness of the overall program.

40. ***Civil registration in Nigeria is currently paper-based, and has opportunity for improved coverage:*** NPopC has the mandate to register all vital events, including births, deaths (and causes of death), stillbirths, and marriages, as per the Births, Deaths, Etc. (Compulsory Registration) Act No. 69 of

1992. According to the Act, all births are to be registered within 60 days, and deaths within 30 days. To register births and deaths, NPopC operates 3,624 registration centers in all 774 LGAs in Nigeria. The registration of vital events is currently mainly manual, with hand-written certificates issued.[27] At the time of registration, information about the child, and his or her mother and father, are required. No unique identification numbers are issued. During 2016, 2,568,348 children, aged below one year, were registered, representing 37% of about 7 million births estimated in Nigeria.[28] Rural areas, as well as regions in the Northern parts of Nigeria, had the lowest coverage of birth registration. Birth registration also differed by wealth quintile, with about 65% of registered births in the highest wealth quintile, compared to 7% in the lowest wealth quintile. The coverage of death registration is even lower, estimated at less than 5%.[29]

41. ***To strengthen civil registration, the FGN has developed a strategic action plan:*** The FGN requires undertaking several activities to strengthen civil registration in its own right, to ensure that all births, deaths, and other vital events are registered, and to provide a foundational link to the unique ID system. NPopC undertook a *National Strategic Action Plan on CRVS systems (2015–2019)*, highlighting major reforms needed to strengthen civil registration and vital statistics (CRVS) in Nigeria. These reforms include revising the legislative framework; improving infrastructure and resources; increasing coverage of registration of births, deaths, marriages and divorces; building capacity; instituting processes to produce and disseminate vital statistics; and promoting advocacy and communication.

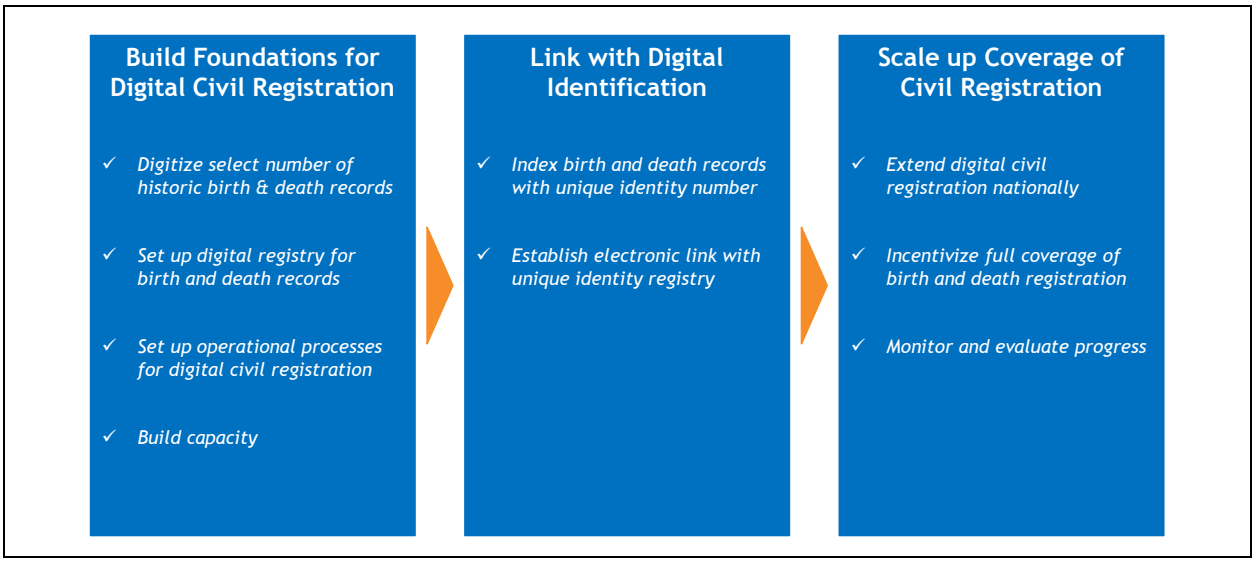
42. ***To strengthen digital identification, the FGN may consider building foundations to digitally capture birth and death registration:*** Several steps may be needed to develop the foundations for digital capture of birth and death registration (see **Figure 12**). First, NPopC may require a digital registry of birth and death (B&D) records. Second, NPopC may require digitizing historic records of birth and death, currently in paper form, for a time-bound period, going back to a fixed time in the past. Third, new operational processes may need to be established for digital civil registration, together with capacity building. Fourth, NPopc may require instituting a cut-over date, after which new registrations of B&D may be digitally captured and stored in the digital registry. These steps may provide the basis for linking with unique ID registry over time.

Figure 12: Linking with Civil Registration

[27] Through the support of UNICEF, NPopC also maintains a RapidSMS mobile technology system which enables real time monitoring of birth registration in civil registration centers on a pilot basis. The RapidSMS system facilitates the transfer of the summary of births registered in a LGA or health facility to a central database, classified by sex and age (< 1year; 1–4; 5–9; 10+) on a daily basis.

[28] Source: Data derived from RapidSMS system.

[29] *Ibid.*



43. ***A new process may thus result for registering births and deaths:*** NPopC and NIMC may need to coordinate in registering births and deaths. At birth, NPopC may register the birth, issue a birth ID number as an index for its digital registry of B&D, obtain a unique ID number (i.e. NIN) from NIMC for the child (based on the unique ID number of a parent), and issue a birth certificate bearing the birth ID number and the unique ID number. The child's unique ID number may then become a lifelong identifier, and may be linked with the child's biometrics at a later, specified age, to be collected by NIMC. At death, NPopC may issue a death certificate bearing the unique ID number of the person, when the number is available, and update its records in the digital registry of B&D, prompting NIMC to update its unique ID record related to the person. If the unique ID number of the person exists, NIMC may update its record, reflecting the person as expired. If the unique ID number does not exist, NIMC may do nothing.

Managing Unique ID Information

44. ***For the digital identification program, NIMC may continue to be the custodian of unique ID information of people.*** Currently, NIMC operates a national ID registry as an electronic database at its premises in Abuja.[30] The national ID registry hosts all data related to the unique ID of a person, and may, over time, become the central repository of biometric data in Nigeria. Given the importance of digital identification, NIMC should continue to be the authority managing all information related to unique ID of people in Nigeria.

45. ***The FGN may strengthen its core capacity of managing information related to unique ID:*** Going forward, NIMC may further strengthen its capacity, using updated technology and systems and further capacity building, to operate and manage the national ID registry, with attention to the following areas (see **Figure 13**):

a) *Quality control at entry of information:* NIMC should institute quality control for any data entering its registry, based on strict guidelines, established by law and regulations, and on well-developed operations. Appropriate measures should be taken to minimize data entry

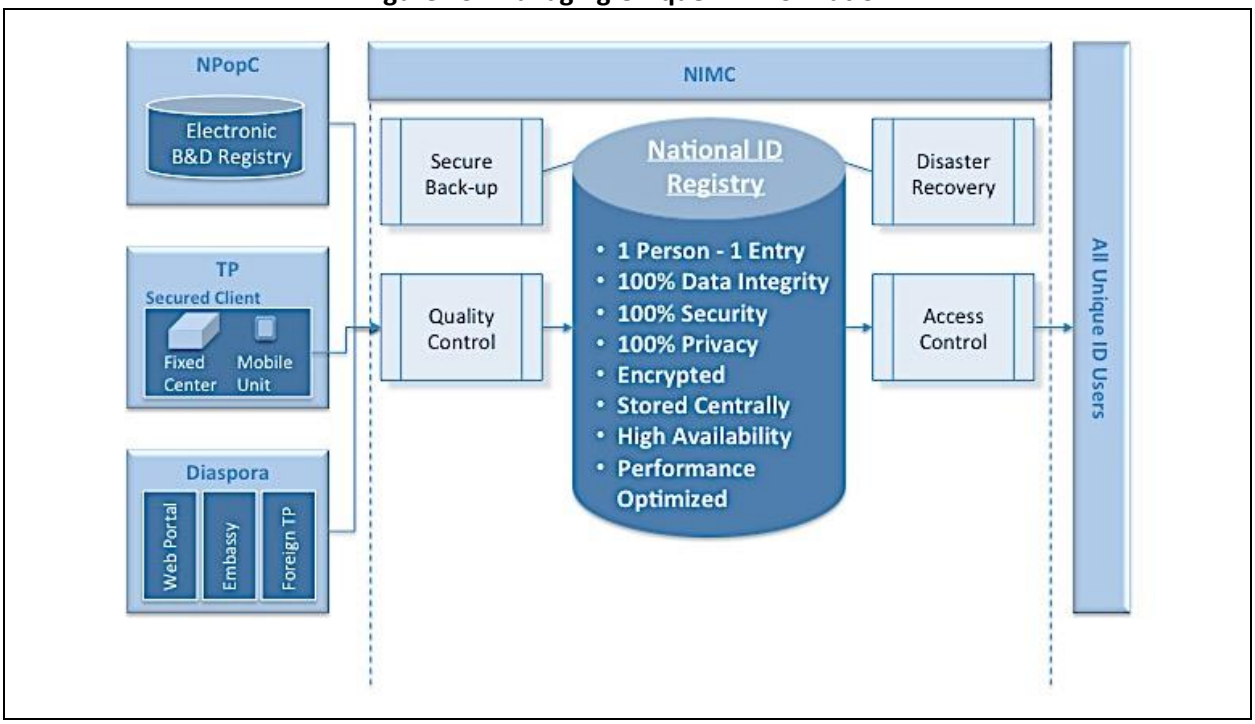
[30] The facility is supported by uninterrupted power supply, temperature-controlled facilities, and high-speed internet links to enrollment facilities throughout Nigeria.

errors at the point of data collection. The software and systems used at the point of data collection should protect any access to biometric data and demographic data from tampering, storage, or unauthorized use by any collecting agency. The data collected during enrollment should be encrypted and compressed after the collection event and used only for transmission to the national ID registry. The data collected should not be stored locally for any other use. The quality control process should ensure that the data entering the registry are 100% compliant to data encryption requirements, data collection standards, and data quality standards, per NIMC data specifications. A secure connection over a dedicated network should be used to transmit data to NIMC.

b) *Data integrity in management:* NIMC should continue to ensure that the national ID registry has 100% data integrity with 100% data security and privacy. Each record in the registry should be unique and represent an actual person in Nigeria. All records in the registry should be consistent, complete and up-to-date. The ID data should remain encrypted "at rest," i.e. when not being processed or used, and detailed security measures by design should be used to isolate the data from any intrusion. The database should be "highly available," allowing for failover and recovery measures in case of any untoward emergency and natural disaster.

c) *Access control for usage of information:* All access to the national ID registry should be monitored and controlled to ensure only explicitly permitted uses, authorized by law. All access to the registry should be permitted using application programing interfaces (APIs) to authorized users only. Any access to the database must be tracked, logged, monitored and reported to safeguard from possible abuse.

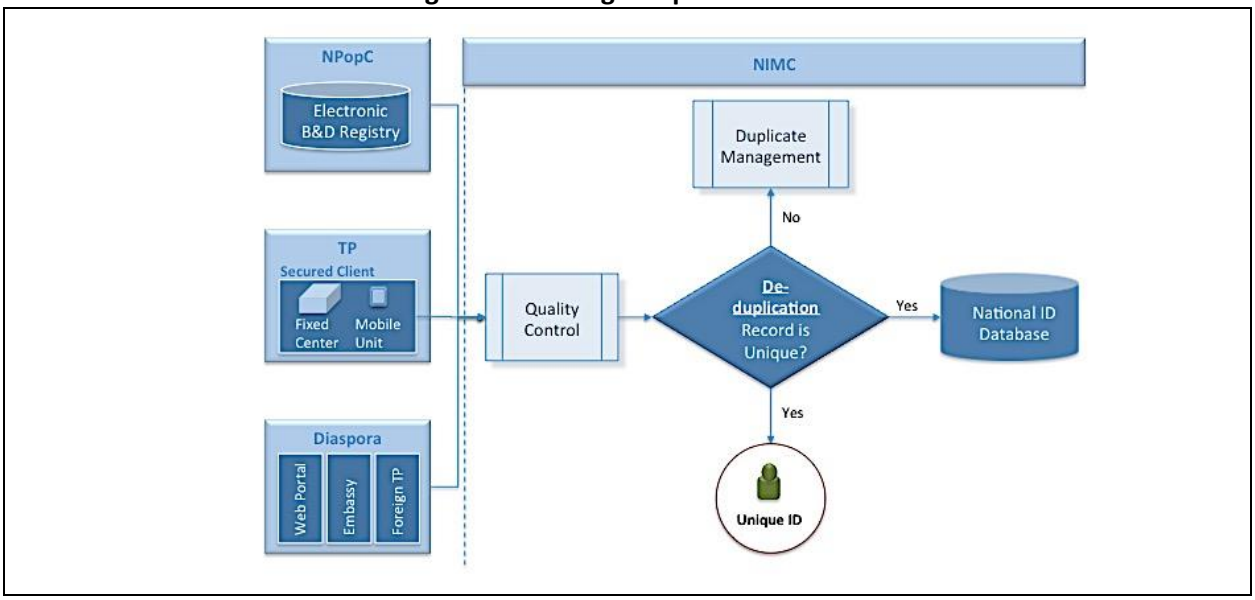
Figure 13: Managing Unique ID Information



Issuing Unique ID Numbers

46. ***NIMC may offer a digital proof of identity, as a unique ID number (or NIN), to every person:*** Currently, NIMC operates an established process to issue a unique ID number (or NIN) per person, using de-duplication.[31] At present, NIMC uses 10 fingerprints to de-duplicate and establish the unique ID of a person. To improve accuracy of determining unique ID, NIMC may consider using multiple modes of biometrics in de-duplication, while strengthening quality control (see **Figure 14**).[32] NIMC also generates the unique ID number in real-time at the time of enrollment, with high cost and performance requirement. Based on desired outcomes, NIMC may continue to use real-time de-duplication, or produce ID numbers in batches, at a lower cost.

Figure 14: Issuing Unique ID Number



Facilitating Issuance of ID Cards

47. ***For people to obtain a proof of ID, the FGN may use a competitive marketplace of firms offering ID card as a service to people, according to laws and regulations of Nigeria:*** Currently, NIMC operates an in-house facility to customize and issue multi-purpose smartcards to people in Nigeria. NIMC manages the entire supply chain of printing, shipping, and distributing ID cards. Given capacity constraints within NIMC, the issuance of cards has been slow, and is now on hold. Since card issuance began in November 2014, NIMC has printed approximately 1 million cards, and issued approximately 0.5 million cards. To alleviate cost and capacity challenges, NIMC may alter its strategy, and use a competitive marketplace of firms for people to obtain ID cards in Nigeria, based on the following approach (see **Figure 15**):

a) *Role of NIMC:* NIMC may specify: (a) the terms of contract based on which firms may be engaged, using transparent, competitive tendering process, to offer ID card as a service to

[31] In the technological process of de-duplication, each incoming biometric record of a person being enrolled is compared against the national ID registry, with biometric records of all people previously enrolled. If the biometric record is found to be unique, the record is added to the registry and a new unique ID number is issued to the person. If the biometric record is found to be not unique, the record is flagged as a duplicate.

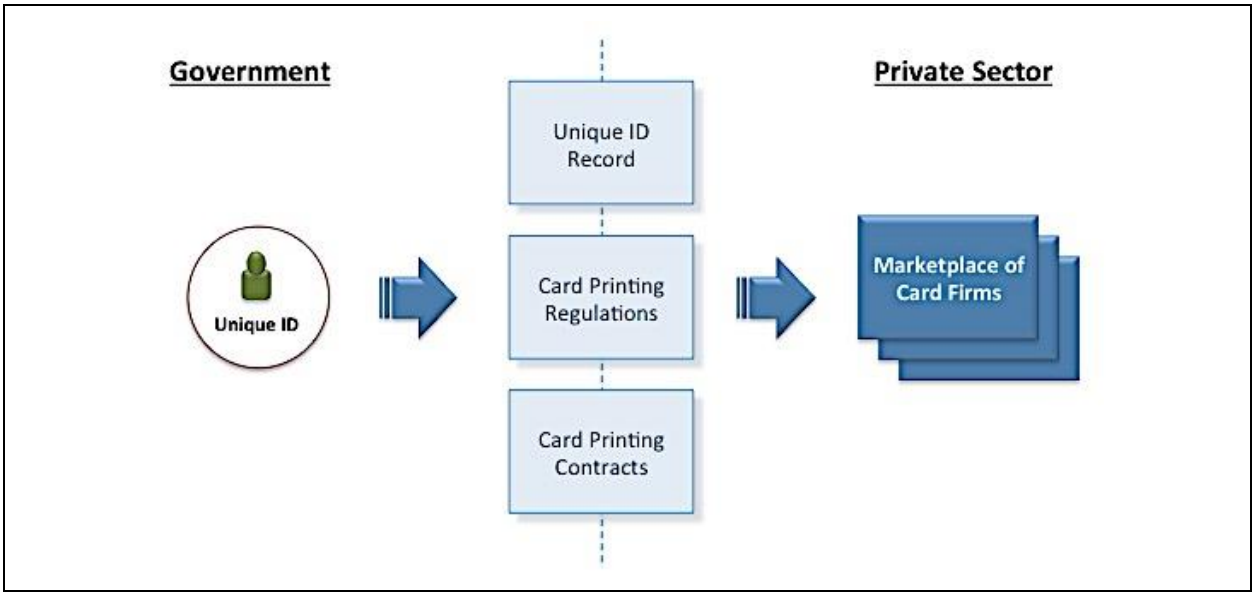
[32] Each mode of biometric (such as fingerprint, iris, or photograph) offers a given error rate in determining uniqueness of a person. The error rate increases with the size of population. Combining multiple modes of biometrics reduces the collective error rate, and may thus be suitable for a population size of Nigeria.

people in Nigeria; (b) the regulations that firms would abide by to print and issue ID cards as a service to people; (c) an online facility which firms may use to access the unique ID record of a person from NIMC, following access control rules of the national ID registry; and (d) a supervisory and enforcement framework to ensure that card issuance is done per law and regulation of Nigeria, and supported by monitoring and evaluation system of NIMC.

b) *Role of firms:* Individual firms may offer a physical card as a service to people in Nigeria, following the laws and regulations of Nigeria, and contractual commitments with NIMC. The marketplace of firms may be an extension of the ID ecosystem, and follow corresponding specifications for handling, training, certifications, operation, and performance.

c) *Cost of card:* NIMC may fund the cost of the ID card, using fiscal budget, fees charged by card recipients, or a public-private partnership, established using a transparent, competitive tendering process, and according to the laws and regulations of Nigeria.

Figure 15: Marketplace for Card Issuance



Using IDs

48. ***To achieve widespread use of ID, the FGN may require setting up a digital verification system, for a person's ID to be reliably verified anytime or anywhere in Nigeria:*** The transformational benefits of digital identification are achieved with widespread use of ID. To promote such use, the FGN would require setting up a digital verification system. At present, NIMC runs a web-based facility for a NIN to be verified. Given a simplified construct, the facility has limited though growing use. Government agencies operating a functional ID program currently run their own digital verification facilities for specific use cases, with limited scope. Government agencies without a functional ID program rely on traditional, non-digital ways of verifying a person's ID, often with a substantial loss of efficiency. In places where people do not have a unique ID, they are not able to effectively access entitlements, benefits or services. The FGN may help foster a digital verification system of IDs in Nigeria (see **Figure 16**), constituting the following:

a) *Digital authentication platform:* The FGN would require a digital authentication platform, operated by NIMC, to allow government agencies, firms and individuals, all authorized users of ID,[33] to be able to determine the ID of a person. The platform may offer a digital verification service, to allow a person to prove his or her identity, using a unique ID number, biometrics, or other means. The platform may also offer a know-your-customer (KYC) service, to allow a financial institution, or approved agency, to determine the ID of a person, for sake of digital payments and transactions, per the regulations of the Central Bank of Nigeria. To ensure that IDs can be digitally verified anytime and anywhere in Nigeria, NIMC may give attention to the geographic and demographic disparity of people in Nigeria, the coverage of mobile phone, internet, and financial infrastructure, population density, and literacy.[34] NIMC may set performance requirements and standards based on which the diverse set of users of ID may benefit from the digital authentication platform.

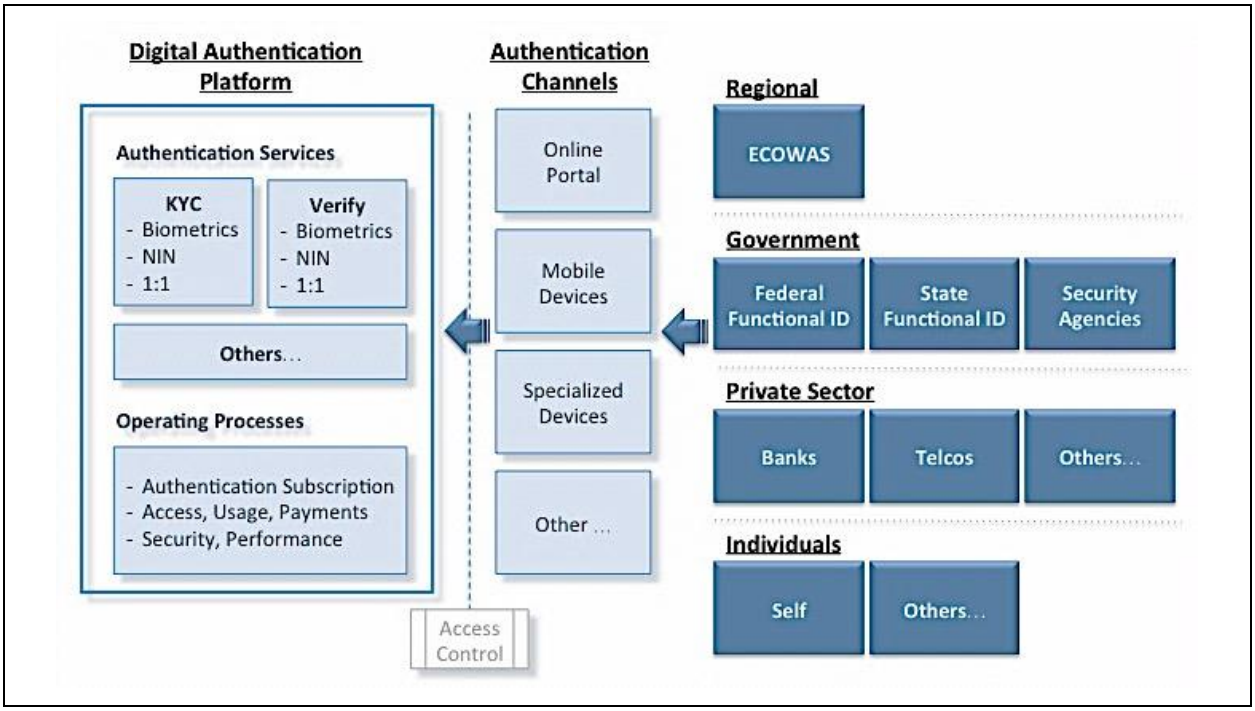
b) *Digital authentication channels:* To support the verification system, NIMC may allow a diverse set of digital channels, including online portals, mobile phones, smart devices, cards, and internet of things, to be used by people to assert their identity. The use of each channel would conform to access control rules of NIMC, and abide by the laws and regulations of Nigeria.

c) *Digital authentication devices:* Each authorized user of ID – a government agency, firm, regional body, or individual – would require a physical device, allowed by NIMC, to link with the digital authentication platform, using the approved digital channels, to determine the ID of a person. The device may be an online portal, mobile phone, smart device, point of sale device, card reader, or internet of things. The verification devices would run software applications approved by NIMC, complying with data security protocols, communications protocols, and hardware specifications.

Figure 16: Digital Verification System

[33] The access to the platform by authorized users may only be enabled through a network of approved partners across Nigeria, conforming to the access control practices laid out by NIMC.

[34] In implementing the authentication platform, NIMC may require a feasibility study to ensure 100% coverage of Nigerian people.



Timeline for Development

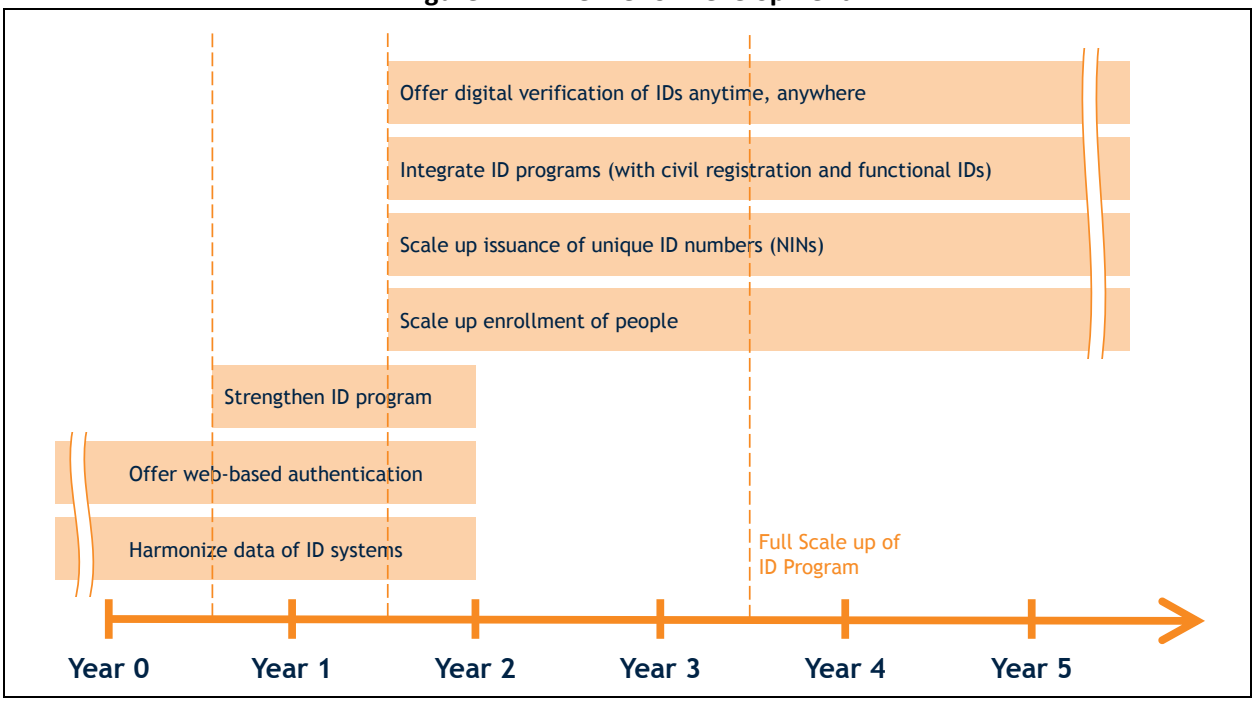
49. ***The development of digital identification in Nigeria is achievable in 3-5 years, with three important milestones of program setup, scale up of program, and full enrollment of people:*** To develop the digital identification program, the FGN may consider the following milestones, spanning a time horizon of 3-5 years (see **Figure 17**):

a) *Set up of the digital identification program:* As early as possible, the FGN may formalize the digital identification program, set the government's policy on ID, confirm leadership of the program, and allocate funding and resources to the program. As the program is developed, a first next step would be to strengthen the ID program in Nigeria, for national scale up and rollout. While the program is being strengthened, the FGN may continue ongoing work of harmonizing data from ID systems, and offering web-based authentication.

b) *Scale up of the program:* Within 12-18 months, after the ID program is substantially strengthened, as per the strategic roadmap, the FGN may initiate a nationwide scale up of enrollment of people, rapidly issuing unique ID numbers to people, integrating ID systems across government agencies, including for unique ID, civil registration, and functional IDs, and offering digital verification anytime and anywhere in Nigeria.

c) *Full enrollment of people:* The FGN may incur 24-36 months to enroll all people in Nigeria, providing them with a unique ID, setting up a registry of 185.9 million people in the country, and providing digital verification of IDs anytime and anywhere in Nigeria. Once enrollment of people is fully or substantially achieved, the FGN would be able to obtain transformational benefits of a digitally-enabled ID in the country, with impact on delivery, efficiency and effectiveness of priority government services and enabling private sector services.

Figure 17: Timeline for Development



Cost of Development

50. ***Based on the strategic roadmap, and depending on the choices and assumptions made, the FGN may incur a cost of US$433 million to US$2.3 billion to develop digital identification in Nigeria in 3-5 years:*** The strategic roadmap, as discussed in this report, provides the policy, institutional, and operational choices that the FGN may consider to expedite the development of the digital identification program in Nigeria. The roadmap is intended to be achievable within 3-5 years, breaking from the current pace of development. Successfully implementing the program would require allocating funding up front. The cost of the program is broadly determined by three main drivers: (a) enrollment approach; (b) amount of information collected; and (c) how a credential is offered as a proof of ID. The FGN may consider the following four scenarios for funding the digital identification program (see **Table 3**). Annex A provides further details about the assumptions made and the financial analysis used.

a) *Scenario #1:* The FGN may develop the digital identification program with a full scale-up in 3 years, and continuing operations for another 2 years. To establish unique ID, the FGN may collect the same amount of demographic information (70+ fields) per person, and the same biometrics (photograph and 10 fingerprints) per person, as it currently does today. To carry out nationwide enrollment, the FGN may use an agency approach, building up the capacity of a single government agency. Once enrollment is completed, the FGN may offer a digital proof of ID and a smartcard to each person. The FGN may develop its capability to verify IDs anytime and anywhere in Nigeria, thus promoting widespread use of IDs.

b) *Scenario #2:* The same as Scenario #1, except that, to establish a unique ID, the FGN may now collect 20 fields of information per person, and Iris as an additional biometric per person. To carry out nationwide enrollment, the FGN may leverage the ecosystem of existing government agencies and the private sector involved in ID in Nigeria.

c) *Scenario #3:* The same as Scenario #1, except that, to establish a unique ID, the FGN may now collect 10 fields of information per person, and Iris as an additional biometric per person. To carry out nationwide enrollment, the FGN may leverage the ecosystem of existing government agencies and the private sector involved in ID in Nigeria. Once enrollment is completed, the FGN may offer a digital proof of ID and a simple card to each person.

d) *Scenario #4:* The same as Scenario #1, except that, to establish a unique ID, the FGN may now collect 10 fields of information per person, and Iris as an additional biometric per person. To carry out nationwide enrollment, the FGN may leverage the ecosystem of existing government agencies and the private sector involved in ID in Nigeria. Once enrollment is completed, the FGN may offer a digital proof of ID to each person.

Table 3: Cost of Development

	Scenario #1	Scenario #2	Scenario #3	Scenario #4
Assumptions				
Time for full scale-up	3 years	3 years	3 years	3 years
Time after scale-up	2 years	2 years	2 years	2 years
Demographic data collected per person	70+ fields	20 fields	20 fields	10 fields
Biometrics collected per person	Photo Fingerprints	Photo Fingerprints Iris	Photo Fingerprints Iris	Photo Fingerprints Iris
Enrollment approach	One agency	Ecosystem	Ecosystem	Ecosystem
Type of credential offered	Digital ID Smartcard	Digital ID Smartcard	Digital ID Simple card	Digital ID
Digital verification of IDs	Anytime Anywhere	Anytime Anywhere	Anytime Anywhere	Anytime Anywhere
Cost (in US$ millions)				
Enabling Environment[35]	7	7	7	7
Nationwide enrollment	1,005	253	253	197
Technology and systems[36]	104	104	104	104
Credentials	1,035	1,035	104	10
Linkage with civil registration	18	18	18	18
Linkage with functional IDs[37]	31	31	31	31
Operating expenses (ongoing)	65	65	65	65
Total	2,266	1,514	583	433

[35] To further strengthen the enabling environment, additional work may be needed to carry out a policy and legal review, update the legislative environment, develop public and private partnerships, strengthen existing institutions, and update strategies for technology and authentication.
[36] The FGN may need to update technology systems and infrastructure, for all stages of ID, including enrollment, management of national ID registry, issuance of unique IDs, digital authentication, and security and privacy.
[37] Linkage with functional ID may be demonstrated by prioritizing 2-3 use cases for digital authentication across Nigeria.

Mitigating Risks

51. **While implementation identification systems can raise sensitive issues, these can be managed to render truly transformative results. The key risks – political, technological, user privacy, and system-design related – are enumerated below.**

52. **Developing a national identification system comes with significant data protection and privacy risks, as well as the risk of potential improper use of data which will need to be mitigated against.** In order to ensure the identification system is developed in accordance with international data protection and privacy standards, the FGN may develop both the technical design and legal and regulatory frameworks to support data protection, privacy by design, and user consent. From the legal and regulatory perspective, a robust framework could include the development of enabling e environment protecting cyber security, data protection and privacy regulations and an institutional governance model which promotes accountability. From a technical design perspective, the FGN may consider building a system which promotes the principles of data collection proportionate to use, minimal data aggregation, as well as secure and authorised access to data across all involved agencies.

53. **Achieving this objective would require high-level political commitment and continued leadership across all counterpart agencies as well as a protracted consultative outreach effort.** To mitigate against the inherent political risk of such a strategic reform, the FGN could (i) minimize delays in preparation phases in order to show early results, increasing the political costs to a future government of walking back aspects of the reform, (ii) ensure that the governance structure of the reform is reflected in official decrees, (iii) front-load work on legal and regulatory reforms in order to allow necessary legislation to be considered by the National Assembly prior to election season, (iv) implement the bulk of the proposed reforms through NIMC, which has an autonomous legal status and not directly dependent on any given government.

54. **Technical System Design risks are High, but can also be managed.** There have been a number of previous attempts to build national ID systems in Nigeria, so it will be important to have commitment from the various ID providing agencies that the data collected from previous attempts will be converted, migrated or integrated within a prescribed time frame, once NIMC has the required capacity, maximizing the use of the Foundational ID system, and ensuring that individuals benefit from a true Foundational ID rather than simply being issued yet another form of identity. In order to mitigate these risks, the FGN could consider leveraging a strategic coordination team in the VP's Office, made up of technical and change-management experts, with the mandate of development and supervising the implementation of comprehensive change-management plans, sensitize and ensure communication between relevant stakeholders, and ensuring strategic coordination of the rollout of the reforms to the ID ecosystem. This coordination team could also work closely with the existing Harmonization Committee, which included representatives of public and private sector and is engaged in an ongoing dialogue on ID system reform. Finally, there are substantial technical risks associated with a lack of connectivity in rural areas for enrollment and authentication. In cases where connectivity is not available, the approach could consider designing for offline batch enrollment where possible, and building multiple options for modes of authentication (e.g. 2D barcodes in addition to online authentication options) as well as strong exception handling mechanisms which avoid exclusion on the basis of a failure to authenticate.

55. **Other risks related to technology neutrality and vendor lock-in are High.** On the technology front, the FGN may consider adopting a technology-neutral approach which avoids vendor lock-in thereby ensuring value for money and ease of maintenance or future revision of the systems. To mitigate these risks, specifications for technology components of the key foundational registries and enrollment systems could be carefully developed and common technology standards established to ensure technology neutrality. The use of public-private partnerships could be explored to work closely with and to invest in strengthening the overall capacity of the public and private sector in the country, and to leverage these for improvements in the public sector more broadly through the ID initiative.

56. **Institutional capacity for implementation risks are High.** Weak institutional technical capacity on the part of the foundational ID agency could impact success. This includes both risks associated with low implementation capacity as well as the subsequent risks associated with sustainability of the built-up capacity post initial mass enrollment. These risks could be managed through significant capacity building initiatives during the project, by competitively recruiting appropriately skilled staff and its technical capacity by making investments in NIMC's information systems, including those used to manage the central biometric database. Moreover, capacity could be built at both the VP level and at the NIMC level to ensure longer term sustainability whilst leveraging the current elected government's motivation to pursue the agenda.

57. **Ensuring coverage of the foundational system and strong linkages with service delivery to create value could pose a challenge, but will be critical to the success of the project.** The FGN would need to mitigate against potential exclusion risks within the foundational ID. Moreover, to ensure full coverage, the FGN may consider paying close attention to the linkage with services. The demand for IDs will be an outgrowth of demand to access services which are enabled by foundational ID. The inverse is also true: The demand from service providers (such as social protection or health) to have their databases linked to the foundational ID system will not materialized if there is no supply of individuals with government-recognized IDs among their target population – a chicken-or-egg situation. The foundational ID system may need to obtain a critical mass of users on one side (i.e. near universal coverage) to stimulate demand from service providers to use the IDs in order to authenticate individuals accessing their services. If the FGN is unable to broker an agreement between NIMC and key service providers to use the IDs to authenticate for services (such as financial services, education, or G2P cash transfers), end-users will see little use for enrolling in the foundational ID system. Thus the FGN could focus on integrating access to service delivery as an integral part of the project in part to mitigate against this risk. By supporting a number of highly visible priority services directly in their efforts to link their databases to the foundational ID system, the FGN could show the value-add of such linkages both for these services as well as for their beneficiaries.

58. **While identification can raise sensitive, political issues - these can be managed, and render truly transformative results, notably by making the invisible visible, enabling access to services and preventing wastage of scarce resources.**

Action Plan

59. ***To develop digital identification, the FGN may pursue next steps of setting its policy on ID, defining the roles of government agencies, enlisting champions, raising funding, and strengthening the ID program in Nigeria:*** The strategic roadmap, as discussed in this report, outlines the main elements of a viable plan for developing digital identification in Nigeria. As discussed, digital identification may be a

government agenda in Nigeria, untied to a single agency, and would require top-level government ownership. To develop digital identification, the FGN may consider the following next steps:

a) *Set the government's policy on ID, and initiate a legal review:* To formalize the digital identification program, the FGN would need to set its policy on ID, and spell out the distinct roles of individual government agencies and the private sector participating in developing the program in Nigeria. Currently, there is ambiguity about the roles of government agencies involved in identification in Nigeria. Setting the policy may require consultations within government and with stakeholders. The policy would trigger a review of the legal environment, and updates to legislations dealing with ID.

b) *Confirm key champions of the program:* The success of the digital identification program would rest upon key champions within government who drive the development of the program. Leadership at the highest levels of government may be necessary to harness the diverse agendas of government agencies involved, manage the competing interests of the public and private sectors, and mitigate the risks associated with developing an ambitious, technology-intensive ID program within government.

c) *Secure funding for the program:* Based on the strategic roadmap, the FGN may allocate sufficient funding in order for the program to be viable and achievable. The FGN may choose appropriate options in determining the cost of the program.

d) *Set up the organization to deliver:* The digital identification program would require a high-caliber team to execute the program across government. The organization may need to be tiered at three levels, for governance, implementation, and use. Expert staff may be needed within the ID Coordination Unit of the Office of the Vice President, and ID Implementation Unit of NIMC, with possible oversight of a Harmonization Board or Committee.

e) *Broker partnerships:* The program may require partnerships with key government agencies and the private sector, including for enrollment, issuance of ID credentials, and digital verification of IDs.

f) *Strengthen the ID program:* The digital identification program would leverage the existing systems and capacities within the FGN, though would require building enrollment capacity (whether by agency or ecosystem), updating technology systems and infrastructure, building new institutional capacities, and supporting development of a digital verification system.

g) *Execute a public awareness campaign:* A communications campaign may help evangelize the opportunity presented by ID to people in Nigeria, the approach for nationwide enrollment, the facilities for digital verification, and the rights and privileges afforded to people.

60. **Following a careful evaluation of the various options to achieve the objectives outlined in this roadmap, the FGN has opted to pursue Scenario IV as the preferred option**. This strategy was endorsed by the Harmonisation Committee Workshop held on January 31, 2018, chaired by the Office of the Vice President.

Annex A: Estimating Cost of Development

Assumptions

- ***Time horizon:*** The planning horizon for the entire program is 5 years, with scale-up to 100% coverage to be achieved in 3 years, and ongoing operations of the program to continue for 2 years.

- ***Population:*** The population to enroll or update through the program is approximately 187 million. The data of individuals who have a NIN may be updated with additional biometrics, such as IRIS, and to further improve the quality of data.

- ***Foreign exchange:*** All conversion from Naira to US Dollar assumes a foreign exchange rate of 300 NGN/USD.

- ***Real prices:*** All figures are estimated to be in real dollars based on current prices.

- ***Population segments for enrollment:*** Enrolment is expected in three population groups: urban, rural, and remote. The rural and remote population in Nigeria is estimated to be 52%, with 60% of that population taken to be remote, where people do not have access to electricity, and the remaining 40% as remote.[38] The urban population is derived to be 48%.

- ***Enrollment growth:*** The number of people enrolled is estimated to grow by 10 million per year, accounting for 3 million updates of people already enrolled and 7 million births per year.

- ***Operating times for enrollment:*** Enrolment is expected to be conducted for 48 weeks every year, 5 days each week, and 10 hours each day.

- ***Enrollment centers by population segment:*** Urban population with higher population density is expected to be served by larger enrolment centers, compared to rural population. Remote population is expected to be enrolled by mobile enrolment units.

- ***Cost of enrollment centers:*** The cost of enrolment of each segment factors in capital cost of the equipment, operating expenses, salary expenses of staff, utilities, and miscellaneous expenses. For mobile operating units, the cost is adjusted with travel requirements and expenses.

- ***Energy requirements of enrollment centers:*** An enrollment center in urban area is expected to operate 25% of the time on national electric supply, and the remaining time on generators. An enrollment center in rural area is expected to operate 10% of the time on national electricity supply, and the remaining time on generators. An enrollment center in rural area is expected to operate 100% of the time on generators.

- ***Equipment for enrollment centers:*** The useful life of equipment used for enrollment in urban and rural centers is expected to be 5 years. The useful life of mobile enrolment units is expected to be 3 years due to increased movement and associated wear and tear. The requirements for mobile enrolment assumes 20% back-up equipment to allow for repair delays while maintaining operations.

[38] WB Indicator SP.RUR.TOTL.ZS (2014 numbers).

The existing enrolment equipment is assumed to be at the end of life and require replacement or upgrade. The cost of the enrolment equipment assumes inclusion of IRIS in the biometrics.

- ***Internet for enrollment centers:*** The urban and rural enrolment centers are assumed to have access to secure internet connection to the main NIMC data center in Abuja. The mobile operating units are expected to transmit data through a fixed center location either in urban or rural area. In cases where connectivity is not available, the approach should design for offline batch enrollment where possible, ensure multiple options for modes of authentication (e.g. 2D barcodes in addition to online authentication options) as well as strong exception handling mechanisms which avoid exclusion on the basis of a failure to authenticate.

- ***Credentials:*** The cost of a smartcard, including all associated personalization costs, is assumed to be $US5 per card. The cost of a simple Card, including all associated personalization costs, is assumed to be US$0.50 per card. The cost of a digital proof of ID is assumed to be US$0.05 per proof. Each individual who is issued a NIN is issued the same card, and the card is assumed to be distributed in the same year as the year in which NIN is issued.

- ***Technology and systems:*** The funding required for technology and data center upgrades is assumed to have a useful life of approximately 7 years, with provisions for regular upgrades, starting the first year at a rate of 15% of the cost of initial upgrades. NIMC has currently paid for a license for automated biometric information system (ABIS) to do 100 million de-duplications per year. The ABIS software for an additional 100 million de-duplications is factored into the funding requirements with a 10% support for further spending on the ABIS software.

- ***Batched de-duplication:*** The enrolment data is assumed to be de-duplicated in a batch process, easing the requirement for high-speed internet connection and large infrastructure in the data center in Abuja. The batch processing of enrolment data can be run without an “Active-Active” failover of processing servers to optimize cost.

- ***Digital authentication:*** The digital authentication platform is assumed to run real-time with an “Active-Active” failover setup. Authentication demand is assumed to be similar to in India, adjusted for per-capita. Infrastructure sizing for authentication assumes as many as 4M authentications/day.

- ***Data center:*** All storage is sized to account for moving 300M ID records to allow for growth, and concurrent maintenance of data collected/updated through upgraded design as well as data collected via current harmonization. All data storage is assumed to be replicated in a remote disaster recovery data center. Authentication services database is assumed to run separately from the master database for IDs to provide sufficient cyber security protection. Data Center is assumed to run on generator power 100% of the time and all facilities-related power of NIMC headquarters is expected to run on utility power. Internet connectivity to Data Center is assumed to be based on an E4 connection.

- ***Operating expenses:*** NIMC current operating expenses is scaled up to account for increased activity in different departments of NIMC. NIMC operations is assumed to include a call-center going forward.

- ***Linkage with civil registration:*** All children are assumed to be enrolled either directly at an enrollment center or via the linkage of civil registration with unique ID. Children over the age of 5 years are included in estimates for the biometrics collection. Linkage to CRVS assumes digitization of up to 15

million records, a new registry built, requisite software, integration with NIMC database, and capacity building. The linkage may benefit from third-party implementation.

Analysis

Category	Scenario #1	Scenario #2	Scenario #3	Scenario #4
Total cost	***$2,265,901,192***	***$1,514,056,257***	***$582,556,257***	***$433,133,710***
Fixed cost	***$95,927,888***	***$95,927,888***	***$95,927,888***	***$95,927,888***
Enabling Environment	$7,100,000	$7,100,000	$7,100,000	$7,100,000
Enrollment				
IT & Data Center	$42,969,750	$42,969,750	$42,969,750	$42,969,750
Software and hardware	$42,633,084	$42,633,084	$42,633,084	$42,633,084
Power	$333,333	$333,333	$333,333	$333,333
Internet	$3,333	$3,333	$3,333	$3,333
Facilities				
Linkage With CRVS	$18,008,138	$18,008,138	$18,008,138	$18,008,138
Authentication	$27,850,000	$27,850,000	$27,850,000	$27,850,000
Recurring cost	***$2,169,973,304***	***$1,418,128,369***	***$486,628,369***	***$337,205,822***
Enrollment	$1,005,071,399	$253,226,464	$253,226,464	$196,953,917
IT & Data Center	$61,484,197	$61,484,197	$61,484,197	$61,484,197
Software and hardware	$19,674,317	$19,674,317	$19,674,317	$19,674,317
Power	$41,539,880	$41,539,880	$41,539,880	$41,539,880
Internet	$103,333	$103,333	$103,333	$103,333
Facilities	$166,667	$166,667	$166,667	$166,667
ID Credentials	$1,035,000,000	$1,035,000,000	$103,500,000	$10,350,000
Authentication	$3,140,000	$3,140,000	$3,140,000	$3,140,000
Operating Expenses	$65,277,708	$65,277,708	$65,277,708	$65,277,708

This is the cost of implementation for the first phase of development – which seeks to improve coverage of the foundational NIN number. Future phases would seek to realise the full vision of the roadmap, by ensuring a sustainable digital infrastructure for continuous inclusion and building value enhancing use cases of the national ID.

Estimated Costs of Additional Investments

Areas of focus for Building a Sustainable Digital Infrastructure	Estimated Cost ($m)
Supporting usage of digital ID by building linkages between the NIN and additional key services	75
Ensuring cybersecurity of the ecosystem	25
Strengthening the infrastructure for e-government and digital signature	100
Reinforcing the civil registration system (increasing number of registration centers, including in consulates)	150
Linking civil registration with national identification through provision of NIN at birth	50
Total	**400**