# EVANS SCHOOL OF PUBLIC POLICY AND GOVERNANCE
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## Evans School Policy Analysis and Research (EPAR)

**Review of National Identity Programs**
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**Abstract**

We review the status and characteristics of 48 national identity programs and initiatives in 43 developing countries, and evaluate how these programs are being connected to—or used for—service provision. The identity programs we review are mainly government-issued national IDs. However, we also review other types of national identity programs with links to various services including voter cards, passports, and two programs targeting the poor and the banking population. Following a brief review of the roles of identity systems in development and recent identity system trends, we present an overview of the 48 national identity programs, including technical features (such as whether physical identities incorporate an electronic component or are embedded with biometric features), implementation status, population enrollment strategies, and coverage. We next review evidence of implementation challenges around accountability, privacy, data management, enrollment, coverage, cost, and harmonization of identity programs. Finally, we present the functional applications of national identity programs, reporting how these programs are linked with services in finance, health, agriculture, elections, and other areas, and analyzing whether particular identity program characteristics are associated with functional applications.

> **"An illiterate person is one who cannot write his name, and an illiterate state is one that cannot write the names of its citizens" – Plan Nacional Peru Contra la Indocumentacion**

## 1. Introduction

The ability to formally identify oneself has increasingly become integral to many aspects of civic participation and inclusion (Gelb & Clark, 2013). Proponents argue that formalized identity management systems have the potential to establish strategic partnerships between the state and citizens (Malik, 2014). Failure to register populations and provide identity documents is believed to have detrimental effects for both the individual and the state (Cunningham, 2013). To both better understand and serve citizens, countries are placing increasing attention on establishing national identification systems and the role they play in strategic political, economic, and social development (*ibid.*).

Identification systems are becoming more common across Latin America, South and Southeast Asia, and Sub-Saharan Africa. Of the 48 identity programs we review, 29 have been introduced in the past decade, and 14 of those in the past five years. The driving force behind creating a national identity system varies from country to country. Rich countries have a relatively long history of using identification systems for surveillance and security purposes, further motivated over the past decade by the events of 9/11(Bennett & Lyon, 2008; Gelb & Clark, 2013). For developing countries, surveillance, fair and democratic elections, and fostering national unity are all mentioned in the evidence we review as reasons for implementing an identity system. In addition, identification systems' development potential is reflected in goal 16.9 of the proposed Sustainable Development Goals (SDGs): "provide legal identity for all including birth registration" by 2030 in order to "promote peaceful and inclusive societies for sustainable development, provide access to justice for all, and build

effective, accountable and inclusive institutions at all levels" (The Division for Sustainable Development, United Nations, 2015; World Bank, 2015).

The complexity of government administration in "the modern world" is a major problem facing developing countries. Often, individual government programs have their own database of beneficiaries that are not digitized and therefore cannot be easily merged (Giné, n.d.). Delivering public services efficiently and providing financial inclusion to the poor in partnership with the private sector depends on accurate identification and authentication of citizens and residents. Government programs must have the capacity to cross-reference databases and information (*ibid.*).

Technological innovations have opened up new possibilities for governments to develop comprehensive identity management systems that link peoples' identities through their entire life (Bennett & Lyon, 2008), from birth certificate, civil registration, driver's license, to marriage certificate, voter registration and national identity card. At the same time, governments in developing countries are expected to carry out many of the same functions that richer countries are capable of performing; these functions include "providing universal access to healthcare and education, implementing know your customer (KYC) rules for financial institutions, and administering a wide variety of transfer programs" (Gelb & Clark, 2013).

As identification technology evolves, so do identification systems. Many of the programs we review are updating their initial systems to incorporate electronic and biometric elements into their ID programs. Gelb & Clark (2013) find that the biometrics industry grew at 28 percent annually between 2005 and 2010 and that the rate was even higher in developing regions, at 34 percent. They also quote estimates which suggest that as of 2012, over 1 billion people in developing countries have had their biometrics captured for one or more purposes. Incorporating biometric technologies in national identity systems is particularly useful for the growth of electronic government (e-government) as well as providing both public and private services (*ibid.*). As compared to manual, paper-based registers, advanced electronic capture and storage of data are able to reduce costs and human error as well as increase administrative efficiency (World Bank, 2014).

**Key Findings:**

- Government-issued national IDs are the most common form of national identity program reviewed (38 of 48 programs).
- 28 programs have an electronic component and 37 programs employ biometric information, most commonly in the form of fingerprints. 16 programs incorporate multiple biometrics into their IDs, usually combining fingerprints with face or iris scans.
- 35 of the 48 national identity programs are operational and in use, meaning they have completed initial enrollment and begun using the IDs, though ten of these are still actively enrolling new participants. Three programs are planned initiatives which have not yet begun enrollment, and three are actively enrolling but not yet operational.
- 39 programs report implementation challenges in some form. We identify seven general categories of challenges: accountability, privacy, data management, enrollment, coverage, cost, and harmonization of ID programs.
- Coverage of particular geographic or demographic groups is the most commonly reported challenge (22 programs). 20 programs report challenges in two or more of the categories we identify.
- IDs are most commonly used for Know Your Customer (KYC) purposes, especially for financial transactions and elections. 22 ID programs are mentioned as accepted credentials for banks to verify customer identity, and 21 are accepted forms of identification to vote.
- Five ID programs are linked to digital banking and four have mobile money applications. 13 programs are linked to government transfers, such as relief or welfare.
- 12 programs are connected to health functions. Four programs help enable digital tracking of medical services and treatment, and four others assist with verification of eligibility for health insurance coverage or for medical benefits.
- National ID programs are not well-linked to agricultural functions. Thailand's "Smart ID" is linked to the provision of extension services. Nigeria's electronic ID (eID) is used to monitor delivery of farming inputs.
- Other functions that are being applied to national ID programs include surveillance and security, civil service administration, travel, driver registration, and taxes.
- The year a program is introduced is not associated with number of functional linkages, but programs that are still actively enrolling members appear to be linked to more types of services.
- Programs that include electronic cards or biometrics tend to have a greater variety of functional linkages than programs that do not.

Electronic and biometric identification systems also have the potential to link national identity to multiple functional applications (World Bank, 2015). With electronic identity programs, a wide range of services can be delivered on computers

or mobile devices. Besides using fingerprints, PINs, and/or signatures as means of authentication for commercial transactions and for access to financial and social services, more precise digital biometric technology has been used in combination with mobile devices to create "mobile money" for secure and cashless commercial transactions and social transfers (World Bank, 2014; Gelb & Clark, 2013). Biometrics have also been used beyond authentication to secure identities in order to fulfill KYC requirements for opening bank accounts, to register and de-duplicate beneficiaries, to authenticate cash or in-kind transfers at the point of service, and to fulfill various other services such as health, voting and civil service reform (Gelb & Clark, 2013). A World Bank report quoted several projections showing that the number of "digital government/citizen transactions worldwide will grow to about $67 billion by 2020" (World Bank, 2015). As a result of linkages between national ID programs and financial services, these programs are also believe to have the potential to promote financial inclusion.

This literature review aims to answer the following research questions:
1. What developing countries have national identity programs, and what are the characteristics of these programs?
2. What is the level of coverage of these national identity programs, in terms of percentage of a country's overall population and of particular population groups (e.g., poor populations)?
3. To what extent are national identity programs being connected to and used to support provision of services and products, especially in the finance, agriculture, and health sectors?
4. What characteristics of national identity programs are associated with connections to financial, agricultural, and health services?

Section 2 of this report outlines our search and review methodology. In section 3, we present an overview of the 48 national identity programs, including their technical components, implementation status, and level of coverage. Evidence of implementation challenges these programs face is presented in section 4. In section 5, we describe the functions linked to national identity programs, and in section 6 we evaluate what characteristics of these programs are associated with service linkages. A spreadsheet providing greater detail on the characteristics of each of the national identity programs we review is included as a supplement to this report. In addition, we present summary case studies of the national identity programs of 12 selected focus countries in Appendix D.

## 2. Methodology

We define *national identity programs* as government-initiated programs that assign a unique identification number to each targeted participant, which is used for identification verification. We focus on identity programs that have at least one functional authentication purpose, such as voter verification, government transfers, and accessing financial or other services. In addition, we include only identity programs that operate at the national level, except where sub-national government identity programs exist and are the only nationally-recognized program.

We review national identity programs in 43 developing countries with 2013 populations over 15 million and GDP per capita under US$10,000. Among the 43 countries of interest, we further provide in-depth case studies for 12 focus countries based on supplemental searches of the available literature; these include: Bangladesh, Ethiopia, India, Indonesia, Kenya, Malawi, Nigeria, Pakistan, Peru, Tanzania, Uganda, and Zambia.[1]

To analyze coverage and key characteristics of developing countries' national identity programs and evaluate whether and how these programs are being connected to or used for service provision, we conducted a search of both the academic and grey literature on the following databases:
- Google
- Google custom search of International Non-Governmental Organizations
- Center for Global Development
- Scopus
- Google Scholar

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[1] The criteria for including countries were determined by the International Telecommunication Union (ITU)'s Digital Financial Services Ecosystems Working Group and the Bill & Melinda Gates Foundation's Financial Services for the Poor team, who requested this review.

We employed a variety of search strings using terms relevant to national identity programs in general and to the specific national identity programs of the countries of interest[2]. We conducted additional searches to target information gaps and complement the findings from the initial search, though evidence was limited for many programs. Appendix A includes more detail on our search process and results.

During the initial search, we identified a total of 397 documents that appeared relevant to national identity programs in the countries of interest. We supplement program-specific documents with articles from the published and grey literature, though note that because of a limited literature in this area, much of the literature cited in this report draws heavily on a few papers and authors. Based on these documents, we identified 48 relevant national identity programs in the 43 countries. For each national ID program, we reviewed the evidence using a framework that contains the following information:

- Basic national identity program information – includes information about the management, funding, target population, and general history of the program
- National identity program methodology – includes information on enrollment/registration methods, credentials used (e.g., biometrics), and general operation of the program
- Implementation of the program – includes information on coverage/inclusion of the program, cost of the program, and implementation challenges
- Functional applications of the program – includes information on uses of the program for health, finance, agriculture, elections, social transfers, civil service administration, surveillance and security, and other purposes

The complete set of review framework questions is included in Appendix B. In this report, we use information coded according to our framework to summarize trends and gaps among national identity programs. The complete spreadsheet is included along with this report and provides additional detail for all of the national identity programs reviewed.

### 3. Overview of Selected National Identity Programs

We reviewed literature for a total of 48 national identity programs or initiatives in the 43 countries of interest. These national identity programs or initiatives include 38 government-issued national identity card programs, two passport programs, four voter's card programs, as well as three special identity programs (*Figure 1*). A summary table of the 48 selected national identity programs, which presents the country, program name, program type, enrollment approach, year of launch, and implementation status of each program, is included in Appendix C.

*Figure 1*. Type of National Identity Program
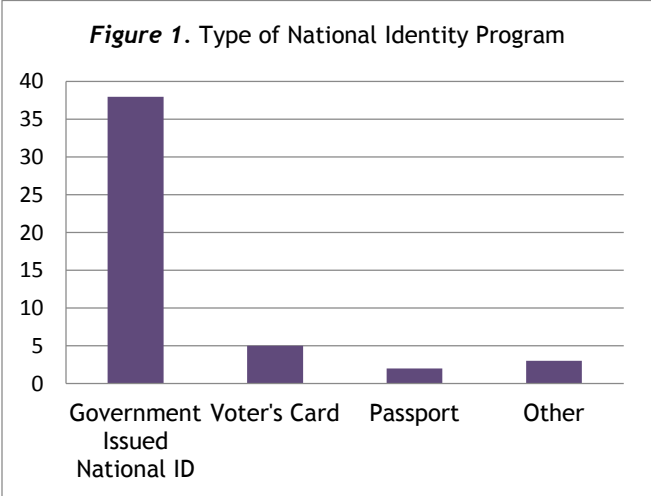
For most countries, a government-issued national identity card is the main program that is being used for both identification verification and for at least one functional authentication purpose. In five of the countries we review, including **Burkina Faso, Cambodia, Nigeria, Ukraine, and Zambia, there is more than one prominent national identity program**. In addition to their national identity card programs, Burkina Faso and Zambia also implemented voter's card programs. Burkina Faso had been using their national identity cards as primary documents for registration of voters (The Carter Center, 2013). In 2012, the Burkinabè government began to roll out a biometric voter card program to prevent duplicate voting registrations due to the lack of a reliable civil registration database (University of Florida, 2015). As part of their ongoing commitment to improve the performance of democratic governments, the United Nations Development Programme (UNDP) supported Zambia in incorporating biometrics in its Continuous Voter Registration program in 2010 (Government of Zambia & United Nations Development Programme, 2009). The government of Ukraine passed a

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[2] Our initial search string for each country was *national AND (identity OR identification) AND (program OR system OR card) AND "Country Name"*.

biometric identification law in 2012 that allows for the incorporation of biometrics in both the national identity card and passport, and a unified state demographic register will be set up to store citizen's basic personal information (Mayhew, 2012).

The extent of national identity systems and the roles of these systems varies dramatically across countries. Cambodia and Nigeria, for example, both implemented special identification programs in addition to national identification cards. The Cambodian Identification of Poor Households Programme seeks to identify poor households in rural villages and the level of poverty in these villages so that the Ministry of Planning can help lift the poorest households out of poverty by directly targeting services and development assistance to them (Cambodia Ministry of Planning, n.d.). In Nigeria the focus of the special identification program is quite different: in 2014 the Central Bank of Nigeria, in collaboration with all banks in Nigeria, launched the Bank Verification Number (BVN). The BVN is a centralized biometric identification system that provides the banking industry and its customer greater security for access to sensitive or personal banking information (Central Bank of Nigeria, 2014a).

In Ethiopia, except for passports, we find no evidence of any national-level identity cards. Instead, all regional governments issue their own identification cards (Kebele cards), including in local languages such as Oromifa, Amharic, Somali, Tigregna and English (Immigration and Refugee Board of Canada, 2014b). All descriptions of the Ethiopian ID program in this review refer to these regional IDs.

3.1. Program Technical Features

Formal identification and authentication to ensure eligibility are important requirements for people's interactions with both public and private institutions (Gelb & Clark, 2013). Traditional paper-based identification systems have long used a variety of personal information which can include a name, assigned number, date of birth, gender, address, signature, and even a photograph of the individual. Traditional non-digital systems, however, are subject to errors, duplications, forgery, false acceptances (when an unauthorized individual is allowed enrollment), and false rejections (when an authorized individual is rejected for enrollment). Electronic databases, combined with biometric technology, may mitigate some of these errors. Instead of registering target populations manually and storing identity information in paper registers, proponents contend that electronic capture and storage of data "can improve accuracy and security, facilitate fast data processing and collection, and create auditable transaction records; all of which have the potential to prevent fraud, improve service delivery, and aid development planning" (Gelb & Clark, 2013; World Bank, 2014). In addition, modern biometric technologies in identification offer some promise of authentication, establishing confidence in individual claims about identity (Bennett & Lyon, 2008; Gelb & Clark, 2013).

For each of the 48 programs reviewed, *Table 1* describes whether authentication involves a physical credential, an electronic component, and different types of personal and biometric information. Physical credentials are usually paper or plastic-based identity cards. Programs with no physical credential are based entirely on electronic systems. Physical credentials with an electronic component include "smart" cards and other types of machine-readable IDs, such as those containing barcodes. Authentication can involve both personal information, such as a name, gender, birth date, and other related information, as well as biometric information which can include fingerprints, a face scan, an eye scan, a voice print, or DNA. Blank spaces in the table indicate areas where we could not find information about a specific program.

*Table 1*. Methodologies, Personal and Biometric Information Involved in the Selected National Identity Programs

| Country | Official Name of National ID Program | Physical credential Involved | Electronic component Involved | Personal Information | | | | Biometric Information | | | | | Physical credential includes a photo |
| | | | | Name | Gender | Birth Date | Other (religion, birth place, etc.) | Fingerprint | Face | Eye | Voice | DNA | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Afghanistan** | e-tazkira | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | No | No | Yes |
| **Algeria** | National ID | Yes | Yes | Yes | | Yes | Yes | No | No | No | No | No | |
| **Angola** | National ID | Yes | Yes | | | | | Yes | No | Yes | No | No | Yes |
| **Bangladesh** | National Identity Card (NID) | Yes | Yes | Yes | | Yes | Yes | Yes | No | No | No | No | Yes |
| **Burkina Faso** | National ID | Yes | | | | | | | | | | | |
| **Burkina Faso** | Voter Card | Yes | | | | | | Yes | No | No | No | No | Yes |
| **Cambodia** | National ID | Yes | Yes | Yes | Yes | Yes | No | Yes | No | No | No | No | Yes |
| **Cambodia** | IDPoor | Yes | | Yes | Yes | | | | | | | | Yes |
| **Cameroon** | National Identity Card | Yes | No | Yes | Yes | Yes | Yes | Yes | No | No | No | No | Yes |
| **China** | Second Generation Resident Identity Card | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No | No | No | Yes |
| **Colombia** | Registraduria Nacional del Estado Civil | Yes | | Yes | Yes | Yes | Yes | Yes | No | No | No | No | Yes |
| **Congo, Dem, Rep.** | Elector's Card | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No | No | No | Yes |
| **Cote d'Ivoire** | National ID | Yes | | | | | | Yes | No | No | No | No | Yes |
| **Ecuador** | Cedula de Identidad | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No | No | |
| **Egypt** | National Identity Card (Current) Personal Verification Card | Yes | Yes | Yes | | | Yes | | | | | | Yes |
| **Ethiopia** | Regional ID | Yes | No | Yes | Yes | Yes | Yes | | | | | | Yes |
| **Ghana** | GhanaCard | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | No | No | No | Yes |
| **Guatemala** | Documento Personal de Identificación (DIP) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No | No | Yes |
| **India** | Aadhaar | No | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No | |
| **Indonesia** | Kartu Tanda Penduduk Elektronik (E-KTP) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No | Yes |
| **Iran** | Karte Melli | Yes | | | | | | No | No | No | No | No | Yes |
| **Iraq** | Civil Status Identification Card (Bitaka shakhsiyeh) | Yes | No | Yes | Yes | Yes | Yes | No | No | No | No | No | Yes |
| **Kenya** | Third Generation National ID | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | No | No | Yes |
| **Madagascar** | National Identity Card | Yes | No | | | | | No | No | No | No | No | Yes |
| **Malawi** | National Registration and Identification System | Yes | | | Yes | Yes | Yes | | | | | | |
| **Mali** | National Identification Number (NINA) Card | Yes | | | | | | Yes | No | No | No | No | Yes |
| **Morocco** | Carte Nationale D'Identite Electronique | Yes | Yes | Yes | | Yes | Yes | Yes | No | No | No | No | Yes |

| Country | Program | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Mozam-bique | Bilhete de Identidade | Yes | | Yes | Yes | Yes | Yes | Yes | Yes | No | No | No | Yes |
| Nepal | National Identity Card (NID) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No | No | No | Yes |
| Niger | Voter Card | Yes | | | | | | No | No | No | No | No | |
| Nigeria | National Identification Numbers (NIN) and National Electronic Identity Cards (eID) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | Yes | No | No | Yes |
| Nigeria | Bank Verification Number (BVN) | No | | | | | | Yes | Yes | No | No | No | |
| Pakistan | National Database and Registration Authority (NADRA) | Yes | Yes | Yes | Yes | No | Yes | Yes | Yes | No | No | No | Yes |
| Peru | Registro Nacional de Identificacion y Estado Civil (RENIEC) | Yes | Yes | Yes | Yes | | Yes | Yes | No | No | No | No | Yes |
| Philippines | Filipino Identification System Act | Yes | | Yes | Yes | Yes | Yes | No | No | No | No | No | Yes |
| Romania | National Identity Card/Carte de identitate eID | Yes | Yes | Yes | Yes | No | Yes | Yes | No | No | No | No | Yes |
| Sri Lanka | National Identity Card (NIC)/e-NIC | Yes | Yes | Yes | | | | Yes | No | No | No | No | Yes |
| Sudan | National Identity Card Identity Card | Yes | Yes | Yes | | Yes | Yes | | | | | | Yes |
| Tanzania | National ID Program | Yes | Yes | | | | | Yes | No | Yes | No | No | Yes |
| Thailand | National Identity Card/National ID Card/Smart ID Card | Yes | Yes | | | | | Yes | Yes | No | No | No | |
| Uganda | National Security Information System (NSIS) | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No | No | Yes | Yes |
| Ukraine | Biometric Passport | Yes | Yes | | | | Yes | Yes | | | | | Yes |
| Ukraine | ID Card/Biometric Identification Card | Yes | | | | | | | | | | | |
| Uzbekistan | ePassports/Biometric Passports | Yes | Yes | | | | | Yes | No | No | No | No | Yes |
| Vietnam | People's Identity Cards | Yes | | Yes | Yes | Yes | Yes | Yes | No | No | No | No | Yes |
| Yemen | Biometric Voter Registration (BVR) | No | | | | | | Yes | Yes | No | No | No | Yes |
| Zambia | National Registration Cards (NRC) | Yes | Yes | | | | | Yes | Yes | No | No | No | Yes |
| Zambia | Continuous Voter Registration/Voter Registration Cards | Yes | Yes | | | | | Yes | No | No | No | No | |
| GRAND TOTAL | | 45 | 28 | 30 | 25 | 25 | 29 | 34 | 12 | 7 | 0 | 1 | 38 |

**Almost all programs (45 of 48) use a physical credential** to authenticate an individual's identity, with three exceptions. In India, the Unique Identification Authority assigns a one-of-a kind ID number to every Indian resident using cloud-based technology without issuing a card (Zelazny, 2012). Nigeria's Bank Verification Number (BVN) authenticates financial transactions through the use of only biometric features and a PIN (Central Bank of Nigeria, 2014a). Yemen's voter registration assigns each resident a unique identification number and records biometric information without issuing a card (Al-Junaid, 2015).

More than half (28 of 48) of the programs we review include an electronic component in their physical credentials. Many of programs use **smartcards**, where personal information and digital credentials are stored securely on an embedded microchip. For example, the Second Generation Resident Identity Card in China and the Carte Nationale D'Identite

Electronique in Morocco both use a type of microchip that contains a radio frequency identification (RFID) module (Immigration and Refugee Board of Canada, 2007; AGFA, 2015). Other countries which specify the use of smartcards for their national identity program include Afghanistan, Bangladesh, Ecuador, Egypt, Guatemala, Indonesia, Morocco, Nepal, Nigeria, Pakistan, Peru, Tanzania, Thailand, and Ukraine. The use of smart chip technology creates a "platform to deploy applications needed by different government [and private] sectors," and is thus "an enabler of new services" (World Bank, 2014).

**Machine-readable barcodes** that record and protect personal and biometric information are another electronic component of physical credentials used by a small number of countries (Congo, Ghana, Sri Lanka, Uganda, and Zambia). For instance, the NSIS identity card in Uganda is a biometrically enhanced, machine readable card with digitally embedded face scans and fingerprints of the card holder (National Security Information System (NSIS, 2015b; Uganda Convention UK, 2014).

Name (30 programs), gender (25), and birth date (25) of the individual are the most common **personal information** collected during registration. Other types of personal information collected include individuals' signatures, ID number, place of birth, and religion. A photograph of the individual on the physical credential is a feature in 38 of the programs reviewed.

Thirty-six programs collect some kind of **biometric information** for identification and authentication. Modern biometric technologies in identification offer some promise of authentication, establishing confidence in individual claims about identity (Bennett & Lyon, 2008; Gelb & Clark, 2013). *Figure 2* provides an overview of the common types of biometric information used in the 48 programs reviewed. The most common type of biometric information used is fingerprints (32 programs). Twelve programs use face scans, and seven use eye (retina or iris) scans. While vocal recognition is among the biometric features being newly developed for identification and authentication (Gelb & Clark, 2013), we do not find evidence that any of the 48 reviewed programs use it.



*Figure 2.* Type of Biometric Information
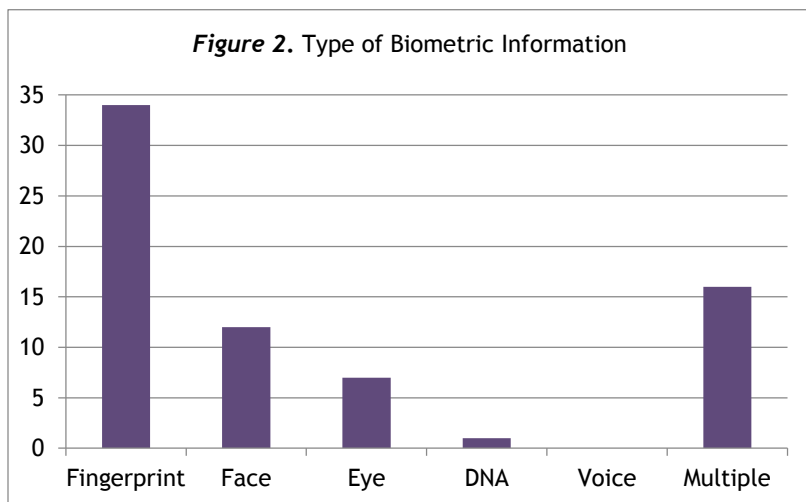
**Sixteen programs use more than one type of biometric information.** The Unique Identification Authority of India (UIDAI) incorporates fingerprints and iris scans in the system as the primary biometrics for identification and de-duplication[3] purposes; it also uses facial recognition to help with human visual inspection and to provide a duplicate check on a small subset of enrollments (Zelazny, 2012). The e-KTP, Indonesia's electronic national identity card, captures the fingerprint, iris, and face images of the millions of citizens the government is getting to enroll at registration centers (Messmer, 2012). The e-KTP's fingerprint verification system has a false rejection rate of 3% or lower and a false acceptance rate of .01% or lower (Fahmi, 2012; Fauzi, 2014). In addition, Uganda's National Security Information System (NSIS) is supported with facial recognition technology (FRS) and an Automatic Fingerprint Identification System (AFIS) to prevent identity forgery or loss (National Security Information System, 2015b). In an address to the nation, Ugandan President Yoweri Musaveni specified that NSIS also plans to capture citizens' DNA to help combat crimes (State House Uganda, 2014).

We find evidence that programs in India, Nigeria, and Pakistan authenticate financial transactions on site using biometric information. However, we find no evidence of countries having devices available for on-site biometric verification during elections. This limited use of biometric verification is likely because biometric authentication is costly, and may be less cost effective than traditional means of verification such as presenting a physical ID (Gelb & Clark, 2013). As a result, while many programs include a central registry of citizen biometric information, few possess the equipment to verify citizens on

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[3] De-duplication involves reviewing all enrolled program members to ensure that no individual is registered more than once.

site for financial/social transfers, elections, or other functions. Evidence of biometric authentication is discussed further in the sections on functional applications of national ID programs.

Finally, several programs collect and digitise signatures, storing them on ID card electronic chips. Ten countries incorporate this feature (Afghanistan, Iran, Bangladesh, Ecuador, Indonesia, Nigeria, Peru, Tanzania, Uganda, and Ukraine). Castro writes that "**digital signatures** use a technique known as asymmetric cryptography requiring two components: a private key for the sender to use to sign a document and a public key for the receiver to use to verify the signature. The keys are generated by a certificate authority, a trusted third party such as a private company or the government" (Castro, 2011, p. 4). For example, the Iranian National Organization for Civil Registration states that for its new generation of ID cards an electronic signature will enable document recipients to feel certain that what they receive is not counterfeit (Immigration and Refugee Board of Canada, 2015). Digital signatures may facilitate online transactions by creating secure routes to send financial, health, or other types of documents. However, we find no evidence in our literature review of the extent to which digital signatures are used by citizens, nor examples of transactions in which digital signatures are applied.

## 3.2. Stage of Implementation



*Figure 3.* Status of National ID Program
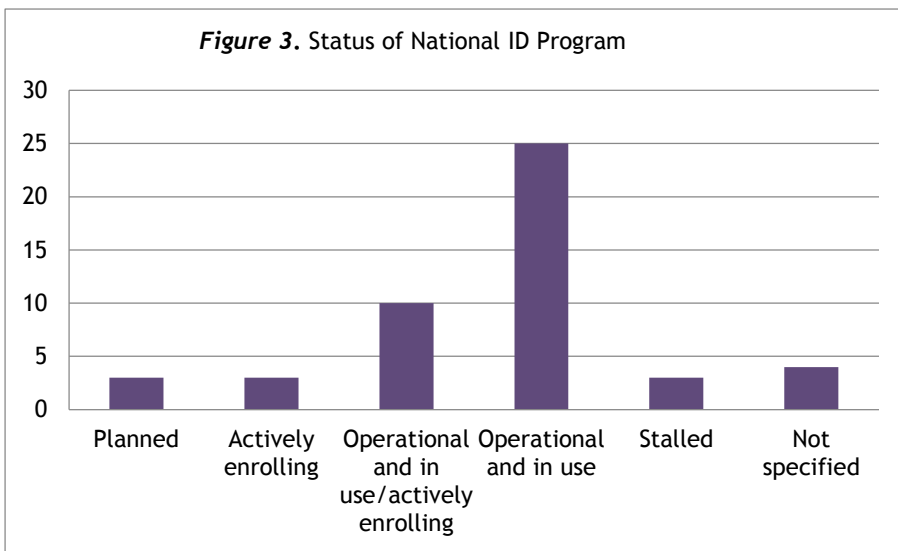
The 48 national identity programs are in various stages of development, though we do not find sufficient evidence to evaluate the implementation status of four of the programs (*Figure 3*). Three programs are planned initiatives which have not yet begun enrollment, and three are actively enrolling but not yet operational. Of the remaining 38 national identity programs, **35 are operational and in use, though ten of these are still actively enrolling new participants**. We define "operational and in use" as programs that have fully scaled up and only enroll newly eligible individuals. Conversely, by "operational and in use / actively enrolling," we refer to programs which have completed at least their initial or pilot phase of enrollment and issued ID credentials to a portion of the target population, but have yet to be fully scaled up. This implementation stage is common in countries where enrollment is designed to take place in phases by age or by region. Bangladesh, for instance, extended eligibility for the NID cards to 15-17 year olds in 2015 after the cards were introduced in 2008 for all people 18 years old and above, and is still actively enrolling this newly eligible population (Chowdhury, 2015b). IDPoor in Cambodia partially or fully registered poor households in five provinces, and is continuously expanding the coverage area as resources become available (Cambodia Ministry of Planning, n.d.).

Finally, **three national ID programs are stalled**. Successful implementation of national identity programs requires sustained popular and political support as well as intergovernmental cooperation (Gelb & Clark, 2013). Political and social instability is affecting successful implementation of the e-tazkira in Afghanistan and the ID card in Ukraine, and both programs are now considered stalled. One account in Afghanistan suggests that a decision not to place "ethnicity" on the physical ID card invoked anger from minority groups who perceived that the Pashtun majority was trying to avoid "counting" them in population estimates used to determine political representation. Violence and collapsing political support have contributed to the stalled implementation of the program (Bezhan, 2013). The government of Ukraine had announced the introduction of biometric ID cards in both 2012 (Mayhew, 2012) and 2015 (Censor.Net, 2015), however, we find no evidence of implementation plans. Technical challenges can also stall program implementation, especially ones that involve the use of electronic components and biometric technology. The adoption of the digital biometric ID card in Algeria has been delayed due to difficulties providing logistical and equipment services (Belamri, 2015).

The implementation status of these programs is often related to the years when the programs were initiated. The programs that are currently operational and in use are generally older, often based on physical credentials issued many years ago, including as far back as 1964 (Kenya, Zambia). Uganda's National Security Information System (NSIS), launched in 2014, is the newest program that is currently operational and in use. Five of the six planned and actively enrolling initiatives were introduced recently, ranging from 2007 to 2015.

Many countries already have existing national identity programs in place but have replaced or are replacing them with the **next generation of national ID cards** that contain electronic and/or biometric components. For example, China's first generation of ID card was introduced in 1985; its second generation card was implemented in 2004 and embedded with a microchip using RFID technology (Chen, 2003; Immigration and Refugee Board of Canada, 2007). In 2015, Egypt's government signed an agreement with MasterCard to link citizens' national IDs to an existing national mobile money platform (Security Document World, 2015). Vietnam's People's Identity Cards program was introduced in 1999 (Ministry of Justice's Portal, the Government of Vietnam, n.d.). While no information can be found on when the new program will be implemented, the available evidence indicates that the goal of this program is to simplify personal papers by replacing the current IDs and household registers (Tuoi Tre News, 2014). Vietnam, Bangladesh, Ecuador, Ghana, Iran, Kenya, and Sri Lanka are all planning to undergo, or are currently undergoing, a transition to a next-generation ID system.



Figure 4. Status of National ID Program by Region
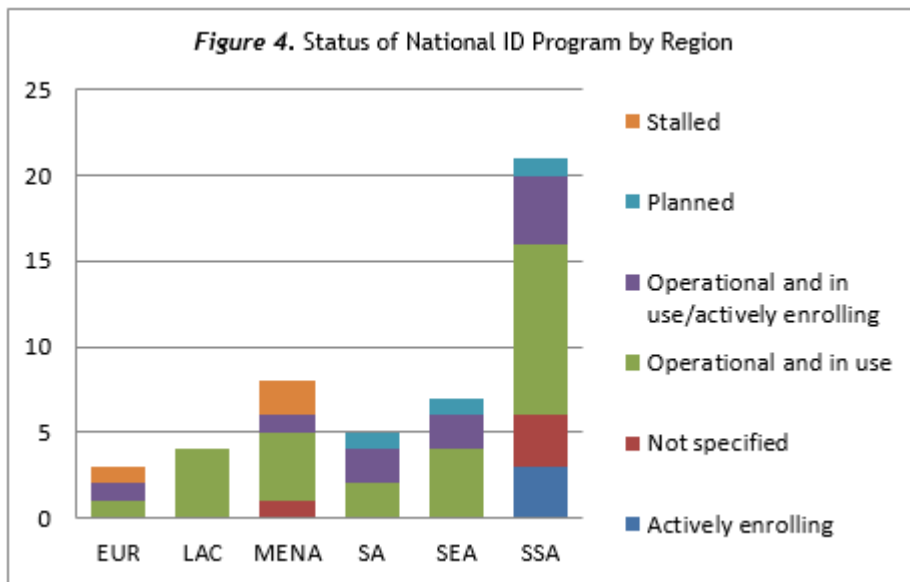
*Figure 4* illustrates national ID programs' stage of implementation by region.[4] All regions have programs that are operational and in use, and the majority of the programs we review are located in Sub-Saharan Africa. The three planned programs are split among South Asia, South East Asia, and Sub-Saharan Africa, but all three programs that are in the active enrollment stage are located in Sub-Saharan Africa. The concentration of newer programs in Sub-Saharan Africa may be due to this region's leapfrogging ability enabled by new electronic and biometric technology (World Bank, 2015).

3.3. Enrollment Methodologies

**Enrollment in identity programs** can be mandatory or voluntary. Almost all of the national identity programs we review (44 of 48) mandate that their target populations (usually all citizens) register in person at a registration center once they reach the eligible age. Exceptions to this rule are the Elector's Card program in Congo, the Aadhaar program in India, the National Identity Card (NID) in Nepal, and the National Database and Registration Authority (NADRA) in Pakistan. Gelb & Clark (2013) point out that when a large scale national identity program is mandatory, a country may face a crush of applications, resulting in frustrated recipients and temporary exclusion if capacity is overrun. Pilot programs, iterative development, or phasing-in programs by area or age group may help minimize these problems (*ibid*).

On the other hand, voluntary enrollment is not without its own problems. A voluntary identity card can quickly become a de facto universal ID card if a program reaches critical mass or is well-integrated with finance, health, and other functions. Citizens without the card then experience difficulty gaining access to public services or even basic goods (Bennett & Lyon, 2008). For instance, while participation in India's Aadhaar program is voluntary, Aadhaar numbers are legally required for authentication if citizens want to access many services and programs (Gelb & Mukherjee, 2015). Registration for the NADRA

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[4] "EUR" indicates Europe, "LAC" indicates Latin American and the Caribbean, "MENA" indicates the Middle East and North Africa, "SA" indicates South Asia, "SEA" indicates Southeast Asia, and "SSA" indicates Sub-Saharan Africa.

is technically voluntary for Pakistani citizens. However, they cannot open a bank account or enter into many transactions with the state without an ID card or a passport (Malik, 2014). We provide more information on enrollment method and challenges in Section 4.4.

**A majority of the 48 national identity programs reviewed target all citizens in the country**. However, a number of national identity programs target populations beyond citizens. The programs in Ethiopia, Ghana, Indonesia, India, Kenya, Nepal, Nigeria, Sudan, and Tanzania issue national identity cards to **residents** living in these countries even if they are not citizens. For example, Tanzania extends its national identity card program enrollment to **refugee populations** (ID World - ID Community Publications, 2015).

In some cases, the target population for a national identity program is a subset of the total population. The IDPoor cards in Cambodia are issued specifically to **poor individual and households in rural areas** (Cambodia Ministry of Planning, n.d.). The Bank Verification Number (BVN) in Nigeria targets only citizens who are eligible for banking (Central Bank of Nigeria, 2014a). Voter's cards in Yemen are for the voting population only.

The **target registration age** of the programs, meaning the lowest eligible enrollment age and not the age eligible for the issuance of physical credentials, ranges from birth to age 18. Eighteen is the most common target age for registration (10 programs), followed by birth and age 16 (eight programs each)[5]. Some governments are developing comprehensive identity management system that manage peoples' identities from birth to death (Bennett & Lyon, 2008). In several cases, however, the age of enrollment and the age for the issuance of physical credentials are different. In Bangladesh, for example, a national identification number is issued to every child at birth, and this number remains through his or her life and is associated with the NID card issued at the age of 15 (Chowdhury, 2015b). Children in Pakistan are required to register with National Database and Registration Authority (NADRA) within a month of birth, although they are not eligible to acquire a Computerized National Identity Card (CNIC) or Smart National Identity Card (SNIC) until they are 18 years old (Khan, 2012). *Table 2* presents the target populations and target registration age of the 48 national ID programs.

*Table 2*. Coverage of Target Population

| Country | Official Name of National ID Program | Target Population | Target Registration Age | Year of Launch | Coverage Rate among Target Population |
|---|---|---|---|---|---|
| **Afghanistan** | e-tazkira | All citizens | Birth | 2010 | 0% |
| **Algeria** | National ID | Not specified | Not specified | 2015 | Not specified |
| **Angola** | National ID | All citizens | Not specified | 2009 | 25% |
| **Bangladesh** | National Identity Card (NID) | All citizens | Birth | 2007 | 60% |
| **Burkina Faso** | National ID | All citizens | Not specified | Not specified | Not specified |
| **Burkina Faso** | Voter Card | All citizens | 18 | 2012 | 58% |
| **Cambodia** | National ID | All citizens | 15 | Not specified | less than 1% |
| **Cambodia** | IDPoor | Other | Not specified | 2006 | Not specified |
| **Cameroon** | National Identity Card | All citizens | 18 | Not specified | Not specified |
| **China** | Second Generation Resident Identity Card | All citizens | Birth | 2003 | Not specified |
| **Colombia** | Registraduria Nacional del Estado Civil | All citizens | Birth | Not specified | Not specified |
| **Congo, Dem. Rep.** | Elector's Card | All citizens | 18 | 2005 | 91% |
| **Cote d'Ivoire** | National ID | All citizens | 14 | 2010 | 59% |
| **Ecuador** | Cedula de Identidad | Not specified | Not specified | 2010 | Not specified |

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[5] Figure 10 in the section on linkages with health services further illustrates the breakdown of target registration age among these programs.

| | | | | | |
|---|---|---|---|---|---|
| **Egypt** | National Identity Card (Current) Personal Verification Card | All citizens | 16 | Not specified | Not specified |
| **Ethiopia** | Regional ID | Citizens and Residents | 18 | Not specified | Not specified |
| **Ghana** | GhanaCard | Citizens and Residents | 6 | 2008 | 59% |
| **Guatemala** | Documento Personal de Identificación (DIP) | Not specified | 18 | 2004 | Not specified |
| **India** | Aadhaar | Citizens and Residents | 5 | 2008 | 67% |
| **Indonesia** | Kartu Tanda Penduduk Elektronik (E-KTP) | Citizens and Residents | 17 | 2009 | 97% |
| **Iran** | Karte Melli | All citizens | 15 | 1997 | 99% |
| **Iraq** | Civil Status Identification Card (Bitaka shakhsiyeh) | Not specified | 1 | Not specified | Not specified |
| **Kenya** | Third Generation National ID | Citizens and Residents | 12 | 1964 | Not specified |
| **Madagascar** | National Identity Card | All citizens | 18 | Not specified | Not specified |
| **Malawi** | National Registration and Identification System | All citizens | Birth | 2007 | Not specified |
| **Mali** | National Identification Number (NINA) Card | All citizens | Birth | 2008 | 88% |
| **Morocco** | Carte Nationale D'Identite Electronique | All citizens | 18 | 1996 | Not specified |
| **Mozambique** | Bilhete de Identidade | Not specified | Not specified | Not specified | Not specified |
| **Nepal** | National Identity Card (NID) | Citizens and Residents | 16 | 2009 | Not specified |
| **Niger** | Voter Card | All citizens | 18 | 2009 | Not specified |
| **Nigeria** | National Identification Numbers (NIN) and National Electronic Identity Cards (eID) | All citizens, all residents | Birth | 2007 | 4% |
| **Nigeria** | Bank Verification Number (BVN) | Other | Not specified | 2014 | 52% |
| **Pakistan** | National Database and Registration Authority (NADRA) | All citizens | Birth | 2000 | 98% |
| **Peru** | Registro Nacional de Identificacion y Estado Civil (RENIEC) | All citizens | Birth | 1993 | 89% |
| **Philippines** | Filipino Identification System Act | All citizens | Not specified | 2015 | Not specified |
| **Romania** | National Identity Card/Carte de identitate eID | All citizens | 14 | Not specified | Not specified |
| **Sri Lanka** | National Identity Card (NIC)/e-NIC | All citizens | 16 | 2014 | Not specified |
| **Sudan** | National Identity Card Identity Card | Citizens and Residents | 16 | 2011 | Not specified |
| **Tanzania** | National ID Program | Citizens and residents, other | Not specified | 2008 | 24% |
| **Thailand** | National Identity Card/National ID Card/Smart ID Card | All citizens | 7 | 2005 | 47% |

| Uganda | National Security Information System (NSIS) | All citizens | 16 | 2014 | 99% |
|---|---|---|---|---|---|
| Ukraine | Biometric Passport | Not specified | Not specified | 2015 | Not specified |
| Ukraine | ID Card/Biometric Identification Card | Not specified | Birth | Not specified | Not specified |
| Uzbekistan | ePassports/Biometric Passports | All citizens | 16 | 2011 | Not specified |
| Vietnam | People's Identity Cards | All citizens | 14 | 1999 | Not specified |
| Yemen | Biometric Voter Registration (BVR) | Other | Not specified | 2014 | Not specified |
| Zambia | National Registration Cards (NRC) | All citizens | 16 | 1964 | Not specified |
| Zambia | Continuous Voter Registration/Voter Registration Cards | All citizens | 18 | 2010 | 79% |

3.4. Coverage of Target Population

The national identity programs we review also vary widely in their coverage of the target population. *Figure 5* provides an overview of the coverage rates (also summarized in the last column of *Table 2*). We are able to uncover evidence of coverage rates for 20 of 48 programs. Among the national identity programs that are active—meaning either they have completed their initial rollouts, are actively enrolling, or are operational and in use—the level of coverage ranges from eight percent of the target population for the National Electronic Identity Cards (eID) in Nigeria to 99 percent for both the Karte Melli program in Iran and the NSIS program in Uganda.

*Figure 5*. Coverage Rates of ID Programs
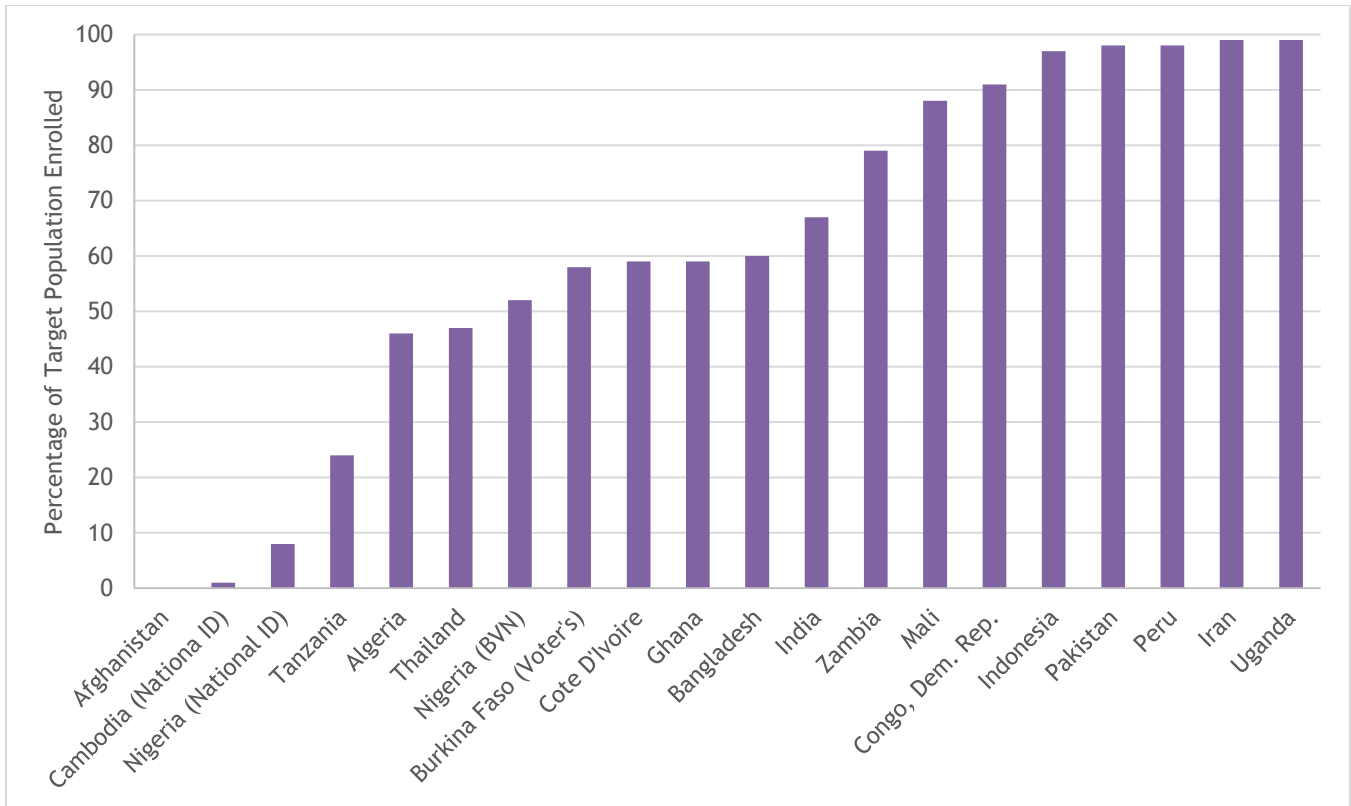
Other ID programs that have high levels of coverage among their target population include Pakistan's National Database and Registration Authority (NADRA) (98% – see Section 4.5 for detail on NADRA's extensive registration efforts), the Registro Nacional de Identificacion y Estado Civil (RENIEC) program in Peru (98%), the e-KTP program in Indonesia (97%), the Elector's Card program in the Democratic Republic of Congo (91%), the National Identification Number (NINA) card program in Mali (88%), the Continuous Voter Registration in Zambia (79%), and India's Aadhaar program (67%). The ID programs that have the lowest level of coverage are the ID card programs in Nigeria (8%), Tanzania (24%), and Angola (25%).

We do not observe any particular factors that appear to be associated with coverage levels. Theoretically, older program would have had more time to increase their coverage rate, but we find no association between year of launch and coverage. For instance, the NSIS program in Uganda has a 99 percent coverage rate despite being a relatively new program established in 2014 while eID of Nigeria, which was launched in 2007, only covers 4 percent of its target population. We also find no clear associations between coverage and geographic size, population size, or GDP per capita. This lack of association may be due to implementation challenges affecting the levels of coverage of ID programs. A majority of the programs we review (32 of 48) report some form of implementation challenges. Section 4 details the various implementation challenges experienced by all programs reviewed.

**4. Implementation Challenges**

Establishing a national-scale identification system is complex, which leads to a wide range of challenges (Gelb & Clark, 2013). We identify seven main categories of implementation challenges: accountability, privacy, data management, enrollment, coverage, cost, and harmonization of ID programs (*Table 3*). **Coverage, including geographic and demographic characteristics**, **is the most reported challenge (22),** and of the 39 programs for which we find evidence of challenges, **20 report challenges in two or more categories**.

*Table 3*. National ID Program Implementation Challenges

| Country | Official Name of National ID Program | Implementation or Program Challenges | | | | | | |
|---------|--------------------------------------|:---:|:---:|:---:|:---:|:---:|:---:|:---:|
| | | Accountability | Privacy | Data Management | Enrollment | Coverage | Cost | Interoperability |
| Afghanistan | e-tazkira | -- | -- | -- | -- | X | -- | X |
| Algeria | National ID | -- | -- | -- | X | -- | -- | -- |
| Angola | National ID | -- | -- | -- | -- | X | -- | -- |
| Bangladesh | National Identity Card (NID) | -- | -- | X | -- | -- | -- | -- |
| Burkina Faso | National ID | -- | -- | -- | -- | -- | -- | -- |
| Burkina Faso | Voter Card | -- | -- | X | -- | -- | -- | -- |
| Cambodia | National ID | -- | -- | -- | X | X | X | -- |
| Cambodia | IDPoor | -- | -- | -- | -- | -- | X | -- |
| Cameroon | National Identity Card | -- | -- | -- | -- | X | -- | -- |
| China | Registraduria Nacional del Estado Civil | -- | X | -- | -- | -- | -- | -- |
| Colombia | Cedula de Ciudadania | -- | -- | -- | -- | X | -- | -- |
| Congo | Elector's Card | X | -- | -- | -- | -- | -- | -- |
| Cote d'Ivoire | National ID | -- | -- | -- | X | X | X | -- |
| Ecuador | Cedula de Identidad | -- | -- | -- | -- | X | -- | -- |
| Egypt | National Identity Card (Current Program) / Personal Verification Card | -- | -- | -- | -- | X | -- | -- |
| Ethiopia | Regional ID | -- | -- | -- | -- | -- | -- | -- |
| Ghana | GhanaCard | -- | -- | X | -- | X | -- | -- |
| Guatemala | Documento Personal de Identificación (DIP) | X | -- | X | -- | X | -- | -- |
| India | Aadhaar | -- | X | -- | -- | -- | -- | X |

| Indonesia | Kartu Tanda Penduduk Elektronik (E-KTP) | -- | -- | X | X | X | -- | -- |
|---|---|---|---|---|---|---|---|---|
| Iran | Karte Melli | -- | -- | -- | -- | -- | -- | -- |
| Iraq | Civil Status Identification Card (Bitaka shakhsiyeh) | -- | -- | -- | X | X | -- | -- |
| Kenya | Third Generation National ID | X | -- | -- | X | X | -- | -- |
| Madagascar | National Identity Card | -- | -- | -- | -- | -- | -- | -- |
| Malawi | National Registration and Identification System | X | -- | -- | - | -- | X | -- |
| Mali | National Identification Number (NINA) Card | -- | -- | X | -- | X | -- | -- |
| Morocco | Carte Nationale D'Identite Electronique | -- | -- | -- | -- | -- | -- | -- |
| Mozambique | Bilhete de Identidade | X | -- | -- | -- | X | X | -- |
| Nepal | National Identity Card (NID) | X | -- | -- | -- | -- | -- | -- |
| Niger | Voter Card | X | -- | -- | -- | -- | X | -- |
| Nigeria | National Identification Numbers (NIN) and National Electronic Identity Cards (eID) | -- | -- | -- | X | -- | -- | X |
| Nigeria | Bank Verification Number (BVN) | -- | -- | -- | X | X | -- | X |
| Pakistan | National Database and Registration Authority (NADRA) | -- | -- | -- | -- | X | -- | -- |
| Peru | Registro Nacional de Identificacion y Estado Civil (RENIEC) | -- | -- | -- | X | X | -- | -- |
| Philippines | Filipino Identification System Act | -- | X | -- | -- | -- | -- | -- |
| Romania | National Identity Card / Carte de identitate eID | -- | -- | -- | -- | -- | -- | -- |
| Sri Lanka | National Identity Card (NIC) / e-NIC | -- | X | -- | X | -- | -- | -- |
| Sudan | National Identity Card Identity Card | -- | -- | -- | -- | X | -- | -- |
| Tanzania | National ID Program | -- | -- | -- | -- | -- | X | -- |
| Thailand | National Identity Card / National ID Card / Smart ID Card | X | -- | -- | X | -- | -- | -- |
| Uganda | National Security Information System (NSIS) | X | -- | -- | X | X | X | -- |
| Ukraine | Biometric Passport | -- | -- | -- | X | -- | -- | -- |
| Ukraine | ID Card/Biometric Identification Card | -- | -- | -- | -- | -- | -- | -- |
| Uzbekistan | ePassports / Biometric Passports | X | -- | -- | -- | X | -- | -- |
| Vietnam | Identity Cards People's Identity Cards | -- | -- | -- | -- | X | -- | -- |
| Yemen | Biometric Voter Registration (BVR) | -- | -- | -- | -- | -- | -- | -- |
| Zambia | National Registration Cards (NRC) | X | -- | -- | X | -- | -- | -- |
| Zambia | Continuous Voter Registration/Voter Registration Cards | -- | -- | -- | -- | -- | -- | -- |
| **GRAND TOTAL** | | **11** | **4** | **6** | **14** | **22** | **8** | **4** |

## 4.1. Accountability

We find reports of a lack of institutional accountability and transparency in 11 of the programs we review, with evidence of corruption occurring on both micro (local/individual) and macro (national/institutional) levels.

**Accountability issues at the micro level** in six programs (Congo, Kenya, Mozambique, Niger, Uganda, and Zambia – NRC) include reports of officials and enrollment personnel soliciting money from citizens for program services beyond a required fee or when fees do not exist. In the cases of Kenya and Mozambique where initial citizen enrollment charges were reduced, alleged corruption is attributed to logistical challenges. Registration officers in Kenya acknowledged the unofficial fees and explained that in the face of limited funding, citizens are charged to offset material shortages or supplement the allowances of mobile registration officers (KNCHR, 2007). In Mozambique, the contracted agency Semlex stated that overcharging citizens was an oversight caused by the incomplete update of the computer system after the reduction in charges (AIM News, 2011). Government officials in Zambia suggest that increased public awareness and education about the registration process could be an effective tool to fight local extortion (Malambo, 2015). In Niger local distribution committees lack institutional oversight and members are reported to use the supply of electoral cards as a tool for political

manipulation or collusion (University of Florida, n.d.).

**Accountability challenges on a macro-level** in six of the programs (Guatemala, Malawi, Mozambique, Nepal, Thailand, and Uganda) relate to the presence or perceived presence of corruption surrounding contracts and/or tenders for the programs. In nearly all cases, limited transparency in the contract bidding and awarding process leads to accusations of collusion and causes significant delays in the implementation of the program. One example is Nepal, which is currently undergoing its second bidding process after it was discovered that a former employee of the initially contracted Gemalto had prepared the tender document (Planet Biometrics, 2014). In Thailand, the implementation of the program has been delayed twice, once in 2006 and again in 2010, both in part due to the suspicion of corruption in the auction process (Gao & Gunawong, 2010).

We find evidence of further challenges with accountability in Uzbekistan, where limited information on regulations and security raise questions about political manipulation (Landinfo, 2013), in Guatemala, with accounts of nepotism and corrupt hiring practices (The Carter Center, 2013), and in Uganda, with repeat government offenses concerning the inappropriate procurement of equipment (Committee-on-Defense, Government of Uganda, 2012; Gelb & Clark, 2013).

4.2. Privacy

Privacy concerns are surfacing as incorporating biometric features in national identification programs has rapidly increased. While biometric features have the potential to strengthen national security and surveillance, they may also impinge on existing privacy rights of citizens, raising questions on how to safeguard citizens from abuse (Malik, 2014). **Four countries report privacy challenges** (China, India, Philippines, and Sri Lanka), though evidence suggests a general concern over the potential for abuse rather than concrete examples of privacy violations. In China, for example, we find evidence of concern over the increased ability for police to track citizens' movements and monitor political and religious dissidents, with fears that information linked to the ID program can be used to target or arbitrarily detain certain groups (Chen, 2003; Keane, 2006).

Many countries are adopting accompanying data protection laws along with their ID programs to address privacy concerns relating to widespread and easy access to personal information across government agencies (Gellman, 2013). Certain programs have implemented targeted **security measures** concerning information access and citizen privacy. For example, strict clearance levels are required to access the UID database in India (UIDAI, 2012), and software has been put in place by NADRA in Pakistan that allows citizens to see what organizations or individuals have accessed their data (Malik, 2014). While these systems have the potential to address some concerns over citizen privacy and information abuse, we do not find supporting evidence that these measures have changed public perception on the security of information and privacy within their respective countries.

4.3. Data Management

Data registries are the foundational element in most national identification programs, and therefore are integral in maintaining a functional and effective program. Six programs (Bangladesh, Burkina Faso – Voter Card, Ghana, Guatemala, Indonesia, and Mali) report challenges with data maintenance, which we define as to the ability to establish, maintain, and secure updated citizen registries within a central database.

In several cases, programs face **challenges with establishing their databases**. In Ghana, the central database infrastructure was completed five years after data capture began, which led to a discrepancy between the number of citizens registered for the program and those with their data recorded. Fifteen million Ghanaian citizens registered with the national civil registry, but only nine million were input into the central database (Akrofi-Larbi, 2015). In Bangladesh, Burkina Faso – Voter Card, and Guatemala, the initial data gathered were of mixed quality and coverage which created complications as countries moved to establish their national identification programs (Gelb and Clark, 2013; Eulich 2011). As a result, Guatemala for example had to re-print over 2.9 million cards with data corrections (Eulich, 2011). We find evidence that Mali experienced widespread problems during the distribution of NINA cards leading up to its 2013 national election. Officials failed to properly update citizen information following the initial registration. Without updated information, cards were distributed by mail to the localities where citizens enrolled in 2009 or 2010, making collection difficult or even impossible for some citizens, especially those that had since been internally displaced by the war in Northern Mali (Duval Smith, 2013).

We find evidence of some form of **data protection** in 16 programs, but these measures range in their level of security in terms of data safety and preventing the creation of fake documents. Indonesia briefly halted its e-ID program in late 2015/early 2015 when reports of fake circulating ID cards indicated a possible security breach (AntaraNews, 2014b). Nigeria's NIMC has a security unit to physically guard personnel and assets (NIMC, 2013), while the UIDAI in India has data encryption software and is stored in a reportedly highly secure data vault (UIDAI, 2012). These data protection measures are also connected to concerns over privacy of enrollment data.

4.4. Enrollment

We find evidence that **14 programs experience general challenges enrolling citizens**. We define enrollment challenges as those that directly affect the ability to carry out a comprehensive and successful registration drive. Broadly, these failures tend to result from inadequate access to resources and complex enrollment procedures.

We identify **limited access to resources** as a barrier to carrying out effective registration campaigns in several programs. Resource challenges include: broken or insufficient equipment and/or material (Cambodia – National ID, Indonesia, Nigeria – NIN, Peru, Thailand, Ukraine – Biometric Passport); undertrained staff (most commonly regarding language diversity) and/or limited human resources (Indonesia, Peru, Sri Lanka, Uganda); and lack of logistical support, guidelines, or public awareness regarding the enrollment process (Algeria, Indonesia, Nigeria – BVN, Nigeria – NIN, and Zambia - NRC).

In addition, we find evidence that the **complexity and/or high centralization of enrollment procedures** causes challenges with enrollment in three countries (Cote d'Ivoire, Iraq, and Kenya). The enrollment process in Kenya, for example, involves in-person verification at the National Registration Bureau, and printing and physical mailing of applications and ID cards. One review states that "This process, according to the NRB, is supposed to take approximately 30 days. But residents from the sample districts (with the exception of Nairobi) reported that in reality the feedback process could take as long as 2 years" (KNCHR, 2007). Complex and lengthy registration procedures can have a larger impact on cost, data management, and coverage (The Carter Center, 2011).

4.5. Coverage

**Twenty-two programs report challenges associated with coverage**, which we define as the extent to which a program is able to penetrate different geographic and demographic populations. In many cases, limited geographic coverage strongly impacts demographic coverage as populations living in remote areas or far from program facilities are disadvantaged and excluded from enrollment (see *Table 4* for further analysis).

Six programs (Cameroon, Congo, Ghana, Kenya, Nigeria – BVN, and Peru) report **geographic barriers** as a limitation to comprehensive coverage. We find evidence that a **lack of enrollment, printing, or distribution centers** is a central barrier for five of these programs (Cameroon, Congo, Ghana, Nigeria – BVN, and Peru). One example is Ghana, where the production of identification cards only occurs in the Greater Accra and Ashanti regions, and distribution of cards is limited to the Greater Accra region. Citizens outside of these regions are not restricted from using the facilities, but the high cost of travel to the locations is a barrier to enrollment (Akrofi-Larbi, 2015). In Peru, lack of available registry centers is identified as a potential reason for low enrollment, and itinerant registration drives (meaning traveling teams and mobile registration) were initiated to help reach more populations. While mobile registration may increase enrollment of citizens living in remote areas, itinerant registration teams experience challenges with data management and enrollment through technical and human resources (Reyna, 2014).

NADRA in Pakistan runs one of the most effective campaigns aimed at reaching full geographic (and demographic) coverage. The program included procuring **mobile registration** vans and motorcycle units, and hiring man-pack units of hikers, mountaineers, and skiers to hike into remote areas to both educate and enroll citizens in the program. While this program helped NADRA reach a 98 percent coverage rate, it is relatively resource intensive (Malik, 2014). Some countries may therefore be precluded from using similar measures to increase coverage.

The **cost of enrollment** varies depending on the resources used for registration. Reported unit costs - the total cost per individual for enrollment, registration, production, etc. - range from US$0.37 (Ghana) to US$79.80 (Peru). This wide range

in costs range can be attributed in part to the heightened costs associated with itinerant registration and enrollment in areas with low population density. For example, the cost to register an individual in Peru at a service office costs US$10.32, but registration costs rise to US$21.83 in the coastal region, US$42.05 in the highlands region, and US$79.80 in the jungle region (Reyna, 2014). Financial resources may therefore limit a program's ability to address challenges with geographic coverage. Kenya's national identification program coverage is constrained by budget allocation decisions. Funding is equally distributed between all districts without attention to size, population, or geographic features. This practice leaves areas with greater need for funding without the means to implement enrollment drives, disadvantaging populations in those districts (Kenya National Commission on Human Rights, 2007).

In addition to geographic barriers to coverage, **nineteen programs have evidence of limited coverage of particular demographic groups**. For many developing countries previously lacking any official identification systems, Gelb & Clark (2013) argue that establishing new national identity programs represents an opportunity for economic, social, and political development. However, certain populations, such as people living in poverty, women, and minority groups, are vulnerable to exclusion from these programs. Obstacles are rarely put in place deliberately to block particular populations, but in practice, various administrative procedures (including the location of administrative offices and the languages spoken by implementing agency staff) or other challenges can create hurdles and/or indirect costs that prevent certain groups from participating (The Carter Center, 2011). Exclusion effectively cuts off these populations from many of the services linked to national identity programs. People who lack any official documentation are deprived of public transfers and services, financial services such as opening bank accounts or registering property, and health care (Gelb & Clark, 2013).

None of the evidence we review for the 48 national identity programs includes information for the percentage of the enrolled who are poor and the percentage of **the poor in the target population** who are enrolled. However, we find some evidence of challenges faced by the poor in enrolling or using the national identity programs. The two main barriers or deterrents faced by poor populations are expensive **fees for ID card registration** (Cambodia – National ID, Ecuador, Guatemala, Mozambique, Pakistan, and Peru), and the costs associated with **obtaining the prerequisites** for registration, such as birth certificates or housing certificates (Angola, Iraq, and Peru). General poverty and economic vulnerability is also cited as a challenge in some countries (Cameroon, Cote d'Ivoire). In addition, we find links between geographic and demographic challenges in terms of coverage of the poor *(Table 4)*. Limited registration centers can especially impact poor, rural communities without the resources or time to travel long and/or challenging distances to register in person.

*Table 4*. Challenges Enrolling Poor and Rural Populations

| Country | Official Name of National ID Program | Poor Individuals Lack Access | Challenge Enrolling Rural Residents |
|---|---|---|---|
| **Angola** | National ID | X | X |
| **Cambodia** | National ID | X | |
| **Cameroon** | National Identity Card | X | X |
| **Congo** | Elector's Card | | X |
| **Cote d'Ivoire** | National ID | | X |
| **Ecuador** | Cedula de Identidad | X | X |
| **Guatemala** | Documento Personal de Identificación (DIP) | X | |
| **Iraq** | Civil Status Identification Card (Bitaka shakhsiyeh) | X | |
| **Kenya** | Third Generation National ID | | X |
| **Mozambique** | Bilhete de Identidade | X | X |
| **Pakistan** | National Database and Registration Authority (NADRA) | X | |
| **Peru** | Registro Nacional de Identificacion y Estado Civil (RENIEC) | X | X |
| **Sudan** | National Identity Card | X | X |

| Zambia | National Registration Cards (NRC) | | X |
| --- | --- | --- | --- |

**Women** are another group at risk of exclusion from national ID programs. We are able to find information on the percentage of the enrolled who are women for just three countries: Cote d'Ivoire (51 percent), Indonesia (51 percent), and Pakistan (44 percent). Nevertheless, several of the documents reviewed describe **challenges that women face with enrollment** or use of the national identity programs in their countries. For example, to obtain a Tazkera ID in Afghanistan a married woman must submit her husband's Tazkera or that of one of his male relatives in order to complete her own application (UN High Commissioner for Refugees, 2005). An Iraqi woman can only be granted a Civil Status ID if a male relative vouches for her (OWFI, 2015). In Egypt, the biggest obstacle facing women in obtaining a national ID is the lack of a birth certificate, which is a requirement in national ID registration (National Council for Women, n.d.).

Besides the poor and women, we find evidence of **other populations experiencing challenges with enrollment or use** of the national identity programs in 13 countries[6]. In some cases, exclusion is a direct result of legal or institutional frameworks, as seen in the cases involving indigenous or minority exclusion (five programs), and religious exclusion (four). Select **religious groups and ethnic minority populations** are the most commonly excluded groups. Bennett & Lyon (2008) warn that identity cards, especially those that are related to the function of surveillance, may contribute to "social sorting" because "once cards are mandatory, then they may be used to single out or even to harass visible minorities and those with alternative lifestyles." In Egypt, requiring an individual to list his or her religion as either Muslim, Jewish, or Christian on the national identity card created a barrier for Baha'is, though a 2008 court ruling allowed Egyptian citizens, including Baha'is, to decline to state a religion and to use a dash on the identity card instead (Farivar, 2012). Other similar cases of religious exclusion include Indonesia, Iraq, and Sudan. We also find concerns with minority populations vulnerable to exclusion with mandatory ID programs in five countries (Colombia, Guatemala, Kenya, Peru, and Sudan). Colombia and Guatemala had enrollment incidents relating to the discrimination of indigenous populations, while Kenya, Peru, and Sudan have complex registration or enrollment procedures that often require a large number of additional documents for proof of identities that are difficult for certain minority populations to produce. For example, people from certain communities in Kenya need to fulfill sixteen requirements before they can obtain identity cards, while Kenyans from other areas are not subjected to this rigorous and lengthy process (Ogiek Peopes' Development Programme et al., 2011).

Indirect exclusion can also result from other enrollment or use challenges that impact some populations more than others. Other populations reportedly experiencing challenges in national identity program enrollment include **refugees, those that are internally displaced, and stateless and undocumented individuals** (three programs), often because they lack pre-requisite materials for enrollment. Additional details on barriers to enrollment for different populations for each national ID program is reported in the review spreadsheet.

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[6] These countries include Colombia, Cote d'Ivoire, Ecuador, Egypt, Guatemala, Indonesia, Iraq, Kenya, Peru, Sudan, Uganda, Uzbekistan, and Vietnam.

4.6. Cost

We identify a range of **funding sources and structures** connected to the implementation of identity programs. Of the 23 programs we review that have evidence on funding sources, 19 programs receive at least part of their budget from a government agency or donor organization (*Figure 6*). A number of large international donors embrace national identity projects as part of their development strategies. *Table 5* reflects the findings of Dahan & Gelb (2013), who suggest, "Partner financing can [help] to ensure a focused and inclusive identity program. Donors could commit, as far as possible, to the development and use of the core national ID systems for projects that they support, rather than developing new functional registries for every project. This will strengthen demand for the use of the system and encourage registration" (p. 6). In the programs we review, donor agencies include the United Nationals Development Program (UNDP), the United States Agency for International Development (USAID), and the Asian Development Bank (ADB).



*Figure 6.* Program Funding Source

Besides providing financial support, disseminating best practices, offering legal support, and ensuring technology is robust, donors also play a key role in ensuring that the poor do not face cost barriers and systematic exclusion to identification (*ibid.*). Other funding sources for the programs we review include private firms and public-private partnerships (PPP).
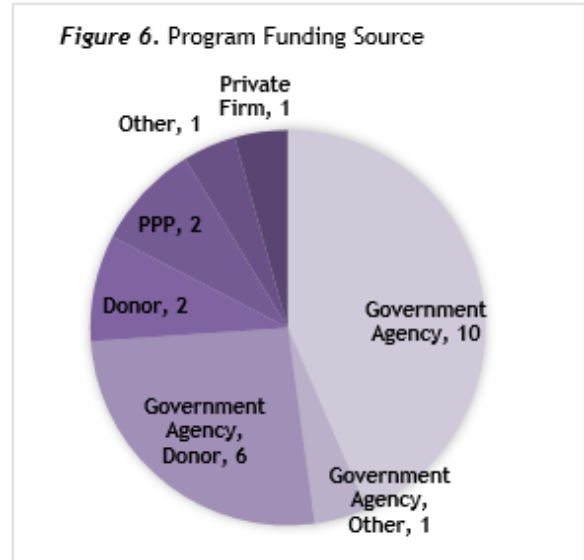
*Table 5*. Key Stakeholders in National ID Programs

| Type of Stakeholder | Multilaterals (MDBs) | Foundations/NGOs | Other Development Partners/agencies |
|---|---|---|---|
| **Key Stakeholders** | • African Development Bank (AfDB)<br>• Asian Development Bank (ADB)<br>• Inter-American Development Bank<br>• Organization of American States (OAS)<br>• UniteCommissioner for Refugees (UNHCR)<br>• World Bank Group (WBG) | • Data2X<br>• CRC4D<br>• World Vision | • International Organization for Migration (IOM)<br>• United Nations Development Programme (UNDP)<br>• United Nations High Commissioner for Refugees (UNHCR)<br>• United Nations Population Fund (UNFPA) |

*Source*: Adapted from Dahan & Gelb, 2015

There are two notable examples that deviate from these traditional funding structures: NADRA in Pakistan and RENIEC in Peru. Both programs depend on generating their own revenue, meaning they internalize initial enrollment and production costs and charge fees associated with the cards to earn back revenue (Ahmad Jan, 2006; Harbitz & Boekle-Giuffrida, 2009). In Pakistan, NADRA charges fees to organizations or government bodies when a citizen's biometric information is used for authentication, for example by a bank (Malik, 2014). While both institutions are under the auspices of a government body, NADRA formed an independent public company, NADRA Technologies Limited, through which it provides services to other countries to implement similar national identification programs (Ahmad Jan, 2006). By independently self-regulating their budgets, NADRA and RENIEC are argued to have developed successful funding structures, and potentially exercise more freedom in their activities as compared to programs that are restricted by the timeline or resources of their funding source (Malik, 2014).

Though most technology costs are generally falling, we find evidence of **challenges relating to program** costs for eight national identity programs. Since costs impact many aspects of program implementation, we restrict cost challenges to macro-level issues that arise directly from a lack of funding.

The most common financial and capital challenges are associated with **delays or indefinite suspensions in enrollment and production** (Cambodia – National ID, Cote d'Ivoire, Malawi, Tanzania, and Uganda). The National Registration and

Identification program in Malawi experienced a one-year delay until it was allocated additional funding from the national budget (Chilunga, 2015), while the program in Cote d'Ivoire was repeatedly suspended due to insufficient funds to deploy and pay the technical enrollment teams (The Carter Center, 2011). Beyond the initial costs incurred, countries must be able to further bear the ongoing costs associated with data management, security, and continual enrollment. Cambodia's IDPoor program saw great success with initial enrollment in part through partner financial support, but faces uncertainty in the funding needed to maintain systematic coverage long-term (Cambodia Ministry of Planning, n.d.). Countries may also face challenges with the costs of training and building labor and technical capacity for implementing and managing ID programs, but we do not identify any programs that specifically mention this issue.

Cost challenges extend beyond operational delays and we find evidence that limited financial resources affect the relative ability of a country to negotiate the details of **national identification program design**, as seen in three countries (Mozambique, Niger, and Uganda). While technology costs are falling, developing identification systems with biometric technology is costly (Gelb & Clark, 2013). Mozambique entered a controversial and reportedly disadvantageous contract with the private firm Semlex, speculated to have been driven by financial constraints forcing the country to outsource card development (AIM News, 2010). Niger also reported abandoned biometric features in their voter registration cards due to their cost, despite a consensus that it would be a more reliable option to ensure fair elections (University of Florida, n.d.).

4.7. Harmonization of ID Programs

In all of the countries we review, the identified program(s) are the dominant identification system present in the country. In many cases, the programs are implemented to either establish the first official system of identification in the country or to create one central identity framework to replace multiple forms of documentation (e.g., birth certificates, passports, etc.). However, we find evidence in three countries (Afghanistan, India, and Nigeria) of challenges involving the **interoperability of the reviewed identification program(s) with other national systems**.

In Nigeria and India, challenges of interoperability relate to a **lack of clear, legal frameworks and delegation of responsibilities by governing bodies** (Udunze, 2015; Zelazny, 2012). In Nigeria, the legal right of the Bank Verification Number (BVN) program to register citizens using biometric information was contested by the National Identity Management Commission (NIMC) who claimed the dominant role in identification matters, though an agreement was reached to harmonize the databases (Udunze, 2015). In India, the UID mandate to issue identification numbers is separate from the mandate to issue national identity cards, causing confusion and repeated registration efforts as both groups compete to enroll more citizens in the respective databases (Zelazny, 2012). In the case of Afghanistan, we find evidence that conceptual challenges exist concerning the link between electronic signatures and electronic authentication, and more broadly, how these different elements can be integrated into an electronic multipurpose infrastructure (Danish, 2014).

**5. Functions Linked To Identity Programs**

Registration of country populations and issuing IDs can benefit both the private and public sectors' ability to deliver services, potentially increasing efficiency and accountability (Gelb & Clark, 2013). As such, national ID programs have been purposed to serve a wide range of functions, including financial services, health, and agriculture. In addition, ID programs can be valuable in elections, facilitating government social transfers, surveillance and security, aiding civil service administration, and supporting other functions such as travel across jurisdictions (*Figure 7*).

Figure 7. Functional Applications of the 48 Reviewed ID Programs
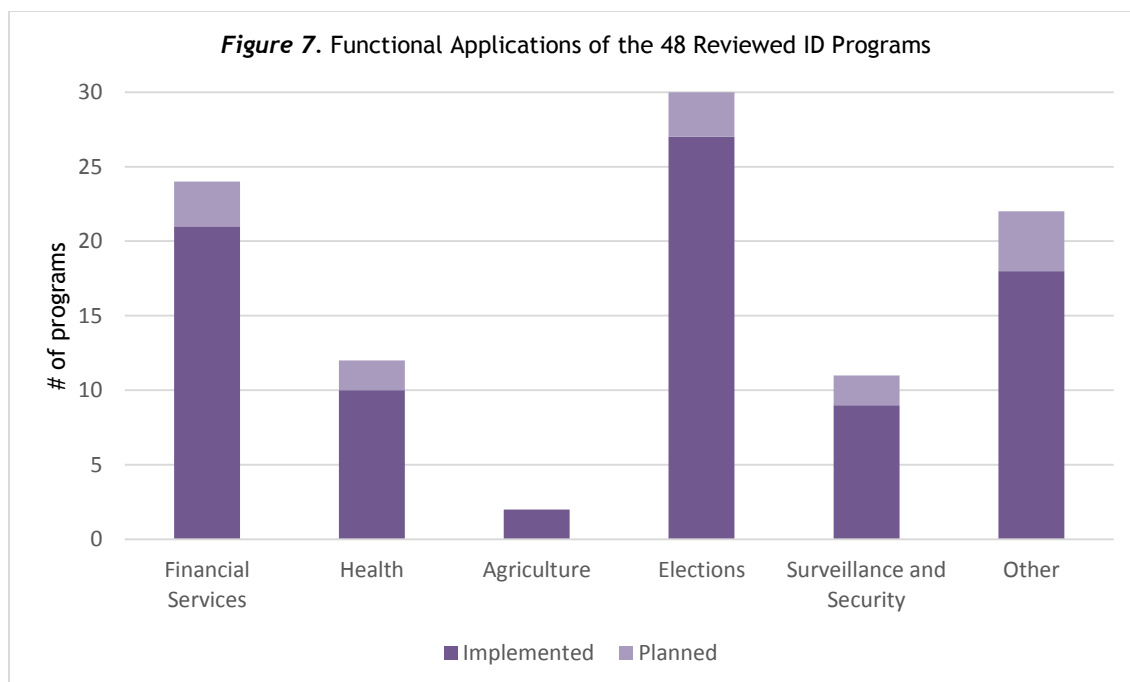
National ID programs may be linked to several types of functions. *Table 6* presents the functions connected to each of the programs we review. For each category of functions, we specify the sub-categories of services that are linked to the national ID program. These categories of functional connections are discussed in greater detail in the sections below.

Table 6. Functionalities of National Identity Programs

| Country | Official Name of National ID Program | Financial services | Social transfers | Health | Agricultural services | Elections | Surveillance & security | Other functions |
|---------|--------------------------------------|--------------------|-----------------|--------|----------------------|-----------|------------------------|-----------------|
| Afghanistan | e-tazkira | | | | | KYC* | | |
| Algeria | National ID | | | | | | | |
| Angola | National ID | KYC | | | | VR | | TR |
| Bangladesh | National ID | KYC | W | | | KYC | SIM | KYC |
| Burkina Faso | National ID | KYC | | | | VR | | |
| Burkina Faso | Voter Card | | | | | KYC | | |
| Cambodia | National ID | KYC | | | | VR | | KYC |
| Cambodia | IDPoor | | O | VEB | | | | |
| Cameroon | National ID | | | | | VR | | |
| China | Second Gen. Resident ID Card | KYC | | | | KYC | LE | |
| Colombia | Cedula de Ciudadania | | | | | KYC | | |

| Country | ID | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Congo | Elector's Card | KYC, MM | | | | KYC | | |
| Cote d'Ivoire | National ID | | | | | KYC | | TR |
| Ecuador | Cedula de Identidad | | KYC | | | | | TR |
| Egypt | National ID | DB*, KYC, MM* | | | | KYC, M | | TR, O |
| Ethiopia | Regional ID | KYC | | | | | | |
| Ghana | GhanaCard | DB*, KYC | KYC*, R* | | | VR* | SIM*, O* | KYC*, CSAT * |
| Guatemala | DIP | | | | | VR | | |
| India | Aadhaar | DB, KYC, MM | CT, W | TST, VEB | | M | LE | CSAT, TR |
| Indonesia | E-KTP | O | | | | KYC, M* | LE | KYC, O |
| Iran | Karte Melli | | | | | | | O* |
| Iraq | Civil Status ID Card | | KYC | KYC | | | | O |
| Kenya | Third Gen. National ID | KYC, MM | KYC | | | VR | P, SIM | |
| Madagascar | National ID | | | | | VR, KYC | | |
| Malawi | National Registration and ID System | | | | | | | |
| Mali | National ID Number (NINA) | KYC | | KYC | | KYC | | |
| Morocco | Electronic National ID | | | | | | BM | TR |
| Mozambique | Bilhete de Identidade | | | | | | | |
| Nepal | National ID Card | | | | | | | |
| Niger | Voter Card | | | | | KYC | | |
| Nigeria | National Electronic ID Cards | DB, KYC | SS, O | O | DOS, O | VR | | KYC, T, O |
| Nigeria | Bank Verification Number | KYC | | | | | | |
| Pakistan | NADRA | DB, O | CT, R | TST, O | | KYC, M, VR | P, SIM, O | |
| Peru | RENIEC | KYC | KYC, W | KYC | | KYC, VR | SIM | O |
| Philippines | Filipino Identification System Act | KYC* | KYC* | KYC* | | KYC* | | KYC*, O* |
| Romania | National ID Card | | | KYC | | | | O |
| Sri Lanka | National ID Card (NIC)/e-NIC | KYC | | | | KYC | | O |
| Sudan | National ID Card | | | KYC | | | | O |
| Tanzania | National ID Program | KYC | KYC | | | M, VR | LE, P | O |
| Thailand | National ID Card/Smart ID Card | KYC | R, W | TST, VEB | MES, O | | | O |
| Uganda | National Security Information System | KYC* | KYC* | TST*, VEB* | | KYC | BM*, P, O* | KYC*, CSAT *, T*, O* |
| Ukraine | Biometric Passport | | | | | | | |
| Ukraine | ID Card/Biometric ID Card | | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Uzbekistan** | ePassports/Biometric Passports | KYC | | | | | |
| **Vietnam** | ID Cards (People's ID Card) | | | | | | |
| **Yemen** | Biometric Voter Registration | | | | | KYC | O |
| **Zambia** | National Registration Cards | KYC, DB* | | | | KYC, VR | |
| **Zambia** | Voter Registration Cards | | | | | KYC, VR | O |

*Note: Under many categories of functions, the service involves using an ID to access services, which we denote as Know Your Customer (KYC). Sub-categories under financial services include digital banking (DB) and mobile money (MM). We separately consider several sub-categories of social transfers as a subset of financial services, including cash transfers (CT), relief (R), social security (SS), and welfare (W). Under health, sub-categories of linkages tracking services and treatment (TST), verification of eligibility/coverage/benefit (VEB). We include monitoring of extension services (MES) and distribution of subsidies (DOS) under agriculture, and monitoring (M), voting (V), and voter registration (VR) under elections. Under surveillance and security we break down linkages into, border enforcement (BM), SIM registration (SIM), and Passport (P). Finally, we include several other types of services linked with identity programs, including, driver registration (DR), student and/or teacher or civil service attendance tracking (STCAT), taxes (T), and travel (TR). For several functional linkages, we also note if there are Other (O) types of services connected to the ID programs.*

In many cases, we find national identity programs are linked to several types of services within each category, especially for functions related to finance, elections, and surveillance and security. Know Your Customer (KYC) linkages are often accompanied with connections to other services, such as voter registration, digital banking, and mobile money. **Bangladesh, Ghana, India, Nigeria, Pakistan, Peru, the Philippines, Tanzania and Uganda stand out as well-integrated ID programs: all cover five or more functional categories**. Conversely, we do not find evidence of linkages of national ID programs with any of these types of services in Algeria, Malawi, Mozambique, Nepal, the Ukraine, or Vietnam.

In the sections below, we provide an overview of the various functions that are found to be connected to the different national identity programs we surveyed, looking at each category of functions in turn.

5.1. Finance

**Key Findings:**
- We find references to financial connections in 24 of 48 programs.
- 22 of these programs have connections that are KYC-related.
- Five ID programs (India, Kenya, Nigeria e-ID, Pakistan, Zambia) are linked to digital banking, and four (DRC, Egypt, India, Kenya) have mobile money applications.
- 13 programs are connected to government assistance programs, which include cash transfers, relief, and welfare.

Our literature review reveals that 50 percent of the 48 ID programs reviewed are linked to financial uses. Four financial "sub-categories" emerged in our search (*Figure 8*):

- **Know your customer** – ID used by financial entities to comply with KYC laws
- **Digital banking** – ID is linked to citizen bank accounts or bank loans, facilitating movement of e-money (often in conjunction with a government social service program)
- **Mobile money** – ID is used for mobile money registration, access to accounts, and/or payments
- **Social transfers** – ID is linked to government assistance programs, which include cash transfers, relief, and welfare



*Figure 8*. Financial Connections to ID Programs
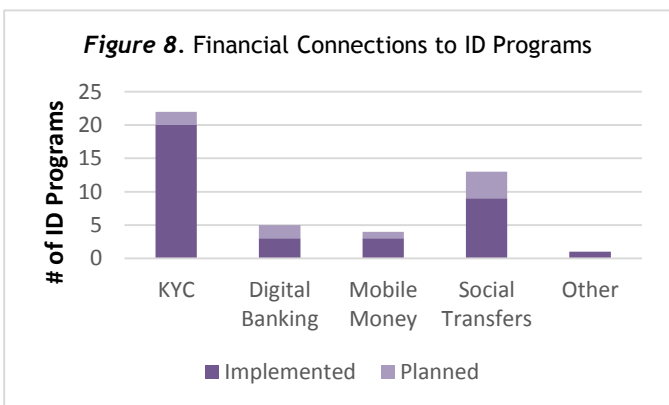
*Know Your Customer*

In many countries, certain individuals or populations lack the necessary identity documents to open a bank account. Know-Your-Customer (KYC) laws require banks to be able to confirm a customer's identity with "reasonable belief" in a four-step process outlined by the Federal Financial Institutions Examination Council: "collecting credentials from the customer, verifying the credentials and the customer against them, checking the customer against government lists, and record keeping" (Dahan & Sudan, 2015).

Identity cards and the issuance of unique ID numbers can promote financial inclusion by providing unbanked individuals with the credentials banks need in order to verify customer identities (Brewer, Meniers, & Schott, 2015). We find this is the most common financial function associated with ID cards. Of 24 ID programs with financial connections in the literature, 22 are mentioned as helping to facilitate adherence to KYC regulations. In nearly all cases, the card functions simply to verify identity. In Tanzania, for example, the Deputy Minister of Home Affairs remarked that the country's new, biometric electronic ID can guarantee the identity of individuals during any given transaction (iD People, 2015). India is taking implications for KYC a step further by taking the onus off of banks to perform KYC processes each time a financial interaction occurs. Before recent innovations, a customer who had already opened up a savings account would have to repeat the KYC process to open up a fixed deposit account, even if both accounts are at the same bank. Now, however, customer information is being recorded in a central database, using the unique identity number issued as part of India's Aadhaar national ID program as an identifier. Banks, insurance companies, and others can access the database as part of their KYC activities. The database is expected to cut down bureaucratic processes for both financial institutions and customers (Sikarwar, 2015).

In Nigeria, the connection between KYC for financial transactions and the Bank Verification Number (BVN) initiative poses a possible threat to increased financial inclusion. BVN assigns a single identification number to bank account owners for verification at all banks and points of transaction. The centralized biometric-based system is expected to increase the efficiency of banking operations and establish a single, standard identification form that meets KYC requirements for all customers (Central Bank of Nigeria, 2014). However, the BVN will become the only accepted form of verification to access accounts or make transactions following the end of the registration period in 2015. Reports suggests that public confusion over the new system and registration requirements have triggered a panic that could potentially lead to a surge of citizens withdrawing money from formal accounts rather than registering in the BVN program (Okoye, 2015).

*Digital Banking*

Though only five programs describe functional links to digital banking, the purposes of tying ID programs to digital banking are diffuse. **Applications of ID programs include streamlining government payments and targeting delivery of subsidies, providing direct relief to disaster victims, and increasing financial inclusion.** Gelb & Clark (2013) write that biometric technology is driving the ability to conduct secure online transactions. All five of the programs tied to digital banking are—or are planned to be—embedded with biometric information.

Two of the digital banking links (India, Pakistan) are related to **government cash transfer programs**. Theory, and some evidence, suggest that the use of electronic IDs can reduce leakage and improve delivery efficiency (Gelb & Clark, 2013). A 2014 randomized evaluation of subsidy delivery by two welfare programs in Andhra Pradesh, India, found that adding biometric verification to verify recipients' identity before disbursing funds led to a 35 percent reduction in leakages (Muralidharan, Paul, & Sandip, 2015). However, using biometric scanners to confirm an individual's identity and authenticate the recipients of subsidies can be problematic.

Pakistan and India are testing similar models on a national scale with their ID programs. During a disastrous period of flooding in 2010 that affected over 20 million people, Pakistan used its already established biometric citizen registry to confirm identities through fingerprint identification. Officials checked known citizen addresses to ensure intended beneficiaries were from the affected area and then disbursed aid on electronic, prepaid debit cards (PR Newswire, 2010; Malik, 2014). The digitized verification system also allowed officials to ensure that poor women were direct recipients of transfers (Dahan & Sudan, 2015).

In India, over 150 million bank accounts are now linked to the national ID. Though many are not consistently used, demand is expected to grow as India continues to link its social programs with direct deposits to beneficiary bank accounts (Dahan

and Gelb, 2015). As of 2014, "one out of six consumers of liquid petroleum cooking gas (used widely across India) receives their subsidy" through direct deposits to bank accounts tied to a national ID linked payment system (Chen, 2014). Again, as in Pakistan, directly linking bank accounts to the Aadhaar number and biometric information has assisted efforts to deliver transfers to female recipients (Dahan & Sudan, 2015).

Nigeria is taking a different course to **provide financial services to the unbanked**. In 2015, the government partnered with MasterCard to produce a national identity card that doubles as a payment card. According to MasterCard, "Nigerians can deposit funds, receive social benefits, save, or engage in many other financial transactions that are facilitated by electronic payment" (MasterCard, n.d.). Plans are in place to deliver social security benefits through the card, and also provide direct cash transfers to program beneficiaries of hydrocarbon subsidies. In addition, MasterCard's head of business for West Africa stated that the cards could be used to establish credit ratings for the poor (Oxford, 2014). Kenya and Pakistan's national IDs are also tied to financial inclusion. Links with M-Shwari, a mobile savings and loan platform, facilitate access to digital loans through the Central Bank of Africa (see below Mobile Money section). Pakistan's national insurance company partnered with NADRA to offer accidental death insurance upon purchase of an ID card for a small additional fee (Malik, 2014).

Within our review, we find a few instances in which financial transactions are dependent on biometric verification of a recipient's identity on-site. As mentioned previously, Pakistan confirmed relief recipients' identities by using fingerprint scanners. In India, on a pilot basis, wages paid to beneficiaries of the Rural Employment Guarantee Act were made dependent on fingerprint identification (Jishnu & Sood, 2012). The Central Bank of Nigeria's BVN program also relies on biometrics. Across all Nigerian banks, customers are issued a unique identity number at the time of their enrollment. At that time, a facial image and fingerprints are also collected. When customers perform a transaction, like applying for a loan or transferring money, they are required to authenticate their identity using biometric scanners (Central Bank of Nigeria, 2014a).

While programs in India, Nigeria, and Pakistan authenticate financial transactions on site using biometric information, in general, cost considerations may prevent other ID programs from doing the same. Portable fingerprint scanners can be less cost effective than traditional means of verification (e.g. presenting a physical ID), especially if they are distributed at the scale required for use in national programs (Gelb & Clark, 2013). In many cases within our review we find that the initial biometric registration of citizens is carried out by international companies who are contracted specifically for the task. These companies bring scanners and other equipment to register citizen biometric information during the registration process, but the equipment is not typically given over to governments for use after registration is completed. Thus, while governments may have a central registry of citizen biometric information they do not necessarily possess the equipment to verify citizens on site for financial/social transfers, elections, or other functions unless they have separately funded the acquisition of such infrastructure. Even with sufficient equipment, technical problems can sometimes interfere. In India, reports emerged that portable biometric scanners were unable to read the fingerprints of rural residents whose hands were calloused or worn from labor. As a result, beneficiaries of the Rural Employment Guarantee Act were unable to withdraw wages (Jishnu & Sood, 2012). Cost and technical capacity may partially explain why we find many ID programs that incorporate biometric features, but few functions that require biometric authentication on-site.

*Mobile Money*

In Congo, national identification cards are used to sign-up for and access mobile money accounts (Intermedia, 2013). In Kenya and Egypt, however, mobile money and IDs are more intricately linked. In a deal similar to Nigeria's digital banking partnership, MasterCard recently partnered with Egypt to integrate the Citizens' National ID with the country's national mobile money platform. "The system will allow the government to issue digital ID cards which can be used to pay for a number of services including government fees, mobile bills, merchant purchases and domestic remittances" (Security Document World, 2015).

In Kenya, customers of M-Shwari who have national IDs are entitled to higher maximum savings balances and access to credit. Cook & McKay (2015) explain that first-level identity verification for M-Shwari occurs "using the existing KYC details from the customer registration of the phone number (SIM) and M-PESA account, which requires physical presentation of an ID." However, a second-level verification can occur if these initial KYC details can be matched against the identification information contained in Kenya's Integrated Population Registration System (which contains all citizens with national IDs).

A successful match means a customer is entitled to accounts that can hold KES 250,000 (instead of the usual KES 100,000). They are also qualified to borrow from the Central Bank of Africa, because they have gone through a stronger verification process (Cook & McKay, 2015). This remote verification method allows the central bank to accurately confirm identity: the biometric database and central registry lend additional confidence that a unique identification has been made. With this confidence, the bank can offer more and higher-quality services, mitigating the perverse cycle whereby identification challenges increase costs for banks and lead to reduced financial service packages for customers (Dahan & Gelb, 2015).

*Social Transfers*

Finally, ID programs are found to link to social transfers and government assistance programs. In many cases IDs verify beneficiary identity for program officials delivering services or goods. If an ID has an identifiable function for social transfer programs beyond KYC, it is categorized into the type of program to which it is linked, including cash transfers, relief, and welfare. Examples of these programs are detailed in previous sections, especially as linkages with KYC and digital banking are often used for social transfers. However, *Figure 9* further illustrates the extent to which social transfers and ID programs are tied together.

*Figure 9*. Social Transfer Connections to ID Programs
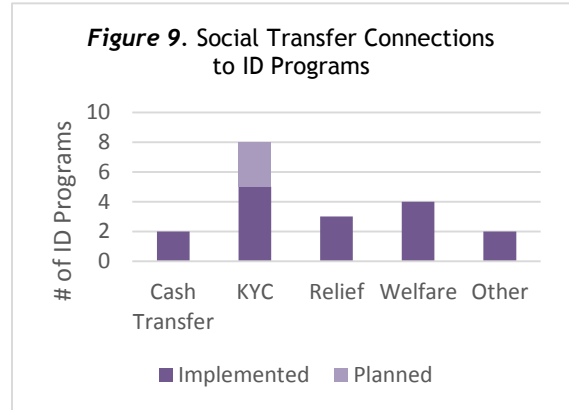
5.2. Health

**Key Findings:**
- Four programs track services and treatment using national identifications registries. India and Pakistan track immunizations, and Thailand and Uganda's national ID's facilitate patient management and tracking at hospitals.
- Four ID programs assist with verification of eligibility/coverage/benefits (Cambodia, India, Thailand, Uganda).
- 38 percent of the registries that underpin ID programs begin enrolling children at birth.

Twelve ID programs are linked to health functions. Common health linkages include the following:
- **ID to access services** – Entering hospitals, and accessing healthcare or insurance applications.
- **Tracking services and treatment** – The ID is used to monitor patient services and treatment (i.e. immunizations).
- **Verification of eligibility/coverage/benefits** – The registry or ID assists medical personnel to verify eligibility, funnels registrants into correct eligibility categories, or itself signals eligibility for a given healthcare program.

The inclusion of "identity" as a proposed Sustainable Development Goal (Goal 16.9 - By 2030, provide legal identity for all, including birth registration) is partially rooted in the benefits that a population registry can bring to public health. Dahan & Gelb (2015) include "improvements in maternal and child health, and coverage by vaccines and similar treatments" as health goals that are buoyed by widespread adoption of ID documents, registries, and systems. Challenges with issuing documentation, however, begin at birth. Worldwide, one in every three children under five have never been registered or issued birth certificates. Lack of birth certificates can present challenges to children receiving health care and to government's ability to track births, marriages, deaths (UNICEF, 2013).

*Figure 10*. ID Program Registration Ages
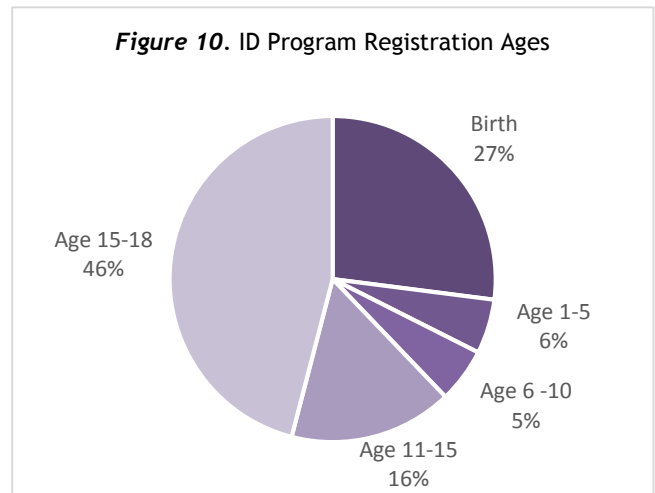
Many of the ID programs profiled in this paper function primarily as voter cards or national IDs that are issued at later stages in life and therefore do not aim to register children. However, 38 percent of the registries that underpin ID programs *do* incorporate children before age 11 (*Figure 10*). Colombia's Registraduria Nacional del Estado Civil has a three-tiered system of documentation from birth to age 18. It issues birth certificates to newborns, an identity card to minors at age

seven, and its "citizen card" to adults at 18 (Immigration and Refugee Board – Colombia, 2007). India has set its registration age at five, but beginning in May 2015 the state of Haryana began enrolling newborn babies into the Aadhaar program, issuing each unique ID numbers. The goal of such early enrollment is related to both health and education, as it enables the government to centrally track immunization rates and also school admission during adolescence (Economic Times of India, 2015a).

Figure 11 illustrates what health services are linked to national ID programs.  In six cases, IDs are necessary in order to **access hospital or other health care system services** (Iraq, Mali, Peru, Philippines, Romania, Sudan). Four programs **track services and treatment** using national identifications registries. India and Pakistan track immunizations, and Thailand and Uganda's national ID's facilitate patient management and tracking at hospitals. Four countries (Cambodia, India, Thailand, Uganda) are using ID registries to **verify eligibility** for particular health insurance coverage or for medical benefits. For example, Thailand's national ID synchronizes with its universal health coverage to automatically separate citizens into one of three possible public health insurance schemes: "a) the civil servant medical benefit scheme for government employees, spouses, and dependents under 20 years old, their parents and government retirees; b) the Social Health Insurance Scheme for private sector employees, excluding their spouses and dependents, and; c) the Universal Coverage Scheme for the 76 percent of the population not covered by a or b" (JointLearningNetwork, n.d.).



*Figure 11*. Health Connections of ID Programs
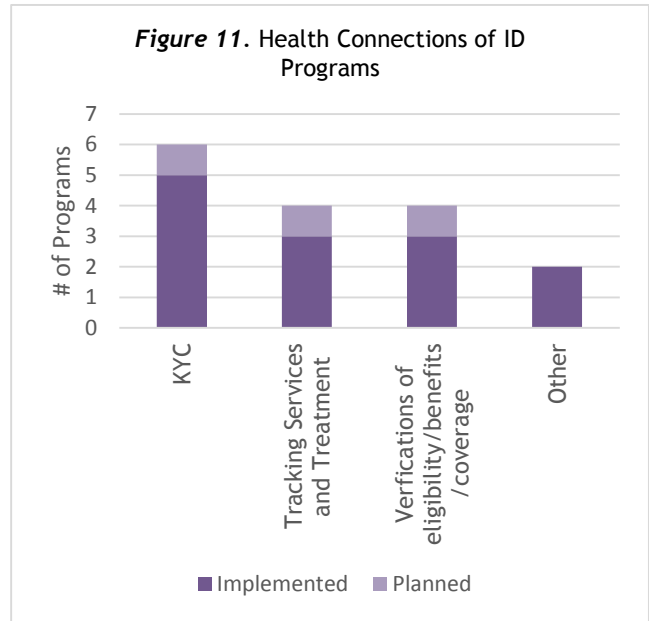
Despite the potential usefulness of national ID programs in centralizing information to inform public health decisions, our literature review failed to return high numbers of demonstrated health links. One possible explanation for low integration of national IDs and health may be that many existing, separate health cards already exist. We found evidence of **separate health IDs in five countries** (Cote D'Ivoire, Ghana, Indonesia, Kenya, and Mozambique). As discussed in the interoperability challenges section, we find evidence of instances in which government agencies engage in ID turf wars in order to preserve existing powers or oversight (India, Nigeria, Pakistan). This may prevent separate "health card" schemes from folding into overarching national ID programs. In addition, for health agencies, maintaining status-quo operations may be more convenient given the political will and effort that can be required to overhaul existing systems.

5.3. Agriculture

**Key Findings:**
- We find agricultural connections in Nigeria (monitoring subsidies) and Thailand (delivery of extension services).
- ID links to agriculture may be limited by lack of connectivity in rural areas, requiring significant offline infrastructure to synchronize with centralized systems.

National ID programs are not well-linked to agricultural functions according the evidence we review. Among the 43 countries, only Nigeria and Thailand are identified as having functional agricultural applications. Nigeria's program linkages promote more efficient delivery of subsidies, while Thailand's focus on delivering targeted extension services.

Scarce agricultural applications may be attributable to several challenges. First, we find that ten ID programs have faced challenges enrolling rural residents (*Table 4*), suggesting barriers to national identity systems may be higher amongst rural populations (more likely to engage in agriculture). These challenges stem from the geographic remoteness of rural populations and poor road infrastructure that makes access difficult for mobile registration teams. In addition, nine ID programs cited high initial fees to obtaining an ID card as a barrier to the poor, with specific impact on rural areas. Difficulty enrolling poor and rural populations, likely including many farmers, may have an impact on desires to link ID

programs to agricultural functions. Without strong coverage among farmers, separate registration and card issuance efforts would need to be undertaken to ensure an agricultural ID link could function across the target population.

A second challenge revolves around connectivity. Though increasing, cellular network coverage varies widely in developing nations, with low-coverage and "dead zone" areas still common in isolated areas (Food and Agriculture Organization, 2013). Yet, the primary agricultural uses for IDs that we came across in the literature are reliant on having intermittent to continuous access to a mobile network or the internet in order to provide their intended benefits:

- **Nigeria**: Digitally monitoring delivery—and receipt—of subsidies in order to optimize efficiency (see below case study in Table 7).
- **Thailand:** Digital delivery of extension services based on remote monitoring of farmer practices and crops via satellite (see below case study in Table 7).
- **India** (potential use): Monitoring supply and demand of grain subsidies, and using the information to better inform farmers, and manage grain storage and distribution (Zelazny, 2012).

Each of these programs benefits from connectivity between the end user and officials administering and monitoring the program. In areas without connectivity, concerted efforts are required to build infrastructure that can operate offline and intermittently synchronize to central databases. Thailand's government delivers digital extension services through its network of community ICT centers, and Nigeria utilizes tablets that can process subsidy transactions offline at point of sale (Boonoon, 2013; Grossman & Tarzai, 2014).

| Table 7. Case Studies of Agricultural Linkages | |
| --- | --- |
| Nigeria – Distribution of Subsidies | Thailand – Monitoring Extension Services |
| Nigeria's Growth Enhancement Support (GES) scheme distributes subsidies to farmers through links to farmers' mobile money accounts. In remote areas, however, connectivity issues can prevent users from accessing the funds. In response, an effort is underway to link distribution of subsidies to the new MasterCard national ID, which doubles as a payment card (CGAP –Serving Smallholder, 2014).<br><br>Farmers' biometric information is registered and each is issued an ID card. Agricultural dealers, who manage the sale of fertilizer and other inputs, operate point of sale terminals, compatible so that farmers can pay using their national ID card. Regardless of connectivity, the POS terminals record the sale. All sales information is uploaded to a central database when the agrodealer is again within network coverage. Almost in real-time, GES officials can track sales as they occur by agrodealers (Financial Technology, 2014).<br><br>In addition to providing an off-network way to track and distribute subsidies, ensuring farmers receive national IDs also increases financial inclusion. "Farmers will be able to use their ID as a debit card tied to a no-frills Bank of Agriculture account, through which farmers will be able to save and seek access to credit, insurance and other agricultural financial services" (CGAP –Serving Smallholder, 2014). | In 2013, the government of Thailand merged its farmer database—containing records of 7.2 million farm households—with the national identity card, or "Smart ID." The farmer database holds information on household production, including crops, livestock, and fish. It also contains basic household information (members, location) (Viyakornvilas, 2014). The connection enables the government of Thailand to track and manage farm production, transfer knowledge, and support farmers in the event of natural disasters.<br><br>During the program's rollout, farmers in were given a Smart ID embedded with information already contained in the farmer database. Knowing a farmer's geographic location, and crops and livestock allows government officials to target assistance to farmers in the event of disease outbreaks, droughts or other natural disasters (Boonoon, 2013).<br><br>Thailand's National Science and Technology Development Agency also detailed how silk farmers benefit from tailored extension services. Government officials can access satellite, overhead views of silk farmers' property by logging into an Android tablet application. The views provide information on the health and spacing of mulberry trees that support silkworms. The information allows officials to better understand where and when additional mulberry trees should be planted. This knowledge, and other agricultural extension, is dispensed directly to farmers through TV and ICT centers in communities |

| | nationwide. Farmers also have access to the application via their Smart ID, allowing them study their property and also see how other silk farmers arrange farms (National Science and Technology, 2014). |
|---|---|

5.4. Elections

**Key Findings:**
- 13 ID programs are used for voter registration, and 21 are accepted as identification at polling stations.
- Despite widespread use of biometrics (34 programs are embedded with biometric information), we find no evidence of countries having devices available for on-site biometric verification during elections.
- Five programs are implementing other tools to monitor voting, including use of e-voting infrastructure.

Elections are the most common service function of ID programs. Thirty of the 48 programs reviewed use their ID or population registry for at least one of the three following functions:

- **ID to vote** – A card or unique ID number can be used to verify identity in order to vote.
- **Monitoring** – An ID program is used to monitor elections, either by culling voter registries of duplicate voters or remotely using biometric information to authenticate votes.
- **Register to vote** - A card or unique ID number can be used to register to vote.



*Figure 12* - Linkages with Elections
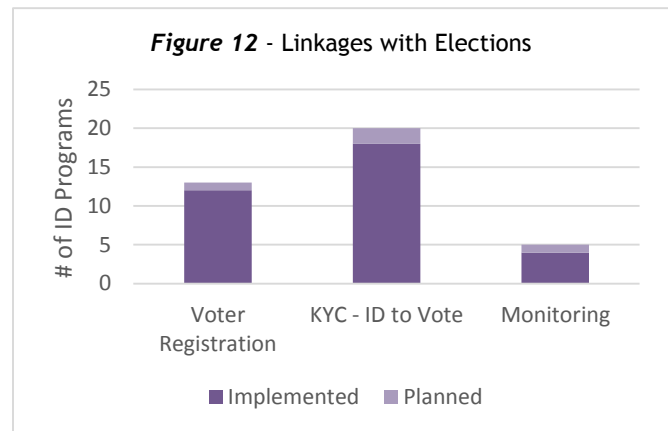
In elections, having strong, secure identification documents can be the difference between fraudulent and clean elections. Voter registration is a cornerstone of certifying that only eligible voters can participate in elections (The Carter Center, 2013). In the literature we surveyed, we found evidence that **13 of 48 IDs are accepted as credentials to register to vote** (*Figure 12*). Still, if an ID lacks high-level security features or can be easily faked then there is risk that a single voter can register under multiple names using fake IDs. In Afghanistan, for instance, The Wall Street Journal reported that voter cards and national IDs are available on the black market for $30 each, with reports that fraudulent cards number in the millions (Abi-Habib and Hodge, 2012).

**Incorporating biometric verification into ID cards is believed to be a strong way to limit voter fraud**, in part because stronger verification requirements limit the number of times a citizen can register, lessening opportunities to submit multiple votes (Clark & Gelb, 2013). Verification can also proceed a step further by having fingerprint, iris, or other biometric scanners available at polling booths to reconfirm a person's identity. In practice, however, even with 34 ID programs that incorporate biometric information we see **no evidence that biometric verification occurs on site at polling stations**. Biometric verification is not available on site for all 21 documented cases of IDs being used to vote. Gelb & Clark (2013) write that this is largely a function of cost. They find that "Large-scale registration exercises that are carried out on a rolling basis can be accomplished with a relatively low equipment/citizen ratio […]. Elections themselves, however, entail a mass, simultaneous mobilization of staff and citizens within a short time period, and would thus require a widespread distribution of technology and connectivity." They add that biometric verification may not be cost-effective, as cheaper ways to prevent multiple voting exist: "Checking photos and cards against voter lists and using indelible ink to mark voters may be good enough in many scenarios" (Gelb & Clark, 2013).

As a result of cost issues for employing biometric monitoring on site at elections, **five countries have enacted—or plan to enact— other monitoring solutions** (Egypt, India, Indonesia, Pakistan, Tanzania). For the 2014 election in Egypt, 2000 **e-readers** were purchased to scan national ID cards at polling booths, and verify the authenticity of the card and its user. The e-readers were also meant to reduce voting time and amalgamate data in one central location to monitor election progress and voter eligibility (Egypt Ministry of Communications, 2014). For the 2013 general elections in Lahor, Pakistan, voters inked **fingerprints** onto election rolls. The fingerprints were later checked against the National Database and Registration

Authority's (NADRA) registry, allowing the government to see that less than 40 percent of the fingerprints had a match with registered voters on file (Yasif, 2015). In Indonesia, the government is currently working to build **e-voting infrastructure** for the 2019 elections. Voters will walk into a voting booth where the e-KTP identity card and the information on it will be verified on site. The chairman of the Indonesian Agency for the Assessment and Application of Technology claims that it will enable election results to be tallied quickly, and facilitate election audits (AntaraNews, 2014a).

5.5. Surveillance and Security

> **Key Findings:**
> - We find no evidence indicating major violations of privacy, although concerns are prevalent.
> - Identity cards are required for SIM registration in Bangladesh, Ghana, Kenya, Pakistan, and Peru.
> - Four national IDs double as "passports" (Kenya, Pakistan, Tanzania, Uganda).

In general, developed nations tend to use ID programs for surveillance and security to a greater degree than developing nations (Clark & Gelb, 2013). Nonetheless, security concerns are also an impetus behind the creation and application of ID systems in developing nations. Both Kenya and Indonesia cite terrorism as a motivation behind the development of their ID programs (Kenyatta, 2015; King, 2012).



*Figure 13*. Surveillance and Security Connections to ID Programs

Our review finds 11 ID programs that are being leveraged for surveillance and security. IDs are purposed for border management, law enforcement, and SIM registration, and four double as international passports (*Figure 13*).
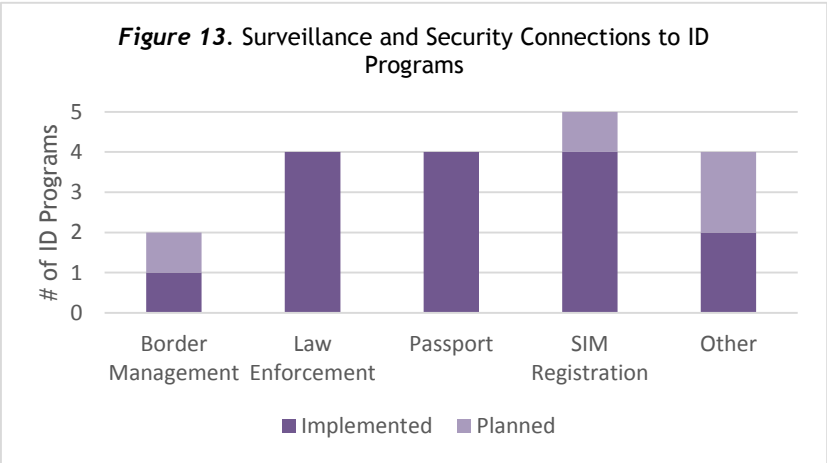
- **Border management** – The ID program is integrated with immigration or other border management agencies in order to monitor travel.
- **Law enforcement** – Registry information is used by police or other enforcement officials for purposes of confirming identity, or investigation, or reporting.
- **SIM Registration** – Biometric or other verification is required as part of the registration process to acquire a new SIM card or mobile phone, and mobile phones remain linked to the ID.
- **Passport** – The national ID doubles as an accepted international travel document for certain countries.

We do not find much evidence of the precise ways in which countries are deploying ID programs for border management and law enforcement. Morocco's ID program has links to border management, and Uganda is planning border management applications, but details are vague for both countries. The Moroccan identity card contains security features that are aimed at "control of migration flows" (Rutherford, 2008). Additional information specifying the card's capacity to monitor immigration could not be found. Uganda's National Security and Information Service states that one of the key services to be integrated with its forthcoming national ID is "immigration services," including border crossings (National Security Information System, 2015b).

In law enforcement, national IDs are assisting governments to track criminal activity. In Maharashtra, India it is now required by law that police include the Aadhaar unique identification number of witnesses and criminals in reports on crimes (Gelb & Raghavan, 2014). Tanzania's new ID system is intended to support better coordination across police, immigration authorities, the country's revenue service, and other government agencies by allowing them "to share information and differentiate between Tanzanians, foreign nationals and refugees" (Makoye, 2013).

Instances of national IDs that double as passports are largely the result of a single agreement between East African Community (EAC) member states to allow international travel between member states. We find that citizens of Kenya, Tanzania, and Uganda can all travel between the five-member EAC using only their respective national IDs.

Finally, as governments seek to cut down on the ability of extremists and criminals to use cell phones to conduct illicit activities like money laundering, some have turned to using identity cards for mobile phone and SIM registrations (Okuttah, 2015). In Bangladesh, Ghana, Kenya, Pakistan, and Peru IDs are now required in order to buy a cell phone or swap SIM cards. These requirements are also related to identification and authentication efforts for digital banking and mobile money, as discussed previously.

5.6. Other Functions

In addition to the categories of functions already discussed, we find evidence of linkages of ID programs with four other categories of services (*Figure 14*):

- **KYC - Government services** – The ID is used as a verification document for individuals to receive access to government civil services (Passport applications, driver registration, etc.).
- **Student or civil service employee attendance tracking** – Identity systems are leveraged to ensure that government employees and students attend work or school.
- **Taxes** – The unique ID number issued is linked to the issuance of tax identification numbers or the payment of taxes.
- **Travel** – The ID is used as a document that permits domestic travel (i.e. railway or bus travel).



*Figure 14.* Other Functional Linkages of ID Programs
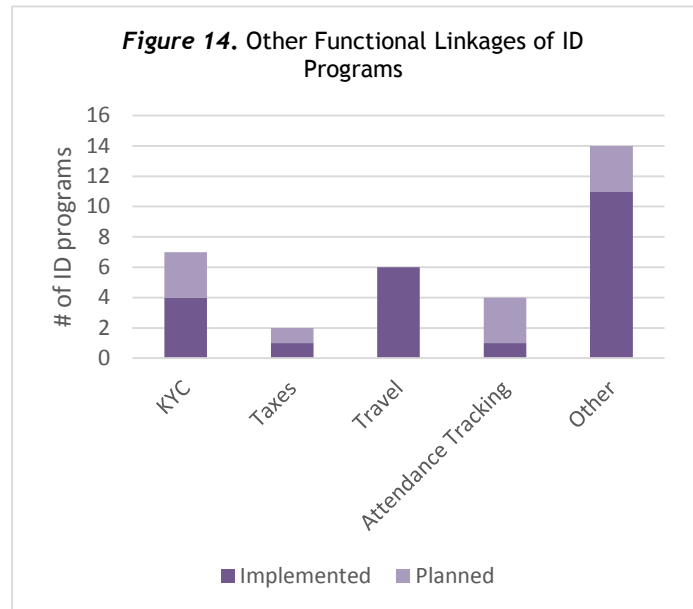
In keeping with the theme of utilizing ID programs to reduce fraud, streamline administration, and prevent fund leakage, countries have developed applications to track the attendance of civil servants. Both Ghana and Uganda have made this a function of their upcoming national ID registries, and Tanzania is developing a system with links to civil service employees. India has already implemented such a system:

> "The Indian government has launched a Biometric Attendance System (BAS) using the Aadhaar number provided through the UIDAI. So far some 50,000 central government employees have been registered across 148 organizations in Delhi. Employees are registered using their Aadhaar numbers and log in and out daily. Their attendance rates can be tracked on a dashboard, aggregated across organizations and accessed by anyone on the BAS public domain: Attendance.gov.in. [...] One can access the website without any login constraint, search employees by name, find out whether they were at work that day, what time they arrived and left, and how many work days, sick days and vacation days they have taken in the past month" (Raghavan & Gelb, 2014, p. 1).

Tracking of attendance also has applicatons for education. In Ghana, children are issued personal identification numbers at age six. These numbers are used at every stage of enrollment from primary school to college. Centralized data on school attendance allows the government to allocate resources, build infrastructure, and develop policy interventions (National Identification Authority, 2015).

Another theme that emerged in the literature is national IDs as a document to facilitate travel within countries. Documentation can help guarantee freedom of movement (Cote D'Ivoire) or be used by railways to book travel (India). In addition, as described in the section on surveillance and security, the national IDs of several countries can be used as regional passports.

## 6. Characteristics of ID Programs with Functional Applications

**Key Findings:**
- We do not find any association between region and number of functional linkages, although national ID programs in South Asia have the highest mean number of connections to different types of functions, driven by well-integrated programs in India and Pakistan.
- The year a program is introduced is not associated with the number of functional linkages, but programs that are still actively enrolling members appear to be linked to more types of services.
- Programs that incorporate cards with electronic components or biometrics have a higher mean number of different linkages than programs that do not.
- In most regions, over half of national identity programs have or plan financial linkages.
- Programs in South and Southeast Asia appear most likely to have health linkages, with over 40 percent of programs connected to a health function.
- National identity programs in Sub-Saharan Africa are more likely to be linked to financial services (62 percent) than health services (19 percent).

In this section we consider whether any ID program characteristics, including region, year of introduction, stage of implementation, or technical features, are associated with a greater likelihood of the program being linked with different types of functions, and specifically to finance and health. Our ability to identify associations is limited by the small sample size and by our definition of functional linkages, which only considers whether a linkage exists but not how developed it is or the extent to which it is incorporated into the national ID program. Though we cannot confidently report that many characteristics of national ID programs are associated with particular functional linkages, we do identify a few trends.

6.1 General Functional Linkages

We first consider whether particular types of national ID programs have a greater number of different functional linkages. To measure the linkages, we count how many of the different sub-categories of services[7] presented in section 5 and summarized in *Table 6* are linked to each program. Thus, a program with evidence of linkages to mobile money, digital banking, voter registration, KYC for elections, border enforcement, and SIM registration would be measured as having six different functional linkages. These sub-categories may not reflect the full variety of services linked to national ID programs, and for certain programs we were not able to identify much information on linkages. Further, using the number of types of services for which we find evidence of linkages as a proxy for integration of national ID programs into different areas does not tell us anything about how well-developed those linkages are, as a program with many limited connections to different types of services would be rated higher than a program with a few well-developed connections. However, this approach provides us with a rough estimation of how well a national ID program is integrated with different services.

As shown in *Table 8,* national ID programs in South Asia have the highest mean number of linkages to different functions, with 6.2 types of services on average linked to the five programs in the region. However, this analysis is complicated by aggregating different programs to the regional level and by the small sample sizes. The high average in South Asia is driven by national ID programs in India and Pakistan, which are linked to 11 and 12 different services, respectively, so the high average level of integration does not hold across South Asia. We do not observe any real consistency in the number of linkages for national ID programs by region, as in Sub-Saharan Africa for example it ranges from zero to 12 and in Southeast Asia from zero to eight.

*Table 8*. Mean Number of Service Linkages by Region

| Region | Number of Programs | Mean Number of Service Linkages |
|---|---|---|
| **Europe** | 3 | 0.7 |
| **Latin America** | 4 | 3.0 |

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[7] These services include: Know Your Customer (KYC) services in several different areas; digital banking, mobile money, cash transfers, relief, social security, and welfare under finance and social transfers; tracking services and treatment, and verification of eligibility/coverage/benefit under health; monitory of extension services and distribution of subsidies under agriculture; monitoring, voting, and voter registration under elections; border enforcement, SIM registration, and passport under surveillance and security; as well as driver registration, student and/or teacher or civil service attendance tracking, taxes, and travel under other functions.

| Middle East and North Africa | 8 | 2.1 |
|---|---|---|
| South Asia | 5 | 6.2 |
| South East Asia | 7 | 4.0 |
| Sub-Saharan Africa | 21 | 3.5 |

*Table 9* illustrates that programs introduced in the period prior to 1995 have the highest mean number of linkages, with national ID programs connected to six types of services on average. The three countries with ID programs that launched prior to 1995—Kenya, Peru, and Zambia—ID programs have all evolved since their inception: each currently incorporates an electronic component and biometric information. The numbers fluctuate between 2 to 4.1 types of services for any other periods, so there is no apparent association between year of introduction and integration with different services.

*Table 9*. Mean Number of Service Linkages by Time Period

| Year of Introduction | Number of Programs | Mean Number of Service Linkages |
|---|---|---|
| Prior to 1995 | 3 | 6.0 |
| 1996-2000 | 4 | 3.8 |
| 2001-2005 | 4 | 3.8 |
| 2006-2010 | 16 | 4.1 |
| 2011-2015 | 10 | 2.8 |
| Not specified | 11 | 2.0 |

This analysis is complicated by the small sample size in many time periods, by the selection of time intervals for grouping programs, and by the difficulty in truly establishing when a program was introduced, as there is often a lag between announcing a program and its actual implementation. In addition, the availability of information on functional applications appears to be related to the year of introducing a program. Four of the seven programs for which we could find no information on functional associations were launched in the past ten years, and for two of the other programs the year of introduction is not specified. Two of the three stalled programs were also launched in the last ten years while the year of launch for the other stalled program is not specified.



Figure 15. Average Number of Linkages by Stage of Implementation
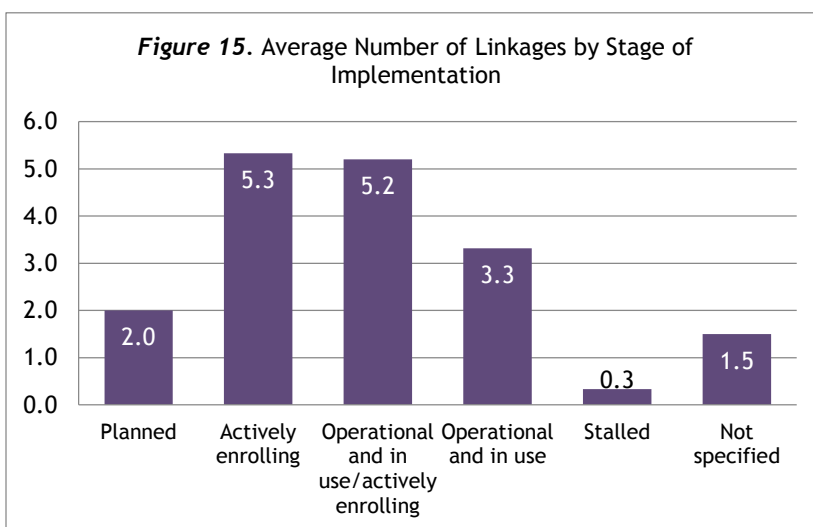
Analyzing the average number of service linkages by stage of implementation reveals that the national identity programs that are still actively enrolling (including the programs that are operational and in use/actively enrolling) have the highest average number of service linkages, 5.3 and 5.2 linkages respectively (*Figure 15*). As discussed in section 3.2, the programs that are still actively enrolling participants tend to have been introduced more recently, ranging from 2007 to 2015. These more recent programs that are in the initial or pilot stage of implementation may be more likely to have the technical capacity required to incorporate more diverse types of services, as the majority of programs with digital (17 of 27) and biometric (21 of 36) components were launched in the past ten years. Programs that are fully scaled-up and operational have a mean of 3.3 types of service linkages, which may indicate that the more established programs may have been less ambitious in scope. Stalled programs have the lowest average number of service linkages (0.3). Programs that are still in the "planned" stage have evidence of an average of two types of linkages. This finding highlights a limitation of our analysis, as these linkages are not yet developed but are counted equally with fully-developed large scale linkages.

We find that technical features may be associated with functional applications of national identity programs (*Table 10*). Programs that are embedded with electronic and biometric features are more likely to be linked to a greater variety of functions. Digitalized ID programs where ID cards include an electronic component or do not contain any physical component are linked with an average of 4.5 different types of services, compared to 1.5 types for non-digital programs. ID programs that collect biometric information have a mean of 3.8 service linkages, compared to 2.3 for programs that do not.

*Table 10*. Mean Number of Service Linkages by Technical Features

| Technical Features | Number of Programs | Mean Number of Service Linkages |
|---|---|---|
| Digital | 31 | 4.5 |
| Non-Digital | 17 | 1.5 |
| Biometrics | 36 | 3.8 |
| Non-Biometrics | 12 | 2.3 |

In the following two sections, we highlight national identity program characteristics associated with financial and health linkages.

6.2 Finance

As described in section 5.1, 24 national identity programs have or plan to have financial connections. *Figure 16* illustrates that in most regions, over half of national identity programs have or plan financial linkages, led by Sub-Saharan Africa (62 percent) and followed closely by South Asia (60 percent) and South East Asia (57 percent). Just one of the four ID programs in the Middle East and North Africa, and none of the three ID programs in Europe, have financial linkages.

As shown in *Figure 17,* 58 percent of the 24 programs with financial linkages were introduced in the last ten years. Seven programs with financial linkages were launched in the last five years (Ecuador, Nigeria - Bank Verification Number (BVN), Philippines, Sri Lanka, Sudan, Uganda, Uzbekistan). However, we do not observe any trends in the proportion of programs with financial linkages in each time period. The three programs launched prior to 1995 all have financial linkages while 60 percent of programs introduced from 2011 to 2015 have financial linkages.



*Figure 16*. Percentage of ID Programs with Financial Linkages (by Region)
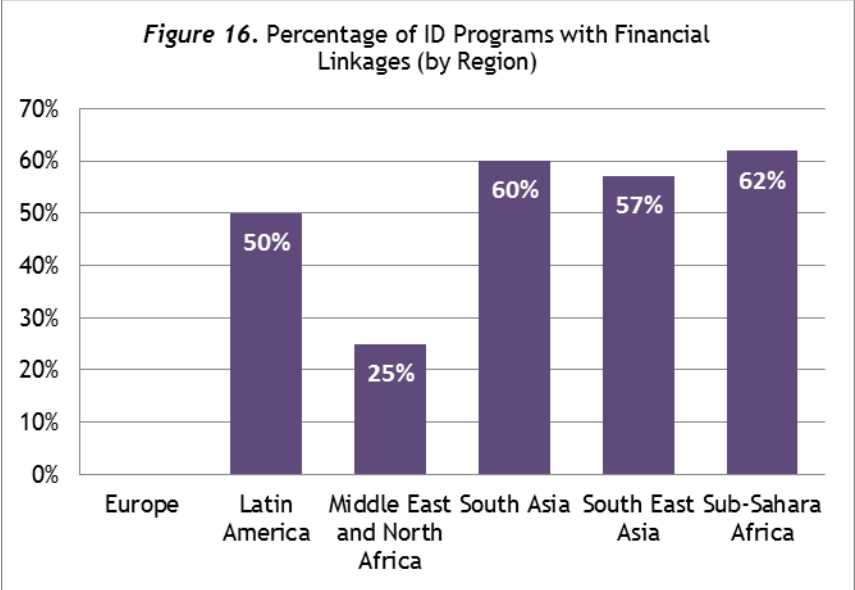
Aside from the issues mentioned in section 6.1 with evaluating the association between ID program linkages and year of program, another concern is that a number of these programs are multi-generational. Kenya's current ID program, for instance, was developed in 1964. A second generation of the program was launched in 1995, and it eventually developed links to mobile money and digital banking. Rollout of a third generation ID is currently underway.

Advanced electronic and biometric identification systems may allow developing countries to leapfrog the traditional paper-based system and link national identity to multiple functional applications (World Bank, 2015). Besides using fingerprints, PINs and/or signatures as a means of authentication for commercial transactions and for access to financial and social services, more precise digital biometric technology has been used in combination of mobile devices to create "mobile money" for secure and cashless commercial transactions and social transfers (World Bank, 2014; Gelb & Clark, 2013). However, we find no association between program technical features and the likelihood of financial linkages (*Table 11*). Among the 28 programs which are embedded with electronic components, 18 are linked with financial services. Of the 36 biometric programs, 18 have financial linkages.



**Figure 17.** Percentage of ID Programs with Financial Linkages by Time Period
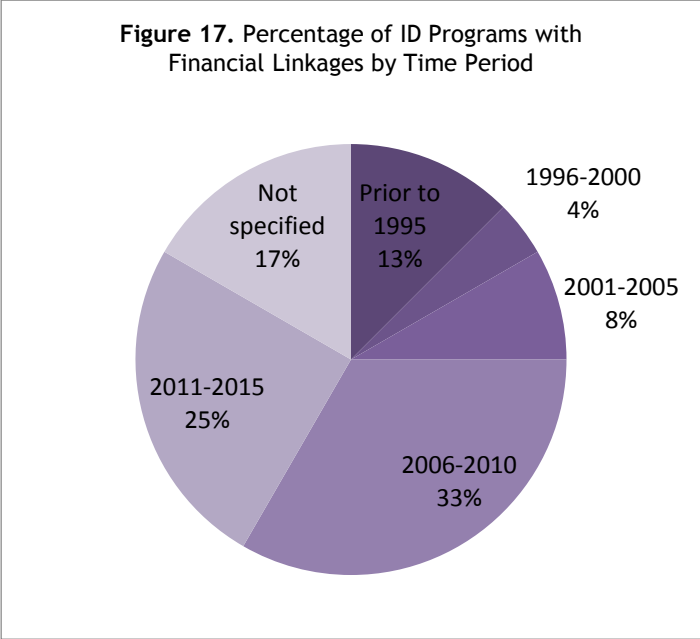
*Table 11*. Digital and Biometric ID Programs Associated with Financial Connections

| Program Technical Features | Financial Connections | No Financial Connections / Not Specified |
|---|---|---|
| **Programs Embedded with Electronic Component (28 Programs)** | 18 | 10 |
| **Programs Involving Biometrics (36 Programs)** | 18 | 18 |

For four of the eight programs with digital banking, mobile money, or social cash transfer functions (Congo, Ghana, Kenya, and Zambia), we observe that the funding model involves donor support and public-private partnership. Another of these programs, the National Database and Registration Authority (NADRA) in Pakistan, has a special funding model where a commercially viable business model is put into place to generate revenue to sustain itself (Ahmad Jan, 2006). As programs are more commonly funded by government agencies, this finding may indicate that programs with external sources of funding are more likely to include financial linkages.

6.3 Health

*Figure 18* breaks down the 12 national ID programs with health linkages by region. Programs in South and Southeast Asia appear most likely to have linkages, with over 40 percent of programs connected to a health function in contrast to less than 20 percent of programs in the Middle East, North Africa and in Sub-Saharan Africa.
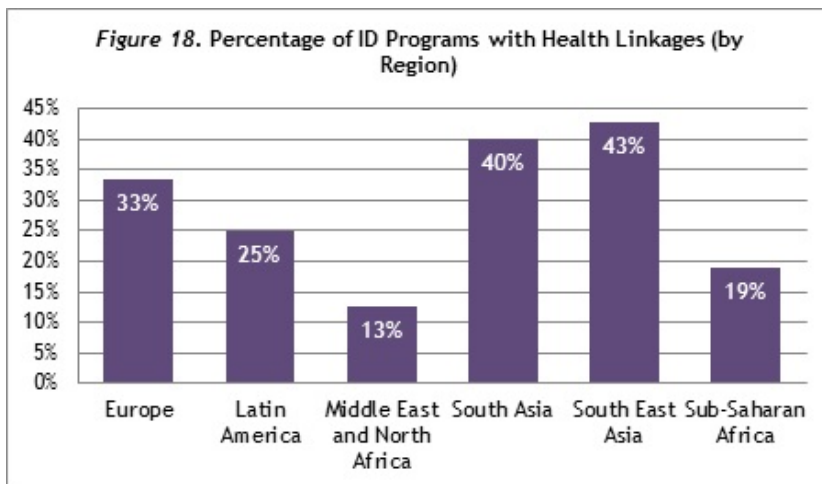
Health applications appear to have spread in the last ten years, as 59 percent of the programs linked with health services were established between 2006 and 2015 (*Figure 19*). However, we do not observe any trends in the proportion of programs with health linkages over time. Half of the programs introduced prior to 1995 are linked to a health service, and the proportion for the other time periods ranges from 25 to 27 percent.



Figure 18. Percentage of ID Programs with Health Linkages (by Region)



Figure 19. Percentage of ID Programs with Health Linkages by Time Period
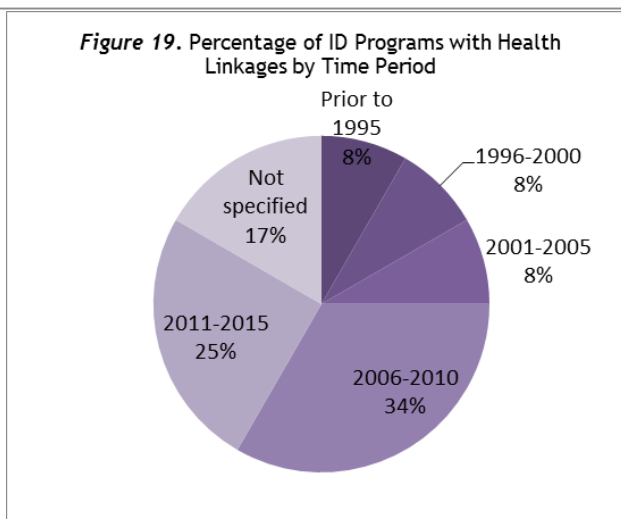
Beyond KYC identification to access health services, functional links involve e-government applications like electronically confirming eligibility benefits and tracking services and treatment. When citizens have a unique ID or ID card, systematically monitoring immunization rates or in-hospital care can become more efficient, especially if digital capabilities allow access to a synchronized central database access of personal health information (Ghen et al., 2013). Electronic or biometric IDs can potentially facilitate such functions. Given the small number of programs with health connections, however, we find that only seven of the 27 digitalized programs and eight of the 36 biometric programs are connected to the provision of health services (*Table 12*). We also find no association between funding source and the likelihood of linkages to health services.

*Table 12*. Digital and Biometric ID Programs Associated with Health Connections

| Program Technical Features | Health Connections | No Health Connections / Not Specified |
|---|---|---|
| **Programs Embedded with Electronic Component (27 Programs)** | 7 | 21 |
| **Programs Involving Biometrics (36 Programs)** | 8 | 28 |

## 7. Conclusion

The implementation of identification systems appears to be actively expanding in the developing world. The relatively small literature on identification systems suggests that effective formalized identification establishes a foundation through which development efforts can be facilitated, starting with the political, financial, and healthcare inclusion of all citizens. Almost all countries we review articulate the important contribution a formal national identity system can bring to their countries' development. Many of them link or have plans to link their national identity programs to a variety of different services, with the most common function being KYC for providing financial services, healthcare, and voting access.

Gelb & Clark (2013) argue that the advancement of electronic and biometric technology has played an important role in reducing the long-term cost of development and opening access to low-income countries, especially as technology and security firms more frequently take on the role of developing and implementing the programs in conjuncture with

government agencies. However, in most programs biometrics are used primarily as a foundational element for de-duplication in identification systems and not for biometric authentication during service provision, for example for financial services or voting. Cost is often a contributing factor as the infrastructure needed to fully utilize biometrics and link with authentication is expensive *(ibid.)*. As identification systems evolve and expand, it is possible that biometric links to functions such as finance, health, and elections will become more widespread.

Despite advancing technology and lowering costs, we find evidence that challenges with implementation are widespread and have the potential to cause substantial delays and barriers to reaching full population coverage. Programs like NADRA in Pakistan can provide examples of how to overcome particular implementation challenges, but many challenges discussed in country specific documents are related to issues with program design or are context-specific.

Due to the growth of identification systems in the last decade, our research relies heavily on a limited number of academic sources that review identification programs more generally, and on non-academic sources and grey literature to gather evidence on the particular country programs. Current evidence in English on the various programs we review is not always available, so communication with officials or other sources closer to the programs may be required to obtain more up to date information.

*Please direct comments or questions about this research to Principal Investigator Leigh Anderson at eparx@u.washington.edu.*

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**Appendix A. Literature Search Methodology**

We used a set of Boolean search strings to capture a broad range of literature related to national identity programs on three main databases: **Google, Google custom search of International Non-Governmental Organizations, and Center for Global Development**. We also conducted searches on **Scopus** and **Google Scholar** for academic literature on national identity programs. The aim of these searches was to return a wide variety of relevant literature and reduce the need for additional targeted searches.

We found that the search string *national AND (identity OR identification) AND (program OR system OR card) AND "Country Name"* yielded the most relevant results regarding the particular national identity programs in each country. However, we also used customized search strings for each country targeting specific national identity programs and/or specific areas of information. A total of **209 search strings** were used in our initial and supplemental searches. Below is a list of the types of major search terms used in our initial and supplemental searches.
- The name of the identity program specific to each country
- Financial: Cash Transfers, Mobile Money, Know your customer (KYC), and Social Welfare Transfers
- Health: Health
- Agriculture: Farming and Agriculture
- Election: Election and E-Voting
- Coverage: Coverage, "Level of Penetration" and "Penetration Rate"
- Poor Populations: Poor, Poverty, and Low-Income
- Women: Women, Female and Gender
- Methodology: Biometric and Electronic
- Program Budget: Budget, Fund, Funding, Cost, and Expense
- Program Security: Security and Secure
- Acceptance: "False Acceptance" and "False Rejection Rate"

During the initial search and supplemental search, we identified a total of 649 documents that appeared relevant to national identity programs in the 43 countries of interest.
- Google: 410 documents
- Center for Global Development: 44 documents
- Google custom search of International Non-Governmental Organizations: 107 documents
- Google Scholar: 13 documents
- Scopus: 68 documents
- Others: 7 documents

397 documents were retained for review after further screening. After the initial search, a targeted supplemental search was conducted to address any existing information gaps for ID programs. Examples of major topics on which we conducted supplemental searches include how programs are linked to financial services, health, agriculture, and elections, the level of coverage with the ID program's target population, challenges with uptake or use by poor populations and/or women, and program budgets.

**Appendix B. Review Framework Questions**

Basic National Identity Program Information (9)
- What institution is responsible for managing the program?
- What is the funding source for the program?
- What is the budget for operating the program?
- At what level is the program implemented? (National or subnational)
- What is the target population for the program?
- What is the target registration age for the program?
- In what year did the program begin?
- Is the program currently active?
- Are changes to the program planned or anticipated?

National Identity Program Methodology (10)
- Is enrollment mandatory?
- What is the method of enrollment/ initial capture?
- Does authentication involve a physical credential (e.g., ID cards, eID, mobile ID, smartcard, SIM card) as opposed to all information stored in the cloud?
- Does the physical credential include an electronic component?
- Does authentication involve personal information (e.g., name, gender, birth date, other)?
- Does authentication involve biometric information (e.g., fingerprint, face, eye, voice, DNA, other)?
- Does the physical credential include a photo of the individual?
- Does the program utilize an online system (e.g., immediate connection to central database), an offline system (e.g., periodically synchronized with central database), or a mixture of both?
- What is the risk of false acceptance (unauthorized individuals allowed enrollment/access) or false rejection (authorized individuals denied enrollment/access)?
- What are the security standards for protecting information in this system?

Implementation of the Program (9)
- What is the level of coverage among the target population (e.g., citizens, residents)?
- Are there challenges with enrollment or use of the program by the poor?
- Are there challenges with enrollment or use of the program by women?
- Are there challenges with enrollment or use of the program by other populations?
- What is the cost per person of the program?
- How cost-effective is the program?
- Have there been any challenges with implementation or the program (e.g., concerns about accountability, privacy, cost, coverage, data management, enrollment, interoperability with other in-country systems, other)?
- Is there a process for responding to implementation challenges at the micro-level (e.g., individual issues)?
- Is there a process for responding to implementation challenges at the macro-level (e.g., systemic issues)?

Functional Uses of the Program (6)
- Is the identity program used for elections?
- Is the identity program used for surveillance and security?
- Is the identity program used for financial services (including social transfers)?
- Is the identity program used for agricultural services?
- Is the identity program used for health services?
- Is the identity program used for other functions?

**Appendix C. Summary of National Identity Programs**

| Country | Official Name of National ID Program | Type of National ID Program | Mandatory Enrollment | Year of Launch | Status of Program |
|---|---|---|---|---|---|
| Afghanistan | e-tazkira | Government Issued National ID | Yes | 2010 | Stalled |
| Algeria | National ID | Government Issued National ID | Not specified | 2015 | Stalled |
| Angola | National ID | Government Issued National ID | Yes | 2009 | Operational and in use/actively enrolling |
| Bangladesh | National Identity Card (NID) | Government Issued National ID | Not specified | 2007 | Operational and in use/actively enrolling |
| Burkina Faso | National ID | Government Issued National ID | Not specified | Not specified | Operational and in use |
| Burkina Faso | Voter Card | Voter's Card | Not specified | 2012 | Operational and in use |
| Cambodia | National ID | Government Issued National ID | Yes | Not specified | Operational and in use/actively enrolling |
| Cambodia | IDPoor | Other | Not specified | 2006 | Operational and in use/actively enrolling |
| Cameroon | National Identity Card | Government Issued National ID | Yes | Not specified | Operational and in use |
| China | Second Generation Resident Identity Card | Government Issued National ID | Yes | 2003 | Operational and in use |
| Colombia | Registraduria Nacional del Estado Civil | Government Issued National ID | Yes | Not specified | Operational and in use |
| Congo, Dem. Rep. | Elector's Card | Voter's Card | No | 2005 | Operational and in use |
| Cote d'Ivoire | National ID | Government Issued National ID | Not specified | 2010 | Operational and in use/actively enrolling |
| Ecuador | Cedula de Identidad | Government Issued National ID | Yes | 2010 | Operational and in use |
| Egypt | National Identity Card (Current) Personal Verification Card | Government Issued National ID | Yes | Not specified | Operational and in use/actively enrolling |
| Ethiopia | Regional ID | Other | Not specified | Not specified | Operational and in use |
| Ghana | GhanaCard | Government Issued National ID | Yes | 2008 | Operational and in use |
| Guatemala | Documento Personal de Identificación (DIP) | Government Issued National ID | Not specified | 2004 | Operational and in use |
| India | Aadhaar | Government Issued National ID | No | 2008 | Operational and in use/actively enrolling |
| Indonesia | Kartu Tanda Penduduk Elektronik (E-KTP) | Government Issued National ID | Yes | 2009 | Operational and in use |
| Iran | Karte Melli | Government Issued National ID | Yes | 1997 | Operational and in use |
| Iraq | Civil Status Identification Card (Bitaka shakhsiyeh) | Government Issued National ID | Yes | Not specified | Operational and in use |
| Kenya | Third Generation National ID | Government Issued National ID | Yes | 1964 | Operational and in use |

| | | | | | |
|---|---|---|---|---|---|
| **Madagascar** | National Identity Card | Government Issued National ID | Yes | Not specified | Operational and in use |
| **Malawi** | National Registration and Identification System | Government Issued National ID | Yes | 2007 | Planned |
| **Mali** | National Identification Number (NINA) Card | Government Issued National ID | Not specified | 2008 | Not specified |
| **Morocco** | Carte Nationale D'Identite Electronique | Government Issued National ID | Yes | 1996 | Operational and in use |
| **Mozambique** | Bilhete de Identidade | Government Issued National ID | Not specified | Not specified | Not specified |
| **Nepal** | National Identity Card (NID) | Government Issued National ID | No | 2009 | Planned |
| **Niger** | Voter Card | Voter's Card | Not specified | 2009 | Operational and in use |
| **Nigeria** | National Identification Numbers (NIN) and National Electronic Identity Cards (eID) | Government Issued National ID | Yes | 2007 | Actively enrolling |
| **Nigeria** | Bank Verification Number (BVN) | Other | Yes | 2014 | Actively enrolling |
| **Pakistan** | National Database and Registration Authority (NADRA) | Government Issued National ID | No | 2000 | Operational and in use |
| **Peru** | Registro Nacional de Identificacion y Estado Civil (RENIEC) | Government Issued National ID | Yes | 1993 | Operational and in use |
| **Philippines** | Filipino Identification System Act | Government Issued National ID | Yes | 2015 | Planned |
| **Romania** | National Identity Card/Carte de identitate eID | Government Issued National ID | Not specified | Not specified | Operational and in use |
| **Sri Lanka** | National Identity Card (NIC)/e-NIC | Government Issued National ID | Yes | 2014 | Operational and in use |
| **Sudan** | National Identity Card Identity Card | Government Issued National ID | Not specified | 2011 | Not specified |
| **Tanzania** | National ID Program | Government Issued National ID | Yes | 2008 | Operational and in use/actively enrolling |
| **Thailand** | National Identity Card/National ID Card/Smart ID Card | Government Issued National ID | Not specified | 2005 | Operational and in use |
| **Uganda** | National Security Information System (NSIS) | Government Issued National ID | Yes | 2014 | Operational and in use/actively enrolling |
| **Ukraine** | Biometric Passport | Passport | Not specified | 2015 | Operational and in use/actively enrolling |
| **Ukraine** | ID Card/Biometric Identification Card | Government Issued National ID | Not specified | Not specified | Stalled |
| **Uzbekistan** | ePassports/Biometric Passports | Passport | Not specified | 2011 | Not specified |
| **Vietnam** | People's Identity Cards | Government Issued National ID | Yes | 1999 | Operational and in use |

| Yemen | Biometric Voter Registration (BVR) | Voter's Card | Not specified | 2014 | Operational and in use |
|-------|-----------------------------------|--------------|---------------|------|------------------------|
| **Zambia** | National Registration Cards (NRC) | Government Issued National ID | Yes | 1964 | Actively enrolling |
| **Zambia** | Continuous Voter Registration/Voter Registration Cards | Voter's Card | Not specified | 2010 | Operational and in use |

**Appendix D. Summary of National Identity Programs in Focus Countries**

Table D.1 Bangladesh Case Study

| BANGLADESH - National Identity Card (NID) | |
|---|---|
| **INTRODUCTION/BACKGROUND:** The National ID database was established by the Bangladesh Election Commission (BEC),[1] using citizen information collected in 2007 and 2008 during voter registration.[2] The mixed quality and coverage of the information has made the transition to a National ID database difficult.[3] A contract for the production of new smart cards was signed with Oberthur Techologies in January 2014, and the distribution of the new cards was planned for August 2015. [4,5] The national database is currently in a pilot phase to allow other agencies, such as the Bangladesh Bureau of Statistics and the Ministry of Social Welfare, to access information for services, with the potential to increase linked functions with social welfare and expand beyond current "Know Your Custromer" identification functions.[6] | |

| **BASIC NATIONAL IDENTITY PROGRAM INFORMATION** | |
|---|---|
| **Institution(s) Managing the Program:** | The Bangladesh Election Commission (BEC)[7] |
| **Funding Source:** | Not specified<br>Partial funding is received from the World Bank and non-bank sources[8] |
| **Budget for Program Operation:** | Contract for production – Tk 8 billion, or US $102 million[9]<br>Total project cost – US $219 million[10] |
| **Target Population:** | All citizens[11] |
| **Target Age:** | Birth (registration), 15 (registration/physical credential)<br>Citizens are issued an identification number at birth,[12] and given as National Identification Card (NID) at age 15. Citizens are automatically included in the electoral roll at age 18.[13] |
| **Year Introduced:** | 2007[14] |
| **Program Currently Active:** | Operational and in use/actively enrolling<br>Eligibility for citizens under 18 to receive a NID was established in 2015[15] |
| **Are Changes to the Program Planned or Anticipated:** | • Plans exist to build a Bangladesh Poverty Database (BPD) that will link to the NID system[16]<br>• New smart cards expected to be distributed in August 2015[17] |

| **NATIONAL IDENTITY PROGRAM METHODOLOGY** | | | |
|---|---|---|---|
| **Mandatory Enrollment:** | Not specified | **Method of Enrollment / Initial Capture:** | Scanners, Camera[18], Manual[19] |
| **Physical Credential Involved in Authentication:** | Yes[20] | **Electronic Component Involved in Physical Credential:** | Yes<br>Embedded integrated circuits, microchip,[21] bar code[22] |
| **Personal Information Involved in Authentication:** | Name, date of birth, ID number, mother's name, father's name, blood type, date of issue[23] | **Photo of Individual on Physical Credential:** | Yes[24] |
| **Biometric Information Involved in Authentication:** | Fingerprint, iris (expected)[25] | | |

| **PROGRAM IMPLEMENTATION** | |
|---|---|
| **Level of Coverage:** | 60% - citizens with national ID cards[26] |
| **Challenges with enrollment or use of the program by the poor:** | Not specified |
| **% of the enrolled who are poor:** | Not specified |

| | |
|---|---|
| Challenges with enrollment or use of the program by women: | Not specified - "There has been some concern regarding taking women's biometrics in conservative populations, particularly photos and iris scans of Muslim women who wear the veil. In most cases, however, this has been a minor or a non-issue."[27] |
| % of the enrolled who are women: | Not specified |
| Challenges with enrollment or use of the program by other populations: | Not specified |
| Cost/Person: | Not specified |
| Challenges with Implementation or Program: | • **Data Management**: the information collected during the initial voter registration was of mixed quality and coverage, making the transition into a civil registry and national ID system difficult.[28] |
| Process for responding to implementation challenges: | Not specified |

| | |
|---|---|
| **FUNCTIONAL USES OF PROGRAM** | |

**Financial Services (including Social Transfers)**
- **KYC**: the National Identity Card is required for opening a bank account, as well as verification for other services provided by the Credit Information Bureau or Bangladesh Financial Intelligence Unit (BFIU).
- **Social Transfers:** the national database with citizen information can be accessed by the Bangladesh Bureau of Statistics (Bangladesh Poverty Database), the Ministry of Social Welfare (safety net schemes) and the Access to Information (A2I) program of the Prime Minister's Office.[29]

**Elections**
- **Voting**: the National Identity Card functions as a voter identity card.[30]

**Surveillance and Security**
- **SIM registration**: the NID is required for establishing a new mobile phone connection.[31]

**Other Functions**
- The NID database is used to verify identities of citizens applying for a passport or registering for electronic income tax identification numbers.[32,33]

[1] Khan, 2014
[2] Islam et al. 2012
[3] Gelb and Clark, 2013
[4] World Bank, 2015
[5] Chowdhury, 2015c
[6] World Bank, 2015
[7] Khan, 2014
[8] World Bank, 2015
[9] Chowdhury, 2015c
[10] World Bank, 2015
[11] Election Commission of Bangladesh, n.d.
[12] Chowdhury, 2015c
[13] Chowdhury, 2015b
[14] Islam et al., 2012
[15] Chowdhury, 2015b
[16] Khan, 2014
[17] Chowdhury, 2015c
[18] Immigration and Refugee Board of Canada, 2010
[19] Gelb and Clark, 2013
[20] Chowdhury. 2015a
[21] Tip Boss, n.d.
[22] Immigration and Refugee Board of Canada, 2010
[23] *Ibid.*
[24] Islam et al., 2012
[25] Khan, 2014
[26] Chowdhury, 2015a
[27] Gelb and Clark, 2013
[28] ibid
[29] World Bank, 2015
[30] Immigration and Refugee Board of Canada, 2010
[31] BBC News, 2012
[32] World Bank, 2015
[33] *Ibid*

Table D.2 Ethiopia Case Study

| ETHIOPIA - Regional ID | |
|---|---|
| **INTRODUCTION/BACKGROUND:** Ethiopia does not have a national ID card. The nine regional states and two administrative states (including Addis Ababa City) each have a regional ID card. Registration and distribution of regional ID cards occurs at the sub-district level. The following information is for the regional card issued in Addis Ababa. | |

| BASIC NATIONAL IDENTITY PROGRAM INFORMATION | |
|---|---|
| **Institution(s) Managing the Program:** | Regional governments are responsible for issuing ID cards.[1] |
| **Funding Source:** | Not specified |
| **Budget for Program Operation:** | Not specified |
| **Target Population:** | All citizens and residents 18 years and older[2] |
| **Year Introduced:** | Not specified |
| **Program Currently Active:** | Operational and in use |
| **Are Changes to the Program Planned or Anticipated:** | In 2012, the national government enacted a law to create two institutions that would implement the national registration of citizens and then issue biometric national identity cards.[3] We find no evidence that indicates that the program has been carried through to fruition. |

| NATIONAL IDENTITY PROGRAM METHODOLOGY | | | |
|---|---|---|---|
| **Mandatory Enrollment:** | Not specified | **Method of Enrollment / Initial Capture:** | Not specified |
| **Physical Credential Involved in Authentication:** | Yes | **Electronic Component Involved in Physical Credential:** | No |
| **Personal Information Involved in Authentication:** | Woreda (district), Kebele (neighborhood), house number, mother's full name, telephone number, date of birth, place of birth, sex, ethnicity, occupation, emergency contact, a signature.[4] | **Photo of Individual on Physical Credential:** | Yes[5] |
| **Biometric Information Involved in Authentication:** | No[6] | | |

| PROGRAM IMPLEMENTATION | |
|---|---|
| **Level of Coverage:** | Regional identity cards are issued by Kebeles, or neighborhoods centers. These centers are well-staffed and widespread, providing the infrastructure for the issuance of identity cards. However, there is no direct information on the coverage level of regional ID cards.[7] |
| **Challenges with enrollment or use of the program by the poor:** | Not specified |
| **% of the enrolled who are poor:** | Not specified |
| **Challenges with enrollment or use of the program by women:** | Not specified |
| **% of the enrolled who are women:** | Not specified |
| **Challenges with enrollment or use of the program by other populations:** | Not specified |

| | |
|---|---|
| **Cost/Person:** | Not specified |
| **Challenges with Implementation or Program:** | Not specified |
| **Process for responding to implementation challenges:** | Not specified |

| **FUNCTIONAL USES OF PROGRAM** |
|---|

**Financial Services (including Social Transfers)**
   • **KYC**: regional ID cards are accepted as a valid form of identification by some commercial banks and one money transfer organization within Ethiopia.[8]

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[1] Immigration and Refugee Board of Canada, 2014b
[2] Ibid
[3] UNECA, 2012
[4] Immigration and Refugee Board of Canada, 2014b
[5] Ibid
[6] Ibid
[7] World Health Organization, 2014
[8] Geda & Irving, 2011

Table D.3 India Case Study

| India - Aadhaar Unique Identification Numbers | |
|---|---|
| **INTRODUCTION/BACKGROUND:** Aadhaar is an Indian identification program that currently covers 67 percent of the national population. Citizens are issued a unique 12-digit identification number (UID), and biometric information—fingerprints, iris, facial scan—is recorded and matched to the UID. Aadhaar purposefully avoids issuing a physical ID. Instead, the open, cloud-based system allows government programs and private- or civil-sector third parties to develop applications for its use. | |

| **BASIC NATIONAL IDENTITY PROGRAM INFORMATION** | |
|---|---|
| **Institution(s) Managing the Program:** | Unique Identification Authority of India (UIDAI)[1] |
| **Funding Source:** | Government of India[2] |
| **Budget for Program Operation:** | Total expenditure $771,111,833 (as of August 31,2014)[3] |
| **Target Population:** | Citizens and Residents[4] over age five[5] |
| **Year Introduced:** | 2008[6] |
| **Program Currently Active:** | Operational and in use / Actively enrolling[7] |
| **Are Changes to the Program Planned or Anticipated:** | Not specified |

| **NATIONAL IDENTITY PROGRAM METHODOLOGY** | | | |
|---|---|---|---|
| **Mandatory Enrollment:** | No[8] | **Method of Enrollment / Initial Capture:** | Scanners, cameras[9] |
| **Physical Credential Involved in Authentication:** | No (cloud)[10] | **Electronic Component Involved in Physical Credential:** | N/A |
| **Personal Information Involved in Authentication:** | Name, gender, date of birth, and address.[11] | **Photo of Individual on Physical Credential:** | N/A |
| **Biometric Information Involved in Authentication:** | 10 fingerprints, face, iris[12] | | |

| **PROGRAM IMPLEMENTATION** | |
|---|---|
| **Level of Coverage:** | 67% of national population[13] |
| **Challenges with enrollment or use of the program by the poor:** | Well-disbursed registration centers and an effective communication campaign have fueled Aadhaar's success in enrolling India's poor. A 2012 study of new registrants found that 56 percent did not previously carry any form of identification. In addition, of the households that previously did not carry identification, 87 percent of them had annual household incomes less than US $2,000.[14] |
| **% of the enrolled who are poor:** | Not specified |
| **Challenges with enrollment or use of the program by women:** | Not specified |
| **% of the enrolled who are women:** | Aadhaar registrations are relatively evenly distributed between genders.[15]<br>• Male=51.8%<br>• Female=48.1%<br>• Transgender=.005% |
| **Challenges with enrollment or use of the program by other populations:** | Not specified |
| **Cost/Person:** | 72.81 rupees ($1.15 USD – 2015)[16] |

| | |
|---|---|
| **Challenges with Implementation or Program:** | • **Harmonization with other in-country systems**: There are conflicting mandates between the UIDAI and a second, competing national ID program (National Population Register). At times, this friction has led political parties to favor one ID program over the other.[17]<br><br>• **Privacy**: In October, 2015, the Indian Supreme Court heard a case concerning privacy concerns over biometric and other information embedded within the Aadhaar ID. The court assented that Aadhaar can be used for social schemes like the National Rural Employment Guarantee Act, but restricted its application for other uses, such as banking. Challenges are pending.[18] |
| **Process for responding to implementation challenges:** | Not specified |

| FUNCTIONAL USES OF PROGRAM |
|---|

**Financial Services (including Social Transfers)**
- **KYC**: customer KYC information is recorded in a central database using the Aadhaar unique identity number. Banks and insurance companies can access the database to check and verify customer identities.[19]
- **Digital banking**: 150 million bank accounts are linked to the national ID.[20] Subsidies for various government programs are distributed through this linked payment system. As of 2014, one in six beneficiaries of subsidies for liquid petroleum cooking gas receive payments through direct deposits to bank accounts tied to a national ID linked payment system.[21]
- **Mobile money**: Aadhaar has been linked to a text messaging platform that enables users to transfer funds between Aadhaar-linked bank accounts. Transferring money requires only that senders input the recipient's unique ID number, and specify the amount to be transferred.[22]

**Health Services**
- **Verification of coverage, and tracking services and treatment**: in the state of Haryana, newborn babies are concurrently given a UID number and a birth certificate. The UID will be used to monitor and track childhood progress, including required immunizations.[23] Citizens covered by India's national health insurance for the poor are issued identity cards that can contain the UID number.[24] This allows patient data and hospital visits to be tracked.[25]

**Elections**
- **Monitoring**: India's Electoral Commission linked Aadhaar's registry with its electoral photo identity card database. This synchronization allows the electoral commission to pinpoint unqualified voters and eliminate them from its database.[26]

**Surveillance and Security**
- **Law enforcement**: in Bombay, by law police are required to record the ID numbers of witnesses and accused criminals in first information reports.[27] Additionally, law enforcement agency links to information in the central database—including stored bank account information—is expected to assist in efforts to curb money laundering.[28]

**Other Functions**
- A Biometric Attendance System (BAS) has been implemented for federal government employees. Employees register using their UID number. In- and out-times of 50,000 government employees across 148 organizations are tracked and recorded daily. All information is publically available at attendance.gov.in.[29]
- In Kerala, UID numbers are used to track students' educational progress.[30]
- The UID is used to purchase tickets and confirm the identity of travelers on the nation's railways.[31]

[1] Gerdeman, 2012
[2] Brindaalakshmi, 2013
[3] The Economic Times of India, 2014
[4] Brindaalakshmi, 2013
[4] The Economic Times of India, 2014
[5] Zelzany, 2012
[6] Ibid
[7] The Economic Times of India, 2015
[8] Gelb & Mukherjee, 2015
[9] Zelzany, 2012
[10] Ibid
[11] Ibid
[12] Ibid
[13] The Economic Times of India, 2015b
[14] Martinsson, 2012.
[15] Dashboard Summary, 2015
[16] The Economic Times of India, 2014
[17] Zelazny, 2012
[18] Anand, 2015
[19] ibid
[20] Dahan & Gelb, 2015
[21] Chen, 2014
[22] Frisz, 2014
[23] The Economic Times of India, 2015a
[24] Fan, 2013
[25] Gelb & Clark, 2013
[26] Jain, 2015
[27] Hickok, 2013
[28] Sikarwar, Deepshikha, 2015
[29] Gelb  & Raghavan, 2014
[30] Center for Internet Society, 2013
[31] Jain, 2015

Table D.4 Indonesia Case Study

| INDONESIA - Kartu Tanda Penduduk Elektronik (e-KTP) | | | |
|---|---|---|---|
| **INTRODUCTION/BACKGROUND:** In 2009, Indonesia undertook biometric registration of citizens and residents in an effort to improve national security, clamp down on election fraud, and improve public services.[1] By 2014, the government had issued unique identity numbers and electronic identity cards to 97 percent of the program's target population.[2] | | | |
| **BASIC NATIONAL IDENTITY PROGRAM INFORMATION** | | | |
| **Institution(s) Managing the Program:** | Ministry of Home Affairs (MOHA) | | |
| **Funding Source:** | Government agency | | |
| **Budget for Program Operation:** | MOHA allocated US $642 million for initial rollout of the program[3] | | |
| **Target Population:** | Citizens and residents[4] over age 17[5] | | |
| **Year Introduced:** | 2009[6] | | |
| **Program Currently Active:** | Operational and in use[7] | | |
| **Are Changes to the Program Planned or Anticipated:** | Not specified | | |
| **NATIONAL IDENTITY PROGRAM METHODOLOGY** | | | |
| **Enrollment Mandatory:** | Yes[8] | **Method of Enrollment / Initial Capture:** | Scanner, Camera[9] |
| **Physical Credential Involved in Authentication:** | Yes[10] | **Electronic Component Involved in Physical Credential:** | Yes. A chip stores biometrics, a signature, and a photo.[11] |
| **Personal Information Involved in Authentication:** | The card contains the following: signature, name, date and place of birth, gender, blood type, address, religion, marital status, occupation, citizenship status.[12] | **Photo of Individual on Physical Credential:** | Yes[13] |
| **Biometric Information Involved in Authentication:** | Fingerprint, iris, face[14] | | |
| **PROGRAM IMPLEMENTATION** | | | |
| **Level of Coverage:** | 97 percent[15] | | |
| **Challenges with enrollment or use of the program by the poor:** | Not specified | | |
| **% of the enrolled who are poor:** | Not specified | | |
| **Challenges with enrollment or use of the program by women:** | Not specified | | |
| **% of the enrolled who are women:** | In March 2012, of the 44,163,062 people registered, 50.71 percent were women.[16] | | |
| **Challenges with enrollment or use of the program by other populations:** | **Minority/Religious groups:** Until May 2015, Indonesians were required to either list one of the country's six official religions (Buddhist, Catholic, Protestant, Confucian, Hindu, and Muslim) on ID cards or to leave religion blank.[17] Minority religious denominations could not be listed. Many chose to leave religion blank, but reports emerged of individual registration officials blocking or choosing to lump these individuals into one of the six recognized religious groups.[18] In practice, this led people from minority | | |

| | religious groups to choose not to get national ID cards.[19] The 2015 policy change now allows any religion to be written onto the identity card.[20] |
|---|---|
| **Cost/Person:** | US $3.73[21] |
| **Challenges with Implementation or Program:** | • **Data management**: A temporary halt to the project occurred in late 2014/early 2015 over concerns about data security. Reports of fake circulating ID cards indicated a possible security breach.[22]<br>• **Enrollment**: In 2012, equipment failures delayed enrollment. The problem was compounded by the lack of personnel on hand to fix the equipment and a generally inefficient response that resulted in some 5 million enrollment records stuck en route to transfer to a central database.[23,24] |
| **Process for responding to implementation challenges:** | Not specified |
| **FUNCTIONAL USES OF PROGRAM** | |

**Financial Services (including Social Transfers)**
  • **Debtor Information**: in 2015, Bank Indonesia and MOHA partnered to link identification information contained in the central database with the bank's debtor information system. The partnership is expected to enable the bank to "review their prospective and existing customer with less cost and time because of the more valid database" (para 3).[25]
  • **Social Transfers**: as of 2013, the government was distributing a separate card (Social Protection Card) for social programs. 15.5 million households with this card use it to access some of the country's largest transfer programs: rice subsidy, unconditional cash transfers, and cash transfer for poor students. No evidence is found of social transfer links with the e-KTP.[26]

**Election**
  • **Voting**: the e-KTP is used as an ID to verify identity before casting a vote.[27]
  • **Monitoring (planned)**: in Indonesia, the government is currently working to build e-voting infrastructure for the 2019 elections. Voters will walk into a voting booth where the e-KTP identity card and the information on it will be verified on site. The chairman of the Indonesian Agency for the Assessment and Application of Technology claims that it will enable election results to be tallied quickly, and facilitate election audits.[28]

**Surveillance and Security**
  • **Law enforcement**: security measures embedded in the ID card and biometric information associated with individuals are purported to make IDs less susceptible to forgery. Government officials cite that mitigating the use of fake IDs will aid in tracking and capturing criminals.[29]

**Other Functions**
  • **Civil Service administration functions:** the card is used as citizen identification when applying for passports, driving licenses, taxpayer identification numbers, insurance policies, and certificates of land.[30]
  • **Electronic signature: t**he card contains a bearer's electronic signature.[31]

[1] Priyanto, 2012
[2] AntaraNews, 2014b
[3] Ibid
[4] King, Rawlson, 2012
[5] Sumner, 2015
[6] Kurnaiati, 2013
[7] Amianti, G2015
[8] Kurnaiati, 2013
[9] Ibid
[10] Priyanto, 2012
[11] Ibid
[12] Ibid
[13] Ibid
[14] Messmer, 2012
[15] AntaraNews, 2014b
[16] Fahmi, 2012
[17] Aritonang, 2015
[18] US Department of State, n.d.
[19] Wardah, 2014
[20] Aritonang, 2015
[21] AntaraNews, 2014b
[22] Ibid
[23] Kurnaiati, 2013
[24] Priyanto, 2012
[25] Amianti, 2015
[26] Banerjee, et.al., (2013
[27] Ibid
[28] AntaraNews, 2014a
[29] King, 2012
[30] Kurnaiati, 2013
[31] Priyanto, 2012

Table D.5 Kenya Case Study

| KENYA | |
|---|---|
| **Third Generation National ID** | |

| | |
|---|---|
| **INTRODUCTION/BACKGROUND:** Kenya has a long history of registering and issuing identity documents to its citizens. It released its first identification card in 1964 upon gaining independence from Britain. In 1995, it began issuing second generation identity cards and collected fingerprints of citizens. A central registry known as the Integrated Population Registration System (IPRS) became the storage base for biometric and citizen information around 2012.[1] In 2015, largely as a response to national security and terrorism concerns, Kenya began roll-out of a third generation card. As part of the process it is registering all citizens, residents, and refugees over the age of 12.[2] | |

| **BASIC NATIONAL IDENTITY PROGRAM INFORMATION** | |
|---|---|
| **Institution(s) Managing the Program:** | Kenya Citizens and Foreign Nationals Management Service (KCFNMS) |
| **Funding Source:** | Kenya's government, a private Israeli security firm, and donors (likely including USAID, DFID, the World Bank and/or AFDB) will fund rollout of the new ID. The business model is structured so that the fees citizens pay to acquire the card—estimated to raise $33 million annually—are a six year revenue stream for the Israeli firm.[3] At the end of six years, control of the citizen registry and related infrastructure is given to Kenya's government.[4] |
| **Budget for Program Operation:** | Contributions from Kenya's government (US $10 million), donors ($35 million), and an Israeli security firm ($100 million) fund the initial rollout.[5] |
| **Target Population:** | Citizens, residents, and refugees over the age of 12 will all be registered. Iris scans will be administered to children under 12, but no other identification information will be gathered.[6] |
| **Year Introduced:** | 1st generation, 1964. 2nd generation, 1995.[7] 3rd Generation, 2015.[8] |
| **Program Currently Active:** | Operational and in use / Actively enrolling[9] |
| **Are Changes to the Program Planned or Anticipated:** | No |

| **NATIONAL IDENTITY PROGRAM METHODOLOGY** | | | |
|---|---|---|---|
| **Mandatory Enrollment:** | Yes[10] | **Method of Enrollment / Initial Capture:** | Scanners[11] |
| **Physical Credential Involved in Authentication:** | Yes[12] | **Electronic Component Involved in Physical Credential:** | Yes[13] |
| **Personal Information Involved in Authentication:** | Information is not known for the 3rd generation ID card. The 2nd generation card contained the following: registration number, name, sex, declared tribe or race, date and place of birth, occupation, address, finger and thumb impressions.[14] | **Photo of Individual on Physical Credential:** | Yes[15] |
| **Biometric Information Involved in Authentication:** | Fingerprint, Iris[16] | | |

| **PROGRAM IMPLEMENTATION** | |
|---|---|
| **Level of Coverage:** | Not specified |
| **Challenges with enrollment or use of the program by the poor:** | Not specified |

| % of the enrolled who are poor: | Not specified |
|---|---|
| Challenges with enrollment or use of the program by women: | Not specified |
| % of the enrolled who are women: | Not specified |
| Challenges with enrollment or use of the program by other populations: | **Minority groups & rural residents**. No challenges are reported for 3rd generation enrollment; however reports of discriminatory registration practices against Nubians, Kenyan Somalis, and coastal Arab minorities were widespread for the 2nd generation ID.[17] In addition, it was reported that limited resources undermined registration efforts in rural communities.[18] |
| Cost/Person: | Not specified |
| Challenges with Implementation or Program: | *No challenges are reported yet for the 3rd generation program. Challenges with the 2nd generation program included:*<br>• **Accountability:** Reports circulated that many registration centers charged fees much higher than the official amount set by the government.<br>• **Coverage**: Regardless of size or population, all districts received equal funding preventing adequate coverage in especially large districts.<br>• **Enrollment**: All registrant ID applications had to be sent by mail to a central registration center in Nairobi. ID cards were then supposed to be sent back to registrants from Nairobi in 30 days. In practice, this process could take as long as two years.[19] |
| Process for responding to implementation challenges: | Not specified |

| FUNCTIONAL USES OF PROGRAM |
|---|

**Financial Services (including Social Transfers)**
- **Digital banking/Mobile Money**: in Kenya, customers of M-Shwari—a mobile phone savings platform—who have national IDs are entitled to higher maximum savings balances and access to credit. A successful match of a customer identification number against the central IPRS database means a customer is entitled to accounts that can hold KES 250,000 (instead of the usual KES 100,000). They are also qualified to borrow from the Central Bank of Africa, because they have gone through a stronger verification process.[20]
- **KYC**: national identity cards are an accepted form of identification at banks, and their presence has been cited as helping to facilitate financial agents' compliance with KYC regulations.[21] In addition, beneficiaries of Kenya's Hunger Safety Net Programme must present an ID card to verify identity before receiving cash transfers.[22]

**Health Services**
- None specified. Kenya's national ID system does not appear to be well-integrated with health functions. It issues separate identity numbers to track HIV patients.[23] In addition, national IDs are not used to track patients through the healthcare system. Instead, a private sector company has developed a standalone health card/infrastructure for that task.[24] It is now known whether the 3rd generation ID card will be more effectively linked with health.

**Election**
- **Voter registration**: ID cards are required in order to register to vote.[25]

**Surveillance and Security**
- **Passport**: ID cards may be used for as a "passport" for travel between the five members of the East African Community (Burundi, Kenya, Rwanda, Tanzania, Uganda).

- **SIM Registration**: in order to activate a SIM or register for mobile money services, ID cards must be presented and customer identification numbers are required to be confirmed against information in the central registry.[26]

[1] Kenya National Commission on Human Rights, 2007
[2] Ligami, 2014
[3] Ibid
[4] Mutegi, 2014
[5] Ligami, 2014
[6] Ibid
[7] Ibid
[8] Ibid
[9] Ibid
[10] Mutegi, 2014
[11] Ligami, 2014
[12] Ibid
[13] Ibid
[14] Soft Kenya, 2012
[15] Ligami, 2014
[16] Ibid
[17] Refugees International, 2008
[18] Kenya National Commission on Human Rights, 2007
[19] Ibid
[20] Cook & McKay, 2015
[21] Cracknell, 2012
[22] World Bank, 2013
[23] UNAIDS, 2009
[24] Homeland Security News Wire, 2011
[25] Bier, 2013
[26] Mark, 2015

Table D.6 Malawi Case Study

| MALAWI - National Registration and Identification System |
|---|
| **INTRODUCTION/BACKGROUND:** The National Registration and Identification System has not seen widespread implementation since the National Registration Bureau's establishment in 2007. While evidence indicates that registration has begun,[1] no identity cards had been distributed as of October, 2014.[2] New funding allocated to the NRB for the financial year starting July 2015 has potential to allow the procurement of necessary resources and end delays in producing the identity cards.[3] There is no indication that the identity cards are electronic or hold biometric information, though there are multiple other programs in Malawi that utilize these features including the Dowa Emergency Cash Transfer program.[4] This will be the first national identification document in Malawi.[5] |

| BASIC NATIONAL IDENTITY PROGRAM INFORMATION | | | |
|---|---|---|---|
| **Institution(s) Managing the Program:** | National Registration Bureau (NRB)[6] | | |
| **Funding Source:** | Government of Malawi[7] | | |
| **Budget for Program Operation:** | K1.65 billion or US $3,644,444<br>The national budget initially allocated K155 million (US$344,444) to the program, and increased that by K1.5 billion (US$3.3 million) for the 2015 financial year.[8] | | |
| **Target Population:** | All Citizens[9] | | |
| **Target Age:** | Birth (registration), 16 (physical credential)[10] | | |
| **Year Introduced:** | 2007 – NRB was established[11] | | |
| **Program Currently Active:** | Planning stages: No cards have been issued as of October 2014.[12] The NRB was allocated increased funding through the national budget for the 2015 financial year beginning in July,[13] which will help to procure the resources needed for the next phase of the program.[14] | | |
| **Are Changes to the Program Planned or Anticipated:** | Not specified | | |
| NATIONAL IDENTITY PROGRAM METHODOLOGY | | | |
| **Mandatory Enrollment:** | Yes. A child's birth must be registered within six week and failure to register results in a fine of $1 million Kwacha and up to five years in prison[15] | **Method of Enrollment / Initial Capture:** | Manual. At birth, parents must complete and deliver a birth report to the district registrar.[16] Hard copy registers are eventually computerized.[17] |
| **Physical Credential Involved in Authentication:** | Yes (identity card)[18] | **Electronic Component Involved in Physical Credential:** | Not specified |
| **Personal Information Involved in Authentication:** | Gender, date of birth, parents' names, marital status[19] | **Photo of Individual on Physical Credential:** | Not specified |
| **Biometric Information Involved in Authentication:** | Not specified | | |
| PROGRAM IMPLEMENTATION | | | |
| **Level of Coverage:** | Low<br>Registration has begun but there is no evidence on the level of coverage.[20] No cards have been distributed as of October 2014.[21] | | |
| **Challenges with enrollment or use of the program by the poor:** | Not specified | | |

| | |
|---|---|
| **% of the enrolled who are poor:** | Not specified |
| **Challenges with enrollment or use of the program by women:** | Not specified |
| **% of the enrolled who are women:** | Not specified |
| **Challenges with enrollment or use of the program by other populations:** | Not specified |
| **Cost/Person:** | Not specified |
| **Challenges with Implementation or Program:** | • **Accountability**: Prior to the establishment of the NRB, a contract was made with Secucom Holdings international of Switzerland that failed due to controversy over how the tender was awarded.[22]<br>• **Cost**: The delay in producing and distributing identity cards has been due to financial constraints and a lack of resources to procure the necessary equipment. [23,24] |
| **Process for responding to implementation challenges:** | Not specified |
| **FUNCTIONAL USES OF PROGRAM** | |

Not specified

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[1] Kulemeka, 2013

[2] Masina, 2014

[3] Chilunga, 2015

[4] Gelb & Clark, 2013

[5] Nyasa Times, 2013

[6] DHHS, 2014

[7] Masina, 2014

[8] Chilunga, 2015

[9] The Adolescent Girls' Advocacy & Leadership Initiative, 2011

[10] *Ibid*.

[11] Masina, 2014

[12] *Ibid*.

[13] Chilunga, 2015

[14] Nyasa Times, 2013

[15] The Adolescent Girls' Advocacy & Leadership Initiative, 2011

[16] *Ibid*.

[17] Kulemeka, 2013

[18] The Adolescent Girls' Advocacy & Leadership Initiative, 2011

[19] *Ibid*.

[20] Kulemeka 2013

[21] Masina, 2014

[22] Nyasa Times, 2013

[23] *Ibid*.

[24] Masina, 2014

Table D.7 Nigeria Case Study (1)

| NIGERIA - Bank Verification Number (BVN) | |
|---|---|
| **INTRODUCTION/BACKGROUND:** The Bank Verification Number (BVN) was introduced in 2014 to establish a form of identification for bank account owners and authentication at points of transaction in part to reduce access to blacklisted customers, reduce fraud, and increase the efficient of banking operations. [1,2] The program is actively enrolling, and the deadline to register for a BVN has been extended to October 31st, 2015 at which point it will be required for all formal banking and financial transactions in Nigeria. [3] Significant challenges with enrollment, most prominently limited public knowledge about the program and regulations, have caused confusion, decreased registration, and even led to customers withdrawing their money from banks out of fear of being shut out. [4] There has been additional challenges with the National Identity Management Commission (NIMC) that is responsible for issuing national identity cards over who is the dominant institution collecting biometric information. [5] | |

| BASIC NATIONAL IDENTITY PROGRAM INFORMATION | |
|---|---|
| **Institution(s) Managing the Program:** | The Central Bank of Nigeria (CBN)[6] |
| **Funding Source:** | The Central Bank of Nigeria (CBN)[7] |
| **Budget for Program Operation:** | US $55 million, N8,579<br>Total budgeted for the BVN scheme[8] |
| **Target Population:** | Adults eligible for a bank account[9] |
| **Target Age:** | Not specified |
| **Year Introduced:** | 2014[10] |
| **Program Currently Active:** | Actively enrolling<br>The deadline to enroll for the BVN program was extended to October 31st, 2015, at which point it will be required for all banking and financial transactions[11] |
| **Are Changes to the Program Planned or Anticipated:** | Yes - There is a plan to implement biometric functions on POS and ATM terminals for use with BVN in the future.[12] CBN is expected to release revised guidelines for the enrollment of Nigerians who do not live in the country and do not have plans to visit before the deadline[13] |

| NATIONAL IDENTITY PROGRAM METHODOLOGY | | | |
|---|---|---|---|
| **Mandatory Enrollment:** | Yes - Customers will not be able to access or operate their bank accounts without the BVN after the deadline[14] | **Method of Enrollment / Initial Capture:** | Not specified |
| **Physical Credential Involved in Authentication:** | No - Authentication involves biometric features and a PIN[15] | **Electronic Component Involved in Physical Credential:** | N/A |
| **Personal Information Involved in Authentication:** | N/A | **Photo of Individual on Physical Credential:** | N/A |
| **Biometric Information Involved in Authentication:** | Facial image, two thumbs and index fingerprints[16] | | |

| PROGRAM IMPLEMENTATION | |
|---|---|
| **Level of Coverage:** | 52% - In July 2015, 15 million customers enrolled in the BVN program out of an estimated 28.6 million adults operating bank accounts in Nigeria.[17,18] |
| **Challenges with enrollment or use of the program by the poor:** | Not specified |

| | |
|---|---|
| **% of the enrolled who are poor:** | Not specified |
| **Challenges with enrollment or use of the program by women:** | Not specified |
| **% of the enrolled who are women:** | Not specified |
| **Challenges with enrollment or use of the program by other populations:** | Not specified |
| **Cost/Person:** | Not specified |
| **Challenges with Implementation or Program:** | <ul><li>**Enrollment and Coverage**: Customers are required to physically present their BVN at each bank they operate accounts at after enrolling, which is costly for some populations as well as inconvenient for traveling anyone out of the country[19].</li><li>**Enrollment**: Nigerians in diaspora are confused about the guidelines and if concessions will be made to them regarding the deadline. [20]</li><li>**Coverage**: There is limited public awareness and some rural communities remain unaware of the initiative.[21]</li><li>**Coverage**: Confusion over the BVN program is causing citizens to draw funds out of their accounts, decreasing levels of financial inclusion rather than increasing it.[22]</li><li>**Harmonization of ID Programs**: the legal right of the Bank Verification Number (BVN) program to register citizens using biometric information was contested by the National Identity Management Commission (NIMC) who claimed the dominant role in identification matters, though an agreement was reached to harmonize the databases.[23]</li></ul> |
| **Process for responding to implementation challenges:** | Participating institutions are responsible for addressing individual issues.[24] |
| **FUNCTIONAL USES OF PROGRAM** | |

**Financial Services (including Social Transfers)**

- **KYC**: the BVN is used to identify and verify individuals that have bank accounts in Nigeria, and to authenticate them at points of transaction.[25]

[1] Central Bank of Nigeria, 2014a
[2] Central Bank of Nigeria, 2014b
[3] This Day Live, 2015
[4] Okoye, 2015
[5] Udunze, 2014
[6] The Central Bank of Nigeria, 2014
[7] Udunze, 2014
[8] *Ibid.*
[9] Central Bank of Nigeria, 2014b
[10] Central Bank of Nigeria, 2014a
[11] This Day Live, 2015
[12] Central Bank of Nigeria, 2014b
[13] This Day Live, 2015
[14] Central Bank of Nigeria, 2014a
[15] *Ibid.*
[16] Lee, 2015a
[17] Egwuatu, 2015
[18] This Day Live, 2015
[19] Okoye, 2015
[20] *Ibid.*
[21] *Ibid.*
[22] *Ibid.*
[23] Udunze, 2014
[24] The Central Bank of Nigeria, 2014a
[25] Ibid

Table D.8 Nigeria Case Study (2)

| NIGERIA - National Identification Number (NIN) and National Electronic Identity Card (eID) |
|---|

**INTRODUCTION/BACKGROUND:** In 2007, the National Identity Management Commission (NIMC) was established, tasked with creating and managing an integrated identity program that included both unique National Identification Numbers (NIN) for all citizens and residents, as well as Smart eID cards with biometric features combining 13 applications and government programs. [1,2] The centerpiece of the program is a partnership with MasterCard that places a heavy focus on financial inclusion and providing financial services to their population. [3] The pilot phase of distributing 13 million eID cards began in August 2014.[4] Implementation has faced few challenges, though the authority of the National Identity Management Commission to lead the collection of biometric information was challenged by the Bank Verification Number (BVN) program before an agreement to harmonize the databases was reached.[5]

| BASIC NATIONAL IDENTITY PROGRAM INFORMATION | | | |
|---|---|---|---|
| **Institution(s) Managing the Program:** | National Identity Management Commission (NIMC)[6] Partners include MasterCard, Unified Payment Services Limited, Cryptovision, and Access Bank Plc.[7] | | |
| **Funding Source:** | The Federal Government of Nigeria[8] | | |
| **Budget for Program Operation:** | US $75,517,600[9], N12,334,450,000 Ongoing administrative costs for financial year 2013[10] | | |
| **Target Population:** | All citizens and residents[11] | | |
| **Target Age:** | Birth (registration),[12] 16 (physical credential)[13] | | |
| **Year Introduced:** | 2007[14] - the NIMC was established | | |
| **Program Currently Active:** | Actively enrolling - The pilot phase for registration began in August, 2014[15] | | |
| **Are Changes to the Program Planned or Anticipated:** | Not specified | | |
| NATIONAL IDENTITY PROGRAM METHODOLOGY | | | |
| **Mandatory Enrollment:** | Yes The use of the National Identification Number (NIN) is mandatory[16] | **Method of Enrollment / Initial Capture:** | Scanner, Camera, National Database[17] |
| **Physical Credential Involved in Authentication:** | Yes National Electronic Identity Card (eID)[18] | **Electronic Component Involved in Physical Credential:** | EMV Chip[19] |
| **Personal Information Involved in Authentication:** | Name, age, unique identification number,[20] gender, address[21] | **Photo of Individual on Physical Credential:** | Yes[22] |
| **Biometric Information Involved in Authentication:** | Fingerprint, iris, facial picture[23] | | |
| PROGRAM IMPLEMENTATION | | | |
| **Level of Coverage:** | 4% of total population in 2015[24] - Nigeria is currently enrolling as part of a pilot program[25] | | |
| **Challenges with enrollment or use of the program by the poor:** | No[26] | | |
| **% of the enrolled who are poor:** | Not specified | | |
| **Challenges with enrollment or use of the program by women:** | Not specified | | |

| % of the enrolled who are women: | Not specified |
|---|---|
| Challenges with enrollment or use of the program by other populations: | Not specified |
| Cost/Person: | Not specified |
| Challenges with Implementation or Program: | • **Enrollment**: Fake agents have opened unauthorized registration centers and charge citizens fees to participate in the registration process.[27] Lacking commitment from front-end partners led the National Identity Management Commission to seek approval for additional enrollment equipment[28]<br><br>• **Harmonization of ID Programs**: the National Identity Management Commission contested the legal right of the Bank Verification Number (BVN) program in Nigeria to register citizens using biometric information, claiming the dominant role in identification matters. An agreement was eventually reached to harmonize the databases.[29] |
| Process for responding to implementation challenges: | Micro-Level (Individual Issues):<br>• Individuals can receive assistance through a Call Center during the week, or access support at any point through an Interactive Voice Response (IVR) system.[30]<br><br>Macro-Level (Systematic Issues):<br>• A governing board has the power to establish ad-hoc committees to address matters concerning the National Identity Management Commission and its activities.[31] |

### FUNCTIONAL USES OF PROGRAM

**Financial Services (including Social Transfers)**
- **KYC**: Used for verification when opening a bank account; purchasing insurance policies; and purchasing, transferring, or registering land in accordance to the Land Use Act[32]
- **Digital Banking**: The National Identity Card is linked with MasterCard, and acts as a payment tool to deposit, withdraw, or receive funds (in particular social benefits), pay for goods or services, save, or engage in other financial transactions facilitated by electronic payments.[33]

**Health**
- **Insurance**: transactions under the Contributory Health Insurance Scheme will use the NID.[34]

**Agriculture**
- **Distribution of Subsidies**: those eligible for the Nigeria Agriculture Payment Initiative (NAPI) can redeem subsidies at point-of-sale (POS) devices after confirmation of biometric information. Cards can additionally be used as a debit card tied to Bank of Agriculture accounts.[35]

**Election**
- **Voter Registration**[36]

**Other Functions**
- **Know Your Customer**: National Identity Cards are required for the application and issuance of an international passport.[37]
- **Driving License**: the database for driving licenses will be integrated with the National Database.[38]
- **Taxes**: NID transactions will include the payment of taxes.[39]

[1] National Identity Management Commission, 2015
[2] MasterCard, n.d.
[3] *Ibid.*
[4] Business Day, 2015
[5] Udunze, 2015
[6] National Identity Management Commission, 2015
[7] MasterCard, n.d.
[8] National Identity Management Commission, 2007
[9] 2013 conversion rates
[10] National Identity Management Commission, 2013
[11] *Ibid.*
[12] *Ibid.*
[13] National Identity Management Commission, 2013
[14] National Identity Management Commission, 2015
[15] Business Day, 2015
[16] National Identity Management Commission, 2015
[17] National Identity Management Commission, n.d.
[18] National Identity Management Commission, 2015
[19] MasterCard, n.d.
[20] BBC, 2014
[21] MasterCard, n.d.
[22] National Identity Management Commission, 2015
[23] Mastercard, n.d.
[24] Azeez, 2015
[25] Business Day, 2015
[26] National Identity Management Commission, n.d.; National Identity Management Commission, 2013
[27] Okonji, 2014
[28] National Identity Management Commission, 2013
[29] Udunze, 2014
[30] National Identity Management System, 2013
[31] National Identity Management Commission, 2013
[32] National Identity Management Commission, 2015
[33] MasterCard, n.d.
[34] National Identity Management Commission, 2015
[35] Grossman & Tarazi, 2014
[36] National Identity Management Commission, 2015
[37] National Identity Management Commission, 2015
[38] BBC, 2014
[39] National Identity Management Commission, 2015

Table D.9 Pakistan Case Study

| PAKISTAN - National ID Program | |
|---|---|
| **INTRODUCTION/BACKGROUND:** The National Database and Registration Authority (NADRA) was established in 2000, and since has issued a series of physical credentials including the Computerized National Identity Card (CNIC) and the Smart National Identity Card (SNIC) most recently in 2012.[1] Pakistan has one of the highest target population coverage rates with 98% of the country registered, and has launched extensive registration campaigns to target traditionally under registered populations such as rural and tribal groups, women, and undocumented children. [2,3] NADRA operates through a self-generating revenue model that charges institutions who use the database for biometric verification, and additionally earns money through services provided by their independent public company, NADRA technologies.[4] Their comprehensive biometric database has laid a foundation as a platform to link identity cards to other functions and services, including social transfers, health, and voting.[5] | |

| BASIC NATIONAL IDENTITY PROGRAM INFORMATION | |
|---|---|
| **Institution(s) Managing the Program:** | National Database and Registration Authority (NADRA) NADRA acts as an independent corporate body. It was formed when the National Database Organization under the Ministry of the Interior and the Directorate General of Registration (DGR) merged.[6] |
| **Funding Source:** | NADRA is a self-generating revenue authority. NADRA charges fees to organizations or government bodies when a citizen's biometric information is used for authentication. The institution also formed an independent public company, NADRA Technologies Limited, through which it provides services to other countries to implement similar national identification programs and gains additional revenue.[7] |
| **Budget for Program Operation:** | US $162,243,580, RS10,353,479,580 Ongoing administrative costs for financial year 2013[8] |
| **Target Population:** | All citizens[9] |
| **Target Age:** | Registration is required within one month of birth.[10] Biometric information is taken starting at age 14 or 15 (when biometrics become stable)[11], but the minimum age to acquire a SNIC is 18.[12] |
| **Year Introduced:** | The ordinance and preparation began in 2000[13], the multi-biometric system was released in 2007, and the Smart National Identity Card (SNIC) was introduced in 2012. [14,15] |
| **Program Currently Active:** | The program is operational and in use. Currently, biometric fingerprint information is being linked with cell phone SIM cards to verify mobile phone users.[16] |
| **Are Changes to the Program Planned or Anticipated:** | Not specified |

| NATIONAL IDENTITY PROGRAM METHODOLOGY | | | |
|---|---|---|---|
| **Mandatory Enrollment:** | No (in 2008)[17] | **Method of Enrollment / Initial Capture:** | Scanner, National Database[18] |
| **Physical Credential Involved in Authentication:** | Yes Smart National Identity Card (SNIC)[19] | **Electronic Component Involved in Physical Credential:** | Yes[20] |
| **Personal Information Involved in Authentication:** | Name, parentage, permanent and temporary address, registration number, family number,[21] gender[22] | **Photo of Individual on Physical Credential:** | Yes[23] |

| Biometric Information Involved in Authentication: | Fingerprints, facial image[24] |
|---|---|

| **PROGRAM IMPLEMENTATION** | |
|---|---|
| Level of Coverage: | 98% of the adult population over 18 - 120 million identities have been registered and 97 million ID cards have been distributed[25]. |
| Challenges with enrollment or use of the program by the poor: | Yes - The cost of NADRA verification for mobile money is high, and it limits the commercial viability to offering accounts to poor customers[26]. |
| % of the enrolled who are poor: | Not specified |
| Challenges with enrollment or use of the program by women: | Not specified - Cultural inhibitions were thought to be a potential reason for lower female registration rates initially[27], but effective, targeted registration campaigns led to overall growth concerning women registration rates[28] and even some of the most conservative provinces reached overall registration of 99 percent[29]. |
| % of the enrolled who are women: | 44%[30] in 2014 |
| Challenges with enrollment or use of the program by other populations: | Not specified - Nadra launched an extensive campaign to reach out to traditionally underregistered populations, including minorities, rural/tribal groups, transgender groups, orphaned children, those with special needs, those in diaspora, and refugees. The program included procuring mobile registration vans and motorcycle units, and hiring man-pack units of hikers, mountaineers, and skiers to hike into remote areas to both educate and enroll citizens in the program[31]. The one group that has not been widely included in registration is Karachi's Rohingya population[32]. |
| Cost/Person: | Not specified |
| Challenges with Implementation or Program: | Not specified |
| Process for responding to implementation challenges: | Micro-Level (Individual Issues): <br><br> • Yes – a grievance system was put in place specifically for emergency aid distribution, but there is no indication of a larger system for addressing general challenges. [33] <br><br> Macro-Level (Systematic Issues): <br><br> • Yes – the parliamentary standing committee oversees the actions of the Nadra board of directors and helps to prevent the misuse of data and address challenges. [34] |

| **FUNCTIONAL USES OF PROGRAM** |
|---|
| <u>Financial Services (including Social Transfers)</u><br><br>• **Digital Banking**: the smart card is used for branchless banking and e-commerce. [35]<br>• **Other**: NADRA partnered with the State Life Corporation of Pakistan to include insurance against accidental death for a nominal charge built into the ID card fee.[36]<br>• **Social Transfers**: The database was used to help distribute emergency aid relief in the wake of floods in 2010, 2011, and 2012, and to internally displaced citizens.[37,38] In addition, NADRA supports the Benazir Income Support Program (BISP) to identify and deliver aid to poor women through the SNIC.[39]<br><br><u>Health</u><br><br>• **Tracking services and treatment**: vaccinations for children are tracked through the SNIC. [40]<br>• **Other**: the SNIC supports biometric-based secure health insurance. [41] |

**Election**
- **Voter registration**[42]
- **Voting**: citizens must have an identity card to cast a vote[43]
- **Monitoring**: votes are cross-matched with biometric information to verify correct voting[44]

**Surveillance and Security**
- **Passport**: the SNIC is acceptable at 100 international airports and adheres to ICAO rules for a machine-readable travel document.[45]
- **SIM registration**: owners of SIM cards must submit fingerprints to the Nadra database when registering their SIM cards, or verify themselves against previously submitted biometric information.[46]

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[1] Malik, 2014

[2] *Ibid*.

[3] *Ibid*.

[4] Ahmad Jan, 2006

[5] Gelb & Clark, 2013

[6] NADRA, n.d.a

[7] Ahmad Jan, 2006

[8] NADRA, 2013

[9] Kahn, 2012

[10] *Ibid*.

[11] *Ibid*.

[12] Malik, 2014

[13] *Ibid*.

[14] Kahn, 2012

[15] Malik, 2014

[16] Craig & Hussain, 2015

[17] Malik, 2014

[18] NADRA, (n.d.b) Multi-Biometric Card.

[19] Malik, 2012

[20] *Ibid*.

[21] Kahn, 2012

[22] Malik, 2014

[23] Ahmad Khan, 2014

[24] NADRA, n.d.b

[25] Malik, 2014

[26] Kumar & Radcliffe, 2015

[27] Pakistan Press Foundation, 2010

[28] Malik, 2014

[29] Pakistan Press Foundation, 2010

[30] Malik, 2014

[31] *Ibid*.

[32] Rehman, 2015

[33] Malik, 2014

[34] Khan, 2012

[35] Malik, 2014

[36] *Ibid*.

[37] *Ibid*.

[38] Zelazny, 2012

[39] Malik, 2014

[40] *Ibid*.

[41] *Ibid.*
[42] Malik, 2014
[43] *Ibid.*
[44] Yasif, 2015
[45] Malik, 2014
[46] Craig & Hussain, 2015

Table D.10 Peru Case Study

| PERU - Registro Nacional de Identificacion y Estado Civil (RENIEC) | | |
|---|---|---|
| **INTRODUCTION/BACKGROUND:** The Registro Nacional de Identificacion y Estado Civil (RENIEC) was first established in 1993, but renewed its mission to provide documentation to the citizens of Peru in 2001 following the Truth and Reconciliation Commission. [1] In 2007, an IDB survey concluded that Peruvians have more faith in the RENIEC and the national civil registry than in the Catholic Church,[2] and by 2012, 89 percent of the population was registered in the national database.[3] The physical credential distributed by RENIEC, the Documento Nacional de Identidad (DNI)[4] or Documento Nacional de Identidad Electronico (DNIe), is linked to many function uses, but primarily as a means of identification (KYC).[5] | | |

| BASIC NATIONAL IDENTITY PROGRAM INFORMATION | |
|---|---|
| **Institution(s) Managing the Program:** | Registro Nacional de Identificacion y Estado Civil (RENIEC)[6] |
| **Funding Source:** | The government partially funds RENIEC. Remaining funding is self-generated revenue from fees associated with the national identity documents and renewals.[7] |
| **Budget for Program Operation:** | Not specified |
| **Target Population:** | All citizens[8] |
| **Target Age:** | Citizens are registered at birth. Renewal occurs every eight years, and a new Documento Nacional de Identidad (DNI) or Documento Nacional de Identidad Electronico (DNIe) is issued at age 18.[9] |
| **Year Introduced:** | RENIEC was established in 1993, and a new national plan for the restitution of identities was created in 2001.[10] |
| **Program Currently Active:** | Yes[11] |
| **Are Changes to the Program Planned or Anticipated:** | Not specified |

| NATIONAL IDENTITY PROGRAM METHODOLOGY | | | |
|---|---|---|---|
| **Mandatory Enrollment:** | Yes[12] | **Method of Enrollment / Initial Capture:** | Itinerant registration is done manually. There is no evidence for other methods of enrollment.[13] |
| **Physical Credential Involved in Authentication:** | Yes -Documento Nacional de Identidad (DNI)[14] or Documento Nacional de Identidad Electronico (DNIe)[15] | **Electronic Component Involved in Physical Credential:** | Yes - The DNIe has a cryptographic chip, two digital certificates, and a digital signature.[16] |
| **Personal Information Involved in Authentication:** | Name, gender,[17] and a unique identification number[18] | **Photo of Individual on Physical Credential:** | Not specified |
| **Biometric Information Involved in Authentication:** | Fingerprints[19] | | |

| PROGRAM IMPLEMENTATION | |
|---|---|
| **Level of Coverage:** | 89% in 2012[20] |
| **Challenges with enrollment or use of the program by the poor:** | Yes - undocumented and/or poor citizens have difficulty affording the prerequisite birth certificate, the registration fee, or the associated fess such as travel costs to registration center. [21] |
| **% of the enrolled who are poor:** | Not specified |
| **Challenges with enrollment or use of the program by women:** | Not specified |

| % of the enrolled who are women: | Not specified |
|---|---|
| **Challenges with enrollment or use of the program by other populations:** | • Disabled individuals are not permitted identity cards.[22]<br>• Transgender individuals are not allowed to change their genders on identity cards.[23]<br>• Rural and indigenous populations are largely undocumented and cannot register without birth certificates.[24] |
| **Cost/Person:** | US $10.32 – US $79.80[25]<br>• At service office: US $10.32<br>• In coastal regions: US $21.83<br>• In highlands: US $42.05<br>• In jungle regions: US $79.80 |
| **Challenges with Implementation or Program:** | • **Enrollment**: limited human resources, including trained officials to address cultural or language barriers, impacted the ability to enroll populations in rural areas.[26]<br>• **Coverage**: there is a lack of available registry centers. [27] RENIEC deployed itinerant (traveling) registry teams to address this issue, though they were met with high costs and challenges with the lack of resources in remote areas. [28] |
| **Process for responding to implementation challenges:** | RENIEC was granted Quality Certification from the Societe Generale de Surveillance (SGS S.A.) to hold themselves accountable in terms of the technology and IT systems.[29] |

| FUNCTIONAL USES OF PROGRAM |
|---|

**Financial Services (including Social Transfers)**
- **KYC:** an identity card is required to verify identity when opening a bank account.[30]
- **Social Transfers: A**n identity card is required to verify identity when receiving social security benefits.[31] RENIEC partners with the development organization JUNTOS to register poor citizens, and then the database is used to distribute aid.[32]

**Health**
- **KYC:** an identity card is required to verify identity and access the national healthcare system.[33]

**Election**
- **Voter registration**: the voter registry is based on the civil registry, which citizens are included in once they register for their identity card.[34]
- **Voting**: citizens must present their DNI or DNIe to cast a vote.[35]

**Surveillance and Security**
- **SIM registration**: prepaid phones can only be activated after biometric data is used to verify the identity of the user through the national register, RENIEC.[36]

**Other Functions**
- **KYC:** an identity card is required to marry, own or inherit property, or find formal work[37]

[1] Hartitz & Boekle, 2009
[2] Gelb & Clark, 2013
[3] The Carter Center, 2013
[4] Ibid
[5] High Security Printing, 2015
[6] Hartitz & Boekle, 2009
[7] *Ibid.*
[8] The Carter Center, 2013
[9] *Ibid.*
[10] Hartitz & Boekle, 2009
[11] Lee, 2015b
[12] Brennan Center for Justice, n.d.
[13] Reyna, 2014
[14] The Carter Center, 2013
[15] High Security Printing, 2015
[16] *Ibid.*
[17] Chase, 2014
[18] The Carter Center, 2013
[19] *Ibid.*
[20] *Ibid.*
[21] *Ibid.*
[22] Cunningham, 2013
[23] Chase, 2014
[24] Cunningham, 2013
[25] Reyna, 2014
[26] *Ibid.*
[27] Cunningham, 2013
[28] Reyna, 2014
[29] Hartitz & Boekle, 2009
[30] Cunningham, 2013
[31] *Ibid.*
[32] Reyna, 2014
[33] Cunningham, 2013
[34] The Carter Center, 2013
[35] *Ibid.*
[36] Lee, 2015b
[37] Cunningham, 2013

Table D.11 Tanzania Case Study

| TANZANIA - National ID Program | |
|---|---|
| **INTRODUCTION/BACKGROUND:** A national identity system was first envisioned in Tanzania in 1968, but implementation was long delayed by financial constraints.[1] In 2008, a national identity project officially launched with the aim of modernizing the national identity management system and linking it with new identity cards that would replace the old paper cards.[2,3] The national identification database is expected to be linked together with the vital statistics database and systems from the National Electoral Commission, Tanzania Revenue Authority, President's Office, Public Service Management, Ministry of Labor and Employment, Interpol, as well as health, education, and police databases.[4] | |

| BASIC NATIONAL IDENTITY PROGRAM INFORMATION | |
|---|---|
| **Institution(s) Managing the Program:** | National Identification Authority[5] (Cards are issued by Iris Corporation Berhad, a Malaysian firm) [6] |
| **Funding Source:** | The Government of the United Republic of Tanzania and bank loans[7,8] |
| **Budget for Program Operation:** | Total project cost is estimated at 237.6 billion Tanzanian shillings (US$ 149 million) for issuing identity cards to between 23 million and 25 million people.[9] |
| **Target Population:** | All Tanzanian citizens, residents, and refugees,[10] with registration occurring first for residents in Dar es Salaam Region in 2012.[11] |
| **Target Age:** | Not specified |
| **Year Introduced:** | The project started in 2008; [12] registration of citizens began in 2012. [13] |
| **Program Currently Active:** | Operational and in use & still actively enrolling as of March, 2015[14,15] |
| **Are Changes to the Program Planned or Anticipated:** | Not Specified |

| NATIONAL IDENTITY PROGRAM METHODOLOGY | | | |
|---|---|---|---|
| **Mandatory Enrollment:** | Yes[16] | **Method of Enrollment / Initial Capture:** | National database; cameras[17,18] |
| **Physical Credential Involved in Authentication:** | Yes (smartcards)[19] | **Electronic Component Involved in Physical Credential:** | Yes[20] |
| **Personal Information Involved in Authentication:** | Not specified | **Photo of Individual on Physical Credential:** | Yes[21] |
| **Biometric Information Involved in Authentication:** | Fingerprint, eye, digital signature, and photograph[22,23] | | |

| PROGRAM IMPLEMENTATION | |
|---|---|
| **Level of Coverage:** | The ID program has been implemented in Dar es Salaam, Coast, Lindi, Morogoro, Mtwara and Tanga regions of Tanzania mainland and Zanziba,r with Over 6.1 million people registered and 1.7 million issued with IDs as of March 2015 (6.8% of the target population of 25 million).[24] |
| **Challenges with enrollment or use of the program by the poor:** | Not specified |
| **% of the enrolled who are poor:** | Not specified |
| **Challenges with enrollment or use of the program by women:** | Not specified |
| **% of the enrolled who are women:** | Not specified |

| Challenges with enrollment or use of the program by other populations: | Not specified |
|---|---|
| Cost/Person: | 9,504 - 10,330 Tanzanian shillings (US$5.96 – US$6.48) based on 237.6 billion Tanzanian shillings (US$149 million) for issuing identity cards to between 23 million and 25 million people.[25] |
| Challenges with Implementation or Program: | • **Cost and Human Capacity** – High costs and a lack assigned personnel to support the program slowed implementation at the beginning and caused the government to temporarily suspend the issuance of national identity cards. [26,27] |
| Process for responding to implementation challenges: | Not specified |

## FUNCTIONAL USES OF PROGRAM

### Financial Services
- **KYC**: The Managing Director of CRDB, a prominent bank in Tanzania, said that the new national ID would lower the cost of registering new customers and the cost of lending because the ID offers stronger guarantees of customers' identity and information.[28] Where before bank officials had to conduct home visits to verify a customer's address, now the ID can reliably provide that information. The Director cited that lower costs would be passed on to customers.  A national ID has also been cited as necessary to address facilitating easier identification for would-be borrowers of housing loans. [29] The national ID system, in conjunction with the credit bureau, is said to be expected to significantly raise credit provision.[30]
- **Social Transfers:** The national ID will be used to enable agencies that issue social pension funds to identify beneficiaries.[31] The Deputy Minister of Home Affairs said that the government will also use the national ID to "establish efficient and accountable ways to implement social relief projects."[32] The central database also provides a foundation for supporting other citizen-centric services. [33]

### Agricultural Services
- The Managing Director of CRDB Bank said that the new national ID would lower the cost of registering new customers and the cost of lending. He cited that lower costs would lead more accessible agribusiness loans for rural populations.[34]

### Election
- **Voter registration and monitoring**: National IDs can be used to register to vote. Biometric information associated with the IDs will be used to de-duplicate voter databases and ensure only eligible voters participate in elections, preventing voter fraud.[35,36]

### Surveillance and Security - Law enforcement and Passport
- **Law enforcement**: It is believed that the electronic ID cards will be useful to combat organized crime and illegal trade given that law enforcement, immigration, revenue, and other officials will have access to the citizen registry, thus enabling coordination and information sharing across agencies.
- **Passport:** The national ID doubles as a passport for travel between East African Community member countries.[37]

### Other
- The identification database is the basis for *development of a* civil servants information system.[38] By running government payrolls and pension payments with the help of a national ID system and through systems that require biometric verification of identity when making and collecting payments, the Tanzanian government can weed out ghost workers from the civil system and save an estimate US $6 million.[39]

[1] Makoye, 2013
[2] ID World – ID Community Publications, 2015
[3] Makoye, 2013
[4] African Health Observatory, World Health Organization Africa, 2015
[5] Ibid.
[6] Ibid.
[7] Ibid.
[8] Great Lakes Voice, 2015
[9] Mugwe, 2013
[10] Ibid.
[11] African Health Observatory, World Health Organization Africa, 2015
[12] Id World – ID Community Publications, 2015
[13] African Health Observatory, World Health Organization Africa, 2015
[14] Id World – ID Community Publications, 2015
[15] Nachilongo, 2015
[16] Issa, et al., 2015
[17] Id World – ID Community Publications, 2015
[18] Makoye, 2013
[19] Great Lakes Voice, 2015
[20] Ibid.
[21] Id World – ID Community Publications, 2015
[22] Ibid
[23] Makoye, K2013
[24] Nachilongo, 2015
[25] Mugwe, 2013
[26] Id World – ID Community Publications, 2015
[27] Nachilongo, 2015
[28] Mugwe, 2013
[29] Kironde, et. Al. 2003
[30] CGAP and McKinsey, 2015
[31] Robertson, et al., 2012
[32] Id World – ID Community Publications, 2015
[33] Ibid.
[34] Magomba, 2014
[35] Ibid.
[36] Makoye, 2013
[37] President of the Republic of Uganda, 2015
[38] African Health Observatory, World Health Organization Africa, 2015
[39] Zelazny, 2012

Table D.12 Uganda Case Study

| UGANDA - National ID Program | |
|---|---|
| **INTRODUCTION/BACKGROUND:** The National Security Information System (NSIS) was implemented by Uganda's Ministry of Internal Affairs to capture, store and process citizens' data.[1] The NSIS project registers all Ugandan nationals, and issues national ID numbers and ID cards. The system was enacted to help enable national security to facilitate the provision of fair and equitable civil administration services. [2] | |

| BASIC NATIONAL IDENTITY PROGRAM INFORMATION | |
|---|---|
| **Institution(s) Managing the Program:** | Ministry of Internal Affairs[3] (The National Information Technology Authority (NITA) and a private company, Muhlbauer ID services, provide technical support.)[4,5] |
| **Funding Source:** | Not specified |
| **Budget for Program Operation:** | Not specified |
| **Target Population:** | All citizens[6] |
| **Target Age:** | 16[7] |
| **Year Introduced:** | 2014[8] |
| **Program Currently Active:** | **Operational and in use/actively enrolling**; national ID card registration will resume in 2016 for citizens age 0 to 15 years, after the national general elections. [9] |
| **Are Changes to the Program Planned or Anticipated:** | Not specified |

| NATIONAL IDENTITY PROGRAM METHODOLOGY | | | |
|---|---|---|---|
| **Mandatory Enrollment:** | Yes[10] | **Method of Enrollment / Initial Capture:** | Camera, Scanner[11] |
| **Physical Credential Involved in Authentication:** | Yes (biometric, machine-readable card)[12] | **Electronic Component Involved in Physical Credential:** | Yes[13] |
| **Personal Information Involved in Authentication:** | Name, gender, date of birth, identification number, and expiry date[14] | **Photo of Individual on Physical Credential:** | Yes[15] |
| **Biometric Information Involved in Authentication:** | FingeFinrprint, face, and DNA[16,17] | | |

| PROGRAM IMPLEMENTATION | |
|---|---|
| **Level of Coverage:** | 99%[18] |
| **Challenges with enrollment or use of the program by the poor:** | Yes – cost barrier. Although registration is free, there is an indirect cost for obtaining a local council letter, which is a requirement by the verification committees in Akwang sub-county for registering any person.[19] |
| **% of the enrolled who are poor:** | Not specified |
| **Challenges with enrollment or use of the program by women:** | Not specified |
| **% of the enrolled who are women:** | Not specified |
| **Challenges with enrollment or use of the program by other populations:** | Yes - enrollment assistance to citizens in need—such as the sick, those with language barriers, the physically-handicapped and the elderly— is not being provided in all areas. Prisoners are not eligible to enroll.[20] |
| **Cost/Person:** | Not specified |

| | |
|---|---|
| **Challenges with Implementation or Program:** | • **Accountability**: There are reports of officials soliciting money from Ugandans seeking to register for national identity cards.[21] Serious procurement problems delayed the project in 2010, as several former ministers were accused of violating procurement laws by awarding contracts to a private supplier without a due diligence process.[22],[23]<br>• **Enrollment**: In rural registration centers, staff are reported to be ill-trained on effective use of biometric enrollment kits.[24]<br>• **Cost**: The short implementation period for the large-scale registration and enrollment of citizens created labor and cost considerations that delayed the project.[25] |
| **Process for responding to implementation challenges:** | **Micro-Level (Individual Issues):**<br>• Handicapped or sick individuals can report challenges getting to registration; however, no processes are in place to assist those individuals to physically travel to registration centers.[26]<br><br>**Macro-Level (Systematic Issues):**<br>• To address the problem of bribery, Internal Affairs has directed police to arrest local leaders and officials soliciting money from registrants.[27] |

**FUNCTIONAL USES OF PROGRAM**

Financial Services
• **KYC**: National identity cards are becoming a requirement at financial institutions to open bank accounts and acquire loans.[28]
• **Social Transfers**: NSIS plans to integrate the national ID with social security benefits delivery.[29]

Health
• **Tracking services and treatment**: NSIS plans to integrate National Health Service & Hospitals Delivery – NHIS and patient management with the ID card.[30]
• **Verification of eligibility/coverage/benefits**: NSIS is linked to the Microcare Medical Access Treatment Card (MTAC).[31]

Election
• **Voting:** the national identity card is required in national elections to vote. Voter list generation and voter verification (smart elections) are planned to be integrated with the national ID cards when implementation is complete. [32]

Surveillance and Security
• **Border management**: border management will be integrated with the national ID.[33]
• **Passport**: the national ID doubles as a passport for travel between East African Community member countries.[34]

Other Functions
• **Education**: by 2017, Ugandan citizens will be unable to access school for his/her children without proof of identification using the National Identity Card.[35]
• **Civil Service Tracking**: biometric information on all government employees is contained within NSIS. Public employees must have a national ID in order to access payroll.
• **Taxes**: the Ugandan revenue authority is expected to utilize the NSIS registry for more "effective taxation targeting."[36] National identity cards are mentioned in a 2010 World Bank report as having potential to reduce tax evasion in Uganda.[37]

[1] United Nations Commission on Science and Technology for Development, 2010
[2] *Ibid.*
[3] National Information Technology Authority - NITA Uganda, 2015
[4] *Ibid.*
[5] Committee-on-Defense, Parliament of Uganda, 2015
[6] *Ibid.*
[7] Tentena, 2015
[8] National Security Information System, 2015b
[9] National Security Information System, 2015c
[10] The Independent Reporter, 2014
[11] Mwesigye, & Nangonzi, 2014
[12] Uganda Convention UK, 2014
[13] *ibid.*
[14] Mwesigye, 2013
[15] Uganda Convention UK, 2014
[16] National Security Information  System, 2015b
[17] The State House of Uganda, 2014
[18] National Security Information System, 2015a
[19] Mwesigye & Nangonzi, 2014
[20] Ibid
[21] Nyakairima, 2014
[22] Gelb & Clark, 2013
[23] Committee-on-Defense, Parliament of Uganda, 2015
[24] Mwesigye & Nangonzi, 2014
[25] Gelb & Clark, 2013
[26] Mwesigye & Nangonzi, 2014
[27] Nyakairima, 2014
[28] Ibid
[29] Uganda Convention UK, 2014
[30] Ibid
[31] Gelb & Clark, 2013
[32] Ministry of Finance, The Government of Uganda, 2014
[33] Uganda Convention UK, 2014
[34] President of the Republic of Uganda, 2015
[35] Uganda Convention UK, 2014
[36] Ibid
[37] World Bank, 2010

Table D.13 Zambia Case Study (1)

| ZAMBIA - National Registration Card (National ID Program) | | | |
|---|---|---|---|
| **INTRODUCTION/BACKGROUND:** Zambia first introduced its National Registration Card (NRC) in 1964.[1] More recently, the card has evolved to incorporate electronic and biometric features. Zambia became the first country in eastern and southern Africa to implement digital multipurpose National Registration Cards (NRC) with applications for voting, accessing banking services, and driving licenses.[2] | | | |
| **BASIC NATIONAL IDENTITY PROGRAM INFORMATION** | | | |
| **Institution(s) Managing the Program:** | The Department of National Registration, Passport and Citizenship[3] | | |
| **Funding Source:** | The United Nations Development Program (UNDP) and the government of Zambia[4,5] | | |
| **Budget for Program Operation:** | K25 million (US$3.26 million) for total project cost[6] | | |
| **Target Population:** | All citizens[7] | | |
| **Target Age:** | 16[8] | | |
| **Year Introduced:** | 1964[9] | | |
| **Program Currently Active:** | Actively enrolling[10] | | |
| **Are Changes to the Program Planned or Anticipated:** | Not specified | | |
| **NATIONAL IDENTITY PROGRAM METHODOLOGY** | | | |
| **Mandatory Enrollment:** | Yes[11,12] | **Method of Enrollment / Initial Capture:** | Camera, Scanner, and Other[13] |
| **Physical Credential Involved in Authentication:** | Yes (Electronic, plastic card)[14,15] | **Electronic Component Involved in Physical Credential:** | Yes[16,17] |
| **Personal Information Involved in Authentication:** | Not specified | **Photo of Individual on Physical Credential:** | Yes[18] |
| **Biometric Information Involved in Authentication:** | Fingerprint and face[19,20] | | |
| **PROGRAM IMPLEMENTATION** | | | |
| **Level of Coverage:** | Not specified | | |
| **Challenges with enrollment or use of the program by the poor:** | Not specified | | |
| **% of the enrolled who are poor:** | Not specified | | |
| **Challenges with enrollment or use of the program by women:** | Not specified | | |
| **% of the enrolled who are women:** | Not specified | | |
| **Challenges with enrollment or use of the program by other populations:** | Yes, rural residents are reported to have experienced difficulties in accessing NRCs because of distance to registration centers in town.[21] | | |
| **Cost/Person:** | Not specified | | |
| **Challenges with Implementation or Program:** | • **Accountability**: There are reports that people in some areas were asked to pay a fee to get the NRC.[22]<br>• **Enrollment**: Rural residents cannot be enrolled due to difficulties accessing registration centers located in town.[23] | | |
| **Process for responding to implementation challenges:** | Not specified | | |

| FUNCTIONAL USES OF PROGRAM |
| --- |

**Financial Services (including social transfers)**
- **KYC and digital banking** - identity cards are used at banks to comply with KYC rules. It is the intention of the government to further link the NRCs to the provision of financial services (e.g. online banking),[24] but confirmation that this has occurred cannot be found.

**Election**
- **Voting**: voters must present their NRC and voter card.[25]
- **Voter registration**: to register, voters must produce an NRC.[26]  Instead of carrying multiple cards, people can present their electronic NRC in the 2016 elections; this card will be to curb electoral malpractices rampant.[27]

[1] Kapambwe, 2015
[2] Malakata, 2010
[3] LusakaTimes, 2013
[4] *Ibid.*
[5] Malakata, 2010
[6] Nyirenda, 2015
[7] ZambiaLII, 2015
[8] *Ibid.*
[9] Kapambwe, 2015
[10] Zambia National Broadcasting Corporation, 2015
[11] Zambia Daily Mail, 2015
[12] ZambiaLII. *2015*
[13] United Nations Development Programme & Government of Zambia, 2009
[14] Zambia Daily Mail, 2015
[15] Malakata, 2010
[16] *Ibid.*
[17] United Nations Development Programme & Government of Zambia, 2009
[18] *Ibid.*
[19] *Ibid.*
[20] LusakaTimes, 2013
[21] Malambo, 2015
[22] *Ibid.*
[23] *Ibid.*
[24] Malakata, 2010
[25] The Carter Center, 2013
[26] *Ibid.*
[27] Malakata, 2010

Table D.14 Zambia Case Study (2)

| ZAMBIA - Voter's Card | |
|---|---|
| **INTRODUCTION/BACKGROUND:** Zambia placed democratic governance a priority in the Fifth National Development Plan 2006-2010.[1] The Electoral Commission of Zambia (ECZ), with United Nations' support, first used continuous Voter Registration for the election in 2006. It began to roll out a biometric multipurpose card 2010.[2,3] | |
| **BASIC NATIONAL IDENTITY PROGRAM INFORMATION** | |
| **Institution(s) Managing the Program:** | Electoral Commission of Zambia[4] |
| **Funding Source:** | The United Nations Development Program (UNDP)[5] |
| **Budget for Program Operation:** | US$7.3 million for total project cost[6] |
| **Target Population:** | All citizens[7] |
| **Target Age:** | 18[8] |
| **Year Introduced:** | 2010[9] |
| **Program Currently Active:** | Operational and in use[10] |
| **Are Changes to the Program Planned or Anticipated:** | Not specified |
| **NATIONAL IDENTITY PROGRAM METHODOLOGY** | |

| | | | |
|---|---|---|---|
| **Mandatory Enrollment:** | Not specified | **Method of Enrollment / Initial Capture:** | Not specified |
| **Physical Credential Involved in Authentication:** | Yes[11] | **Electronic Component Involved in Physical Credential:** | Yes[12] |
| **Personal Information Involved in Authentication:** | Not specified | **Photo of Individual on Physical Credential:** | Not specified |
| **Biometric Information Involved in Authentication:** | Fingerprint[13] | | |

| PROGRAM IMPLEMENTATION | |
|---|---|
| **Level of Coverage:** | 79%[14,15] |
| **Challenges with enrollment or use of the program by the poor:** | Not specified |
| **% of the enrolled who are poor:** | Not specified |
| **Challenges with enrollment or use of the program by women:** | Not specified - the Electoral Commission of Zambia has stated that its goal is to be comprehensive in registering voters, with a goal of registering 100 percent of qualified persons, including women, youth, and rural residents.[16] |
| **% of the enrolled who are women:** | Not specified |
| **Challenges with enrollment or use of the program by other populations:** | Not specified - the Electoral Commission of Zambia has states that its goal is to be comprehensive in registering voters, with a goal of registering 100 percent of qualified persons, including women, youth, and rural residents.[17] |
| **Cost/Person:** | Not specified |
| **Challenges with Implementation or Program:** | Not specified |
| **Process for responding to implementation challenges:** | Not specified |

| FUNCTIONAL USES OF PROGRAM |
| --- |

**Elections**
- **Voting:** the voter's card is required to vote[18]
- **Voter Registration:** this program is a voter registration program. Registry information will be linked to to the national citizen registry used for the National Registration Cards (NRC). [19,20]

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[1] United Nations Development Programme & Government of Zambia, 2009
[2] LusakaTimes, 2010
[3] Center For Global Development, n.d.
[4] LusakaTimes, 2010
[5]*Ibid.*
[6] United Nations Development Programme, 2009
[7] *Ibid.*
[8] *Ibid.*
[9] LusakaTimes, 2010
[10] United Nations Development Programme & Government of Zambia, 2009
[11] Malakata, 2010
[12] United Nations Development Programme, 2013
[13] Center For Global Development, n.d.
[14] *Ibid.*
[15] United Nations Development Programme & Government of Zambia, 2009
[16] *Ibid.*
[17] *Ibid.*
[18] The Carter Center, 2013
[19] Malakata, 2010
[20] Center For Global Development, n.d.