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Brief on ICT Trend

Digital Identity



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Correspondence concerning this report should be addressed to the email: apcict@un.org

Contact:

Asian and Pacific Training Centre for Information and Communication Technology for
Development (APCICT/ESCAP)
5th Floor G-Tower, 175 Art Center Daero,
Yeonsu-gu, Incheon, Republic of Korea
Tel +82 32 458 6650
Fax +82 32 458 6691/2
Email apcict@un.org
<http://www.unapcict.org>

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1. Introduction

Identity is defined by the International Telecommunication Union (ITU) as a “representation of an entity in the form of one or more attributes that allow the entity or entities to be sufficiently distinguished within context.”¹ The United Nations Sustainable Development Goals (SDGs), which aims at creating a better and more sustainable future for all also aims for every individual to have “free and universal legal identity, including birth registration by 2030.”⁶¹ This can be achieved through digital ID systems, which can also be instrumental for realizing other SDGs. The provision of identification— “proof of identity”—is embodied in SDG Target 16.9, which requires the provision of “legal identity for all, including birth registration.” In addition, identification is a key enabler of numerous other Targets, including 1.3 (implementing social protection systems), 1.4 (ensuring that the poor and vulnerable have control over land, property, and financial assets), 5a (giving poor women equal access to economic resources, including finance), 5b (enhancing the use of technology, including ICT to promote women’s empowerment), 10.7 (safe and responsible migration and mobility), 10c (reducing the cost of remittance transfer), 12c (phasing out harmful fuel subsidies), 16a (strengthening the capacity to fight terrorism and crime), 16.5 (reducing corruption), and many others.²

1.1 Benefits of identification

Identification of citizens of a country using an identity system helps the government to provide services, financial, health care, etc. benefits directly to the citizens. Identification of citizens can be helpful in achieving some of the following development benefits³:

¹ Bob Contri and Rob Galaski . Picture perfect A blueprint for digital identity. Deloitte. Available from <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Financial-Services/gx-fsi-digital-identity-online.pdf>

² World Bank, Principles on Identification. Available from <http://documents.worldbank.org/curated/en/213581486378184357/pdf/112614-REVISED-English-ID4D-IdentificationPrinciples-Folder-web-English-ID4D-IdentificationPrinciples.pdf>

³ Why Digital Identity? ID2020. Available from <https://id2020.org/digital-identity-1/>

Table 1: Development benefits of identification

A Fundamental Human Right	The Universal Declaration on Human Rights states that "everyone has the right to recognition everywhere as a person before the law."
A Gateway to Economic Opportunity	To move out of poverty and economic crisis, citizens should have access to a bank account or use official financial services, as more than 2.5 billion adults still do not have access to these resources.
Important for Gender Equality	Identity will empower women to prevent child marriage, exploitation and trafficking. It will also enable women to play a vital role in household decisions and to make them financially independent.
A Key Enabler of Global Development	To give the benefit of international goals we need to identify the audience that these goals target.
Necessary to Access Basic Services	The identification system will play a vital role to access healthcare and education, vote, and access other social welfare programs run by different organizations.
Critical for Accountability and Governance	Without identification, precise budgeting and its impact cannot be measured. In Nigeria, enrolment of civil servants saved approximately \$74M by eliminating "ghost workers" on a payroll.

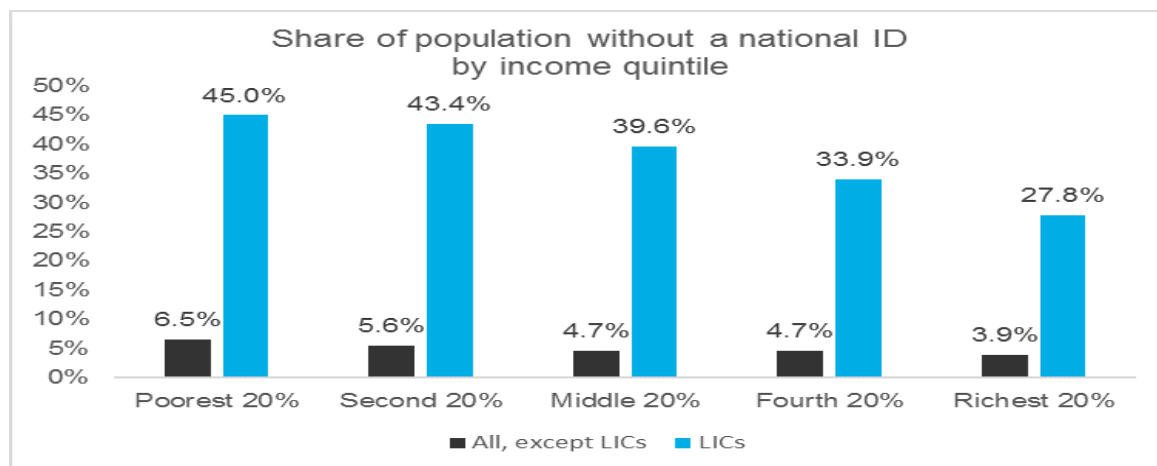
Source: <https://id2020.org/digital-identity-1/>

According to the World Bank, "1 billion people lack an official proof of identity."⁴ They face challenges in accessing services and economic opportunities such as financial services, official employment details, social inclusion, right to vote in elections etc.⁵ The lack of official proof of identity impacts disadvantaged groups in developing countries across Asia-Pacific and Africa. Figure 1 shows how access to national identity drops drastically when comparing the 20 per cent richest households to the 20 per cent poorest.

⁴ Global Identification Challenge by the Numbers. World Bank. Available from <https://id4d.worldbank.org/global-dataset/visualization>

⁵ Yiannis Theodorou. Digital Identity – Regulatory trends and the role of mobile. GSMA. <https://www.gsma.com/mobilefordevelopment/programme/digital-identity/digital-identity-regulatory-trends-and-the-role-of-mobile/>

Figure 1: Population without national ID by income quintile



Source: <https://blogs.worldbank.org/voices/global-identification-challenge-who-are-1-billion-people-without-proof-identity>

Moreover, according to the World Bank, “1 in 2 Women in low-income countries do not have an ID thus limiting their access to critical services and participation in political and economic life” (see Figure 2).⁶ Gender discrimination is a big challenge still faced by low-income countries (LICs) in Asia and Africa and identifying women via digital identity has a potential to empower them. Digital identity can help in creating schemes and services in order to uplift women in the society and facilitate their equal participation in economic and political activities. Having a digital identity can help women avail rights that they were previously not able to access due to a lack of valid identification proof – this includes their right to vote or right to financial services. With a digital identity, it is expected that they will be able to perform actions such as opening of bank account, getting a mobile connection or getting social security benefits in a much better and convenient manner.⁷ Digital identity can also help government agencies in monitoring if women specific schemes are reaching them.

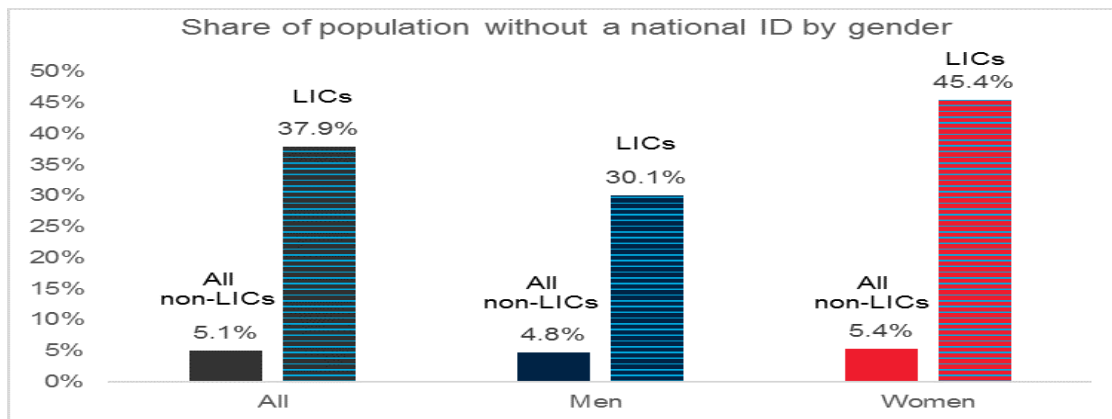
The identification of women has brought about a positive change in Pakistan, for example. 40 million women in Pakistan possessed a Computerized National Identity Card (CNIC) by 2012, and as per official report, it had significant empowerment effects on women, such as having a

⁶ Global Identification Challenge by the Numbers. World Bank. Available from <https://id4d.worldbank.org/global-dataset/visualization>

⁷ International Telecommunication Union, Digital Identity Roadmap Guide. Creative Commons Attribution 3.0 IGO (CC BY 3.0 IGO). Available from https://www.itu.int/en/ITU-D/ICT-Applications/Documents/Guides/ITU_eID4D_DIGITAL%20IDENTITY_ROAD_MAP_GUIDE_FINAL_Under%20Review_Until-05-10-2018.pdf

new sense of individual identity, exercising their right to vote, and enjoying legal protection as registered citizens of the country.⁸

Figure 2: Population with a national ID by gender



Source: <https://blogs.worldbank.org/voices/global-identification-challenge-who-are-1-billion-people-without-proof-identity>

1.2 Digital Identity

With the growing proliferation of digital technologies, the concept of digital identity has increasingly gained significance. The International Organisation for Standardisation (ISO) states that digital identity is an “item inside or outside an information and communication technology system, such as a person, an organization, a device, a subsystem, or a group of such items that has a recognizably distinct existence.” The World Economic Forum has defined digital identity as a “collection of individual attributes that describe an entity and determine the transactions in which that entity can participate”.

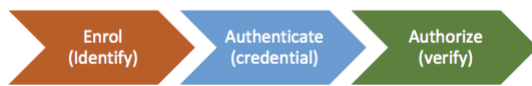
The attributes of digital identity can be divided into different categories such as birth-related information (name, place of birth, date of birth, etc.), descriptive information (height, weight, physical traits, etc.), personal identifiers (e.g. social security number) and biometric data (fingerprint, DNA, iris, etc.)⁹.

⁸ Lucia Hanmer. Identification for Development: Its Potential for Empowering Women and Girls. World Bank. Available from <http://blogs.worldbank.org/ic4d/identification-development-its-potential-empowering-women-and-girls>

⁹ Nancy Sundberg. Digital identity in the ICT ecosystem: An overview. ITU. Available from https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-BB.ID01-2018-PDF-E.pdf

Figure 3: A three-step approach to digital identification and access to online transactions

Identification process



Source: https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-BB.ID01-2018-PDF-E.pdf

Figure 3 depicts a three-step approach to digital identification and access to online transaction. The first step in the process pertains to enrolment into the digital identification system by registering via unique characteristics of the individual. The second step is authentication that involves credential matching and the final step is to authorize the user to access critical data in secure manner for online transactions¹⁰.

A digital ID system can be further imagined as made up of the following processes and building blocks¹¹:

- Capturing data: Identity data like biometrics that can be used to provide a unique identity to people.
- Storing data: Electronic databases are used to store identity data electronically, as opposed to on paper. Electronic databases also help in recovery of data in case of disaster or loss of data.
- Offering credentials: Smartcards or unique numbers may be used to issue electronic form of identity documentation.
- Offering services: Identification system helps in offering electronic services linked with the digital ID

Table 2 provides some guiding principles that can be used while designing a digital identity system.

¹⁰ International Telecommunication Union, Digital Identity Roadmap Guide. Creative Commons Attribution 3.0 IGO (CC BY 3.0 IGO). Available from https://www.itu.int/en/ITU-D/ICT-Applications/Documents/Guides/ITU_eID4D_DIGITAL%20IDENTITY_ROAD_MAP_GUIDE_FINAL_Under%20Review_Until-05-10-2018.pdf

¹¹ Nancy Sundberg. Digital identity in the ICT ecosystem: An overview. ITU. Available from https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-BB.ID01-2018-PDF-E.pdf

Table 2: Guiding Principles for digital identity

Social Good	The system is available to all users and delivers maximum benefit to a range of stakeholders.
Privacy-enhancing	User information is exposed only to the right entities under the right circumstances.
User-centric	Users have control over their information and can determine who holds and accesses it.
Viable and sustainable	The system is sustainable as a business and withstands shifting political priorities.
Open and flexible	The system is built on open standards to allow scaling and development; standards and guidelines are transparent to stakeholders.

Source: <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Financial-Services/gx-fsi-digital-identity-online.pdf>

Various stakeholders in the public and private sectors may benefit from a private, secure and transparent identification system. It may help in reaching out to more citizens and consumers, generating more revenue and better estimating the risk involved in transactions. The use of digital identification systems can help in creating savings for citizens, governments, and businesses by reducing transaction costs, increasing efficiency, and driving innovation in service delivery, particularly to the poorest and most disadvantaged groups in society.

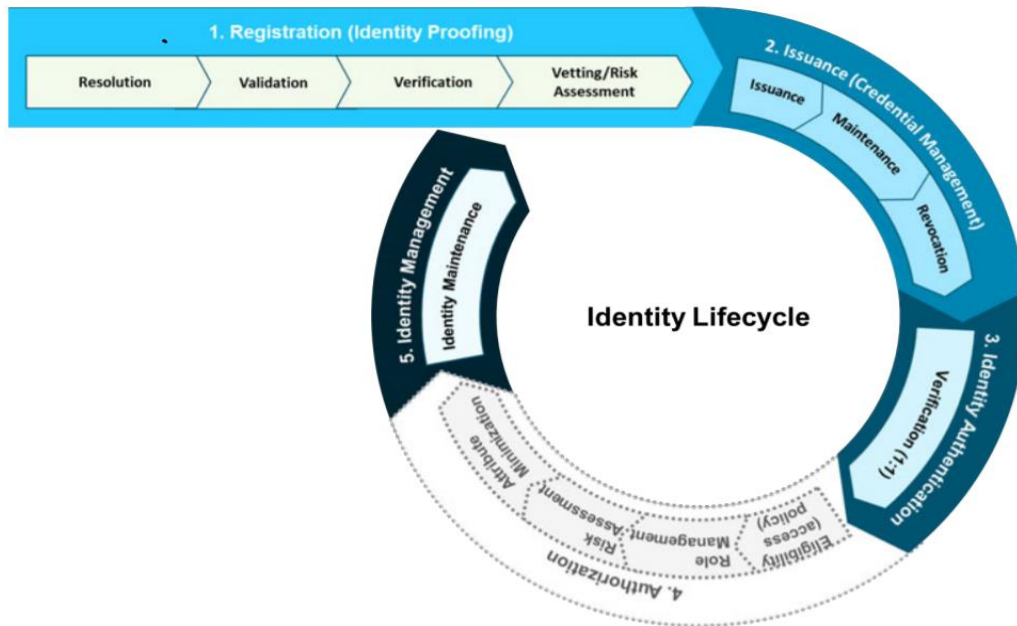
In Oman, for example, the government launched the Electronic Certification (TAM) service provided by the National Digital Certification Centre (NDCC) at the Information Technology Authority (ITA) to provide electronic access to government services and transactions using digital authentication. The citizens of Oman need to activate electronic certification on their ID card and they also need card reader to access its services. The services include medical appointments to registering as a job seeker and making tax payments. The use of digital identity has empowered the government to perform 7.2 million electronic transactions using the ID card and 2.1 million electronic transactions using Mobile ID by end of 2017.

The city of Zug in Switzerland announced in July 2017 that it intended to offer digital identities on an app to its citizens using blockchain technology associated with a crypto address. The system is said to be completely decentralized and an app is expected to enable citizens to register their identities while the town will proceed with the verification using its own identity control procedures. The city conducted an “e-voting” consultation in 2018 using this technology.

2. Technologies for Digital Identity

Digital ID systems need to incorporate all the processes starting from application by an eligible person to removal or invalidation of the person's record owing to death, request for removal by the individual, or any other event¹² – this includes registration (identity proofing), issuance (credential management), identity authentication, authorization and identity management (see figure 4).

Figure 4: Identity lifecycle



Source:

<http://pubdocs.worldbank.org/en/199411519691370495/ID4DTechnologyLandscape.pdf>

Recent advancements in technology offer many options in the implementation of national digital identification system. Some of the principles that are considered useful while designing digital ID systems are given below¹³:

¹² The terminologies used in this framework align with NIST standards and existing ID4D literature published by the World Bank

¹³ Principles on Identification World Bank Available from <http://documents.worldbank.org/curated/en/213581486378184357/pdf/112614-REVISED-English-ID4D-IdentificationPrinciples-Folder-web-English-ID4D-IdentificationPrinciples.pdf>

Table 3: Principles for designing digital ID systems

Inclusion	<ul style="list-style-type: none">• Ensuring universal coverage for individuals from birth to death, free from discrimination• Removing barriers to access and usage and disparities in the availability of information and technology
Design	<ul style="list-style-type: none">• Establishing a robust—unique, secure, and accurate—identity• Creating a platform that is interoperable and responsive to the needs of various users• Using open standards and ensuring vendor and technology neutrality• Protecting user privacy and control through system design• Planning for financial and operational sustainability without compromising accessibility
Governance	<ul style="list-style-type: none">• Safeguarding data privacy, security, and user rights through a comprehensive legal and regulatory framework• Establishing clear institutional mandates and accountability• Enforcing legal and trust frameworks through independent oversight and adjudication of grievances

It has been suggested that the technology architecture of a digital ID system should incorporate options for vendor neutrality, linear scalability and data security¹⁴ as elaborated below:

- **Open architecture** – It should be designed and built to work with any device, any network and on any form factor. The system should also be built based on open standards to ensure interoperability. The system should support open APIs and standard interfaces.
- **Design for scale** – It should be made with the idea of incorporating data of millions of citizens of a country. The system should be built to handle hundreds of millions of transactions across billions of records doing hundreds of trillions of biometric matches per day. For horizontal scaling, multi-location distributed architecture could be used along with load balancing to achieve desired scalability. IBM Corporation describes distributed systems¹⁵ as “A system that consists of multiple software components that are on multiple computers but run as a single system”. In digital ID systems, data could be stored at geographically dispersed locations but connected to each other via wide area network (WAN). These systems will then need load balancing capabilities so that they minimize the processing time for authentication/enrolment requests.

¹⁴ Michele Nemschoff. Architecting the World’s Largest Biometric Identity System: The Aadhaar Experience. Mapr. <https://mapr.com/blog/architecting-worlds-largest-biometric-identity-system-aadhaar-experience/>

Today, Estonia claims to have a highly-developed national ID card system. The Estonian government has created this system with the goal to create an advanced digital society by building an efficient, secure and transparent ecosystem that saves time and money. Electronic identity card is used as a definitive proof of identity in a digital and physical context. The chip on the card carries embedded files, and using 2048-bit public key encryption, it can be used as definitive proof of ID in an electronic environment. In 2007, a Mobile-ID mobile solution (dependent on SIM) was introduced, which allows citizens to use mobile phones as a form of digital identity, avoiding having a card reader¹⁶.

- **Data Security** – The Aadhaar ID system of India, for example, uses 2048-bit PKI encryption and tamper detection using HMAC, so that no type of attack can breach its security and misuse the personal information of the citizens. In the data centres of the authority responsible for managing the Aadhaar infrastructure, data is kept in encrypted format so that no internal breach can violate citizens’ right to privacy. The system also is not designed to track any kind of transactional data. In Tanzania the following authentication methods are adopted:
 - Fingerprint or PIN matching against central database through Common Interface Gateway and APIs
 - Fingerprint matching against smartcard
 - Secure web portal to access demographic data (National Identification Number + PIN)
 - Public Key Infrastructure for authentication when online services⁷².

3. Applications of Digital IDs

Below are examples of the applications of Digital ID systems in Asia and the Pacific.

3.1 Healthcare¹⁷

With the increase in worldwide population, health care systems are in needs of identity proofing mechanism. This identity validation can be done by using a legal identity or physical identity. Country’s legal identity includes passport, license, or any other national identification system.

Physical identity consists of biometrics with multiple layers of the biological entity via iris, fingerprint, face recognition etc.

¹⁶ International Telecommunication Union, Digital Identity Roadmap Guide. Creative Commons Attribution 3.0 IGO (CC BY 3.0 IGO). Available at https://www.itu.int/en/ITU-D/ICT-Applications/Documents/Guides/ITU_eID4D_DIGITAL%20IDENTITY_ROAD_MAP_GUIDE_FINAL_Under%20Review_Until-05-10-2018.pdf

¹⁷ Gus Malezis. Digital Identity in Healthcare: Building on the Banking Model. HFMA. Available from <https://www.hfma.org/Content.aspx?id=61233>

In a scenario, for example, where after an accident a patient is not in a state to provide his/her identity, biometric identification can come handy and emergency care can be provided to the person immediately.

Karta Tanda Penduduk (KTP)¹⁸, is the identity card of Indonesia which has a corresponding electronic version named eKTP. The eKTP stores fingerprints of all ten fingers in the database. The card is used by the citizens to avail the benefits of healthcare program, access to public services and other welfare schemes.

Similarly, in Thailand, citizens of the country are given national ID known as PID when they attain an age of seven. The cards issued by the Thailand government acts as a primary means to authenticate the identity of citizens. They are also used for availing healthcare services. The successful implementation of the PID system enabled the government to efficiently implement its Universal Coverage Scheme (UCS) in 2001, guaranteeing subsidized healthcare to all citizens. The scheme helped in monitoring and tracking the patients, their vaccinations and other statistics involving public health policy. The government is also making sure to give benefits while maintaining privacy, data protection, and ethical standards.¹⁹

3.2 Women Empowerment

Women from low-income countries still struggle to exercise their rights due to lack of identification, which also restricts them in availing government programs and access to basic services⁷⁹.

The scarcity of data about women and girls creates obstacles in the efforts to minimize gender discrimination. According to the World Bank, “there is considerable variation within and between countries and regions, but in most countries, gender inequalities tend to be greater among the poor than the rich, especially in education, health, and economic opportunities”.

Data gathering via digital ID systems can be a key step to develop evidence-based policies that can help empower women and girls and help in lifting the constraints that discriminate women with other section of the society. The data can also help in assessing the progress to achieve sustainable development goals²⁰.

Many countries have started to implement national ID schemes that aim to be inclusive for marginalized groups. India launched the Aadhaar program to provide a foundational ID service

¹⁸ Aditya Madanapalle. HOW AADHAAR COMPARES TO OTHER BIOMETRIC NATIONAL IDENTIFICATION SYSTEMS AROUND THE WORLD. First Post. Available from <https://www.firstpost.com/tech/news-analysis/how-aadhaar-compares-to-other-biometric-national-identification-systems-around-the-world-3700543.html>

¹⁹ World Bank. 2018. The Role of Digital Identification for Healthcare: The Emerging Use Cases Available from <http://pubdocs.worldbank.org/en/595741519657604541/DigitalIdentification-HealthcareReportFinal.pdf>

²⁰ Mariana Dahan and Lucia Hanmer. Potential for Empowering Women and Girls. World Bank. Available from <http://documents.worldbank.org/curated/en/859071468190776482/pdf/99543-WP-P156810-PUBLIC-Box393205B.pdf>

for all residents, including the marginalized groups. The Aadhaar program does not discriminate between citizens of the country based on which social group they belong to, it only relies on biometric authentication via the central database instead of an ID card.

As mentioned earlier, presence of a digital ID system can ensure that benefits meant for women, such as conditional cash transfers, reach them. In Pakistan, for example, the use of biometric IDs is a prerequisite for accessing cash transfer programs, ensuring that payments to female beneficiaries are delivered directly to them rather than to their male relatives. The government of Pakistan²¹ launched Benazir Income Support Program (BISP), in which the cash transfers could be given only to the female head of the eligible household and, further, possession of a Computerized National Identity Cards (CNIC) was a prerequisite for enrolment in BISP. This move by the government helped to empower women and provide them with legal identification.

3.3 Finance and Trade

Digital IDs can change the way we interact with physical or digital platforms. Many types of transaction, either online or offline, now involve user authentication via digital identification systems. The increase of digitization has also, however, led to an increase in fraud, identity theft, and compromised account information. Many businesses are working towards developing a digital profile for their customers to ensure security and reduce the risk of fraud. With recent technologies, like blockchain, the online transaction systems have a potential to be further revolutionized. Using blockchain to help create the aforesaid digital profiles could be a step forward in preventing fraud and information misuse.

Some UN agencies such as the UN Capital Development Fund (UNCDF) and the UN Development Programme (UNDP) along with the Sierra Leone Government are developing a blockchain-based ID system for seven million population of the country. The UN agencies have partnered with Kiva, a technology non-profit for this purpose. The identity network will be built like blockchain assets in a decentralized network, complete and secure ownership to the user like that of Bitcoin²².

The blockchain technology is considered secure and any tampering is easily trackable, which creates trust in data and can be used by national organizations for verification. Blockchain technology comes with cryptography mechanisms that make it very difficult to be vulnerable for any kind of security threat.

80 per cent of Sierra Leone population still lacks the formal identification which restricts them to engage in start-ups and small businesses. Currently, the citizens without digital identity and

²¹ Pakistan: Building Equality for Women on a Foundation of Identity. World Bank.

<http://id4d.worldbank.org/country-action/pakistan-building-equality-women-foundation-identity>

²² Yashu Gola. Sierra Leone, United Nations to Develop Blockchain Digital ID System. CCN.

<https://www.ccn.com/sierra-leone-united-nations-to-develop-blockchain-digital-id-system/>

credit history cannot access the mainstream financial system. According to UNCDF²³, “the Kiva Protocol will capture a wide range of financial transactions—from bank loans to credit with a local shopkeeper—to help people access the financial services they need, including loans for businesses, education or basic medical services.”²⁴

The benefits to financial institutions in using a digital ID system could be numerous, as illustrated in the table below:

Offerings	Firms can use detailed and trusted customer information to provide customers with tailored services.
Operations	Digital attribute transfer and handling let financial institutions streamline and automate many processes, eliminating human error.
Security	The secure, digital storage of user information reduces fraud resulting from stolen information or compromised authentication.
Compliance	Thanks to digital attribute handling and greater access to user identity, compliance becomes easier and more accurate.
Revenue	Firms get the chance to increase revenue from improved products and services as well as offer identity-as-a-service.
Competitiveness	Financial institutions offer a streamlined user experience and position themselves as a critical part of the digital economy.

Table 4: Benefits of digital ID to financial institutions

Source: <https://www2.deloitte.com/content/dam/Deloitte/global/Documents/Financial-Services/gx-fsi-digital-identity-online.pdf>

4. Challenges and Policy Implications

Digital ID systems are largely built with the intention of providing the citizens the ability to access their development rights related to healthcare, education, food security etc. They are especially expected to help the vulnerable groups, refugees, stateless people, women to avail entitlements and services guaranteed by their respective national governments and public agencies. However, given that such ID systems handle the identity information of large number of citizens, they are susceptible to serious concerns related to data security and privacy of the individuals. The sections below highlights some of the concerns that policy makers need to be aware of to devise appropriate response strategies.

²⁴ Karima Wardak. Kiva, Sierra Leone and United Nations Agencies Partner to Implement "Credit Bureau of the Future" . UNCDF. Available from <http://www.uncdf.org/article/3948/kiva-sierra-leone-and-united-nations-agencies-partner-to-implement-credit-bureau-of-the-future>

The World Bank Group (WBG) launched its cross-sectoral Identification for Development (ID4D) initiative in 2014 to support countries in building such robust, inclusive, and responsible identification systems. The three pillars of ID4D are “Thought Leadership,” “Global Convening and Platforms,” and “Country and Regional Engagement.” ID4D is guided by senior leadership and a working group with members from multiple Global Practices and Departments.²⁵

4.1 Privacy²⁶

The early 2018 Cambridge Analytica scandal involving unauthorized harvesting of personal data from millions of people’s Facebook profiles to influence voting behaviour provided a lesson that personal data can be exploited in ways that harm democracies, and the need to build robust security and policy guidelines to protect personal online digital datasets. The system can create a threat by compromising confidential information about an individual including unique fingerprint and iris scan. The digital ID system can potentially have significant benefits for nations and their citizens, but the risks to privacy that are associated with these programmes can also lead to racial and social profiling with a potential for triggering catastrophic mishaps.

India’s digital ID system, Aadhaar, has been termed as “one of the most brazen breaches of the right to privacy and the right to live initiated by the government of a democratic country.”²⁷ In response to the problems in the Aadhaar system the highest court of India, the Supreme Court, in a recent judgement²⁸ while stating that “the program’s invasion of privacy was minimal and served a much larger public interest by providing identities to India’s poor and marginalized citizens”, struck down the national security exception under the Aadhaar Act. This judgement indirectly ensures greater privacy of individual’s Aadhaar data while restricting the government access to it.

4.2 Inclusion

Digital ID systems are being built with the idea that the system will be inclusive for all vulnerable groups. SDG 16 is about inclusiveness and access to justice, institutions, and basic services. A concern on this aspect arises when, instead of being inclusive, digital ID systems may lead to the creation of another barrier for marginalized groups.

²⁵ World Bank. 2018. Guidelines for ID4D Diagnostics, Washington, DC: World Bank License: Creative Commons Attribution 3.0 IGO (CC BY 3.0 IGO). Available from:

<http://pubdocs.worldbank.org/en/370121518449921710/GuidelinesID4DDiagnostic-030618.pdf>

²⁶ Wafa Ben-Hassine. Digital identity programs: what could go wrong? Our contribution at UNCTAD’s E-Commerce Week. Available from <https://www.accessnow.org/digital-identity-programs-what-could-go-wrong-our-contribution-at-unctads-e-commerce-week>

²⁷ Reetika Khera. These digital IDs have cost people their privacy — and their lives. Available from https://www.washingtonpost.com/news/theworldpost/wp/2018/08/09/aadhaar/?noredirect=on&utm_term=.1262f6e74d4a

²⁸ What Supreme Court’s Aadhaar verdict means for you: 10 points. Available from <https://www.livemint.com/Companies/cpSHu1fjQ1WvOP8vMi27aL/What-Supreme-Courts-Aadhaar-verdict-means-for-you-10-point.html>

Again, in India, it has been reported that hundreds of thousands of people have been denied access to basic services because they either do not have an Aadhaar card, or their digital identity is “incomplete” because their fingerprints have not been uploaded to the national database due to poor internet connectivity.²⁹

The development and deployment of a digital ID system should ensure that all groups of the society can access and avail the benefits associated with the digital ID system.

4.3 Infrastructure

Building a suitable digital infrastructure to support the needs of low latency in authentication and heightened data security can be a big challenge for developing countries that may have limited resources and may want to invest more in other sectors such as healthcare and education, especially because of the high cost associated with setting up big server farms and purchasing proprietary software for digital ID systems. Policy framers need to achieve a fine balance in terms of resource investments and need to ask hard questions from the technology vendors before deciding on an appropriate digital ID strategy for their countries.

4.4 Political Considerations

The digital identification system may also face political challenges, particularly from those political parties that stand to benefit from the presence of weak identification systems. One major challenge is to make the system sustainable over a long period of time irrespective of the political formation in power. The number of stakeholders in the national identification system will be very large and overcoming resistance from all the stakeholders will require being attentive to multiple demands and needs.³⁰

4.5 Interoperability

Multiplicity of digital identity systems, for example across countries or provinces, can increase chances of fraud-related risks in verification and authentication processes as well as lead to data discrepancies. Making these systems interoperable will help in reducing duplication and increase efficiencies and veracity in the authentication and verification process. As of now there do not appear to be common global/international standards or frameworks for countries to design and implement their digital identity systems. In this context, the European Union’s eIDAS Regulation, could be useful. As mentioned in an ITU report⁷⁵, this regulation “requires that electronic identification schemes across EU countries be interoperable. It provides for the establishment of an interoperability framework that is to be technology neutral that follows international standards, facilitates privacy by-design, ensures personal data is processed in

²⁹ Gaurav Vivek Bhatnagar. Testimonies Reveal How Aadhaar Has Brought Pain, Exclusion to Poor. Available from <https://thewire.in/government/aadhaar-right-to-food-pain-exclusion>

³⁰ Nancy Sundberg. Digital identity in the ICT ecosystem: An overview. ITU. Available from https://www.itu.int/dms_pub/itu-d/opb/pref/D-PREF-BB.ID01-2018-PDF-E.pdf

accordance with the Directive 95/46 /EC and addresses accountability, transparency and security requirements of trust service provider.”³¹

The policy challenges and implications clearly show the vulnerabilities to robust, inclusive, and secure identification systems. Identification systems must have high levels of coverage and inclusion within the population, be robust to fraud and error, and operate within a governance framework that protects personal data, promotes trust and accountability, and facilitates end-user control.³² Identification systems should protect the user privacy and control via system design. Countries should also establish clear institutional mandates and accountability while building identification system.

³¹ PRINCIPLES ON IDENTIFICATION World Bank Available from <http://documents.worldbank.org/curated/en/213581486378184357/pdf/112614-REVISED-English-ID4D-IdentificationPrinciples-Folder-web-English-ID4D-IdentificationPrinciples.pdf>

³² World Bank. 2018. Guidelines for ID4D Diagnostics, Washington, DC: World Bank License: Creative Commons Attribution 3.0 IGO (CC BY 3.0 IGO). Available from: <http://pubdocs.worldbank.org/en/370121518449921710/GuidelinesID4DDiagnostic-030618.pdf>

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Glossary

Legal Identity: The recognition of a person before the law, which gives access to specific rights and corresponding duties.

Blockchain: It is a list of growing records known as blocks, which are linked using cryptography.

Linear Scalability: It is the ability to increase the input by a certain percentage and get an equal percentage increase in the output.

Acronyms

ID	Identification
WAN	Wide Area Network
CNIC	Computerized National Identity Card
ITU	International Telecommunication Union
ISO	International Organisation for Standardisation
GSMA	Global System for Mobile Communications
UCS	Universal Coverage Scheme
eKTP	Electronic Kartu Tanda Penduduk
UIDAI	Unique Identification Authority of India
PID	Personal Identification Number