

# Towards a bottom-up approach to inclusive digital identity systems

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## ABSTRACT

The path towards the United Nations objective of providing legal identity for all, including free birth registrations, has been facing several challenges. Particularly, the diversity of social realities, limited ICT infrastructures, inadequate legal frameworks, and unstable political engagement have resulted in solutions highly fitted to a specific scenario, thus hard to be replicated in different regions. Paired with noncomprehensive public services of civil registration, these aspects impact the way identity records are created, stored and used by citizens in their daily interactions. To tackle these impairments, this work introduces IDINA, a non-authoritative approach aiming at a community-oriented identification system underpinned by relations of social trust, inclusiveness, and the use of cutting-edge accessible technologies.

## CCS CONCEPTS

### • Human-centered computing;

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## 1 INTRODUCTION

According to The World Bank, globally, over a billion people lack the means to prove their identity. A reality that affects 15% of the world population, and impacts, in particular, Low-Income Countries (LIC), where 56% of women and 26% of children below five years old have no legal identity registry or birth certificate [1]. This global-scale problem imposes substantial limitations to the quality of life of populations, such as access to critical services (health care, education, social security, etc.), participation in economic activities, and engagement in political processes.

The vital importance of legal identity is historically recognized by the United Nations (UN), that established in Article 6 of the Universal Declaration of Human Rights [4], and in Article 16 of the International Covenant on Civil and Political Rights [5] that "every

individual has the right to recognition everywhere as a person before the law". Moreover, the right to a birth certificate is also stated in Article 7 of the Convention on the Rights of the Child [6] and Article 24(2) of the International Covenant on Civil and Political Rights [5]. More recently, these commitments were included in the UN's Sustainable Development Goals (SDG) of the 2030 Agenda [7], namely Goal 16.9, "provide legal identity for all including free birth registrations".

Motivated by the SDG, different multistakeholder alliances, such as ID2020<sup>1</sup> and ID4D<sup>2</sup>, have been investing in efforts towards the definition of functional requirements to build interoperable and trusted digital identification systems, and supporting countries in their deployment. Although some pilots have been deployed within these initiatives, they usually are designed for a specific scenario (e.g., the decentralized identity for refugees in Thailand<sup>3</sup>) or are integrated with the official civil registration entities<sup>4</sup>, which might limit the number of people covered by them, in the unfortunate and rather common scenario where these systems are noncomprehensive. In fact, for different reasons, in multiple regions, the State cannot provide most of the essential public services to their citizens. In such situations, non-governmental organizations cooperate with local leaders to complement or replace the public administration in delivering those services. Usually, these entities know the population better and are locally well-recognized as reputable structures. They also often possess more abundant and advanced technological resources than the State itself.

Due to their deep integration with local realities, these reputable entities can act as sources of information with the potential to enable the design and implementation of a pragmatic digital identity system aiming at being inclusive, though not managed by the State, and therefore, a non-authoritative solution.

To this end, the authors are developing IDINA, a project with the stated goal of design and implement a non-authoritative digital identity system filling the void stemming from a non-existent or incomplete State-managed legal identity system. It intends to be an inclusive solution enabling individuals to prove their identities in daily interactions, with low to no technological requirements (from the individual). This system can be seen as a stepping stone leading to a future full-fledged, State-managed authoritative system.

The distinguishing aspect of this project consists of relying on entities with local reputation as the primary source of data about the population they interact with. This aspect is also an important

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<sup>1</sup><https://id2020.org/alliance>

<sup>2</sup><https://id4d.worldbank.org/>

<sup>3</sup><https://www.irespond.org/>

<sup>4</sup><https://id4d.worldbank.org/country-engagement>

differentiating characteristic of this project from Self-Sovereign Identity (SSI) approaches [2]. The strategy adopted within this proposal gives rise to technical and operational challenges, which are described in Section 2 and Section 3.

## 2 NON-AUTHORITATIVE DIGITAL IDENTITY SYSTEM

As introduced in Section 1, a non-authoritative identity system consists of a pragmatic solution designed to provide secure and inclusive forms of personal proof of identity without requiring State attestation. Without an official entity vouching for someone's identity, this system will rely on statements made by reputable entities and citizens about individuals they interact with. The independent and distributed statements will gradually evolve from the status of evidence about an individual to consolidated information validated by different sources.

Depending on the confidence model adopted and the legal framework in place, the consolidated data about citizens can be incorporated, or even assume, the role of authoritative identification. In this context, the term "authoritative" means the State shall take this data as the legal identification attributes of its citizens.

Figure 1 shows a representation of how such a non-authoritative system enables the capitalization of the social relations of trust towards an inclusive solution for personal identification. Here, different reputable entities, such as Non-Governmental Organizations (NGO), local leaders and health care services can provide data about individuals they interact with. Presumably, data generated by distributed and uncoordinated sources will be incomplete, anonymized, non-structured or even divergent.

At the core of the system, this unconnected raw data will be consolidated into identity documents following a reinforcement model responsible for: data disambiguation; combining fragmented information from different sources; assessing data quality; and attributing weight to information according to its source trustworthiness. From this point, citizens will be able to use the resulting set of attributes as proof of identity in their daily interactions through either services developed over the system itself or through third-party entities connected to it. Furthermore, the consolidated identity might be recognized as valid certificates when interacting with official institutions.

Being a solution rooted in social interactions and community structures, the design and deployment of such a system need to be driven by requirements often neglected in more traditional digital identity systems, for instance:

- Sources should be able to keep acting autonomously without coordination
- Sources should not be required to have full-time access to the internet
- Individuals may have no access to smartphones or the internet
- Individuals may be required to act as proxies to others (e.g., parents and children)
- The system must guarantee sources and individuals privacy
- Individuals should have access to mechanisms allowing recovery and correction of data about them

- Identity representation and underlying services must be designed towards inclusiveness and usability
- The system might provide incentive mechanisms aiming at sources engagement

Along with these requirements, technical aspects related to interoperability, information security, system availability and scalability, accountability, and fraud detection comprise the core work to be developed within this project.

## 3 EMERGING CHALLENGES AND FINAL REMARKS

Conceiving and deploying a non-authoritative and community-oriented identification system demand overcoming emerging and exciting challenges. By mapping relations of social trust between individuals into information systems, such a development is no longer a purely technical solution as it requires contribution from the social and political sciences, which also consists of a promising research field [3].

With the aim of engaging reputable entities to act as data sources, a non-authoritative identity system must be secure and transparent by design. It means that its development must adopt cutting-edge technologies for data privacy and security. Also, technical and management procedures must be known to all entities involved, including providing audit mechanisms for raw and consolidated data while preserving the source privacy. The same level of confidence must be fostered along individuals identified through the system.

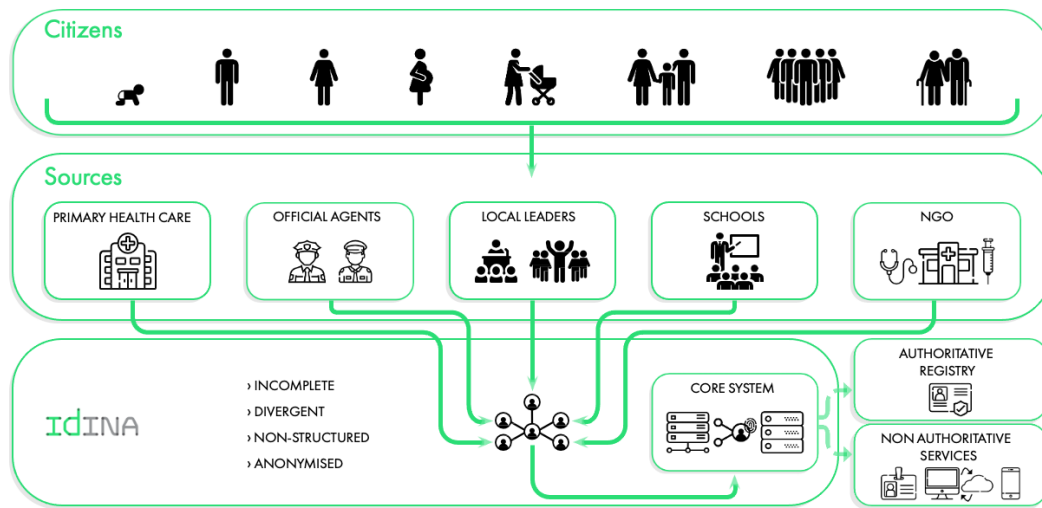
Another important challenge and a key success indicator consists of demonstrating the impact of this approach through Proofs-of-Concept (PoC) in locations afflicted by a non-existent or incomplete State-managed legal identity systems. Although it intends to be a system not managed by the State, deploying a PoC might be arduous without the support of local public administration agencies. To this end this support will also foster contacts with local leaders and entities operating in those areas towards a coordinated action for system deployment and for promoting the population's literacy and inclusiveness, in order to fully take advantage of this novel way to interact with an identification system.

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**Figure 1: IDINA - Non-authoritative system overview**

[7] United Nations. 2015. *The 2030 Agenda for Sustainable Development*. Technical Report.