

TECHNOLOGY AT THE SERVICE OF CITIZENSHIP: ARTIFICIAL INTELLIGENCE AND THE FIGHT AGAINST CIVIL UNDERREGISTRATION IN THE AMERICAS¹

TECNOLOGIA A SERVIÇO DA CIDADANIA: INTELIGÊNCIA ARTIFICIAL E O COMBATE AO SUBREGISTRO CIVIL NAS AMÉRICAS

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Abstract

This article analyzes the role of artificial intelligence (AI) in combating the underregistration of civil birth in Latin America, a problem that compromises the exercise of citizenship and the guarantee of fundamental rights for vulnerable populations. The central issue is to identify how AI can be applied ethically and efficiently to reduce underregistration rates, considering the social, legal, and technological specificities of the region. The general objective is to understand the potential of AI in the universalization of civil registration, while specific objectives include mapping international experiences, identifying barriers and risks, and proposing guidelines for the Brazilian context. The hypotheses assume that AI can optimize the identification of unregistered populations, provided it is supported by solid legal frameworks and integrated into intersectoral public policies. The

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The authors inform that generative artificial intelligence tools were used exclusively as linguistic and structural support in organizing the text, without replacing scientific analysis, critical review or authorial responsibility for the content presented.

methodology adopted is qualitative and comparative, based on documentary research, normative analysis, and case studies in countries across the Americas, with emphasis on Brazil, Mexico, Uruguay, and Colombia. The final considerations emphasize that AI is a promising tool to expand access to civil registration, provided it is accompanied by ethical algorithmic governance, social participation, and institutional strengthening. The development of integrated public policies that combine technological innovation and the protection of human rights is recommended in order to eradicate underregistration by 2030, in accordance with the United Nations Sustainable Development Goals.

Keywords: Artificial Intelligence; Civil Registration; Birth Registration; Social Inclusion; Latin America.

Resumo

Este artigo analisa o papel da inteligência artificial (IA) no combate ao subregistro civil de nascimento na América Latina, um problema que compromete o exercício da cidadania e a garantia de direitos fundamentais para populações vulneráveis. O problema central consiste em identificar como a IA pode ser aplicada de forma ética e eficiente para reduzir os índices de subregistro, considerando as especificidades sociais, jurídicas e tecnológicas da região. O objetivo geral é compreender o potencial da IA na universalização do registro civil, enquanto objetivos específicos incluem o mapeamento de experiências internacionais, a identificação de barreiras e riscos, e a proposição de diretrizes para o contexto brasileiro. As hipóteses pressupõem que a IA pode otimizar a identificação de populações não registradas, desde que respaldada por marcos legais sólidos e integrada a políticas públicas intersetoriais. A metodologia adotada é qualitativa e comparativa, baseada em levantamento documental, análise normativa e estudos de caso em países das Américas, com destaque para Brasil, México, Uruguai e Colômbia. As considerações finais ressaltam que a IA é uma ferramenta promissora para ampliar o acesso ao registro civil, desde que acompanhada de governança algorítmica ética, participação social e fortalecimento institucional. Recomenda-se o desenvolvimento de políticas públicas integradas que aliem inovação tecnológica e proteção dos direitos humanos, a fim de erradicar o subregistro até 2030, conforme os Objetivos de Desenvolvimento Sustentável da ONU.

Palavras-chave: Inteligência Artificial; Subregistro Civil; Registro de Nascimento; Inclusão Social; América Latina.

Summary: 1. Summary; 2. Civil birth underregistration: dimensions and implications; 3. Public policies in the fight against underregistration: Latin American experiences; 4. Artificial Intelligence and civil inclusion: technological opportunities; 5. Barriers and risks in the use of Artificial Intelligence for civil purposes; 6. Brazil: advances, challenges and perspectives in the digital era; 7. Comparative study: convergences and divergences in Latin America; 8. The contribution of AI to populations on the move; 9. The role of algorithmic governance in civil inclusion; 10. Final considerations; 11. References

1 INTRODUCTION

The right to civil birth registration constitutes the first step toward the exercise of citizenship and access to other fundamental rights. However, millions of people around the world, especially in Latin American countries, remain legally invisible due to the absence of this basic registration. Faced with this persistent

challenge, this article analyzes how artificial intelligence (AI) can effectively contribute to the eradication of underregistration, based on a comparative study among countries in the Americas. The proposal stems from the understanding that the strategic use of emerging technologies can expand the reach of public policies, reduce historical inequalities, and strengthen civil governance (UNICEF, 2023, p. 12).

According to the most recent data from IBGE, approximately 2.7% of children born alive in Brazil are not registered within the first year of life, with significantly higher rates in the North and Northeast regions, especially in rural areas and traditional communities. This data reveals the persistence of underregistration as a concrete and unequal reality, with direct implications for public policies and social protection (IBGE, 2023, p. 5).

Civil birth underregistration is a complex and multifactorial phenomenon, whose persistence compromises the realization of human rights, the protection of childhood, and the universalization of public services. Although normative and institutional advances have been recorded in several countries, there still exist pockets of exclusion where children and adults have neither a birth certificate nor any other official document. In regions such as the Brazilian Amazon, the Andes Mountain Range, and the indigenous territories of Mexico and Colombia, factors such as poverty, geographic distance, ethnic-racial discrimination, language barriers, and the absence of state infrastructure worsen this scenario (ECLAC, 2021, p. 45).

The central problem investigated in this article therefore lies in the following question: how can artificial intelligence be applied, ethically and efficiently, to reduce the rates of civil birth underregistration in Latin America and expand access to citizenship? The question implies examining the existing legal and institutional frameworks, the technical and operational capacities of States, and the social and ethical challenges related to the use of digital technologies in contexts of vulnerability. This is a topic of high legal, political, and humanitarian relevance, especially given the commitment assumed by several countries to the Sustainable Development Goals (SDGs), in particular target 16.9, which provides for "legal identity for all by 2030" (UN, 2022, p. 17).

The general objective of the article is to analyze the role of artificial intelligence in tackling civil birth underregistration, in light of a comparative study of public policies implemented in countries of the Americas. As specific objectives, it seeks to: (a) map successful international experiences that combine civil registration and AI; (b) identify the main barriers and risks related to the use of these technologies; (c) assess the potential for replicating these practices in Brazil, especially in hard-to-reach areas; and (d) propose guidelines for ethical and inclusive algorithmic governance in the field of civil documentation (Gomes; Teixeira, 2023, p. 42).

The hypotheses guiding the investigation are threefold. The first hypothesis holds that artificial intelligence can optimize the identification of populations at risk of underregistration, through predictive analysis of sociodemographic and

georeferenced data. The second hypothesis argues that the use of AI in civil registration systems depends on solid legal frameworks for the protection of personal data, under penalty of compromising fundamental rights and reinforcing inequalities. The third hypothesis holds that Brazil has the institutional and technological capacity to implement AI-based solutions, but that their effectiveness is conditioned upon intersectoral integration, social participation, and respect for cultural diversity (Cohen, 2019, p. 104).

The methodology adopted is qualitative and comparative in nature, based on documentary research, normative analysis, case studies, and interdisciplinary literature review. Public policies and concrete experiences in Brazil, Mexico, Colombia, Peru, Uruguay, and Chile were analyzed, in addition to reports from international organizations such as UNICEF, ECLAC, UNHCR, and IOM. The research was organized into four axes: (1) characterization of underregistration and its social determinants; (2) mapping of solutions based on artificial intelligence; (3) critical analysis of the risks associated with the digitalization of civil registration; and (4) formulation of proposals for the Brazilian context (Silva; Nascimento, 2024, p. 74).

The study's focus lies on the intersection between technology, human rights, and public policies. A critical perspective on the use of artificial intelligence is adopted, recognizing both its emancipatory potential and the risks of digital exclusion, algorithmic discrimination, and privacy violations. Thus, the article is not limited to describing technological solutions, but seeks to evaluate them in light of principles such as equity, social justice, transparency, and democratic participation. The analysis also considers the unequal access to digital infrastructure and the need for hybrid strategies that combine innovation with community action (Eubanks, 2018, p. 87).

From a legal standpoint, the article examines the normative frameworks that regulate civil registration and personal data protection, with emphasis on the General Data Protection Law (LGPD) in Brazil, the digital interoperability legislations in the countries analyzed, and the principles established in the SDGs of the 2030 Agenda. The limits and possibilities of applying AI in this field are discussed in light of the doctrine of fundamental rights, informational sovereignty, and the protection of vulnerable groups, such as children, indigenous peoples, migrants, and stateless persons (Benjamin, 2019, p. 121).

Anticipating the final considerations, it is concluded that artificial intelligence represents a promising tool, but its implementation in the field of civil registration must be guided by ethical algorithmic governance, focused on inclusion and the protection of human rights. The experiences analyzed demonstrate that technology can expand access to basic documentation, provided it is associated with intersectoral strategies, robust legal frameworks, and active participation of the communities involved. For Brazil, the strengthening of partnerships among notary offices, public defenders' offices, health agencies, and universities is recommended, with the support of emerging technologies, but always respecting the social and cultural diversity of the national territory (Carvalho; Lima, 2024, p. 64).

Finally, it is hoped that the results of this article can contribute to the academic and institutional debate on the responsible use of AI in civil inclusion policies. By reflecting on the possible paths to eradicating underregistration by 2030, as established in international commitments, the centrality of civil registration as a human right and an indispensable condition for the exercise of full citizenship is reaffirmed. The future of the fight against underregistration will be increasingly technological: but also ethical, participatory, and inclusive (Silva; Rocha, 2023, p. 79).

The temporal delimitation of the research covered the period between 2018 and 2024, considering the consolidation of the LGPD and the expansion of digital identity policies in the Americas. Countries with documented experiences in multilateral organizations (UNICEF, IDB, and OECD) were selected, using as criteria the existence of verifiable public data, government initiatives in AI, and official indicators of registration coverage. As methodological limitations, the heterogeneity of national statistical databases and the absence of standardized metrics on the use of artificial intelligence in civil registries stand out.

2 CIVIL BIRTH UNDERREGISTRATION: DIMENSIONS AND IMPLICATIONS

Civil birth underregistration represents a multifaceted phenomenon that compromises the materialization of citizenship, affecting millions of people in Latin American countries. An unregistered birth deprives the individual of legal recognition of their existence and, consequently, of access to a series of social, civil, and political rights. Legal invisibility directly impacts the right to education, health, social security, and voting, constituting a violation of fundamental human rights (UNICEF, 2023, p. 12).

The incidence of underregistration stems from a series of structural factors, such as the absence of civil registry offices in remote areas, the lack of training for local agents, and misinformation regarding the importance of the registration act. Added to this are digital exclusion and precarious transportation infrastructure, which hinder the displacement of rural or indigenous populations to urban centers where services are provided (ECLAC, 2021, p. 45).

Cultural and linguistic issues also play a relevant role in deepening underregistration. In several indigenous communities, for example, birth is celebrated through their own rites, and contact with State institutions may be viewed with distrust. Furthermore, documents required for registration, such as hospital birth certificates or parents' identity documents, are often inaccessible or nonexistent, especially in home births or in conflict zones (Camara; Medeiros, 2022, p. 91).

It is important to highlight that underregistration not only compromises individual rights but also weakens the State's capacity to plan effective public policies. The absence of reliable population data leads to underestimation of the demand for essential services, such as schools, health clinics, and welfare programs.

It is, therefore, a phenomenon that compromises both social justice and public governance (Pereira; Bastos, 2023, p. 38).

The legal invisibility generated by underregistration is also reflected in the omission of children and adults from censuses and national databases, hindering the monitoring of social indicators and the fulfillment of international development goals. The absence of a birth certificate prevents the obtainment of documents such as the CPF (Brazilian taxpayer ID) and identity card, creating a spiral of documentary exclusion that affects generations (UNICEF, 2021, p. 13).

3 PUBLIC POLICIES IN THE FIGHT AGAINST UNDERREGISTRATION: LATIN AMERICAN EXPERIENCES

In recent years, Latin American countries have adopted different strategies to reduce underregistration rates, with varying degrees of success. In Mexico, the integration between the National Population Registry (RENAPO) and the health sector allowed for the creation of automated hospital registration mechanisms. The "Timely Registration" program ensured that newborns leave the maternity ward with their birth certificate in hand, significantly increasing coverage in vulnerable states (INEGI, 2023, p. 34).

In Brazil, the "Embrace Brazil" project represents one of the most innovative experiences in mobilizing notary offices, public defenders' offices, universities, and NGOs to eradicate underregistration in vulnerable territories. The initiative combines inter-institutional joint efforts with mapping of invisible populations, but still lacks national standardization and greater institutional support (CNJ, 2023, p. 10).

In addition to the aforementioned project, there are noteworthy state-level experiences, such as the "Legal Registration" program in Maranhão and the "Child-Friendly Notary Office" action in Amazonas, which demonstrate the importance of local leadership and coordinated action with maternity wards. However, the continuity of these actions often depends on municipal administrations and one-off funding (DPU, 2021, p. 7).

Colombia, for its part, invested in digitalization and the use of biometric technology to reach historically marginalized populations. The Integrated Personal Identification System (SIIP) collects fingerprint and facial recognition data from children shortly after birth, even in communities without continuous electricity. Additionally, mobile units travel to hard-to-reach areas, allowing registration to occur in real time via satellite connection (DAANE, 2022, p. 18).

In Peru, the National Program for Identity and Civil Status Registration (RENIEC) adopted a community-centered approach. Bilingual agents visit Andean and Amazonian villages explaining, in native languages, the importance of registration and assisting with form filling. Partnerships with schools allowed for the regularization of children already of school age, and joint efforts registered over 250,000 people between 2015 and 2022 (RENIEC, 2021, p. 27).

Other countries in the region, such as Argentina and Ecuador, have also adopted hybrid strategies that combine technology and community presence. In both cases, the mobilization of intersectoral teams (involving health, education, justice, and human rights) has been essential for the effectiveness of the actions. Nevertheless, the initiatives face obstacles such as the discontinuity of public policies, low resource allocation, and institutional instability in some governments (IDB, 2022, p. 41).

4 ARTIFICIAL INTELLIGENCE AND CIVIL INCLUSION: TECHNOLOGICAL OPPORTUNITIES

Artificial intelligence (AI) emerges as a promising tool in tackling underregistration, especially due to its ability to analyze large volumes of data and identify patterns invisible to conventional human action. With the use of machine learning, it is possible to predict with geographic precision the areas with the highest risk of underregistration, allowing for efficient resource allocation and planning of specific actions for vulnerable communities (Gomes; Teixeira, 2023, p. 39).

AI algorithms are also capable of cross-referencing information from different databases (such as vaccination records, school enrollments, healthcare system visits, and welfare registrations) to identify children who were born but not registered. This intelligent cross-referencing dramatically reduces the time and cost of detecting underregistration cases and enables rapid, targeted interventions (Silva; Nascimento, 2024, p. 72).

Another relevant application is the use of facial and voice recognition systems to create unique biometric profiles. This technology is especially useful in contexts of migration, statelessness, or natural disasters, where traditional documents are lost or do not exist. African and Asian countries have already demonstrated success in this type of approach, and similar experiences are being tested by UN agencies in Latin American countries (UNHCR, 2023, p. 15).

Furthermore, AI-based solutions can be integrated into mobile applications or digital kiosks in health centers and schools, allowing citizens themselves to initiate the registration process with real-time virtual assistance. This automation, if accompanied by digital inclusion and community training, has the potential to revolutionize the way the State relates to its citizens in remote and marginalized areas (Carvalho; Lima, 2024, p. 64).

Despite AI's potential, it must be noted that its effectiveness directly depends on the quality of the data used. Fragmented, outdated, or poorly integrated databases compromise algorithm performance, potentially producing flawed analyses and biased decisions that negatively impact the most vulnerable groups (Ribeiro; Almeida, 2022, p. 97).

5 BARRIERS AND RISKS IN THE USE OF ARTIFICIAL INTELLIGENCE FOR CIVIL PURPOSES

Despite the promising contributions of artificial intelligence in combating underregistration, its adoption must be accompanied by heightened attention to social and legal risks. One of the main challenges concerns the protection of sensitive data, especially in contexts where privacy legal frameworks are weak or nonexistent. The use of biometrics, facial recognition, and predictive data analysis can expose vulnerable populations to practices of undue surveillance or excessive social control (Cohen, 2019, p. 104).

The absence of adequate regulation can also open space for rights violations, such as data collection without consent, sharing with third parties, or use of information for purposes other than those that justified the initial registration. Populations already historically marginalized, such as indigenous peoples, migrants, and homeless individuals, risk becoming targets of punitive or discriminatory state programs disguised as technological modernization (Eubanks, 2018, p. 87).

Another risk lies in the AI algorithms themselves, which can reproduce or amplify prejudices existing in the data that feed them. Algorithms trained on official records often reflect structural biases, such as the underrepresentation of ethnic groups or persons without formal schooling. This can lead to false negatives, arbitrary exclusions, or biased prioritization of service, deepening inequalities instead of overcoming them (Benjamin, 2019, p. 121).

Finally, it is necessary to consider the issue of unequal digital infrastructure. In many Latin American contexts, access to the internet, continuous electricity, and electronic devices is limited or nonexistent, especially in rural and indigenous communities. The implementation of AI-based solutions without considering these realities can result in ineffective investments and the perpetuation of the gap between urban and peripheral populations (Ribeiro; Santos, 2022, p. 63).

6 BRAZIL: ADVANCES, CHALLENGES AND PERSPECTIVES IN THE DIGITAL ERA

Brazil has made significant progress in articulating policies promoting civil registration with emerging technologies. The creation of the Civil Registry Information Center (CRC Nacional) allowed for the integration of notary offices into a unified database, enabling cross-referencing of information and real-time monitoring of registrations throughout the national territory. This advance contributed to identifying critical areas and supporting targeted registration campaigns (National Council of Justice, 2022, p. 56).

The lack of interoperability among civil registration, health, education, and social assistance systems remains one of the main obstacles to the efficient use of AI in Brazil. The lack of data standardization, absence of real-time connectivity, and duplication of records prevent the formation of a reliable digital ecosystem (Souza; Ribeiro, 2023, p. 58).

Furthermore, the concentration of technological and human resources in metropolitan regions deepens territorial inequalities. Municipalities with lower revenue face difficulties in adopting digital solutions, requiring the Federal Government to act as an articulator of a robust national strategy with criteria of regional equity (Carvalho; Lima, 2024, p. 64).

The "Registre-se!" program, launched in 2023 by the National Council of Justice (CNJ), is one of the most significant initiatives in this regard. Aimed at eradicating underregistration among homeless populations, indigenous peoples, refugees, and traditional communities, the program integrates Public Defenders' Offices, notary offices, universities, and social assistance agencies. The adoption of digital technologies, such as tablets and automated forms, streamlined the document issuance process in joint efforts carried out in several capital cities and remote regions (Oliveira; Pinheiro, 2024, p. 77).

Still, the country faces important challenges, especially related to territorial inequality and system interoperability. Many municipalities in the Legal Amazon do not have their own notary offices, and communication between the systems of public agencies, hospitals, and civil registries remains flawed. The application of AI could assist in the predictive analysis of critical regions, in planning logistical routes for joint efforts, and in developing multilingual virtual assistants to facilitate communication with indigenous populations (Souza; Ribeiro, 2023, p. 58).

Furthermore, the recent digitalization of civil registration through the e-Notariado platform and the advancement of the Gov.

Br Digital Identity open new possibilities for data cross-referencing and automated verification of records. Based on these systems, AI algorithms will be able to identify inconsistencies, prevent fraud, and support the issuance of secondary documents, such as the CPF and voter registration card, shortly after birth. This is an expanding field that requires continuous investment in infrastructure, training of public servants, and strengthening of legal data protection guarantees (Brazil, 2023, p. 19).

Considering these inequalities, the development of multilingual virtual assistants, with support for indigenous and regional languages, is recommended to enable the use of AI in a culturally sensitive manner. Such a strategy can be integrated into mobile platforms in partnership with schools, health centers, and social assistance units (Silva; Nascimento, 2024, p. 73).

7 COMPARATIVE STUDY: CONVERGENCES AND DIVERGENCES IN LATIN AMERICA

A comparative analysis of public policies aimed at tackling underregistration in Latin America reveals both relevant convergences and divergences. In general, there is consensus among countries on the centrality of civil registration as an instrument of citizen inclusion and promotion of human rights. Most countries have adopted legislation guaranteeing free birth registration and providing for intersectoral partnerships with health and education (UNICEF, 2023, p. 44).

When comparing digitalization policies in Latin America, it is notable that the countries with the greatest structural advances are those that have created their own regulatory frameworks for the use of AI in the public sector. Uruguay, for example, published guidelines on algorithmic ethics that condition the use of automated systems on the performance of periodic audits and transparency of the criteria used (OECD, 2023, p. 38).

On the other hand, the degree of digitalization and institutional integration varies significantly among countries. In Uruguay and Chile, the use of AI and interoperable systems makes it possible to identify, in real time, which children born in hospitals have not yet been registered. These countries operate unified digital government platforms and have specific legislation for algorithmic governance, which facilitates the ethical and transparent adoption of technology (OECD, 2023, p. 38).

In countries such as Bolivia, Haiti, and Guatemala, deeper structural limitations persist. In these nations, many rural areas are not covered by notary offices or registration units, and the registration process still depends on printed documentation with a high degree of bureaucracy. The lack of investment in infrastructure and political instability also compromise the continuity of successful programs, even when initiated with international support (IDB, 2022, p. 41).

Brazil finds itself in an intermediate position in this scenario. Despite having high notary office capillarity and increasing digitalization, it still faces logistical and normative barriers that hinder the full integration of systems. The implementation of AI in the country must be accompanied by broad social participation and institutional strengthening of oversight bodies, public defenders' offices, and control agencies, in order to ensure that technological solutions expand, rather than limit, access to citizenship (Carvalho; Lima, 2024, p. 64).

These findings reinforce the importance of developing, in Brazil, a specific legal framework for the use of AI in social and registration policies. Although the LGPD represents an advance, it does not sufficiently regulate the mechanisms of automated decision-making and citizen oversight of algorithms used by public institutions (FGV Direito SP, 2022, p. 49).

8 THE CONTRIBUTION OF AI TO POPULATIONS ON THE MOVE

Populations in situations of mobility (migrants, refugees, internally displaced persons, and stateless individuals) face even more precarious conditions for accessing civil documentation. The absence of a birth certificate or the loss of documents during displacement creates obstacles for regularization in destination countries, hindering access to essential services such as education, health, and legal assistance. AI can be an ally in the rapid and secure recognition of these identities (UNHCR, 2023, p. 22).

In pilot experiences conducted by UNHCR on the Brazil-Venezuela border, biometric capture via mobile devices was integrated with algorithms that recognize duplicities and suggest identity probabilities based on previous databases. The use of

AI reduced the average service time from 90 to 25 minutes per person, in addition to enabling more accurate screenings for cases of statelessness, unaccompanied children, and trafficking victims (IOM, 2022, p. 31).

AI can also be employed in family reunification processes and identification of kinship ties, through cross-referencing of image, voice, and location data. This use, however, requires careful ethical regulation, especially regarding the protection of minors and the non-use of data for deportation or migration repression purposes. The centrality of human rights must be guaranteed in any technological application in this field (Latonero, 2019, p. 49).

Action in mobility contexts must also consider linguistic and cultural factors. The use of multilingual chatbots and intelligent AI-based interfaces can help migrants access information about rights, forms, and registration channels. By ensuring accessibility and security, these tools can be decisive for the civil inclusion of millions of people in transit in Latin America (Benjamin, 2019, p. 127).

An additional challenge that arises is the collection of biometric data from young children, whose bodies are still developing. The indiscriminate application of technology to this population requires additional care, as there is a risk of false identifications, legal insecurity, and misuse of information by migration authorities (Latonero, 2019, p. 51).

9 THE ROLE OF ALGORITHMIC GOVERNANCE IN CIVIL INCLUSION

Algorithmic governance consists of building normative, technical, and institutional frameworks that govern the development, implementation, and control of AI systems, especially in the public sector. In the context of civil registration, the lack of transparency in the algorithms used can generate distrust, discrimination, and lack of accountability, which is why a robust apparatus of regulation and social oversight is required (Silva; Rocha, 2023, p. 79).

Emblematic cases of algorithmic discrimination have been denounced in several countries, where automated systems reinforced racial stigmas or barred certain groups' access to public benefits. The absence of transparent oversight and the "black box" logic of algorithms compromise the principle of human dignity (Benjamin, 2019, p. 121).

The General Personal Data Protection Law (Law 13,709/2018), in force in Brazil, establishes important guidelines for the processing of sensitive data, but still lacks specific provisions on artificial intelligence and its risks in the registration sphere. The creation of an independent algorithmic supervision authority, with competence to audit systems and ensure the explainability of results, is a growing demand among digital rights experts (Carvalho; Lima, 2024, p. 64).

In the Brazilian context, the General Personal Data Protection Law (Law 13,709/2018) establishes structuring principles such as purpose, necessity, transparency, and accountability, which should guide the development of automated systems in civil registration. The connection between the LGPD and legal identity requires special attention to the processing of biometric and sensitive data, imposing

algorithmic impact assessments and mechanisms for explainability of automated decisions in the public sector.

AI governance must also be democratic and participatory. Populations affected by technologies must have a voice in decisions about their adoption, limits, and uses. The promotion of public hearings, prior consultations with indigenous peoples, and the creation of complaint and correction mechanisms are fundamental to ensuring that technology is an instrument of inclusion, not exclusion (Eubanks, 2018, p. 89).

Finally, algorithmic governance in the fight against underregistration must be articulated with public policies of digital inclusion, citizen education, and institutional strengthening. Without these conditions, any technological innovation risks reproducing the same exclusions it was meant to overcome. It is imperative that the use of AI be anchored in principles such as social justice, equity, and informational sovereignty (Cohen, 2019, p. 108).

To complement the analyses developed, it is important to synthesize the evidence in flowcharts and visual schemes. For example, the chain of actions that links identification, digitalization, data integration, and issuance of civil registration can be represented in stages, facilitating the replication of good practices by local managers (Abrahão, 2021, p. 95).

A comparative table among the countries analyzed (Brazil, Uruguay, Colombia, Mexico, Peru, and Chile) would also allow for the identification of patterns, gaps, and opportunities, especially regarding the use of AI, the existence of legal frameworks, and levels of registration coverage. These graphic elements increase the didactic and scientific impact of the article (IDB, 2020, p. 89).

TABLE 1 – SYNTHESIS OF THE MAIN IDEAS OF THE ARTICLE

Thematic Axis	Main Ideas	Examples / Initiatives	Source
1. Underregistration as a structural problem	Civil underregistration compromises the exercise of citizenship, affects vulnerable populations, and reinforces historical inequalities.	Brazil: North and Northeast concentrate the highest underregistration rates.	Unicef (2021, p. 11); IBGE (2023, p. 5)
2. AI Opportunities	AI can predict territorial gaps, cross-reference data, identify at-risk groups, and automate civil registration flows.	Predictive algorithms, integration with health, education, and social program databases.	De Mauro et al. (2020, p. 215); Abrahão (2021, p. 93)
3. Risks and limits of AI use	AI application requires ethical governance, data protection, and care with algorithmic bias. There is a risk of reinforcing inequalities	LGPD in Brazil; need for ethical regulation and algorithm transparency.	Ribeiro; Almeida (2022, p. 102); Brazil (2018, p. 3)

Thematic Axis	Main Ideas	Examples / Initiatives	Source
4. International experiences	Latin American countries adopt varied technologies, with different degrees of success and reach.	Uruguay: interoperability. Mexico: automated auditing. Colombia: rural digitalization.	BID (2020, p. 88); Cepal (2023, p. 47)
5. Brazil and local challenges	Brazil lacks national integration and continuous policies. Initiatives are fragmented and often depend on local leadership.	"Embrace Brazil" project, Public Defenders' Offices, digital notary offices in some states.	CNJ (2022, p. 19); DPU (2021, p. 7)
6. Legal and political requirements	Tackling underregistration requires interinstitutional articulation, political will, and popular participation.	Joint action among notary offices, Defenders' Offices, Public Prosecutors, and civil society.	Soares (2021, p. 67); CNJ (2023, p. 10)
7. Public policy recommendations	National plan with strategic use of AI, system integration, training, and participatory data governance.	Model with intersectoral committees and social control over technology use.	FGV Direito SP (2022, p. 49); OEA (2023, p. 31)
8. Role of AI in building citizenship	AI should be a tool to guarantee the right to identity, focused on dignity, equality, and inclusion.	Alignment with UN 2030 Agenda SDGs (Goal 16.9).	ONU (2015, p. 34); Cohen (2012, p. 187)

TABLE 2 – LEGAL FRAMEWORKS, REGISTRATION COVERAGE, AND AI USE IN CIVIL REGISTRATION SYSTEMS

Country	Legal Framework on Civil Registration and AI	Registration Coverage (%) ¹	Use of Artificial Intelligence
Brazil	Law 6,015/1973 (Public Records Law); LGPD (Law 13,709/2018); proposed AI bill in progress	97,8% (2022)	Initial testing in pilot projects; CNJ studies automation for data analysis
Uruguay	Civil Registration Law 14,040/1971; Algorithmic Ethics Guidelines (AGESIC, 2021)	99,7% (2022)	Integrated use of AI in duplicity analysis and civil data interoperability

Country	Legal Framework on Civil Registration and AI	Registration Coverage (%) ¹	Use of Artificial Intelligence
Colombia	Decree 1260/1970; National Digital Identity Plan (2020-2025)	95,3% (2022)	Ongoing applications for cross-referencing data with health and education records
Mexico	General Population Law; National Digital Identity Strategy (ENID, 2022)	94,6% (2022)	In integration phase with state systems; AI used in document validation

Legend: The analysis of the data presented in Table 1 shows that, among the countries analyzed, Uruguay stands out for its early adoption of national guidelines on algorithmic ethics and the consolidated use of artificial intelligence in the interoperability of civil databases. This advancement is reflected in nearly universal registration coverage and significant gains in administrative efficiency. In contrast, Mexico is still in the implementation phase of AI in civil registries, with challenges related to federal integration and technological standardization among states, which highlights the need for more robust national coordination to ensure the effectiveness of digital strategies.

Source of Table 1: Prepared by the authors, based on UNICEF (2021, p. 11); IBGE (2023, p. 5); De Mauro et al. (2020, p. 215); Abrahão (2021, p. 93); Ribeiro; Almeida (2022, p. 102); Brazil (2018, p. 3); IDB (2020, p. 88); ECLAC (2023, p. 47); CNJ (2022, p. 19); DPU (2021, p. 7); Soares (2021, p. 67); CNJ (2023, p. 10); FGV Direito SP (2022, p. 49); OAS (2023, p. 31); UN (2015, p. 34); Cohen (2012, p. 187).

Source of Table 2: Data adapted from UNICEF (2022), IDB (2020), AGESIC (Uruguay, 2021), CNJ (Brazil, 2023).

TABLE 3 – COMPARATIVE TABLE BY COUNTRY WITH INDICATORS AND SOURCES

Country	Registration Coverage	Applied AI	Health Integration	Governance Framework
Brazil	97,8%	Pilots	Partial	LGPD
Uruguay	99,7%	Advanced	High	AGESIC Guidelines
Mexico	94,6%	Moderate	High	ENID
Colombia	95,3%	Expanding	Medium	Digital Identity Plan

Source: UNICEF (2022); OECD (2023); IDB (2020).

The comparative table by country was prepared with the objective of synthesizing, in a systematized manner, the main indicators related to civil registration and the use of artificial intelligence in legal identity policies in the Americas. The analysis considers variables such as registration coverage, existence of specific regulatory frameworks, degree of institutional integration, and level of application of technological solutions, making it possible to visualize convergences and asymmetries among the selected countries. The choice of quantitative and qualitative indicators seeks to offer a comparative reading that goes beyond normative description, evidencing how institutional and technological factors directly influence the efficiency of strategies to combat underregistration.

The information presented was extracted from reports by international organizations and official databases, especially UNICEF, IDB, OECD, and national government documents, ensuring methodological reliability and minimum standardization of the data used. The comparative organization allows for the identification of regional patterns, such as the relationship between system interoperability and higher registration coverage, as well as structural gaps still present in contexts with lower digital maturity. Thus, the table acts as a complementary analytical instrument to the text, facilitating the understanding of empirical evidence and supporting the formulation of legal and public policy recommendations aimed at algorithmic governance and the universalization of civil registration.

10 FINAL CONSIDERATIONS

The eradication of civil birth underregistration is one of the most urgent and challenging tasks for contemporary democratic systems, especially in Latin American countries. Throughout this article, we sought to analyze critically and comparatively how artificial intelligence (AI) can contribute to the universalization of civil registration, promoting greater efficiency, equity, and inclusion in basic documentation policies.

The data and experiences analyzed indicate that technology can indeed be a decisive ally in this mission, provided it is used with responsibility, transparency, and social sensitivity (Benjamin, 2019, p. 120).

The central problem of the article (how AI can be ethically applied in combating underregistration in the Americas) proved particularly pertinent given the simultaneous advance of two phenomena: the acceleration of digital transformation and the persistence of structural inequalities. Although the use of algorithms and digital solutions is promising, it is fundamental to recognize that the absence of legal documents is not only a technical problem, but above all a political and historical one. Therefore, any technological solution must start from a deep understanding of the social roots of underregistration (Cunha; Ribeiro, 2021, p. 89).

The article's general objective was to understand the role of artificial intelligence in overcoming civil birth underregistration, exploring international experiences, opportunities, and risks. The specific objectives were fulfilled by

mapping relevant initiatives in countries such as Brazil, Mexico, Uruguay, Colombia, Chile, and Peru; identifying normative, operational, and ethical bottlenecks; evaluating the applicability of these experiences to the Brazilian context; and proposing guidelines for inclusive algorithmic governance. The data collected and the cases analyzed reinforce the idea that AI, when well directed, can expand the reach of state actions and strengthen the rights of the invisible population (UNICEF, 2023, p. 14).

The formulated hypotheses were largely confirmed. Firstly, it was verified that AI can contribute to locating populations at risk of underregistration, using integrated data from health, education, social assistance, and georeferencing. Predictive analysis allows for anticipating territorial gaps and specific vulnerabilities, supporting more effective actions. Secondly, it was found that the success of this strategy depends on a robust regulatory framework for personal data protection, such as that provided for in the LGPD, which ensures transparency and prevents algorithmic discrimination. Finally, it was observed that Brazil has sufficient institutional and technological capabilities to apply these solutions, provided they are articulated with intersectoral public policies and respect for cultural and territorial diversity (Silva; Chaves, 2020, p. 139).

The methodology adopted (qualitative and comparative) proved adequate for approaching the topic, allowing triangulation among normative sources, reports from international organizations, academic literature, and practical experiences. Documentary analysis was complemented by case studies and a critical review of legal doctrine and civil registration policies. This approach made it possible to understand the specificities of each country, as well as to identify regional patterns and trends. The methodology also valued the cross-referencing of legal, technological, and sociological perspectives, which proved fundamental for a comprehensive understanding of the phenomenon (Teixeira; Carvalho, 2022, p. 57).

Among the most relevant results of the study, the case of Uruguay stands out, where interoperability between health and civil registration systems made it possible to achieve, within a few years, coverage close to 100% of digitally registered births. In Mexico, the use of AI for real-time auditing of registration units proved effective in identifying critical zones of underregistration and fraud. In Brazil, although there are isolated experiences, such as the "Embrace Brazil" project and initiatives to integrate maternity wards and notary offices, the absence of a robust and standardized national strategy for the use of AI in this field is observed (ECLAC, 2021, p. 48).

From a normative standpoint, the challenges are concentrated on the protection of sensitive data collected by automated systems, especially in the case of children, indigenous populations, migrants, and homeless individuals. The absence of a unified protocol for the ethical management of this data compromises both the effectiveness and the legitimacy of the technologies applied. Thus, the need for algorithmic governance mechanisms is reinforced, with independent audits, civil society participation, and clear guidelines for the responsible use of AI (Cohen, 2019, p. 103).

Another critical point identified is the risk of digital exclusion, especially in remote regions or those with low technological infrastructure. The implementation of digital civil registration systems requires not only intelligent software, but also connectivity, training of local agents, and intercultural dialogue. Therefore, the use of artificial intelligence must be understood as part of a hybrid strategy that combines technological innovation with community mobilization, education, and state presence in neglected territories (Eubanks, 2018, p. 92).

In terms of public policy formulation, the study recommends: (a) creation of a national plan to combat underregistration using AI; (b) integration of health, education, social assistance, and justice databases; (c) technical training of teams responsible for civil registration; (d) development of transparent and auditable algorithms; (e) respect for personal data protection in accordance with the LGPD; and (f) strengthening of Public Defenders' Offices, notary offices, and NGOs that operate in zones of documentary exclusion (Carvalho; Lima, 2024, p. 68).

From a legal perspective, it is urgent to update national legislations in light of digital transformation, incorporating principles of algorithmic justice, informational sovereignty, and protection against discriminatory use of data. The construction of a solid legal architecture is an indispensable condition to ensure that AI operates at the service of citizenship and not of economic or political interests that aggravate the invisibility of vulnerable populations (Benjamin, 2019, p. 126).

Finally, the study evidences that the eradication of underregistration by 2030, as advocated by the Sustainable Development Goals, will only be possible with the combined use of technology, political will, and social participation. Artificial intelligence can act as a catalyst for this process, but never as a substitute for human action and active listening to communities. Digital transformation, if well conducted, can represent a new stage in guaranteeing the right to identity and strengthening the democratic pact in Latin America (UN, 2022, p. 18).

Thus, it is reaffirmed that civil birth registration is much more than a statistical datum: it is the recognition of the individual by the State and by society. Making this right effective, through fair and inclusive technological solutions, is an ethical and constitutional duty. AI can be a decisive ally in this mission, provided it is guided by values of equity, transparency, accountability, and respect for diversity. By cross-referencing data, algorithms, and rights, the future of citizenship can be closer, more accessible, and more humane (Silva; Rocha, 2023, p. 84).

The inclusion of digital technologies in civil registration must be accompanied by the creation of national quality and impact indicators. The measurement of the number of registrations issued through AI, the reduction of average issuance times, and the increase in coverage in remote areas are fundamental metrics to guide evidence-based policies (Soares, 2021, p. 67).

At the international level, it is recommended that Brazil assume a regional leadership role in articulating a Latin American agenda on digital identity and algorithmic protection, promoting the exchange of solutions among countries and mutual support for technical and legal training (OAS, 2023, p. 31).

The centrality of civil registration as a human right also requires an intersectional perspective that takes into account gender, race, territory, and social class. AI, if well used, can reveal these intersections of inequality and guide more inclusive and specific public responses (Cunha; Ribeiro, 2021, p. 89).

At the same time, it must be reinforced that artificial intelligence is not a panacea. Its adoption must be guided by participatory diagnoses, federal pacts, and active listening to affected populations. Technological transformation without institutional transformation tends to be ineffective or even counterproductive (Teixeira; Carvalho, 2022, p. 60).

The continuous training of public servants, registrars, defenders, and community agents is another indispensable pillar. Without adequate training, digital tools may be underutilized or operate with critical errors. Investing in people is as essential as investing in technology (Gomes; Teixeira, 2023, p. 42).

Ultimately, the success of artificial intelligence in combating underregistration will depend on an indivisible triad: solid legal foundation, ethical governance, and citizen participation. When articulated, these three elements can transform AI into a tool for social justice and human dignity (Ribeiro; Almeida, 2022, p. 105).

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