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Artificial Intelligence Readiness Assessment Report

ACKNOWLEDGEMENTS

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ACRONYMS AND ABBREVIATIONS

AI	Artificial Intelligence
CUP	Cuban Pesos
ETO	Emerging Technologies Observatory
ENIA	National Artificial Intelligence Strategy
GERD	Gross Expenditure on Research and Development
GBARD	Government budget allocations for R&D
IDB	Inter-American Development Bank
ICT	Information and Communication Technologies
IEEE	Institute of Electrical and Electronics Engineers
IODC	International Open Data Charter
ISO	International Organization for Standardization
ISOC	Internet Society
LAC	Latin America and the Caribbean
MINCOM	Ministry of Communications
ODIN	Open Data Inventory
OGP	Open Government Alliance
ONEI	National Office of Statistics and Information
NGO	Non-Governmental Organization
GDP	Gross domestic product
PPP	Purchasing power parity
RAM	Readiness Assessment Methodology
REIA	Recommendation on the Ethics of Artificial Intelligence
R&D	Research and Development
R&I	Research and Innovation
SDG	Sustainable Development Goals
STEM	Science, Technology, Engineering and Mathematics
UNESCO	United Nations Educational, Scientific and Cultural Organization
R&D+i+e	Research, development, innovation and entrepreneurship
SNS	National Health Service
STEM	Science, Technology, Engineering and Mathematics
UNESCO	United Nations Educational, Scientific and Cultural Organization

Foreword

We have officially entered the Age of Artificial Intelligence. The world is now set to change at a pace not seen in decades, even centuries. AI-based tools and applications make our lives easier, smoother, and richer. They help us move efficiently, get informed, get credit, get a job, and get our taxes done.

But in its current form, AI reproduces and amplifies many of the social challenges we face. It is not acceptable that around a third of the world's population still lacks adequate internet access. Upstream, the AI industry is highly concentrated, with just two countries–the United States and China–and a dozen companies accounting for a major share of the sector. This can lead only to greater inequality of outcomes–including gender disparities–downstream. Non-diverse AI teams, unrepresentative datasets, and opaque and biased algorithms can cause harm, particularly to those who are already vulnerable, whether companies or individuals, children and young people, women, or entire democracies.

That is why UNESCO drafted the Recommendation on the Ethics of Artificial Intelligence, which was adopted in 2021 by 193 countries to make sure AI delivers fair, sustainable, and inclusive outcomes. The Recommendation is based on the protection and promotion of human rights, human dignity, and environmental sustainability, and these values are then translated into principles such as accountability, transparency, and privacy. The Recommendation also sets out concrete policy actions that governments can draw on to steer technological developments in a responsible direction, premised on the belief that light-touch regulation, which has until now remained the norm, is insufficient. We need capable governments that are well equipped, in terms of competencies, institutions and laws, to frame responsible AI development and protect the rule of law online, and public and private developers who are accountable for putting human rights and fundamental freedoms–not profits or geopolitical considerations–first.

The Readiness Assessment Methodology (RAM) is a diagnostic tool intended to assist Member States in upholding their commitment to the Recommendation by helping them understand how prepared they are to implement AI ethically and responsibly for all their citizens. By highlighting any institutional, regulatory, or data gaps and obstacles, it enables UNESCO to tailor support for governments to fill those gaps to ensure an ethical AI ecosystem aligned with the Recommendation.

Cuba was selected to implement the RAM in order to support their efforts in the creation and implementation of their national AI strategy, an initiative that we applaud, as it seeks to put AI ethics and governance at the forefront, and we thank them for inviting UNESCO to assist in this effort.

The report presented here reveals a panorama of challenges along with Cuba's strong commitment to harnessing the benefits of AI while protecting its people. The government launched its strategy just after completing the RAM, which was developed while the RAM was being implemented, and allowed the team in charge to incorporate the information collected and its initial findings. Furthermore, the final outcome of this document, together with UNESCO recommendations can inform the implementation and updating of the strategy.

One of the key recommendations of this report is to implement the AI Strategy and develop an institutional framework that considers multiple stakeholders. Likewise, it is recommended to update and evaluate existing laws to strengthen the governance ecosystem.

The report highlights several areas with gaps that must be addressed. For example, data collection revealed the need to have statistical systems that collect baseline information to evaluate policies related to digital technologies and that work hand in hand with international measurement recommendations. Along these same lines, the urgency was detected to work on digital infrastructure, advancing connectivity and reducing urban-rural gaps.

There are several challenges regarding the social and environmental aspects of AI. Cuba has ongoing Gender Equality policies, which show relevant results as women have more access to technology than men. However, there is a great challenge in providing Internet access to all people, especially those living in rural areas. There is also no specific policy to address the impacts of AI on the environment or for the use of AI in the preservation of cultural heritage.

The science and education dimension reveals a low number of authors publishing AI work and a low number of publications. These figures are consistent with the fact that the country does not have AI research centers, nor many universities offering undergraduate or graduate programs dedicated to AI.

The final section of this report presents a set of useful recommendations for the implementation of the AI strategy. This set of comprehensive but focused recommendations includes creating, evaluating and updating AI system acquisition laws, privacy laws, among others. In addition, the creation of specific guides for the ethical use of AI in the Cuban context and training and certification programs for people who work in the government are recommended.

The recommendations also highlight the need to collect more data on the AI ecosystem of research, development, innovation and entrepreneurship. The RAM's recommendations are based on a partial collection of data, but relevant information did not exist in various areas. Additionally, more economic and labor data are required to better evaluate the Cuban ecosystem and provide more complete recommendations.

Overall, this report presents a fundamentally optimistic vision that we share at UNESCO: that ethical governance and responsible regulation of AI are fully consistent with innovation and economic growth and are essential to ensure a technological ecosystem that benefits the public good. With the RAM data and this report along with the strategy, Cuba has a clear roadmap on how to get there.

It was a pleasure working with the Government of Cuba to conduct this exercise. We are grateful for their engagement with the RAM and I am sure that by following the path laid out in this report, Cuba will be able to reap the benefits of AI while making sure that AI technologies deliver fair, sustainable, and inclusive outcomes.

Gabriela Ramos

Assistant Director-General for Social and Human Sciences, UNESCO

Executive Summary

In November 2021, 193 UNESCO Member States adopted the Recommendation on the Ethics of Artificial Intelligence. This global standard aims to harness the positive impact of AI while addressing its inherent risks. Countries around the world are now in the process of implementing the Recommendation, and UNESCO supports them through various capacity-building efforts. In particular, Cuba was selected as one of the first countries in the region to study its AI ecosystem through the Readiness Assessment Methodology (RAM) and thus support the development of its national strategy, which was later launched in 2024.

At the time of the RAM deployment, Cuba did not have an AI strategy or a specific regulatory framework. However, the Ministry of Communications was leading a process since 2023 to develop such a strategy, which is urgent and central to applying UNESCO recommendations on the ethical use of AI. The strategy was launched in 2024.

In the legal dimension, although Cuba has updated its laws in various relevant areas, such as personal data protection or cybersecurity, significant challenges remain, and some areas have not been covered. On the one hand, although existing laws are aligned with ethical recommendations, they sometimes have exception regimes that must be reviewed. Along these lines, there is no adequate open data policy and the indicators related to digital systems are low. In addition, there are areas where the specific challenges of AI have not been addressed, such as the acquisition of systems, procedural guarantees, health, culture, or impacts on the environment.

Considerations of the social and cultural dimensions are central to the ethical and responsible deployment of AI systems, which avoids bias throughout their entire life cycle. In this line, various topics are addressed, such as the gender gap, urban-rural, and diversity, among others. The work in terms of gender stands out, where it is women who access technology more than men in various statistics; however, there are relevant gaps at a general level regarding education and access to technology. An important focus is an urban-rural difference, where the gap is significant in terms of access to the internet and electronic devices, leaving people in rural areas remarkably unaware of the potential benefits of its use and at risk of being left even further behind in socioeconomic terms if this problem is not addressed.

The scientific and educational dimension is critical to the country's technological development and the incorporation of ethical principles from the beginning of the AI life cycle. Along these lines, Cuba has significant gaps with a low number of researchers, which translates into few publications and no patents. In line with the above, Cuban participation in the development of open software is barely detected, and there are no specialised programs on AI in tertiary education. Furthermore, digital technologies are not covered holistically in the educational curriculum, as they focus on technical competencies such as programming and not critical and computational thinking skills.

In the economic dimension, which considers critical aspects in developing and adopting the labour market and its adaptation, Cuba does not have data, making it impossible to establish a baseline. The few existing data indicate a relevant gap in all areas: development, adoption, and transformation of work environments.

The technical and infrastructure dimension addresses the country's installed capacity to implement AI-based solutions across different sectors. In this dimension, a significant gap regarding connectivity and access to high-speed internet and electronic devices is documented. Along the same lines, the country has no relevant computing capacity.

The main recommendations are grouped into three areas: regulation, data and capacity development. Regarding the first, a series of recommendations are made to develop a National AI Strategy along with evaluations and legal updates with the support of international entities. The need to collect data of better quality and granularity, make processes and methodologies transparent, and adhere to international data collection standards that allow reporting to multilateral organisations is emphasised. Finally, regarding capacity development, the criticality of advancing connectivity and education is emphasised.

Cuba faces challenges in all dimensions if it wants to advance in AI development and ethical use. However, it can collaborate with countries within the region at different stages of development and learn from success stories to cover gaps more quickly.

Implementing RAM reveals substantive gaps but makes it possible to organise an adequate roadmap to develop an equitable, safe, and sustainable AI ecosystem.

This initiative is part of UNESCO's effort to contribute to a more ethical and promising future for AI systems globally. UNESCO is committed to upholding respect, protection, and promoting human rights, fundamental freedoms, human dignity, and environmental and ecosystem well-being, ensuring diversity and inclusion, and fostering peaceful, just, and equitable societies. Interconnected. When appropriately managed, the emergence of new technologies, such as Artificial Intelligence, can be harnessed for the collective benefit of humanity. In this context, RAM serves to ensure that all nations can achieve a better future, leaving no one behind.

DIAGNOSIS OF THE NATIONAL SITUATION REGARDING ARTIFICIAL INTELLIGENCE

At the time of collecting information, there was no ENIA or specific legislation on AI at the time of collecting RAM data. The first, as mentioned in the previous section, a process led by the MINCOM was developed, and the strategy was launched in May 2024. In the process, actors from various disciplines and sectors of society were convened to contribute to developing policies. In addition, the inputs collected during the RAM application were taken together with the REIA. The need and potential content of specific legislation on AI systems will be determined in the future ENIA. The recently launched strategy has 6 axes: (1) ethics and regulatory framework, (2) human capital, (3) applications and services, (4) public administration, (5) science and innovation and (6) social communication. Currently, the strategy only establishes a series of objectives, so the implementation details and concrete actions remain to be seen. .

The main obstacles identified by the consultant and reported by the official counterpart of the Cuban government for the development of AI policies and regulations are the following:

- Data from international sources are needed to establish an adequate baseline. Although the government reports some internal data, there is no transparent access to collection methodologies and primary sources.
- Low level of technological development in both companies and research centres.
- Geo-political complexities that make access to tools, information, financing sources, and markets, among others, difficult. In particular, the counterparts declare that the United States economic-financial blockade has a relevant impact on the country's development.
- Lack of open, free and informed participation of multiple stakeholders in the technology public policy development process.

.The following sections discuss Cuba's ecosystem in various dimensions: legal, social, cultural, scientific, educational, economic, technical, and infrastructure. Often, the data requested by the evaluation tool (RAM) is unavailable. We explain the lack of data to demonstrate the need to collect said data in the future.

LEGAL DIMENSION

In this section, the legal dimension will be discussed. The regulatory framework in which AI is situated is crucial to guarantee its ethical deployment. The legal and regulatory framework must include effective mechanisms to safeguard and defend the rights of citizens' rights and monitor, mitigate and compensate for any unforeseen adverse outcomes resulting from the deployment of AI systems. The legal framework includes rules relating to AI, data protection and privacy, data sharing and information accessibility, procurement, due process and accountability, online security and content integrity and public sector capacity.

AI POLICY AND REGULATION

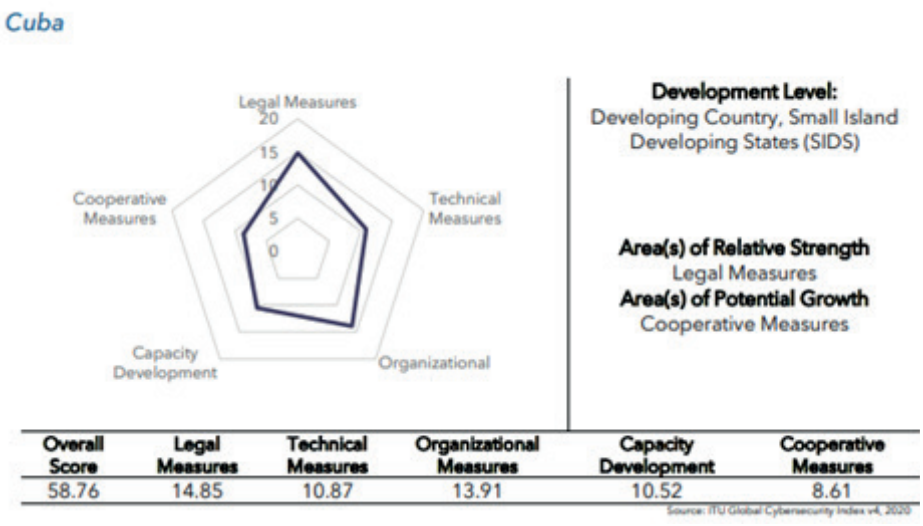
In Cuba, there is no ENIA or specific legislation on AI. As mentioned in the previous section, the first was developed in a process led by the MINCOM and launched during 2024, after the RAM deployment. In the process, actors from various disciplines and different sectors of society have been convened to contribute to the development of the policy. In addition, the inputs collected during the RAM application have been taken together with the REIA. The need and potential content of specific legislation on AI systems will be determined in the future ENIA.

No specific policies or procedures exist for using AI in the public sector. Furthermore, citizens are not obligated to be informed when an AI system is being used in a process that influences them.

DATA PROTECTION AND PRIVACY

Cuba is ranked 82 out of 182 in the 2020 Global Cybersecurity Index , placing it 10 out of 35 in the Americas with a score of 58.76 out of 100. Figure 1 details the scores obtained by Cuba in the different dimensions.

Figure 1. Cuba's ranking in the Global Cybersecurity Index[1] in 2020.



Overall Score	Legal Measures	Technical Measures	Organizational Measures	Capacity Development	Cooperative Measures
58.76	14.85	10.87	13.91	10.52	8.61

Source: Global Cybersecurity Index 2020[2].

Personal data protection is found in the Cuban Constitution[3] and Law 149 on the Protection of Personal Data[4], which has been in force since 2023. The Cuban Constitution establishes in its articles 40, 48 and 97 the value of human dignity with inherent rights, including respect for personal and family privacy and access to and control of personal data. Based on this, the law aims to establish the principles, procedures and definitions to guarantee the right to personal data protection and regulate its use and treatment by public and private entities.

The law defines personal data as "information concerning a natural person, identified or identifiable, that can lead to his or her identity." It considers direct and indirect mechanisms and includes a specific list of personal information elements. However, the law establishes limits on the right to protection of personal data: collective security, general well-being, and respect for public order, the Constitution, and the laws. The law applies to both public and private entity data.

In terms of principles, the current law grants people control over their data and the right to request its erasure, consistent with the Constitution that enshrines the Habeas Data resource. The law also establishes the obligation to express informed consent and the obligation to inform the owner of the data about its processing. There are exceptions to consent when required by law, ordered by a court, to prevent harm, among others. In the case of minors, rights are granted according to their progressive autonomy. Otherwise, parents or legal representatives can give consent. The law also enshrines the principles of transparency, purpose limitation, purpose specification and data minimization. However, there are no mentions of cases where data protection or privacy impact assessments are required.

The law makes a special distinction between sensitive data, defined as *"personal information whose improper use may give rise to discrimination, imply a distinction harmful to human dignity or entail a serious risk for its owner,"* and provides a specific list of data that will be considered within this category. These data have special treatment and protection considered within the law.

The law details a series of sanctions ranging from a warning and/or a fine to suspension or closure of data records. These sanctions are accompanied by various mechanisms for their application and appeal. As for the affected party, the law establishes that the owner has the right to rectify, correct, modify and update their personal data when they are inaccurate, incomplete or not updated. If the above is not met, the owner may demand compensation for damages.

Although the institutionality of the law has not been fully implemented, the law establishes in its transitional provisions that the Minister of Justice must create national control of records, files, archives or personal databases, for which he is responsible and over which who exercises maximum supervision for a maximum of one year. Those responsible or in charge of individual records, files, archives or databases must declare their existence no later than one year after the creation of national control .

DATA SHARING AND ACCESSIBILITY

The framework for data exchange in Cuba is distributed in various regulations. On the one hand, Law 149 on Personal Data[5] deals with the national and international transfer of personal data. In addition, according to information from ECLAC, the current Constitution, Decree-Law 335/2015[6] on the Public Records System of the Republic of Cuba, and Decree-Law 370/2018[7] on the Computerization of Society in Cuba are relevant. In addition, the Digital Transformation Policy and Agenda contemplates actions that contribute to achieving a regulatory framework for data management and interoperability. The Personal Data Law authorises data exchange within the territory, establishing the mechanisms and those responsible.

Cuba has no open data policy and was ranked 135 out of 195 in the Open Data Inventory[8] classification in 2022 with 40 points. The above breaks down into 54 out of 100 in coverage and 29 out of 100 in opening. Along these lines, Cuba has not signed the international open data charter[9].

PROCUREMENT LAWS AND POLICIES

No policies or laws specifically address acquiring AI systems services or products that incorporate them.

FREEDOM OF INFORMATION LAWS AND ACCESS TO KNOWLEDGE LAWS

The Constitution establishes the right of people to request and receive truthful, objective, and timely information and to access information generated by state bodies and entities according to current regulations. However, this right is limited by other laws, such as Decree-Law 199, on the security and protection of official information to protect information that, in the government's opinion, could be useful for subversive and aggressive plans against the country.

At the time of the RAM application, the Law on Transparency and Access to Public Information was in the public consultation process. This law seeks to generate mechanisms so that citizens can access State data and promote the use of information and communication technologies in this area. Thus, this law operationalises the right enshrined in the constitution but also allows entities to limit access by carrying out a damage test and examining the advantages and risks of disclosing the data.

PROCEDURAL GUARANTEES AND ACCOUNTABILITY

The Constitution establishes the foundations on which due process is built. Regarding this, since 2021, the Code of Procedures, Law 141 of 2021 and Law 143 of 2021[10], "On the Criminal Procedure"[11], Law 151 of the "Penal Code"[12], have established the mechanisms and specifications necessary for its application. However, there are no specific elements of AI in the regulatory framework, so there is no obligation to report the interaction with an AI system or mechanisms for supervision, compensation or recourse against damages caused by AI systems. Along the same lines, regulators or courts have no specific legal basis to request information about AI systems and their internal workings.

ONLINE SECURITY AND CONTENT INTEGRITY

Although no policy specifically defines hate speech or disinformation, several regulations address related issues. Along these lines, Law Decree 370/2018[13] on the computerisation of society in Cuba in its article 68, section i) regulates the dissemination of data and information contrary to social interest, good customs and the integrity of people, but It does not specify what type of information is considered within this. Furthermore, the Regulation of the national action model for responding to cybersecurity incidents[14] contains specific provisions that violate the dignity and individuality of people. Although there is no public evaluation, this law is periodically evaluated, and compliance reports are generated.

There are no specific provisions regarding the impact of AI on social media. Decree-Law 35, "On Telecommunications, Information and Communication Technologies and the Use of the Radioelectric Spectrum" and Resolution 58, "Regulation for the security and protection of personal data in electronic format" of the Ministry of Communications of 24 June 2019, could be applicable, but they are not a specific standard.

PUBLIC SECTOR CAPACITY

There is no specific policy for transforming the public sector or training officials. The framework policy in this area is the Comprehensive Policy for the Improvement of the Informatization of Society in Cuba, which covers the issue for the country as a whole.

1 https://www.itu.int/dms_pub/itu-d/opb/str/D-STR-GCI.01-2021-PDF-E.pdf

2 https://www.itu.int/dms_pub/itu-d/opb/str/D-STR-GCI.01-2021-PDF-E.pdf

3 https://www.gacetaoficial.gob.cu/es/constitucion-de-la-republica-de-cuba

4 https://www.gacetaoficial.gob.cu/sites/default/files/goc-2022-o90_0_0.pdf

5 https://www.gacetaoficial.gob.cu/sites/default/files/goc-2022-o90_0_0.pdf

6 https://www.cecmed.cu/sites/default/files/adjuntos/Reglamentacion/decreto-ley_335.pdf

7 https://www.gacetaoficial.gob.cu/es/decreto-ley-370-de-2018-de-consejo-de-estado

8 https://odin.opendatawatch.com/

9 https://opendatacharter.net/

10 https://www.gacetaoficial.gob.cu/es/ley-141-de-2021-de-asamblea-nacional-del-poder-popular

11 https://www.gacetaoficial.gob.cu/es/ley-143-de-2021-de-asamblea-nacional-del-poder-popular

12 https://bwcimplementation.org/sites/default/files/resource/Cuba_PenalCode_2022_0.pdf

13 https://www.gacetaoficial.gob.cu/es/decreto-ley-370-de-2018-de-consejo-de-estado

14 https://www.mincom.gob.cu/sites/default/files/marcoregulatorio/r_105-21_modelo_de_actuacion_nacional.pdf

SOCIAL AND CULTURAL DIMENSION

In this section, the social and cultural dimensions are discussed. Social and cultural dimensions are crucial to evaluating ethical components in the deployment of AI systems, such as mechanisms to avoid the appearance of biases throughout the life cycle of the AI system and the creation of a fair and inclusive AI ecosystem. In this sense, this section addresses topics such as the inclusion of women in the development environment of science, technology, engineering, mathematics (STEM) and AI, as well as the incorporation of social and cultural diversity to ensure the ethical application of AI. In addition, it includes the level of acceptance and attitudes of the general public towards AI, the consideration of environmental and sustainable criteria, health, social well-being and culture in creating AI solutions.

DIVERSITY, INCLUSION AND EQUITY

According to the ITU (2022)[15], in Cuba, only 73.2% of the population uses the Internet, and only 40.1% of homes have internet. Regarding gender, 75.1% of women use the Internet, while only 60.7% of men do so. Based on internal data, the counterpart reports that of the total internet population in 2021, 45.6% are men and 54.4% are women. The above shows that the gap favors women, contrary to the global trend. In geographical terms, 84.1% of people in urban areas use the Internet, which contrasts sharply with only 13.8% in rural areas.

Regarding the gender gap in STEM higher education, 12.16% of men and only 6.15% of women graduate, according to the World Economic Forum[16] . Specifically, regarding ICT, only 4.31% of men and 1.63% of women. When analysed at the level of children and adolescents, no data allows for the evaluation of their performance or expectations by gender. In this regard, the government reports its Pre-University Vocational Institute of Exact Sciences, where children and adolescents are prepared to work as professionals in exact sciences and in which the proportion of enrollment that corresponds to women is 62.8% while 37.2% are men.

Additionally, Cuba has a National Program for the Advancement of Women, published in Presidential Decree 198 in 2021[17], with the objective of "Promoting the advancement of women and equal rights, opportunities and possibilities [...], as well as delve into the objective and subjective factors that, as expressions of discrimination, persist in Cuban society and hinder greater economic, political, social and family results, to eliminate them. The program addresses seven areas of interest: (1) economic empowerment of women, (2) media, (3) education, prevention and social work, (4) access to decision-making, (5) legislation and law as a regulatory framework for protection against all forms of discrimination and violence, (6) sexual and reproductive health, and (7) statistics and research. Policies have not been monitored, but a data observatory on the gender gap was implemented: https*://www.genero.onei.gob.cu* .

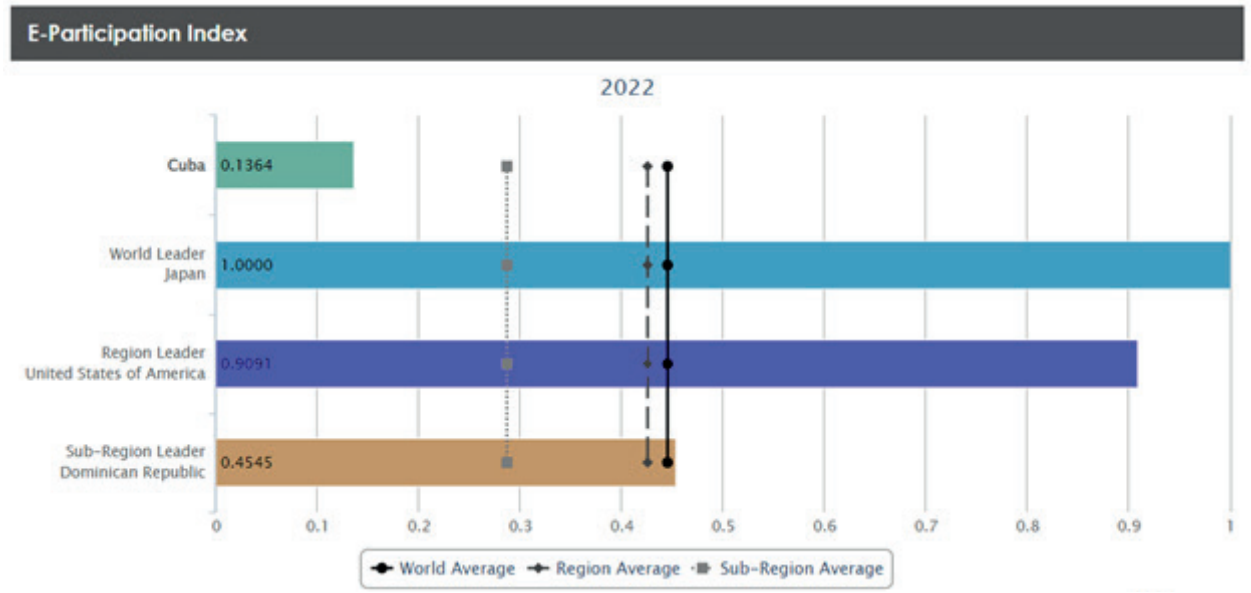
Various initiatives address the urban-rural gap, including the Comprehensive Policy for the Improvement of the Computerization of Society in Cuba, Law 145 of Territorial Planning[18] and Urban Planning with its state plan, the New Urban Agenda, and the National Territorial Planning Scheme. In addition, a rural revaluation program was approved, which contemplates completing, improving and extending connectivity for access to information and communications technologies, internet services, email and electronic commerce to the entire rural area, as long as they do not affect national security and defence, as an instrument for improving the provision of services, interpersonal relationships and the exchange of knowledge and experiences, and establishing differentiated and favourable prices for mobile data packages. To date, no evaluations have been made of these programs.

There are no programs or policies specifically promoting diversity in AI, and there are no obligations regarding the publication of statistics related to diversity in any area.

PUBLIC PARTICIPATION AND TRUST

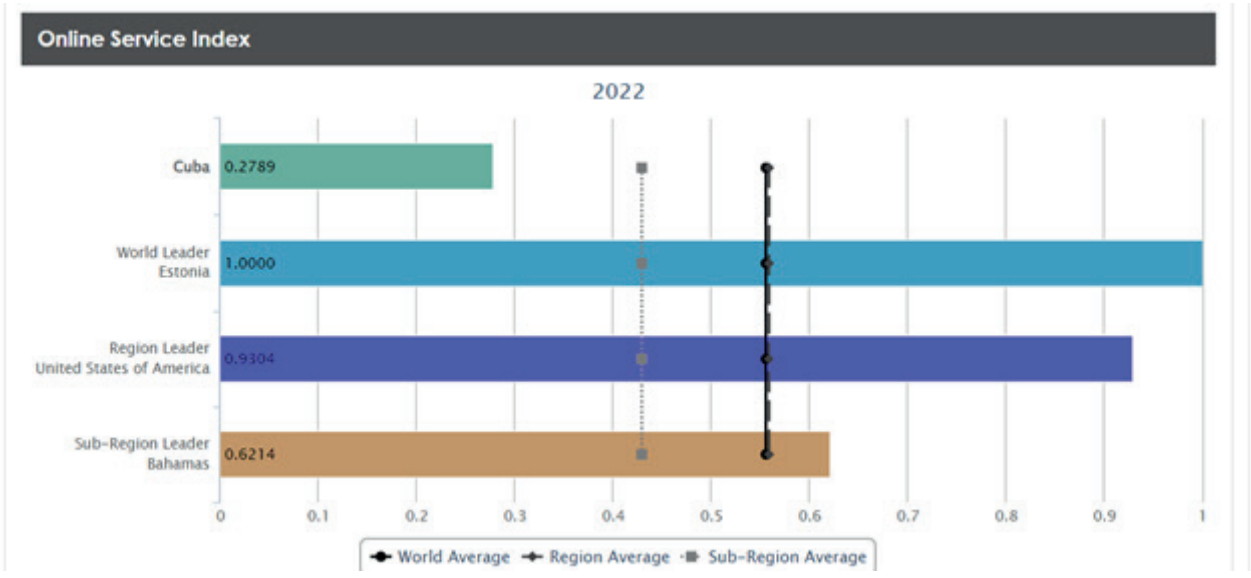
Cuba ranks 170 out of 193 online services ranking (OSI), with just 0.2789 points and 175 out of 193 in the e-participation index (EPI) ranking, with just 0.1364 points. In addition to this, Cuba has only 37.5% in the indicator of citizens trust in government applications and websites, according to the Inclusive Internet Index (III) (Economist Impact, 2022).

Figure 2. Cuba, EPI 2022 scores.



Source: UN E-Government Knowledgebase. E-Participation Index (EPI).

Figure 3. Cuba, OSI 2022 scores.



Source: UN E-Government Knowledgebase. E-Participation Index (EPI).

Finally, there is no data on Cubans' trust in AI products and services.

ENVIRONMENTAL AND SUSTAINABILITY POLICIES

Cuba has no policy addressing AI's environmental impact on the environment or sustainability. Along these lines, there is no specific consideration of AI's impact on the use of land and water, an environmental impact assessment is not mandatory for using AI, and there is no environmental impact assessment of AI's energy demand and related carbon footprint.

Along these lines, there are only general regulations, such as the Natural Resources and Environment System Law (Law 150/2022)[19], which establishes the Strategic Environmental Assessment for evaluating the environmental impacts of development policies, plans and programs. The Environmental Impact Assessment is used to assess investment projects and determine when they affect the population's access to natural resources and the environment in general.

HEALTH AND SOCIAL WELL-BEING

Although there is no specific law on digital health, its aspects are addressed in the Public Health Law[20], approved in December 2023. Along these lines, the approval of digital clinical data is being opened with the introduction of the use of technologies over which the Ministry of Public Health has total control. However, the previous law does not explicitly address AI or its impact on the mental health of children..

CULTURE

Currently, Cuba does not have policies on using AI to preserve cultural heritage, and, according to the counterpart, since there are no indigenous languages, there is no policy in this regard.

There is a policy for preserving cultural heritage: the General Law for the Protection of Cultural Heritage and Natural Heritage[21], approved in May 2022 and published in the official gazette on September 7, 2023. This law regulates the mechanisms and processes for protecting heritage and establishes the rights and obligations of natural and legal persons regarding them.

15 https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx

16 https://www3.weforum.org/docs/WEF_GGGR_2021.pdf

17 https://www.gacetaoficial.gob.cu/sites/default/files/goc-2021-ex14_0.pdf

18 https://www.inotu.gob.cu/es/noticias/ley-no-145-ordenamiento-territorial-y-urbano-y-gesti%C3%B3n-suelof

19 https://www.parlamentocubano.gob.cu/sites/default/files/documento/2023-10/goc-2023-o87.pdf

20 https://www.parlamentocubano.gob.cu/sites/default/files/documento/2023-11/proyecto-de-ley-de-salud-publica_0.pdf

21 https://www.gacetaoficial.gob.cu/es/gaceta-oficial-no-84-ordinaria-de-2023

SCIENTIFIC AND EDUCATIONAL DIMENSION

In this section, the scientific and educational dimensions will be discussed. Since scientific and educational components contribute significantly to the advancement of AI, assessing them becomes a relevant method to determine a country's readiness for AI development. The country's performance in research and innovation (R&I) measures the scientific aspect, including research and development (R&D) spending, research production, ethical AI research, and AI innovation production. AI talents. On the other hand, the educational aspect is evaluated through the country's performance in educational elements such as educational strategy, educational infrastructure, curriculum content, educational achievements, and public access to AI education.

RESEARCH AND DEVELOPMENT

According to Statista data (2024)[22] , Cuba had R&D spending of 0.52% of GDP in 2020, but there was no granularity in natural sciences and engineering. On the other hand, the counterpart complements a publication from the Inter-American and Ibero-American Network of Science and Technology Indicators (2024)[23] , in which Cuba has an R&D expenditure of 0.32% of GDP in 2021. The above translates into low R&D spending as a percentage of GDP compared to world and regional leaders.

In terms of public spending, current expenditures on science and technology from state sources are approximately USD 70.5 million in 2022, according to the Cuban Statistical Yearbook[24] . Although there is no consolidated data on investment related to AI, the counterpart also reports two projects with expenditure associated with this topic of 197,722.05 CUP (approx. USD 8,230) in 2022 and 376,948.43 CUP (approx. USD 15,706) in 2023. In addition, the existence of the National Automatic CTI, Robotics and AI Program is reported where the expenditure planning for five years (2020-2025) was 19,237,200 CUP (approx. USD 801,550).

The number of publications per capita on AI and related topics depends on the source and the methodology used to narrow down the topic. Although both sources correspond to OpenAlex data when considering different labelling criteria and types of publications, the number changes between the Emerging Technology Observatory[25] , which reports 0.000014 publications per capita, and the National AI Center of Chile, which reports 0.000087 publications per capita. The first reports 0.0135 citations per capita, while the second is 0.0027. There is no data on publications in FAccT or, more generally, on ethics.

There are no AI ethics conferences organised in the country. However, some related initiatives are reported, such as IADES (Artificial Intelligence Applied to Sustainable Development) 2023, UCIENCIA 2023, and CiberSociedad 2023, where panels on ethics in AI have been developed.

In institutional terms, no research centres or departments are dedicated to AI ethics.

In terms of people, according to CENIA data, there are, on average, 155 active researchers per year in AI in Cuba, which translates into 0.000014 per capita annually. However, there are no grandmasters on Kaggle.

There are no patents on AI in Cuba. In addition, between 2020 and 2022, there were only 42 GitHub repositories with 582 stars. When taken per capita, Cuba has only 3.73 repositories per million inhabitants (0.0000037 per capita).

EDUCATION

Currently, there are no policies or laws governing the use of AI in the education system or the training of teachers and educators on the subject.

Regarding infrastructure, the counterpart reports that 42.2% of primary schools and 67.36% of secondary schools have Internet access for pedagogical purposes. In terms of connected schools, there are 4,730 general education schools, 181 Diagnostic and Guidance Centers, 170 Municipal Education Directorates, and 15 Provincial Education Directorates. The counterpart reports that both primary and secondary schools have 100% access to computers for pedagogical purposes, but there is no international data to contrast this information.

Only programming teaching is reported at the primary and secondary education levels, but not other elements related to AI, digital resilience, computational and critical thinking.

There are no tertiary education programs dedicated to AI in terms of curriculum. The closest is the recently created Bachelor's Degree in Data Science 2023 at the University of Havana. In any case, the counterpart reports that courses related to AI are offered in computer science-related careers, but no sources corroborate this. Only programming and essential elements of AI are taught at a technical-professional level, but nothing related to its ethics.

In quantitative terms, there is only data on graduates in technical sciences or natural sciences and mathematics from the Statistical Yearbook of Cuba[26], which is 14.4% of enrollment, which, in turn, is only 12.65%. % of the total. There are no specific data for ICT.

The Coursera skills report has no data for Cuba. Moreover, there are no data on PhDs, postdocs, or data science rankings for postgraduate degrees.

Finally, regarding public access to AI education, there are no massive open courses, only isolated initiatives. Regarding these, the counterpart reports an open course on AI developed with the UNESCO .

office with a scientific dissemination section. It is not suitable for the entire public but for professionals with specific basic knowledge. In addition, Joven Club has a course on AI taught in the province of Las Tunas and Holguín, with 17 graduates.

22 https://www.statista.com/statistics/1390868/expenditure-on-research-and-development-randd-as-a-share-of-gdp-cuba/

23 https://app.ricyt.org/ui/v3/bycountry.html?country=CU&subfamily=CTI_IMD&start_year=2013&end_year=2022

24 https://www.onei.gob.cu/sites/default/files/publicaciones/2024-04/aec-2022_0.pdf

25 https://cat.eto.tech/?expanded=Summary+metrics&countries=&countryGroups=Latin+America+and+the+Caribbean

26 https://www.onei.gob.cu/sites/default/files/publicaciones/2024-04/aec-2022_0.pdf

ECONOMIC DIMENSION

The economic dimension considers relevant aspects within the ecosystem in which AI systems are developed and deployed, such as
The economic dimension considers relevant aspects within the ecosystem in which AI systems are developed and deployed, such as
those related to the labour market, intermediate consumption, and AI investment and production. The dynamism and skill level of the labour market and spending on intermediate consumption, investment, and production are crucial aspects for assessing the performance and readiness of the specific ecosystems in which AI is implemented.

LABOR MARKETS

The absence of data on the percentage of job openings requiring AI-related skills, the current number of employees with data science expertise, the relative penetration of AI skills, and the concentration of AI talent is a significant gap. This data is crucial for understanding the labour market's readiness for AI implementation. Similarly, the lack of public policies addressing AI's impact on the labour market is a notable concern.

INTERMEDIATE CONSUMPTION

In general, there is no required data on intermediate consumption that allows us to know companies' spending on AI services or the production of goods and services. As a complement, the counterpart reports that Cuban companies can develop projects for which they have the autonomy to allocate budget items at the beginning of each fiscal year. At the end of 2022, the ONEI records in its Statistical Yearbook total expenditure on science and technology activities more than 4,785 million CUP (approximately USD 170.8 million), but its granularity cannot be determined at the AI level.

INVESTMENT AND PRODUCTION

The absence of data on companies' spending on R&D in programming, consulting, and other computer-related activities is a significant data gap. This data is crucial for understanding the level of investment in AI development. The information provided by the counterpart, from the Statistical Yearbook[27] , reports that total expenditure on R&D activities in 2022 is more than 2,281 million Cuban pesos (approximately USD 81 million). In the case of the Cuban Software Industry, some 20 million Cuban pesos (approx. USD 0.7 million) are recorded as expenses in Research, Development and innovation, of which it is estimated that more than 60% is allocated to disruptive technologies (AI, Big Data and Blockchain). Another notable gap is the absence of dataon high technology exports in Cuba.

27 https://www.onei.gob.cu/sites/default/files/publicaciones/2024-04/aec-2022_0.pdf

TECHNICAL AND INFRASTRUCTURE DIMENSION

The technical and infrastructure dimensions refer to countries' installed capacity for developing and deploying AI solutions, whether through their computing power, the availability of data centres, connectivity, and internet access, among other things. These elements are relevant enablers for developing AI systems within a country since they determine development capabilities based on the infrastructure available and necessary to support the processed information.

INFRASTRUCTURE AND CONNECTIVITY

According to the ITU[28] [29] , in Cuba, only 67.4% of the population subscribes to mobile telephony, 42% to active mobile broadband, and 3.25% to fixed broadband. This leads to a low average international band of 147 kbits, with no data on average download speeds. In terms of connection, only 73.2% have access to the internet, of which 74.3% have access to 3G, but only 49.5% to LTE/WiMAX and no one to 5G. Furthermore, only 96.2% of the population has electricity access, which is not necessarily permanent.

APPLIED STANDARDS

Cuba does not participate as a member or observer in the relevant normalisation committees[30] , nor has it been requested to be part of them.

COMPUTATIONAL CAPABILITIES

Cuba does not have data centres[31] [32] ; the closest one is 360 km away, in Miami, Florida, USA. Furthermore, there is no specific cloud computing policy.

STATISTICAL PERFORMANCE

International sources do not provide data on Cuba's statistical performance, and laws that establish a global framework for the coherent management of data beyond those mentioned in the legal dimension of personal data do not exist.

28 https://datahub.itu.int/data/?e=CUB&i=242

29 https://www.itu.int/en/ITU-D/Statistics/Pages/stat/default.aspx

30 https://www.iso.org/member/1629.html

31 https://www.technologyreview.com/2022/04/25/1051115/global-cloud-ecosystem-index-2022/

32 https://www.datacentermap.com/

RAM IMPLEMENTATION

Cuba currently lacks an active AI ecosystem or citizen participation around this topic. The Ministry of Communications has initiated a process with working groups to develop its ENIA, but it does not include broad and open citizen participation processes.

In line with the above, so that the application of RAM can be used as input in the process, there are no consultation and open participation processes. However, it was circulated with government counterparts and experts they considered relevant for review and complementation regarding data and political priorities.

Thus, the implementation process of this RAM was carried out in three stages:

1) Initial research to gather indicators.

2) Sending a pre-filled form with comments and requests to counterparties for its complement.

3) Review and consolidate the form for preparing the report and recommendations.

Along these lines, this report's results are based on the data available from international sources and those reported by the official counterpart. If there is a discrepancy, all available information is specified and reported.

Despite the above, there is a significant gap in terms of information availability. The report makes this explicit in its sections and materialises it in one of the main recommendations in the following section.

RECOMMENDATIONS

Cuba is behind in terms of AI ecosystem and governance development, which means a double challenge: addressing institutionality and technological development gaps and developing a roadmap to promote ethical and human rights-respectful use of AI. AI. Along these lines, the recommendations presented below point to these two challenges, but they start from previous elements that enable an exemplary deployment of AI.

Table 1. List of the ten priority recommendations

1.REGULATION 1.1. Creation and implementation of a National Artificial Intelligence Strategy. 1.2. Create multi-stakeholder governance with the participation of international observers. 1.3. International assessment of personal data laws, freedom of information and access to knowledge, and online security and content integrity laws.
2.DATA 2.1. Improve data collection of the R&D&i ecosystem 2.2. Open data policy 2.3. International consultancies to improve e-participation indicators and digital services. 2.4. Collect specific data from the AI ecosystem.
3.CAPACITY DEVELOPMENT 3.1. Priority promotion of policies to improve connectivity. 3.2. Rural policy to address the gap in access to electricity and internet. 3.3. Updating education curricula at all levels.

1. REGULATION

1.1. Develop and implement a National AI Strategy.

For the ethical development and use of AI, countries must have a Strategy with concrete actions, measurement mechanisms and those responsible for its implementation. This policy should follow the principles and values of the UNESCO recommendation and

incorporate multiple stakeholders in its development. Regarding the latter, authorities and public policy makers or academics are insufficient; the general public must be considered.

Along these lines, to develop the ENIA, it is recommended that a process that includes open deliberation sessions and public consultation with the support and observation of international expert. . Elements such as information given to citizens when subjected to AI systems, decision-challenging mechanisms, and guarantees of transparency and accountability to citizens must be incorporated.

The development of an ENIA must go beyond AI in the State, addressing mechanisms to promote the private sector, infrastructure and human capital development, and mechanisms to safeguard and control abuse of the same public institutions.

In the strategy launched in May 2024, 6 axes and objectives are established, but there are no details about its implementation or the specific public policy instruments that will be used. Along these lines, progress must be made in the implementation mechanisms and specific actions.

1.2. Create multi-stakeholder governance with the participation of international observers

One of the weakest elements in the RAM are the digital services indicators (OSI) and electronic participation (EPI). In this line, the ENIA should be developed with a robust institutional framework to improve these indicators.

Along these lines, it is recommended that a governance body be created that is made up of people from different sectors of society and observers from international organisations. The latter will provide an expert and neutral look at more developed organisations and countries in terms of their AI ecosystem and governance.

This body should review the policy's implementation and observe the impacts of technology in general and state initiatives. It must also publish open reports on government performance and the use of AI in Cuba.

1.3. Evaluate the development of an Artificial Intelligence Law

The relevance and need for broad AI regulation must be evaluated. For this, it is relevant to study the risks in the uses of AI and how they could be addressed in specific legislation without harming research and innovation in this area.

Along these lines, the systems that will be considered AI and the associated risk levels must be adequately defined. Furthermore, principles must be incorporated in specific legislation or an eventual general regulation that covers issues such as proportionality and harm, safety and security, equity and non-discrimination, supervision and human decision-making, transparency and explainability, and accountability and responsibility.

In an eventual regulation, whether broad or sectoral regulations, the following elements must be addressed:

- Transparency and explainability.
- Ethical and legal impact evaluation.
- Supervision and accountability mechanisms.
- Prohibition of unacceptable uses.
- Equity and non-discrimination.
- Technical and ethical standard.

Cuba should follow up on existing regulatory experiences and discussions, such as the recently published European law or the debate of Chile, Brazil, and Peru laws, among others.

1.4. Develop regulations for the ethical acquisition of AI systems.

Legislation and public procurement procedures are essential elements for the ethical use of AI. Appropriate procurement mechanisms, especially in a country with a large State, can promote good ethical practices that give proper signals to the private and academic sectors.

In the RAM, it was seen that there is no specific regulation for the acquisition of AI systems that have adequate elements for their correct purchase and operation in the State. Furthermore, these procedures can incorporate UNESCO recommendations and use the ethical impact assessment instrument.

1.5. Participation in normalisation and standards organisations related to AI

Currently, Cuba does not participate in any discussion on technical and ethical standards related to AI, such as ISO or EEEI. Along these lines, it is recommended to start conversations with organisations to join as observers in the relevant groups (e.g., JTC1) and, over time, as full members. The latter applies to having a voice that allows the Cuban reality to be brought to the standards, which are usually dominated by the countries of the Global North.

1.6. Creation of specific guides on the ethical and responsible use of AI in the Cuban context

A relevant problem in using AI, especially when the systems are developed primarily in the Global North, is that they do not necessarily adapt to the sociocultural environments of the Global South. Along these lines, it is recommended that use cases that require contextual analysis and issue guides be identified for recommendations and ethical use of AI in these areas. When appropriate, these guides can be accompanied by databases or specific tools that allow the impact of the systems to be evaluated, calibrated and trained appropriately for the Cuban context and audited.

Furthermore, the guides allow for promoting principles and good practices aligned with the UNESCO recommendation without necessarily resorting to the formulation of new laws. This allows for greater agility and potential for updating and adaptation.

1.7. Creation of sectoral policies that incorporate the impact of AI and its responsible use

Currently, Cuba does not participate in any discussion on technical and ethical standards related to AI, such as ISO or EEEI. Along these lines, it is recommended to start conversations with organisations to join as observers in the relevant groups (e.g., JTC1) and, over time, as full members. The latter applies to having a voice that allows the Cuban reality to be brought to the standards, which are usually dominated by the countries of the Global North.

Various areas were detected in which, although AI advances may have a significant impact, no specific policies address them. Along these lines, it is recommended to evaluate relevance and develop guidelines for at least the following four areas:

1.7.1. Working market

Currently, there are no policies that address the impact of AI on employment. Along these lines, it must be analysed how automation through AI can generate unemployment and/or modify existing jobs significantly. Furthermore, the same labour relations and required skills change with the emergence of AI-based systems. Cuba should create a policy to address these impacts on the labour market.

1.7.2. Health

The RAM detects that, although there are general policies that address general health, AI is not addressed as a specific issue. Along these lines, given the unique opportunities in the field of health as well as the emerging risks in this area, it is recommended to work on a specific sector policy and/or significantly update the existing Public Health policy with a section dedicated to AI.

1.7.3. Culture

In the field of culture, AI also presents significant and novel opportunities and risks. On the one hand, the use of AI can foster new forms of art in collaboration with AI or facilitate the protection and preservation of existing cultural heritage. However, this same technology blurs the limits of what creativity, authorship and the minimum subsistence of a cultural identity means that can be lost in the generation of artistic products in an automated way and based on the training of systems. Thus, it is recommended to promote a policy that addresses the use of these technologies in the cultural field and promotes safeguards for artists and Cuban cultural heritage.

1.7.4. Environment

In the environmental field, it must be analysed whether the development of AI in Cuba has a significant impact on the environment. If necessary, the development of a regulation that establishes impact evaluations can be discussed.

1.8. Review, evaluation and updating of related legislation

The analysis shows that in several relevant cases, such as the protection of personal data, Cuba has updated legislation that came into force a few years ago. However, there are still areas where laws do not necessarily adapt to the impacts and challenges that AI brings with it or do not fully align with recommendations on its ethical use.

1.8.1. International evaluation of personal data laws, freedom of information and access to knowledge, and online security and content integrity.

It is recommended that the laws be evaluated by international experts on the subject and updated according to these reports. In particular, some challenges are detected in personal data, freedom of information and access to knowledge, online security, and content integrity that could put citizens at risk.

Along these lines, it is recommended that the laws and how they could adequately protect human rights in using digital technologies such as AI be subjected to an expert and external evaluation. For example, although the personal data law provides adequate rights to individuals, it has exceptions and limitations that should be considered so as not to leave citizens unprotected.

1.8.2. Review and evaluation of the mechanisms and laws that provide procedural guarantees and accountability in the context of AI

There is no updated legislation regarding procedural guarantees and accountability that adequately adapts to the use of AI in public or private systems. Therefore, it is recommended that existing regulations be reviewed, external evaluations requested and updated so citizens have due process when AI systems are involved.

1.9. Training and certification programs for the public sector

A relevant need revealed from the application of RAM is the lack of training and certification programs for public employees. Along these lines, it is necessary to promote the creation of essential technical training courses in the ethical use of AI systems to more extensive programs that provide certifications.

It is recommended that training be provided in the application of tools such as UNESCO's Ethical Impact Assessment and audits of AI systems, among others. This is not only for the use of technology in the State but also for the correct monitoring and supervision of the private sector.

2. DATA

2.1. Improve data collection of the R&D&I ecosystem with a focus on AI

One of the main gaps detected in this evaluation is the lack of data on the economy, research, innovation, and the labour market related to technology. Although the State generates statistics and has its Yearbook, it does not necessarily follow the international collection standards that allow their comparison and ensure their quality.

Along these lines, it is recommended that data measurement from the R&D ecosystem be promoted in a granular and transparent manner, with the methodologies and databases for the correct construction of baselines made available.

For data collection, it is recommended that standards and manuals such as those of Frascati and Oslo be followed. In addition, it is urged to review repositories related to the topic, such as the OECD repositories, to identify the indicators that are not being built and the information that is not being collected in the country.

In line with the above, it is recommended that standards be followed and that data be reported to the corresponding international organisations (e.g., OECD, World Bank, World Economic Forum, United Nations). This will improve transparency and data quality.

2.2. Collect specific data from the AI ecosystem.

It is recommended that data collection on the development and use of AI be promoted, mainly in companies. In particular, information on spending and adoption in the industry and information on employment and skills required for AI-related positions should be collected. To have more disaggregated information, these data must have gender, age, and urban/rural criteria.

2.3. Open data policy

Cuba has no open data policy and has not signed commitments like the Open Data Charter. In line with the two previous actions, it is recommended that Cuba acquire commitments to open data and advance a policy that makes it public and available on a periodic and transparent basis. It is worth mentioning that it is not enough to publish statistics in a yearbook; we must move towards opening databases in machine-readable format[33] , with different download options, clear responsible parties, and adequate metadata that are kept updated and usable.

2.4. International consultancies to improve e-participation and digital services indicators

One of the main gaps detected was in the e-participation (EPI) and digital services indicators (OSI). Along these lines, it is recommended to generate a strategy to improve services and e-participation, working on the technological tools that serve citizens. Therefore, it is recommended that international organizations conduct consultancies and audits processes and suggest improvements.

3. CAPACITY DEVELOPMENT

3.1. Priority promotion of policies to improve connectivity

One of the main gaps detected in RAM is access to high-speed internet, electronic devices, and electricity. For an AI strategy to be properly implemented and for the technology to effectively mean a positive change for citizens, they have to be able to take advantage of it and to do so, they require access through mobile devices and the internet.

Thus, the goal should be to advance Internet access levels, improve upload and download speeds, and facilitate international data transfer. For this, connectivity infrastructure must be improved, and policies must be designed to allow households to access technology.

As mentioned, speed must also be improved. Thus, work must be done to ensure access to higher-speed networks (4G, 5G).

3.2. Rural policy to address the gap in access to electricity and internet

The urban-rural access gap is significant, probably one of the largest in the region. Along these lines, the government should prioritise addressing this situation and promoting the connection of rural areas to the Internet.

However, when access is so low, simply deploying connectivity infrastructure is not enough; education and training programs in digital technologies must accompany it. If people without access are exposed to the infrastructure and not shown its opportunities, change is slower, and the risks of misuse or abuse are more significant.

3.3. Updating education curricula at all levels

A global challenge to which Cuba is no stranger is updating educational curricula at all levels. This should not be done by focusing on technical skills such as programming. Still, work should be done to deliver skills that allow people to adapt to rapid technological advances, approach their development, and use them critically.

Along these lines, the primary and secondary school curriculum must incorporate elements such as critical thinking, computational thinking, algorithmic thinking, ethics in digital environments, etc.

Along the same lines, work should be done in computer science-related careers to include courses on critical analysis of technologies, which allow them to go beyond their development and use and analyse the values involved and the impact of technological systems on different stakeholders and how to navigate value tensions in light of the ethical recommendations of UNESCO and other international organisations.

Along these lines, it is recommended that tertiary education programs focused on AI incorporate significant components of ethical use. This should be done not only at the university level but also at the professional technical level.

3.4. Policy for the use of AI in educational environments

AI not only presents the challenge of teaching its use but can also be used in educational settings to promote learning. There is evidence of AI's potential to offer personalised pathways in academic environments and support children's education in more creative and adaptive ways. However, if the above is done carelessly, there is a risk of harming learning and children.

On the other hand, the emergence of generative AI puts this technology within reach from a very early age. By being able to interact with AI systems through natural language, children and adolescents can use it to support themselves in learning, deepen topics, and improve in various areas ranging from writing to programming and art. However, if not appropriately used, interaction with generative systems can harm skills by not allowing learning from mistakes and generating false information, among other things.

All of the above requires the generation of a specialised policy on the use of AI in educational environments that allows extracting its benefits while protecting people in their learning processes.

3.5. Training program for teachers and educators on AI and its ethical use

A fundamental need beyond updating the curriculum or a policy for the use of AI in educational environments is the training of teachers and educators. If those in charge of leading the learning process are not trained, the rest of the educational policies become very difficult to implement and/or may promote bad practices or partial knowledge that harm students.

The government should prioritise teacher training programs in AI and its ethical use so that educational policies around the technology are correctly implemented.

3.6. Support programs for the study of international doctorates in AI

An important gap detected is the country's lack of advanced human capital, which, in turn, translates into a lack of research and development. Today, the frontier of technology is not found in the country, so it is recommended to work on a program that allows Cubans to travel abroad to obtain doctorates related to both the technical and ethical fields of AI. These programs must have adequate incentives and control mechanisms so that people can reintegrate into the Cuban ecosystem and, thus, strengthen it.

Along these same lines, it is recommended that collaboration programs with universities from other countries be established that allow the exchange of students and academics in projects related to the development and use of AI.

3.7. Incentive program for participation in software development spaces such as GitHub and Kaggle

Activity around AI is measured through publications and patents and participation in open software development environments such as GitHub or development competitions such as Kaggle. The RAM application revealed meagre participation of Cubans in these environments, which shows the need to encourage the country's developers to participate in these instances to contribute and improve the area. Along these lines, it is recommended to design an incentive program that promotes this participation.

3.8. Development of courses open to the general public on basic concepts of AI and its ethical use

AI is a general-purpose technology found in various areas of people's daily lives. Therefore, the general population must have basic knowledge of interacting with AI systems responsibly and safely. Consequently, it is recommended that massive and free courses on AI, its applications, and its ethical and safe use be developed.

3.9. Increase AI R&D spending

Although the data does not allow us to identify specific spending on R&D in AI, it can be seen that R&D spending in general is low in Cuba. Along these lines, it is recommended that the state increase investment in R&D and focus primarily on AI to develop it as a critical sector for the economy and public use in Cuba.

It is recommended that funds be created focused on basic research and AI technology transfer. These can promote research and development both locally and in collaboration with universities and companies outside the country.

3.10.. Increase AI R&D spending

One key component for developing AI systems that adapt to local reality is data. Along these lines, it is recommended to create open repositories for the training of Cuban systems in different industrial and government sectors. These repositories are complex and must be evaluated and audited periodically by international experts to review potential biases that could harm users of the systems trained in them..

3.11. Promote entrepreneurship in AI

In this evaluation, an ecosystem of ventures related to AI or private investment in this area was not detected. It is recommended that innovation and entrepreneurship in the private sector be promoted in an environment open to potential international investments and with an adequate regulatory framework for this.

Table 2 summarizes the recommendations made based on the report's results, along with their priority to advance the implementation of UNESCO principles that promote the development and ethical use of AI in Cuba.

Table 2. List of recommendations based on RAM and international experience

DIMENSION	NO.	RECOMMENDATION	PRIORITY
Regulation	*1*	*Develop a National AI Strategy*	*High*
	2	*Create multi-stakeholder governance with the participation of international observers*	*High*
	3	*Evaluate the development of an Artificial Intelligence Law*	*Half*
	4	*Develop regulations for the ethical acquisition of AI systems*	*Low*
	5	*Participation in normalisation and standards organisations related to AI*	*Low*
	6	*Creation of specific guides on the ethical and responsible use of AI in the Cuban context*	*Half*
	7	*Creation of sectoral policies that incorporate the impact of AI and its responsible use*	*Half*
	8	*Review, evaluation and updating of related legislation*	*High*
	9	*Training and certification programs for the public sector*	*Half*
Data	*10*	*Improve data collection of the R&D&i ecosystem*	*High*
	11	*Collect specific data from the AI ecosystem*	*High*
	12	*Open data policy*	*High*
	13	*International consultancies to improve e-participation indicators and digital services.*	*Half*
Capacity Development	*14*	*Priority promotion of policies to improve connectivity*	*High*
	15	*Rural policy to address the gap in access to electricity and internet*	*High*
	16	*Updating education curricula at all levels*	*High*
	17	*Policy for the use of AI in educational environments*	*Half*
	18	*Training program for teachers and educators on AI and its ethical use*	*Half*
	19	*Support programs for the study of international doctorates in AI*	*High*
	20	*Incentive program for participation in software development spaces such as GitHub and Kaggle*	*Low*
	21	*Development of courses open to the general public on basic concepts of AI and its ethical use*	*Half*
	22	*Increase AI R&D spending*	*Low*
	23	*Enable data repositories for AI development*	*Low*
	24	*Promote entrepreneurship in AI*	*Low*

33 See https://opendatahandbook.org/glossary/en/terms/machine-readable/

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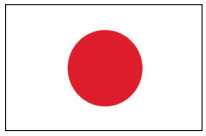

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