Google

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Artificial Intelligence for development

The experience of El Salvador

an AI Sprinters Report









El Salvador

El Salvador has an estimated population of 6.3 million and a GDP of USD 35 billion as of 2024. The sectors contributing most to GDP that year were manufacturing (13.8%), trade (11.3%), and public administration (7.8%), followed by financial services (7.2%), real estate (6.3%), and construction (6.1%).
Security measures implemented in recent years have led to a decline in crime, while macroeconomic austerity policies are helping to address fiscal imbalances and improve investor confidence.

However, a stagnant labor market and high poverty rates continue to pose serious challenges to the country's development. In this context, AI holds significant potential to drive national development, as it is key to improving health and education, as well as to bringing greater dynamism to the Salvadoran economy.

Economic Potential of AI in El Salvador

We estimate AI's economic potential in El Salvador to be between USD 657 million and USD 1.2 billion annually, equivalent to 2.1% and 3.9% of 2022 GDP. The sectors with the highest potential are: manufacturing (USD 103-191 million annually), financial and insurance activities (USD 87-155 million annually), and trade (USD 82-152 million annually). For more details, see Table 1.

These figures, however, depend on the rate of AI adoption in the Salvadoran economy. While there are currently no specific instruments to measure the AI adoption rate in the productive matrix, an approximation is possible. Assuming a 9.1% rate, equivalent to the average of countries in this report that do have such a metric, AI's current impact would be between USD 60 and USD 112 million annually.

2.1-3.9%

Of El Salvador's GDP could represent the economic impact of AI

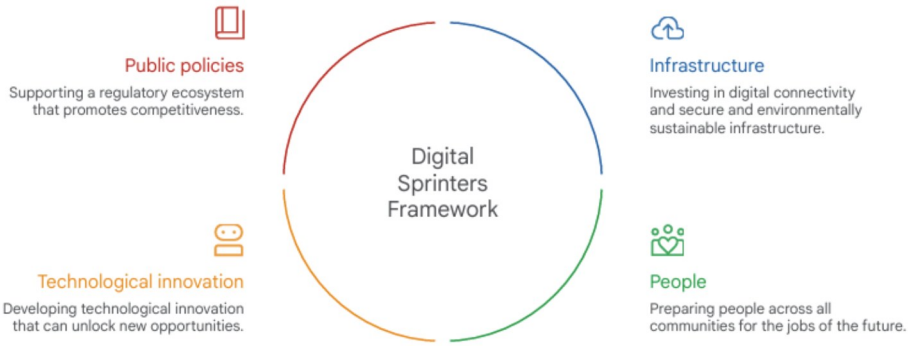
Table 1
Estimated AI impact by Economic Sector in El Salvador (millions of USD 2022)

Economic Sector	Low potential	High potential	Average sectoral share
Manufacturing industry	103	191	16%
Financial and insurance activities	87	155	13%
Wholesale and retail trade; repair of motor vehicles and motorcycles	82	152	12%
Education	46	88	7%
Real estate activities	41	79	6%
Public administration and defence; compulsory social security	39	78	6%
Construction	34	67	5%
Human health and social work activities	36	67	5%
Transportation and storage	31	58	5%
Information and communication	31	56	5%
Administrative and support service activities	28	51	4%
Agriculture, livestock, forestry, and fishing	24	47	4%
Electricity, gas, steam, and air conditioning supply; water supply and waste management	24	44	4%
Accommodation and food service activities	22	42	3%
Professional, scientific, and technical activities	14	25	2%
Other service activities	10	18	1%
Arts, entertainment, and recreation	3	5	0%
Mining and quarrying	2	3	0%
Total	**657**	**1,229**	

Source: Elaborated based on National Economic Statistics from El Salvador

This report seeks to support countries in harnessing the potential of AI, and is part of the Digital Sprinters, AI Sprinters, and AI Pioneers series by Google. The conceptual framework of Digital Sprinters for increasing AI adoption is based on four enabling factors: (1) effective public policies, (2) sound technological infrastructure, (3) fostering innovation, and (4) strengthening human capital. The following sections present findings and recommendations for each factor, in line with the reality of the Salvadoran economy.

Figure 1
Digital Sprinters Framework



Enabling Public Policies

In February 2025, El Salvador passed its innovative Law for the Promotion of AI and Technology. The law created the National AI Agency (ANIA), tasked with promoting and fostering AI development, research, and application across sectors. ANIA will manage the National Registry of AI Development, Innovation, and Application, granting benefits to those who register and comply with technical and ethical standards.

According to Sigfredo Figueroa, legal advisor to the Presidency of El Salvador, the country's AI law aims to differ from other regional approaches. *"The AI law process began by consulting the productive sector; it's an ecosystem based on regulatory pragmatism."* He emphasizes that the initiative is inspired by an innovation-friendly philosophy, similar to those in Japan and Singapore. With this law, the country seeks to strengthen the national AI ecosystem with a regulatory environment that fosters innovation and attracts AI investment.

Along the same lines, Federico Waite, Director of the Artificial Intelligence Laboratory of the National Artificial Intelligence Agency, notes: *"One of the things the artificial intelligence law has sought is precisely to give you a regulatory framework where you can indeed innovate, but you can also begin to make deployments without having to worry about the restrictions of the rule"*. A distinctive element that Waite highlights is the existence of a grace period within the regulatory framework. This allows companies and developers to test their solutions in the real world and to fix technical or regulatory issues progressively.

In parallel, the 2023 Law for the Promotion of Innovation and Manufacturing Technologies aims to boost national competitiveness by offering tax incentives for AI-related activities. It covers the development and commercialization of cloud computing, data flows, AI, big data analytics, distributed ledger technologies, cybersecurity solutions, and quantum computing.

The law grants full exemptions from income tax, municipal asset taxes, capital gains tax, and import duties on goods needed for qualifying activities.

Another relevant regulation is the General Law for the Digital Modernization of the State (2023), which establishes the foundations for the digital transformation of public administration through the digitalization of procedures, interoperability across institutions, and the adoption of advanced technologies to improve the efficiency of public services. According to Mariana Gómez, Executive Director of the Regulatory Improvement Agency, *"this law sets out a new presidential vision for modernization and the development of public administration across all areas, as well as the establishment of strategic partnerships between the Government of El Salvador and Google to attract investment through the use of technological tools and artificial intelligence."*

In this context, the government has begun to leverage AI to modernize public management across key sectors, from healthcare to education. An illustrative example is its application in the simplification and redesign of administrative procedures within the Regulatory Improvement Agency.
Another example is how the Ministry of Public Works and Transport (MOPT) uses AI to monitor urban mobility in San Salvador in real time, including the modernization of the traffic light system, its coordination with the Transport and Emergencies Monitoring Center, and the use of

Use of AI to Map and Streamline Government Procedures

The modernization of administrative procedures has become a priority for the Government of El Salvador. In this context, the Regulatory Improvement Agency (OMR) has incorporated AI tools to map and streamline processes, reduce response times, and improve the management of the National Registry of Procedures (RNT) through its technological platform, Simejora.

Historically, many procedures in the Salvadoran public administration were characterized by

unnecessary requirements, redundant steps, and unclear legal bases, all of which extended response times. In some cases, a procedure would move from one desk to another, with multiple officials reviewing the same document without adding value to the process, unnecessarily delaying responses to users. As explained by Mariana Gómez, Executive Director of the OMR: "when processing a permit or request, it may go through, for example, 20 steps. Within those steps, the document is passed to desk one, where it is reviewed and, without further analysis, sent to desk two. Desk two reviews what desk one did, but does not add value. Then it goes to step three: the person at desk three reviews both previous steps—which may have taken five days—and still adds no value to the process." In addition, process analysis and mapping were carried out manually, which could take "five hours, eight hours, or even two days depending on the complexity of the procedure."

To address this challenge, in February 2026 the OMR launched an AI-powered Process Mapping Tool, developed in collaboration with Google. According to Gómez, the tool enables process flows to be mapped and visually represented "in no more than five minutes," even for highly complex procedures.

The tool has accelerated technical work and supported the reengineering of administrative processes, facilitating the identification and elimination of unnecessary requirements. As a result, "4,968 procedures have been evaluated,

1,706 simplified, and 1,805 registered. This means they have already been streamlined, simplified, and incorporated into the National Registry of Procedures," according to Gómez.

One concrete outcome of this review has been the elimination of the requirement to submit notarized enlarged copies of the national ID (DUI) at specific sizes. As Gómez explains, for years citizens were required to enlarge their ID document and have it notarized, even though this requirement had no legal basis. Such practices imposed unnecessary costs and delays on users.

The project is now moving into a second phase, in which AI will not only map existing processes ("As-Is") but also support the design of optimized versions ("To-Be").

Waze for traffic management. The following case study illustrates this mobility management model:

This pro-innovation regulatory framework is also linked to a broader strategic vision regarding the potential of AI for emerging economies. As noted by Stacy Herbert, Director of the National Bitcoin Office, AI can become "an extraordinary tool for

From monitoring to smart management: AI and real-time control for urban mobility in El Salvador

The MOPT is moving toward a mobility management model based on centralized information and real-time monitoring. According to Diego Benavides, systems engineer at the MOPT, this effort is organized through "*a smart management platform via Google. We are working on different integrations, that would be the word. All the data, the metadata that can be collected. We are unifying all that kind of information and taking it to a next level, with artificial intelligence, not just data collection. We are looking at the integration of sensors, cameras, predictive data*".

One of the pillars of this process is the modernization of the traffic light system: the country has been replacing its traditional network with smart traffic lights capable of operating with the support of cameras and video detectors that count vehicle flow at intersections. According to the MOPT, this information feeds software that makes it possible to adjust green and red times according to traffic conditions.

This network is coordinated with the Transport and Emergencies Monitoring Center, which the MOPT describes as the operations core for traffic management, road safety, and emergencies. One of the most important changes being implemented is the shift from systems that previously operated as

"*islands*" to an integrated ecosystem capable of combining information from multiple modules within a single management platform. In the words of Benavides, "*initially it was a process of, let's see it as islands, we had a project, a flagship project where traffic lights, photo-fines, etc. exist and it is an ecosystem of several modules... We are integrating all those kinds of benefits or services, and we carry it out or integrate it all using Google's infrastructure resources and also AI*".

The value of this initiative lies not only in installing new devices, but in turning scattered data into operational intelligence—that is, video detection, vehicle counting, control software, and centralized monitoring—where the system seeks to interpret information from multiple points across the city and translate it into automatic or semi-automatic decisions about road operations. Benavides specifies that this operational intelligence includes the ability to anticipate which streets concentrate the most vehicles, estimate how closing a road would affect the population, decide which streets are best to close, and support the dispatch of traffic managers. He even mentions that, in a large-scale road closure, predictive data made it possible to identify which street to close and how to better manage traffic to avoid greater disruption.

In practice, this brings the project closer to the idea of a "*brain*" that proactively monitors the city: detecting where congestion increases, coordinating intersections remotely, prioritizing corridors with greater vehicle load, and strengthening incident response capacity. In this regard, Benavides notes, "*the top goal we want, that is, to get to where with one button —let's imagine how wonderful— with one button you say: I am going to open all these streets or all those traffic lights, I am going to set them to green to decongest, say, a main artery of the country, which is something super important. I know it sounds very far-fetched, but the idea is to get there or manage to reduce that dead time*".

The logic of the project is to move from a reactive scheme, where traffic management depends mainly on field observation, to one in which the road network can be observed, coordinated, and adjusted from a control center, which is reinforced by the integration of Waze for Cities, which Benavides describes as the possibility of bringing together all the information that can be generated on a single dashboard. In his words, "*imagine this: all the information that can be generated on a single dashboard —cameras, sensors, photo-fines, street closures— we could even talk about weather issues, floods, accidents, historical data, all that kind of thing; being able to display it or have that information on a single dashboard*".

Waze for Cities in El Salvador

Traffic management in El Salvador faced challenges associated with the need for timely information on congestion, road closures, maintenance works, and other incidents affecting circulation. To respond to this challenge, in September 2020 the Government of El Salvador announced a partnership with Waze, through the Ministry of Public Works (MOP), the Vice-Ministry of Transport (VMT), the Road Conservation Fund (FOVIAL), and the Innovation Secretariat. The initiative was framed within the Waze for Cities program, which enables a two-way exchange of data between the platform and public entities: Waze shares anonymous, real-time information on incidents and slowdowns reported by users, while institutions contribute data on street closures, works, accidents, and other events affecting traffic.

The program makes it possible to provide the population with information on road maintenance activities, road closures, and the condition of the country's road infrastructure. This information seeks to empower citizens to contribute road data, edit the Waze map, and take advantage of the tools the program offers to improve mobility through the use of technology.

Taken together, the experience can be understood as a smart mobility initiative based on data shared between the public sector and a digital platform.

developing economies to leap toward the technological frontier." In her view, there is *"a small, finite opportunity"* that must be seized now—particularly by agile countries capable of moving quickly, such as El Salvador. In this context, Herbert emphasizes the importance of regulatory certainty to attract technological talent: "having a clear regulatory framework and legal certainty is essential to attract builders and engineers—the people who are building the future. That is the goal: to bring them into your country, and that is precisely what El Salvador has done."

The Reciprocal Trade Agreement established with the United States in January 2026—aimed at deepening the bilateral economic relationship beyond CAFTA-DR—reinforces a process that began in 2023. This agreement establishes a framework to strengthen trade and investment between both countries by reducing trade barriers, preventing barriers to digital trade, among other aspects. In particular, the agreement promotes the free cross-border flow of data for commercial purposes, prohibits discriminatory measures against digital services and digitally distributed products, limits the imposition of technology-transfer or source-code-access requirements as a condition of market entry, and establishes the non-application of tariffs on electronic transmissions. It also incorporates cooperation provisions on cybersecurity, which helps consolidate an enabling environment for the development of digital trade.

These regulatory advances provide El Salvador with a favorable environment for the development of AI. The main challenge now is to align other key areas—such as infrastructure and talent—to fully leverage the potential of this robust legal framework.

Recommendations

- Develop a national AI action plan to operationalize recent laws

  Consolidate El Salvador's pragmatic and pro-innovation approach to AI regulation: The country's legal framework stands out for its regulatory pragmatism and its focus on enabling innovation. El Salvador should continue strengthening this approach through multi-stakeholder dialogue, ensuring that benefits reach both emerging and established actors.

- Ensure continuity and institutional backing for AI-related tax incentives:

  The tax incentives established under the Law for the Promotion of Innovation and Technology Manufacturing represent an important step toward attracting investment in high-impact AI applications. Sustaining and clearly communicating the continuity of this policy will help build investor confidence and demonstrate the government's long-term commitment to digital transformation.

- Leverage the favorable regulatory environment to attract advanced human capital

  Continue attracting researchers, entrepreneurs, and developers specialized in AI and its applications across the economy and public sector. Technology visa programs, soft-landing hubs, and strengthened collaboration with international universities could accelerate the consolidation of the country's technological ecosystem



Infrastructure

El Salvador's digital infrastructure has made significant progress in recent years, although key gaps remain—particularly in strengthening the processing capacity required for advanced AI development.

Internet usage has grown rapidly, from approximately 34% in 2017 to 66.5% in 2024 according to the International Telecommunication Union, with alternative estimates placing the figure at 76.9% in early 2025. Median fixed download speeds reached 84.76 Mbps in August 2025, representing a 52% year-on-year increase. However, fixed broadband penetration remains limited, with 11.6 subscriptions per 100 inhabitants compared to a global average of 20.

The gender digital divide in internet access has narrowed significantly. International Telecommunication Union data for 2020 showed a gap of 4.8 percentage points (52.4% for women versus 57.2% for men), but more recent estimates suggest that the Americas region has reached gender parity in both internet use and mobile telephony, with El Salvador converging toward that threshold.

In contrast, the urban–rural divide remains the main structural challenge: only 37% of households have internet access (51.2% in urban areas versus 13% in rural areas, EHPM 2023), a four-to-one disparity that has improved since 2019 but remains pronounced. These inequalities have prompted public initiatives such as Conectando El Salvador, aimed at expanding connectivity in rural areas. In parallel, the University of El Salvador is advancing the Campus Cloud 2025 project to strengthen national high-performance computing capabilities.

At the same time, strategic partnerships with the private sector are accelerating the adoption of cloud and AI technologies across public management and economic development. For example, in August 2023, El Salvador announced a collaboration agreement with Google to support the country's digital transformation, modernize public services, and position it as a regional economic hub. This strategic partnership focuses on cloud and AI, including the joint development of simple and interoperable digital ecosystems for commerce, healthcare, and health records; training for government agencies; and the creation of a telemedicine platform (DoctorSV) that uses AI to automate processes and expand access to healthcare, among other initiatives.

DoctorSV

DoctorSV is a telemedicine application developed by the Government of El Salvador in collaboration with Google Cloud to expand access to healthcare services through digital tools and AI. The platform leverages the Gemini model to support triage and clinical guidance, enabling 24/7 remote medical consultations. Its objective is to facilitate primary care and reduce congestion in the public health-care system.

Through the application, users can conduct video consultations with doctors, receive preliminary diagnoses, and obtain electronic prescriptions. The system is complemented by a network of more than 348 pharmacies, 76 laboratories, and 42 radiology centers, allowing patients to undergo tests and collect medications when needed. The service is free for users, as consultations, tests, and medications are funded by the State.

The platform includes more than 1,200 general practitioners and 250 specialists, and requires users to register with a national ID or passport to schedule consultations. It initially focused on treating low-complexity conditions and users aged 18 to 30, before gradually expanding to a broader population.

Another notable project is the use of AI to strengthen tax management and revenue collection in El Salvador, as the following case illustrates.

AI to strengthen fiscal intelligence

El Salvador's Ministry of Finance is incorporating

AI to strengthen tax management, improve citizen service, and move toward a more integrated, data-driven public administration. An important part of this process arises from the need to connect large volumes of information from systems that have historically operated in a fragmented manner, including cloud platforms and legacy systems.

One of the most advanced projects corresponds to the tax audit initiative, aimed at giving tax auditors proactive visibility to detect anomalies and support audit processes. The project has already completed a proof of concept and an MVP validated together with functional teams from the tax area, using Google Cloud tools such as BigQuery, Looker, and Vertex AI.

In parallel, the Ministry is exploring the use of advanced analytics and graph technologies to identify hidden relationships in large volumes of tax data, particularly in areas associated with tax evasion. According to Martha Murillo, of the Ministry's IT Directorate, these technologies make it possible to uncover patterns that "*simply cannot be seen by the human eye*" and that would be difficult to identify using traditional tools.

The modernization strategy also includes initiatives aimed at facilitating interaction between the State and citizens. The Ministry is developing conversational agents for its various institutional portals, including the fiscal transparency portal, with the aim of facilitating navigation and the consultation of public information.

Another area of application corresponds to subsidy and social assistance programs, where AI is being evaluated as a tool to improve the targeting of benefits and streamline service processes. In the case of the gas subsidy, the Ministry seeks to integrate different sources of information to more accurately identify the population that truly needs the benefit. In the words of Murillo: "*The challenge lies in who should have access to this benefit and, more than who, really making sure the help reaches those who need it (...) how do we add intelligence to the data so that it is the right population to whom we deliver this subsidy and, on top of that, so that the procedure is easy?*"

The adoption of AI at the Ministry has also entailed a process of cultural transformation within the institution. Beyond the technological deployment, the Ministry has had to work on building trust, promoting the responsible use of these tools, and supporting the change in how staff work. In this context, internal campaigns such as "*Demystifying AI*" are being promoted to encourage the safe use of institutional AI tools and reduce risks associated with handling sensitive information.

According to Martha Murillo, the challenge does not consist solely of incorporating new technologies, but also of changing the perception of AI's role in everyday work: "*We must and we are in a marketing-type campaign, selling these strategies to the everyday person, to the everyday finance officer, to the everyday auditor. And how they can change this mindset and say: 'Ok, yes, AI really — the popular myth— is not there to replace me, but rather comes to support me, probably in many daily operational tasks that take up a lot of your time and that you could then focus on another kind of work'.*"

This process is complemented by a governance architecture based on new cybersecurity and personal data protection laws, as well as by internal cybersecurity mechanisms and institutional regulation.

The attraction of private investment has been key to the expansion of El Salvador's digital infrastructure. Among these investments, the Altius Tech Park stands out as the country's first Tier III data center, backed by a USD 70 million investment and with the potential to generate up to 5,000 direct jobs.

The public sector is also investing through a USD 60 million data infrastructure program and a USD 85 million government digital transformation initiative, both supported by the Inter-American Development Bank.

In turn, AI can catalyze private investment by demonstrating its value in concrete applications. One example is the use of virtual libraries at the Ministry of Housing to support the analysis of regulations and the resolution of cases.

Cloud-Based Virtual Libraries for Analyzing Public Regulations

The Ministry of Housing faced a bottleneck in service delivery due to the complexity of technical and legal regulations. According to Jorge Martínez, Head of the Information Technology Unit, one of the main challenges was the analysis and review of regulatory frameworks: *"reviewing a 90-page law, finding a specific article, and trying to understand how it relates to the user's situation was complex and time-consuming."* In practice, the challenge involved *"identifying the relevant regulation for the user's case, analyzing it, and cross-referencing it with other regulations to provide better support and improve response times,"* as Martínez explains.

To address this inefficiency, the Ministry—led by its technology team and supported by Google Cloud—implemented a pilot project based on virtual libraries powered by generative AI agents. The system enables natural language queries over the institution's document base, facilitating information retrieval as well as the generation of summaries, technical extracts, and comparisons across regulations. According to Martínez, these libraries allow users to *"analyze regulations, generate extracts, provide summaries, or compare across regulatory frameworks to deliver better results."*

The pilot delivered immediate results, significantly reducing the time required for analysis and case resolution. As Martínez notes, *"what used to take four hours to complete an analysis and issue a resolution or report is now done in 30 to 35 minutes."* This improvement has been particularly relevant for assisting citizens who approach the Ministry seeking guidance or institutional support.

Following this success, the tool began to expand into other areas, including financial management and procurement. In the area of acquisitions, for example, AI is used to analyze processes, verify compliance, validate adherence to technical specifications, and generate draft reports.

Another public use of AI in infrastructure relates to the management of drinking water service in El Salvador. This critical infrastructure benefits from the use of AI to detect anomalies in water distribution, perform predictive maintenance of pipes and equipment, and maintain water quality standards for Salvadorans.

From operations to smart management: the use of AI at ANDA

The National Water and Sewerage Administration (ANDA) has begun incorporating AI as a tool to improve the management of drinking water service in El Salvador. This adoption has not been limited to a specific area, but has begun to transform different areas of the institution across the board, from water operations to commercial and administrative management.

At the heart of water operations, AI functions as an analytical system that monitors water flow in real time every 5 to 10 minutes. This technology makes it possible to detect anomalies in the network and to recommend precise pressure and valve maneuvers to prevent damage to the pipes. It is also used for predictive maintenance, anticipating failures in motors and pumps before they occur, and to project turbidity or contamination peaks, helping to maintain water quality standards.

In practice, this translates into a substantial improvement in the capacity for analysis and operational decision-making. As Dennis Cañas, innovation manager at ANDA, explains, *"the monitoring center controls the entire water flow nationwide. Artificial intelligence allows us to know how much is being consumed in each zone, where to focus the flow, and what maneuvers to carry out in the network. What used to take months of analysis can now be evaluated in about an hour."*

Building on this operational foundation, the use of data also extends to the commercial front. AI makes it possible to analyze consumption patterns to detect possible fraud or tampered meters. Likewise, the ability to anticipate peaks in complaints makes it possible to plan more proactive responses —such as the preventive deployment of tanker trucks— mitigating the impact of repairs on communities and improving user service.

In parallel, the adoption of AI has transformed the institution's administrative management. As Cañas summarizes, "*the bank reconciliations that used to take us about a week of work, today we do them in half an hour at most... a purchase that used to take a month to manage, right now we are doing it in three days.*"

These efficiency improvements also extend to document management for the governing board — including the drafting of minute items and notifications— which has been reduced from weeks to minutes.

In the area of public procurement and legal compliance, intelligent agents have been developed that validate tender terms against national regulations and anti-bribery laws, reducing procurement cycles from a month to roughly three days.

In addition, "*expert cloning*" solutions have been implemented, through which digital assistants replicate the judgment of experienced managers, allowing technical teams to resolve legal or strategic questions more nimbly. This approach relies on a decentralized adoption logic, where the business areas themselves develop and use their solutions. As Dennis Cañas notes, "*we have managed to get people to create their own agents for cyclical tasks, and what it does is that it automatically leaves them working... and it sends you an email: it's already done.*"

In that sense, rather than replacing functions, the adoption of AI has made it possible to increase the productivity of existing teams. In the words of Cañas, "*we are not changing people, we are streamlining what you did before... today you can do ten times more than what you did before*".

This entire ecosystem has been built under a "*low-cost solutions*" strategy, where the business areas themselves, supported by Google Cloud tools such as Gemini and BigQuery, have the autonomy to create and improve their own agents without relying exclusively on programmers.

Recommendations

- Deepen the adoption of cloud infrastructure to enable AI applications:

  Building on advances in government digital transformation and existing public–private partnerships, El Salvador can expand the use of cloud infrastructure across public institutions. Strengthening technical capabilities, procurement frameworks, and civil servant training would help accelerate the development and deployment of AI-based solutions.

- Expand public–private partnerships for digital infrastructure

  Leverage projects such as Altius Tech Park and Google's telemedicine initiatives to develop national infrastructure nodes that support real-time AI applications, foster innovation, and improve service delivery across the country.

- Scale the use of AI across public agencies

  The Government of El Salvador can build on recent public and private investments to scale the deployment of AI solutions across public agencies—particularly in healthcare and education—tailoring adoption to the country's socioeconomic needs.

With the physical and digital infrastructure now established, the next critical step is to foster a local innovation ecosystem that leverages this new technical capacity to generate high-impact solutions.



Technological Innovation

El Salvador's AI innovation ecosystem remains nascent compared to the average in Latin America and the Caribbean. Currently, R&D expenditure accounts for 0.14% of GDP—approximately one quarter of the regional average.

As of September 2024, the Economic Commission for Latin America and the Caribbean (ECLAC) identified seven companies in the country engaged in AI-related activities. Meanwhile, ETO reported that three Salvadoran companies received venture capital funding by the end of the year, with a total of four transactions amounting to approximately USD 1 million.

Nevertheless, important foundations are being laid. In December 2024, the Center for Innovation in Digital Entrepreneurship (CIED) was inaugurated as a joint initiative between the Government, the United Nations Development Programme, and the Korea International Cooperation Agency. The center provides entrepreneurial training, specialized technical assistance, and access to enabling infrastructure such as 3D printers, scanners, and drones.

A distinctive feature of El Salvador's emerging AI innovation ecosystem is the role of partnerships between the public sector, technology companies, and international organizations. These collaborations have enabled the combination of technological capabilities, financing, and public policy to drive the adoption of digital technologies. Programs promoted by the Inter-American Development Bank in collaboration with Google—such as initiatives supporting business digitalization like ConnectAmericas—illustrate how these partnerships can contribute to strengthening the entrepreneurial ecosystem.

In this context, various public institutions have begun implementing AI-based solutions to modernize services and improve public information management. One example is its application in the National Registry of Natural Persons.

AI to Modernize Civil Registry Systems and Improve Citizen Services

The National Registry of Natural Persons (RNPN) faced the challenge of centralizing and digitizing civil registry records, which had historically been decentralized across municipalities. Although real-time data capture began in 2023 through digital systems, around 18 million images of civil records—containing the historical information of the Salvadoran population—were not available in any centralized system.

The challenge was not only to digitize these documents, but also to extract and index the information they contained, which proved complex due to the high heterogeneity of the records. As noted by Velasco, Executive Director of the RNPN: *"there were handwritten records, others were typewritten, and the information was not uniform; for example, the father's name could appear at the beginning or at the end of the record."*

To address this issue, the RNPN implemented an AI system, in collaboration with Google, trained to recognize patterns in documents and automatically extract key data to integrate it into the central registry system.

To digitize the historical archive, the RNPN established digitization centers across the country and developed logistics to transport registry books from municipalities. Once the images were captured, the AI system was trained to recognize different formats of civil records—from handwritten documents to typewritten forms—and extract relevant data for the central system.

According to Velasco, carrying out this process manually *"would not only have represented a cost of around USD 30 million, but also an estimated timeline of 10 years." In contrast, with the AI-based approach, he notes that "we not only saved a significant amount of resources, but also time, reducing execution time by up to 90%."*

This digitization effort enabled the launch of the simple.sv portal, through which citizens can

request and obtain electronic certificates quickly and remotely. It has also strengthened interoperability across public institutions. According to Velasco, *"around 75% to 80% of government institutions are already connected to the registry,"* enabling real-time data validation and improving administrative processes across the public sector.

As an additional outcome, the process also led to the creation of the Así Somos portal, an open data platform based on demographic information from the national ID (DUI). This tool allows for the generation of population metrics and supports both public policy design and private-sector decision-making.

AI is also being used to improve the efficiency of the justice system and strengthen the responsiveness of public institutions.

Procurador IA: AI to Streamline Public Defense

The Office of the Attorney General (PGR) of El Salvador faced significant delays associated with the volume of case documentation. In the words of Jairon Pineda, strategic advisor to the PGR, *"a public defender takes two to three days to read a case file for a draft lawsuit."*

To address these challenges, Attorney General René Escobar promoted a modernization initiative as part of the agreement between the Salvadoran government and Google, which led to the development of Procurador IA, an AI agent designed to support case analysis.

The system operates in a closed environment that exclusively consults the PGR's institutional databases—including national legislation, jurisprudence, and internal templates—avoiding external references and ensuring that analysis remains within the Salvadoran legal framework. As Pineda explains, the system was deliberately designed to rely only on institutional information: "we *restricted it to search only within our own data... so it does not pull jurisprudence from other countries, but only ours."*

The tool allows defenders to upload case documents to generate summaries, preliminary analyses, and draft defense strategies, which are then reviewed and validated by legal professionals. The system is not intended to replace lawyers, but to strengthen their work.

Pilot tests in the Juvenile and Criminal units show substantial efficiency gains. According to Pineda, *"what might take a defender five hours can now be done in 15 to 20 minutes."* This reduction in time enables defenders to increase their responsiveness and accelerate case processing. As Pineda notes, the expected impact is that *"if I previously produced a defense document in three days... now I can increase my output and generate at least one per day," expanding the institution's capacity to serve citizens.*

Recommendations

- Promote pilot projects in strategic sectors:

  Fund demonstration projects in manufacturing, commerce, and financial services to showcase the tangible benefits of AI in productivity, operational cost reduction, and service quality improvement.

- Strengthen CIED as a hub for AI innovation:

  Expand the scope of the Center for Innovation in Digital Entrepreneurship to incorporate AI-focused incubation programs, industry challenges, and open innovation platforms that connect government, startups, and academia.

- Scale support initiatives for AI-driven entrepreneurship

  Leverage existing programs that support entrepreneurship and business digitalization—including initiatives led by multilateral organizations—to expand the development of AI-based solutions for SMEs.



People

El Salvador is taking initial steps to strengthen its AI talent base. Currently, two universities—Don Bosco University and ISEADE-FEPADE—offer master's programs in AI. In addition, Francisco Gavidia University includes AI modules in its master's program in strategic IT management. However, the country still needs to expand its AI research capabilities. As noted by Sigfredo Figueroa, "the lack of skilled labor could become an obstacle to the deployment of AI in El Salvador."

To address this challenge, several initiatives have emerged, among them the CUBO AI and ARK Educate programs. Mario Flamenco, Executive Director of the National Artificial Intelligence Agency (ANIA), contextualizes these efforts by noting that "*artificial intelligence is a technology that destroys the status quo —meaning it is going to change everything— and that entails risks and risks and opportunities. And the only way El Salvador will be able to acquire the greatest number of opportunities and avoid the greatest number of risks is by educating everyone about what it is and how to use it*".

CUBO AI: building artificial intelligence talent in El Salvador

The CUBO AI program is part of El Salvador's strategy to accelerate the training of specialized artificial intelligence talent. The initiative takes up the intensive technical-training model associated with the CUBO brand and, more specifically, the experience of CUBO+, an educational program driven by the National Bitcoin Office. In 2026, CUBO AI was presented by the National Artificial Intelligence Agency (ANIA) as the return of its specialized AI training program, aimed at young people with English proficiency and intermediate programming knowledge. As Mario Flamenco, Executive Director of ANIA, notes, "*at the level between the end of secondary school and the university level, we have the CUBO AI program, which is a sister program to the CUBO+ program, which was also the program for the end of secondary school, the start of university, and also the professional life of Bitcoin. And we have based it on that because the first one was successful*".

In terms of how it works, the program offers university-level courses in AI and seeks to complement academic training through intensive learning experiences, such as workshops, bootcamps, and mentorships with international experts. These activities allow students to develop practical skills in programming, technological infrastructure, and the development of AI-based solutions, helping to accelerate the training of specialized talent in the country. As Stacy Herbert, Director of the National Bitcoin Office, explains, these programs are based on open calls for university students and on complementary intensive training: "*we invite university students to participate through open calls... and we offer them additional training in programming and bootcamps on weekends*".

Flamenco further notes that the program "*is an educational system in which we take students from age 15 to any age —well, professionals, university students, outstanding secondary-school students, adults— and we give them access to an educational relationship with engineers from AI companies, with founders of AI companies, with leaders in the industry*". According to the interviewee, the program runs over a period of six months, in which participants not only deepen their technical content but also explore real-world AI applications and complementary skills such as English.

Along with this structured training, CUBO AI has also incorporated high-intensity applied experiences. One example was its participation as the Salvadoran host of the LeRobot Worldwide Hackathon, where students from the program worked continuously on robotics and AI challenges, putting into practice tools, models, and collaborative dynamics typical of frontier innovation environments.

Another initiative is ARK Educate, which seeks to introduce AI and robotics concepts into El

Salvador's public school curriculum. The program's effectiveness is rooted in its focus on student-driven innovation, as detailed in the following case study:

ARK Educate: introducing an innovation mindset into Salvadoran public education

ARK Educate has become one of the most visible initiatives of El Salvador's effort to incorporate artificial intelligence and robotics into public education. Rather than treating these technologies as extracurricular activities, the program integrates them directly into the core school curriculum through a pilot implemented in 2025 in 50 public schools in La Libertad, with AI and robotics modules within the Science and Technology subject and a practical component oriented toward applying what is learned to solving problems.

The most distinctive feature of the program is its pedagogical orientation. ARK Educate defines its approach as an education driven by technology-enabled innovation and highlights a methodology centered on student autonomy, engineering design, and problem-based learning. As Stacy Herbert, Director of the National Bitcoin Office, notes, El Salvador partnered with ARK Educate to offer an AI and robotics educational initiative designed to instill an "*innovation mindset*" in both students and teachers.

To achieve this, the curriculum was specifically adapted for the Salvadoran context. The program was designed to begin with students in 1st, 4th, and 7th grade, with different content by level: for example, in first grade work is done on access to and generation of clean water, in fourth grade on machine learning, and in seventh grade on artificial intelligence applications. Before its classroom rollout, the program also included teacher training in AI, robotics, water management, and 3D manufacturing, as part of a strategy that seeks to prepare teachers to lead more applied learning experiences.

In this context, Mario Flamenco, Executive Director of the National Artificial Intelligence Agency (ANIA), adds that training teachers was the most necessary thing from the start, and explains that to do so they created a specific team, Pitch The Teachers: "*this team begins meeting constantly, multiple times a week, with the teachers at each school and starts to build a relationship with the teachers, which is very important, because, again, all of this is new things that they often resist, and it is necessary and quite important to do the social work of interacting with the teachers and understanding what frightens them about it, what they resist about it. So our team is trained to build a relationship with the teachers at each school and also to identify the teachers who could potentially, in the future, become the teachers who teach other teachers, because that is the only way to make this scalable*".

In practice, the program has already begun to translate into concrete student projects. By May 2025, official media reported that the pilot had benefited more than 2,800 students and more than 100 teachers. In that context, during follow-up visits to ten schools, students presented 36 innovation projects in areas such as water filtration, smart agriculture, AI-assisted health, gamified translation, and tools for reforestation. Along these lines, Herbert maintained that the goal is to train builders, inventors, and engineers —that is, students capable of building, experimenting, and developing their own solutions— reinforcing the idea that they can become builders of their own destiny.

Adding to these initiatives are other continuing-education and reskilling efforts driven by the public sector and the business ecosystem: the Ministry of Economy launched a course on "Introduction to AI", and COEXPORT, in partnership with the OEI, delivers the "Mastering the Future" program, aimed at entrepreneurs and business leaders.

Another strategic initiative that seeks to increase digital training in El Salvador is the new pilot program from Google Cloud, developed in collaboration with the Inter-American Development Bank (IDB), which will grant 10,000 scholarships to

boost local technological talent and reduce the digital divide. Through this project, Google Cloud will make its Google Skills platform available, allowing Salvadorans to train free of charge in critical, cutting-edge areas such as generative Artificial Intelligence (Gemini and Vertex AI), Cybersecurity, Data Analytics, and Cloud Architecture.

This strategic partnership responds directly to the main bottleneck of productive development in the region: the disconnect between traditional training and the real needs of industry amid the transition to Industry 5.0, where human-machine collaboration makes talent the key competitiveness factor. Operating under the IDB's Talent Up platform and the regional "America in the Center" framework, the initiative seeks to reverse the shortage of qualified profiles affecting 80% of companies in the area, capitalizing on key opportunities such as nearshoring. Thus, Google Cloud is leading the creation of a dynamic ecosystem that complements training with local tutoring and international certifications, with the goal of meeting the demand of high-value-added sectors and transforming El Salvador and the region into a global hub of innovation and talent.

El Salvador's AI-driven education transformation

El Salvador's public education system has begun implementing a personalized tutoring model on a national scale in collaboration with xAI. This intelligent tutor, based on its latest technology, uses the Socratic method to guide students —from kindergarten to high school— in solving math, science, or history problems, encouraging them to arrive at the answers on their own rather than simply receiving them directly. The goal is to scale educational excellence at a much faster pace than traditional teacher-training models allow. According to Stacy Herbert, Director of the National Bitcoin Office, the system seeks to offer a personalized tutor for each student. In her words, it is "an infinitely patient Aristotle", a tutor that guides students through the process of understanding rather than simply handing them the answers. The project envisions a national rollout —preceded by pilots— and is being developed jointly with xAI engineers who work directly with the Salvadoran government. The initiative seeks to harness AI's ability to incorporate the national curriculum while at the same time integrating content and methodologies from the world's best education systems, with the goal of accelerating learning in contexts where improving teaching quality could take decades through traditional mechanisms. In Herbert's words, this approach would make it possible to *"scale excellence and ambition much faster for developing countries"*, since the tutor can integrate large volumes of knowledge and guide students step by step through the learning process.

Complementarily, Google for Education implemented Workspace for Education for all basic-education students in the public system, trained teachers, and advanced toward personalized learning through Education Plus. The next steps include training pedagogical leaders and the delivery of Chromebooks for fourth-grade students. This last action is key, given that the State has made a strong investment in educational hardware, acquiring an average of 100,000 Chromebooks per year over the last three years, starting from fourth grade with a projection of staggered coverage toward higher levels. Likewise, Google.org committed a USD 200,000 donation to strengthen digital skills training through civil society organizations.

Recommendations

- Launch a National AI Reskilling Plan with tiered training levels:

  Design a national strategy to train learners, implementers, and innovators in AI-related competencies. Offer short, flexible learning formats tailored to different sectors and profiles.

- Promote ICT degree programs in priority regions:

  Expand scholarship programs and partnerships with regional universities to increase the number of graduates in information and communication technologies, particularly outside the capital and in areas of strategic economic importance.

- Scale AI training programs for entrepreneurs

  Strengthen initiatives such as “Mastering the Future” to create AI-focused training pathways for business leaders, helping SMEs and startups integrate AI tools into their operations.



Methodological Annex

The economic impact of artificial intelligence (AI) in El Salvador was estimated by adapting the McKinsey frameworks (2018, 2023) on generative AI and deep learning, taking into account the particularities of the productive structure and the availability of national data.

The estimate calculates the percentage effect of AI on the value added of production by industry, across a range of scenarios (conservative and optimistic), and incorporates the adoption rate estimated for the region's Spanish-speaking countries.

List of Interviewees

As part of the qualitative component of this research, virtual semi-structured interviews were conducted with key actors in El Salvador's AI ecosystem. These conversations, lasting approximately 60 minutes, focused on gathering each expert's view on the current state and prospects for AI adoption in the country, as well as its potential impact on the Salvadoran economy. The interviews also addressed the main factors that facilitate and limit the development and implementation of AI at the national level, considering both institutional capabilities and the dynamics of the productive and academic sectors.

Sigfredo Figueroa: Legal advisor to the Presidency of El Salvador on regulation and infrastructure projects. Director of Regulation of the National Artificial Intelligence Agency (ANIA) and Director of the Regional Operator of the Central American Electricity Market. A lawyer and member of the International Court of Arbitration, specialized in corporate, energy, fintech, and AI regulation. He holds a Law degree from Universidad Dr. José Matías Delgado (El Salvador), a Master's in Commercial Law (King's College London, United Kingdom), an MBA (University of Valencia, Spain), and studies in AI Ethics, Regulation, and Compliance (University of Oxford, United Kingdom).

Federico Waite: Director of the Artificial Intelligence Laboratory of the National Artificial Intelligence Agency. Federico is a global technology leader and strategic consultant specialized in innovation, cybersecurity, and data sovereignty, recognized in the Top 100 CIO Mexico and certified by Harvard's Kennedy School. He has extensive experience in multilateral organizations and governments, and currently co-leads key fronts in El Salvador as Director of the Artificial Intelligence Laboratory (ANIA), focused on the deployment of Sovereign AI. He also serves as Senior IT Strategy Consultant for the IDB in the design of the new National Data Center, advisor to the regional sub-directorate of UNOPS, and leads his firm GW Innovation & Security.

Mariana Gómez: Executive Director of the Regulatory Improvement Agency (OMR) of El Salvador. A lawyer with more than 19 years of experience in the Salvadoran public administration, including 8 years in leadership positions. She previously served as Executive Director of OSARTEC and as an independent consultant in international trade and the negotiation of trade agreements and free trade treaties. A professor of public and private international law at USAM. She holds a Law degree and a Master's in International Law and Business from the Universidad Europea del Atlántico, with master's studies in Business Law at the Universidad Centroamericana José Simeón Cañas (UCA) and postgraduate studies in Administrative Law, Public Policy Management, and Regulatory Impact Assessment.

Diego Benavides: Institutional IT Manager of the Ministry of Public Works and Transport (MOPT), where he leads technological modernization projects, cloud infrastructure integration, and smart mobility solutions. He has experience in telecommunications and technology management in both the private sector and public institutions, including the Innovation Secretariat of the Presidency of El Salvador. His career spans network administration, virtualization, data centers, cloud services, and the coordination of strategic projects associated with the country's 2020–2030 Digital Agenda.

Stacy Herbert: Director of El Salvador's National Bitcoin Office, where she leads President Bukele's sovereign Bitcoin strategy. In parallel, she has established herself as a key figure in El Salvador's AI transformation, drafting the country's pioneering pro-innovation legislation and regulation on artificial intelligence, prioritizing open-source development and minimal bureaucracy. As presidential AI advisor, Herbert drove high-level alliances with global technology leaders, including NVIDIA and xAI, securing the world's first sovereign B300 cluster and establishing the country's first national AI laboratory. She also founded CUBO AI, the first elite educational program of its kind in El Salvador, in which leading AI engineers from around the world teach the country's most outstanding students advanced artificial intelligence and machine learning skills, thereby creating a pool of local talent ready to drive the next chapter of El

Salvador's technological renaissance.

Martha Murillo: National Director of Financial Administration and Innovation (DINAFI) of El Salvador's Ministry of Finance. She is a specialist in digital transformation and technology management in the public sector, with extensive experience in institutional modernization, technological infrastructure, and IT project management. She previously held technical and leadership roles related to database management, technology projects, and specialized consulting, including experience at Oracle El Salvador. She holds a degree in Computer Science and a Master's in Financial Management.

Jorge Martínez: Systems Engineer with a Postgraduate degree in IT Management and 20 years of experience leading digital transformation in the public sector. An expert in cloud architectures (AWS, Azure, GCP) and the management of modernization projects. He currently leads the strategic integration of Artificial Intelligence and Intelligent Agents to optimize government efficiency, automate internal processes, and transform the citizen experience through agile, high-impact digital services.

Dennis Cañas: Chief Transformation & Innovation Officer at the National Water and Sewerage Administration (ANDA), where he drives artificial intelligence, data analytics, and automation initiatives to optimize water operations, administrative management, and user services. He has training in commercial management and marketing, in addition to experience in technology architecture, cybersecurity, and the leadership of digital transformation teams.

Fernando Velasco: Executive Director and National Registrar of the National Registry of Natural Persons (RNPN) of El Salvador. Under his leadership, the RNPN has driven the digitalization of the civil registry through artificial intelligence, including the processing of 18 million images of historical records in collaboration with Google, the enabling of the simple.sv portal for the issuance of electronic certificates, and the deployment of automatic kiosks for DUI processing. He has promoted interoperability among public institutions, connecting the RNPN with more than 75% of State entities, and the creation of the Así Somos open-data platform. A lawyer by profession.

Jairon Pineda: Engineer and Strategic Advisor at the Office of the Attorney General of the Republic (PGR). He is the Coordinator of the Institutional Modernization and Innovation Committee (CMII), the body responsible for directing the institution's digital transformation. His work focuses on driving strategic initiatives to modernize public services, including the standardization of service processes, the improvement of the quality of institutional data, and the adoption of technologies such as Artificial Intelligence and electronic signatures, ensuring an ethical and efficient approach.

Mario Flamenco: Executive Director of the National Artificial Intelligence Agency (ANIA). Mario is an Engineer from Don Bosco University and has more than 15 years of experience in the telecommunications sector. Before being appointed to ANIA, Mario served as an officer of the National Bitcoin Office in El Salvador. He has also led programs such as CUBO+ to train Salvadorans on Bitcoin.

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