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Seizing the opportunity:

the future of AI in Latin America

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About this report

Seizing the opportunity: the future of AI in Latin America is a report written by Economist Impact and supported by Google. The report's findings are based on a programme of in-depth interviews with experts alongside desk research. Economist Impact would like to thank all participants for their time and insights, including the following interviewees and panellists (listed alphabetically):

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Executive summary



In the past decade artificial intelligence (AI) has shifted from the peripheries of policy attention to the centre of investment and political focus. Global investment in AI has soared since 2010, increasing from a mere US\$0.8bn to US\$78bn in 2021—an increase of over 9,000%.¹ In Latin America (LATAM), AI is forecast to boost the region's GDP by over 5% by 2030, with projections likely to rise if governments introduce policies to build talent and expand their digital infrastructure.²

In this report we explore the developments in AI in Latin America, with a specific focus on Argentina, Brazil, Chile, Colombia and Mexico. Although government policy is growing, the region's private sector has been leading the way in terms of AI development. Each of the largest sectors of the region has developed its own AI startup darling, producing regional success stories of their own and attracting the attention of international investors and venture capitalists. But are the countries in Latin America moving fast enough and putting in place the right policies to maximise the benefits of AI while minimising any negative impacts it might potentially have?

As the region is looking to a post-covid future, this report examines the current state of AI in Latin America and provides a high-level outlook for the next decade. It examines AI investment, industry trends in the region, the policy environment and challenges, and a series of policy takeaways based on international good practice for policymakers looking to develop their AI ecosystems and capabilities.

Key findings include:

The proliferation of national AI strategies, expert councils and policy initiatives highlights the importance of AI to the region's socioeconomic transformation.

Argentina, Brazil, Chile, Colombia and Uruguay are the only countries in the region to have released standalone national AI strategies. The first countries to publish their strategies were Argentina, Colombia and Uruguay, followed by Brazil and Chile in 2021. According to one global benchmark which assesses countries' strategies for AI, Colombia scores more highly than the United States and Germany, while Brazil scores more highly than all the MINT countries (Mexico, Indonesia, Nigeria and Turkey).³

AI strategies published by Latin American countries all emphasise as their top priorities cultivating local talent, strengthening the technological infrastructure and ensuring that AI is deployed in a responsible manner.

Colombia's strategy, for example, sets itself the goal to introduce regulatory sandboxes, establish standards for ensuring the inclusiveness of AI implementation and produce a national AI ethics framework.⁴ Brazil's AI strategy proposes to review the country's national teaching curriculum to include courses in AI and programming and a national digital literacy programme, as well as retraining opportunities for teachers,⁵ while Chile's strategy proposes to update its data governance regulation to ensure the availability of high-quality datasets for AI development, guarantee minimum standards for digital services, and modernise its laws to ensure that there is legal certainty for its digital ecosystem.⁶



The LATAM region's AI policy ecosystems is characterised by a high degree of policy discontinuity, with policy initiatives frequently being changed or shelved by new administrations, according to our expert interviews. In Argentina, changes in political leadership have resulted in the new administration putting the previously released national AI strategy on hold. In Chile, these risks are smaller and only individual elements of the previous administration's AI strategy are in danger of being discontinued. Colombia has been able to benefit from policy continuity in the past years. However, according to one of the experts we interviewed, the upcoming elections this year have given rise to the fear that a change in the administration could result in jeopardising recent policy successes. Mexico is one of the few countries that have not yet published an official national AI strategy, despite some declarations of intent from some officials in the previous administration.

The covid-19 pandemic has caused an unprecedented upsurge in private tech investment across the region, with venture-capital investments increasing more than threefold in the past year alone.⁷ Since 2019 over US\$20bn of venture capital (VC) funding has gone into tech startups in the region (US\$4.1bn in 2020⁸ and US\$15.3bn in 2021⁹). According to the experts we interviewed, there are a number of reasons for this. For example, historically the region was considered to be "underinvested in technology".¹⁰ When the covid-19 pandemic shifted activities online, this created a sense that the region needed to "catch up". Another contributing factor was the way in which the largest industries in the region—finance, healthcare and infrastructure—were dominated by just a few firms.^{11,12} One particular example is Brazil's finance sector, 80% of which is controlled by only five banks.¹³ Public dissatisfaction with the inefficiencies and archaic business models thus created the perfect storm for these industries to be disrupted.

The market for AI in health applications is forecast to grow by nearly 38% between 2019 and 2027, and the region already provides a number of healthtech success stories.¹⁴

The healthcare sector has become a significant focus of investment attention, driven by the need to relieve the region's healthcare systems, which are overburdened by patient demand, and to improve the quality of healthcare provision. Applications of AI in healthcare are vast, ranging from early detection of illnesses to forecasting public health scenarios. In particular, early detection of health conditions can be beneficial in areas of LATAM where the availability of medical professionals and equipment is only limited.

The number of agtech startups increased by more than 600% between 2005 and 2018.¹⁵ However, even though agriculture is one of the largest industries in the region, the amount of investment remains relatively low.

Agriculture is one of the economic powerhouses of the region, accounting for a significant share of its exports. However, LATAM currently ranks last in agtech investments, with just US\$440m invested over the past five years.¹⁶ Although statistics dealing specifically with AI-related investment are lacking, our expert interviewees suggest that the sector provides fertile ground for further growth, driven by large local markets and deep expertise, as well as professionals working in the field. AI could become particularly impactful to improve the use of soil, geolocate fertile areas and enable a more sustainable use of land.

The financial sector has received the largest share of investment, with approximately 40% of all investments going to fintech companies.

This is due to favourable market conditions, a large and young population feeling underserved by traditional banks, and an increasing shift towards digital payments triggered by the covid-19 pandemic. Consumers in the region are also more confident to use automation in the financial sector, with 83% of Brazilian consumers, for example, willing to trust a computer to provide banking advice, compared with a global average of 71%.¹⁷ This potential is echoed in the growth of LATAM fintechs. When Brazil's Nubank launched its IPO it reached a valuation of US\$45bn, although this valuation has since declined, Argentina's Ualá reached US\$2.45bn,¹⁸ and Mexico's Konfío reached unicorn stage and a market valuation of US\$1.3bn in 2021.¹⁹

The biggest policy challenges facing the LATAM region include the infrastructural divide and the need to cultivate domestic talent.

As the experts we spoke to mentioned, multinational companies have increasingly been trying to move into the region to develop regional hubs, but apart from Chile the region is still in need of telecommunications services and associated infrastructure—a crucial prerequisite for AI adoption. The region also struggles with cultivating local talent. Highly skilled individuals frequently leave for other parts of the world, especially North America, to join more competitive tech companies.

Introduction: the AI opportunity



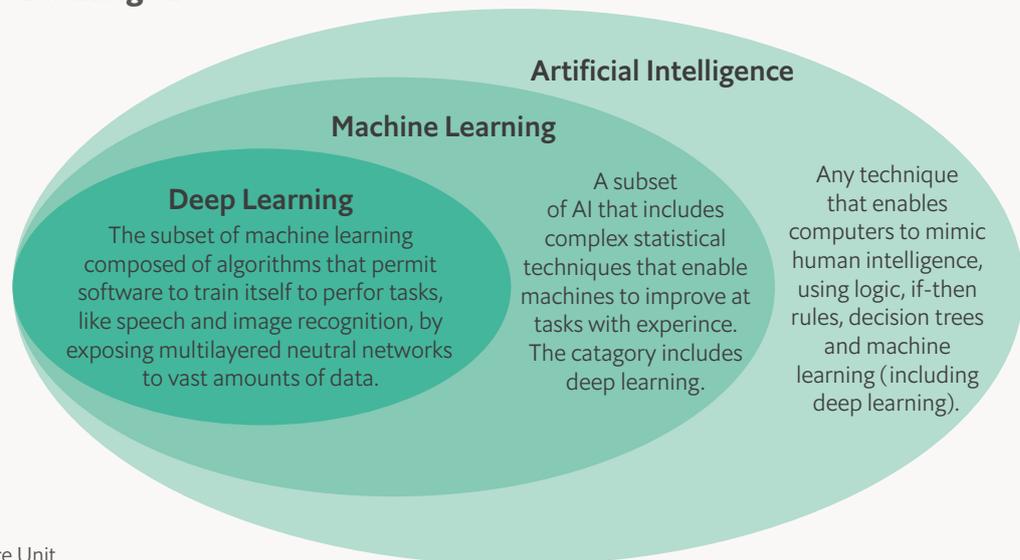
But first, what is AI?

The term “AI” was coined in 1956 by John McCarthy, a cognitive scientist and Stanford computer science professor, who proposed the possibility of replicating human intelligence “so precisely...that a machine can be made to simulate it”.⁴² In the same decade Herbert Simon, an American political scientist, developed the General Problem Solver, a pioneer of AI programming, and by 1965 Simon had become convinced that “machines will be capable of doing any work a man can do”.⁴³

The concept of AI builds on these pioneering ideas, generally referring to computer software that “learns” from data, behaves intelligently and mimics human cognition and perception. As such, AI covers a wide range of models and processes, including “deep learning,” “machine learning” and “natural language processing”, that depend on the use of large amounts of data to train software in patterns and create corresponding outcomes.

In this report we refer to AI as a catch-all term for techniques that enable computers to learn from data and behave intelligently, especially those that integrate machine-learning techniques, including deep learning.

Defining AI



Source: The Economist Intelligence Unit

Almost a century since its origins as a theoretical concept, artificial intelligence (AI) is finding increased application in the world economy. The 21st century has seen some of the most important AI milestones—the establishment of ImageNet, the first database of annotated images designed to aid in visual object-recognition software research; the onset of autonomous vehicle development in 2009; and the defeat of Go champion Lee Sedol by DeepMind’s AlphaGo computer program in 2016.²⁰ On the back of other innovations, such as high-performance computing and cloud technology, AI is poised to deliver on its promise.

As innovation has surged, so has investment. Since 2010 global investment in AI has increased from a mere US\$0.8bn to US\$78bn in 2021—an increase of over 9,000%.²¹ However, the promise of AI is currently being experienced unevenly across the globe. For decades awareness of AI has been concentrated in countries and regions such as the US, the UK, China and Europe. The same applies to private investment—in 2020 private AI investment in the US reached US\$23.6bn, followed by China (US\$9.9bn) and the UK (US\$1.9bn).²² According to CB Insights, a market intelligence platform, out of the 100 most promising private AI companies in the



world 64% were from the US, 8% from the UK, 6% each from China and Israel and 5% from Canada.²³

As investment and innovation in AI continue to grow, so does its potential to have a tangible impact on day-to-day life. Multiple sectors, including healthcare, retail, finance, transport, manufacturing and government services, are set to experience change as a result of AI adoption and applications.²⁴ Across these sectors, AI applications can deepen our ability to automate, detect, personalise, predict and understand. For example, AI is being leveraged to automate repetitive physical labour in manufacturing;²⁵ detect objects surrounding autonomous vehicles;²⁶ personalise movie and TV streaming recommendations;²⁷ predict rider demand and traffic flows based on historical data;²⁸ and understand trends between patient history and disease incidence.²⁹ Global investment in AI applications in pharmaceuticals, for example, increased five-fold between 2019 and 2020 alone—the largest increase in

investment, followed by the automotive sector (autonomous vehicles) and education.

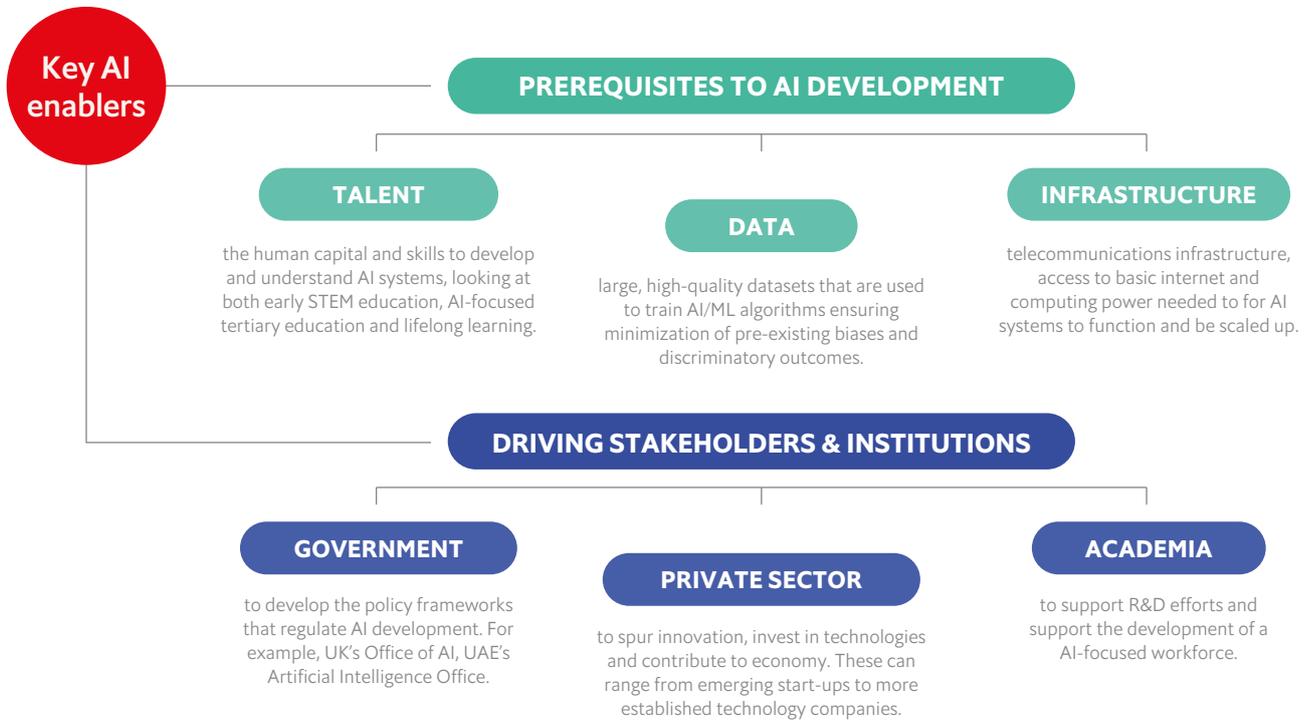
Balancing the promise and pitfalls of AI

As AI spreads through these sectors, the impact of the technology is forecast to be considerable. Analysis Group, an economic consultancy, argues that AI could add up to US\$2.95trn to the global economy within the next decade,³⁰ the McKinsey Global Institute estimates that AI will deliver US\$13trn by 2030,³¹ while estimates by PwC, a multinational consultancy, push this up to US\$15.7trn.³²

But with the promise of AI come potential challenges. Risks associated with AI include the possibility of biased and unexplainable outcomes, ethically challenging applications, privacy concerns and misuse of AI.³³ These problems can have painful implications at the individual level, such as discriminatory algorithms excluding minority groups.³⁴ Another concern is AI's potential impact on the labour market. The proliferation of AI and automation is frequently linked to unemployment, with one study by PwC claiming that up to 30% of jobs could be automated by the mid-2030s.³⁵ However, other studies predict just a shift in skills without entire jobs being automated, whereas other research forecasts that AI will result in more jobs being created in the long term,³⁶ suggesting that this is still an area where future research will be crucial.

To minimise these drawbacks and fully harness the economic benefits of AI, governments need to put the right policies in place. This can range from implementing effective governance to guide the development and use of AI to developing initiatives to mitigate negative impacts of AI.

FIGURE 1: Mapping the enablers of AI



Sources: Tortoise Media (2021); Oxford Insights (2021); Economist Intelligence Unit (2018).

To address the issue of ethics, the UK, the US Department of Defence or the Global Partnership on AI (GPAI) have drawn up ethical guidelines to avoid some of the issues outlined above.³⁷

Harnessing the potential

As evidence of the social and economic benefits of AI grows, countries have been grappling with the question of how they can develop the right capabilities and raw materials to create an environment that is conducive to AI growth.

A number of benchmarking tools have been produced to assess countries' AI preparedness. We have analysed two of the most robust tools—Tortoise's Global AI Index³⁸ and Oxford Insights' Government AI Readiness Index³⁹—to determine the key enablers needed to bring about

advancements in AI. The Global AI Index measures the national ecosystems on which the creation and use of artificial intelligence depends, looking at levels of investment, innovation and implementation. Meanwhile, the Government AI Readiness Index homes in on whether governments are ready to implement AI in the delivery of public services to their citizens. The index covers three key pillars—government, which explores the government's AI vision and capacity, the technology sector, which looks at the supply of tools and human capital needed to drive AI development, and data and infrastructure, which looks at the inputs needed for development.

Similarly, in 2018 The Economist Intelligence Unit (EIU) established five key pillars needed to facilitate AI development: data; talent; ethics and governance; R&D; and

infrastructure, with the last two comprising an “AI ecosystem”.⁴⁰ What brings these different frameworks together is an understanding that countries’ AI capabilities are based on two factors: the raw capabilities needed to develop AI and the institutions needed to support this development. The raw capabilities include infrastructure, talent and data—the crucial inputs that determine success in AI development. The institutions needed to invest in developing a responsible AI ecosystem range from government and policymakers (such as the UK government’s Office for Artificial Intelligence) to the private sector (including the developers of and investors in AI) and academia (including the scientists contributing to AI R&D).

As The EIU has highlighted previously, having the right policies in place can make a substantial difference to the ability of countries to maximise the benefits and minimise the costs of AI.⁴¹

What is the future of AI in the Latin America region?

To truly benefit from the promise of AI, there is work to be done throughout the LATAM region, from cultivating the talent to support a thriving AI ecosystem to developing robust regulatory frameworks to promote responsible AI use and development.

This report assesses the current AI landscape across the region and its potential evolution over the next decade for five countries at different stages of their AI journey: Argentina, Brazil, Chile, Colombia and Mexico. By exploring these five countries, this report

aims to explore AI development in the region, including a discussion on key sectors of economic importance and a set of policy futures that can support this development.

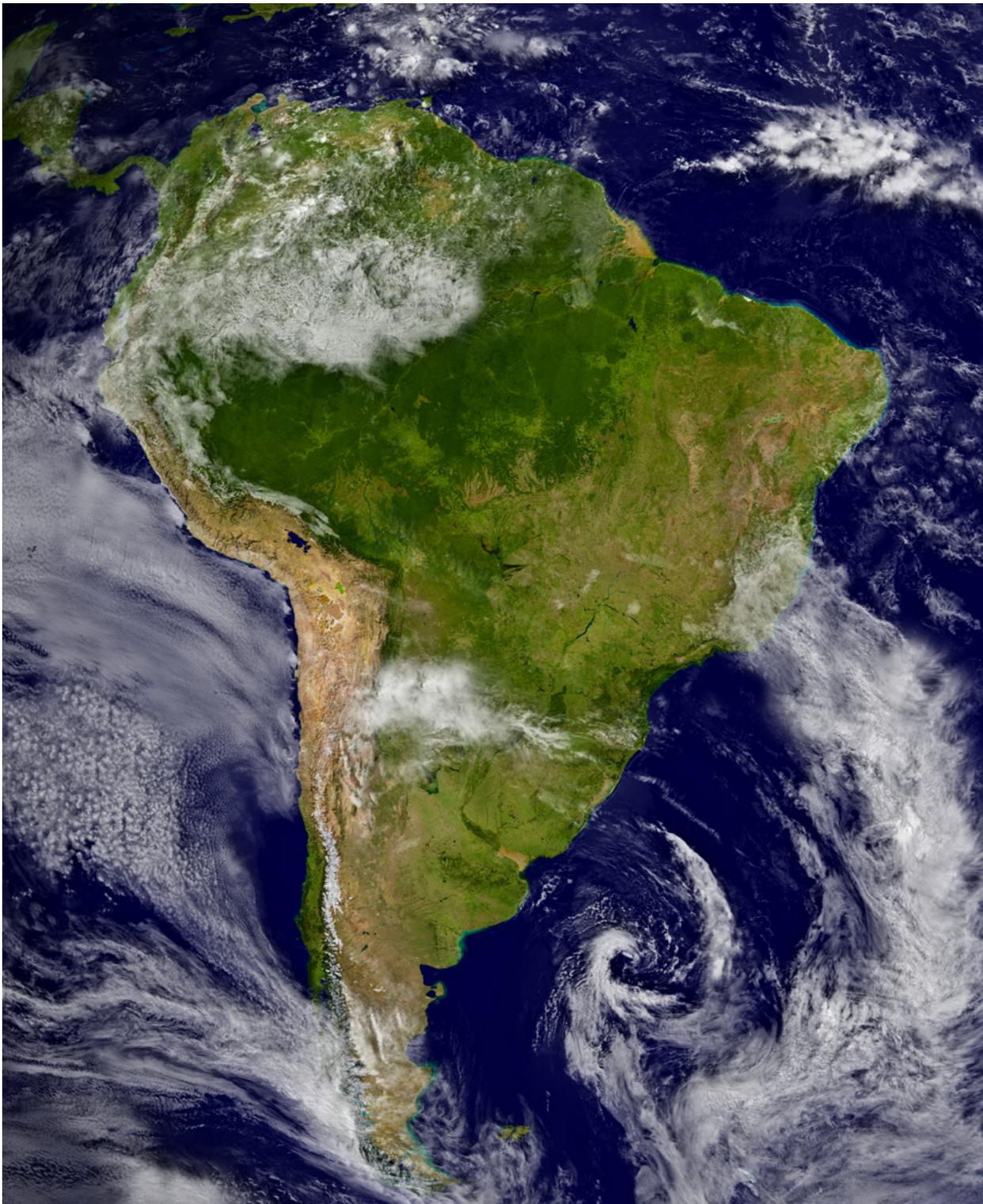
The report begins by mapping out the current AI landscape in each priority country, from the current investments in AI to how these countries have been seeking to maximise key enablers of AI as set out in the introductory chapter.

In Chapter 2 we illustrate the wider impact that AI has had, and is expected to have, on the wider Latin American economy. The chapter is divided into four sectors—government service, agriculture, healthcare and finance—that have shown the greatest progress in terms of AI adoption, are most likely to gain from this, and are also economically important to our priority countries. This provides readers with an overview of where success has already been achieved and where it can still be achieved in the region.

While the potential of AI in the region is growing, Chapter 3 explores the challenges that may limit this potential, namely the barriers that are holding back the basic prerequisites of AI, such as talent, data and infrastructure, and the need to ensure the responsible development and use of AI. Finally, the report concludes with a breakdown of government policies and a supplementary policy playbook that can contribute towards a strengthened AI ecosystem in the Latin America region.

Chapter 1

AI in Latin America: state of play



According to international benchmarking tools, the leading countries in the field of AI are the US and China. On both the Global AI Index and the Government AI Readiness Index the US has consistently been ranked first. China, on the other hand, was ranked 2nd in the former and 15th in the latter index in 2021.⁴⁴ Between Silicon Valley and Shenzhen the two countries are home to the ten most valuable companies that are developing or leveraging AI software today, including ByteDance (US\$140bn), Wish (US\$11.2bn) and Sensetime (US\$7.5bn).⁴⁵ What makes these countries so strong is a thriving AI private sector that benefits from a steady supply of talent, the right policy environment conducive to AI growth, and the availability of high-quality data to develop these technologies.^{46,47}

Although Latin America has produced no tech giants which could hold their own against one of the top-performing US tech giants, the so-called FAANG companies, in the past two years the region has enjoyed a period of unprecedented investment activity and received growing policy attention.

Pre-covid AI policy initiatives

In the past few years the region has witnessed the proliferation of national AI strategies, expert councils and policy initiatives, highlighting the importance of AI to its socioeconomic transformation. The first policy initiatives and mentions of AI in policy documents emerged already in the years leading up to the pandemic.

In 2018 the government of Brazil acknowledged the importance of AI in its Digital Transformation Strategy, referring to it as a “brand new technology [...] with high potential to transform social relations”.⁴⁸ The strategy, however, did not include

specific provisions targeted at developing the country’s AI capabilities, and nor did it mention direct investment in cultivating AI capabilities. Rather, it focused on enabling wider digitisation, which in turn would support the emergence of AI.

The first full standalone AI strategies in Latin America were published by Argentina and Colombia in 2019—slightly behind such global economic powerhouses as the UAE, Canada, China and Singapore, for example, which published their AI strategies in 2017, while France, the UK, South Korea and the EU published theirs in 2018.

Argentina’s strategy—although now on hold due to changes in the administration—placed great emphasis on achieving AI growth through its private sector and mentioned a number of initiatives to facilitate this, including policy amendments that would allow entrepreneurs to start a new business within 24 hours, tax breaks for startups and the establishment of FONDCE, the National Fund for Entrepreneurial Capital.^{49,50}

Colombia’s strategy, by contrast, took a broader approach, establishing as its key objective the reduction of barriers to AI uptake in the public and private sectors; creating conditions for stimulating uptake; strengthening human capital related to AI; and putting in place the right frameworks for mitigating potential risks.⁵¹ What distinguishes Colombia’s strategy from the strategies of the other countries in the region is its inclusion of objectives specifically related to responsible AI policies. As part of this, the government set forth the establishment of an AI ethics framework, regulatory sandboxes, and the implementation of the OECD’s principles on AI.⁵²

Mexico’s government has not yet published an AI strategy. In 2018 Oxford Insights,

a consultancy, and C Minds, a women-led action tank, published a white paper called “Towards an AI Strategy in Mexico”, which was endorsed by government officials.^{53,54} While not an official strategy, the white paper outlined five key areas of focus needed to support a Mexican AI ecosystem: 1) governance and public services; 2) research and development; 3) capacity, skills and education; 4) data infrastructure; and 5) ethics and regulation.⁵⁵ This document became the region’s first draft, a statement of intent for a country-wide policy to foster AI capabilities. The direct involvement of the Office of the Mexican president underscored the political will and importance of nurturing the country’s AI ecosystem.

Apart from the five countries which are the focus of our research, the only other Latin American country with a published national AI strategy (2019) is Uruguay. It performs remarkably well in terms of AI readiness, ranking 4th in the region,⁵⁶ which, considering the relatively small size of its tech sector compared with significantly larger countries such as Brazil, is a considerable achievement. What sets Uruguay’s strategy apart from that of the other countries in the region and worldwide is its emphasis on cultivating and implementing AI specifically within the public administration. This includes capacity building, employing AI in the implementation of government policies, training public servants in the use of the technology, and



ensuring its responsible use.⁵⁷ By focusing on one sector rather than the whole country, Uruguay's strategy departs from the more macro grand-strategy approach towards AI adopted by countries such as Colombia, Chile and Brazil, or outside the region by Saudi Arabia and the UAE.

Strengths and diversity of countries

Latin America is characterised by diverse AI ecosystems in terms of capabilities, with countries exhibiting strengths in vastly different areas. Brazil, for example, has made a name for itself as the capital of tech startups, which account for over 5.6% of its GDP.⁵⁸ Here, São Paulo in particular stands out. Home to over 2,700 tech startups and the largest tech hub in the region, the city's GDP alone is larger than the combined economies of Argentina, Chile, Paraguay, Uruguay and Bolivia.⁵⁹

At the policy level, Colombia has already published a rich set of policy initiatives that support its AI ecosystem. Since 2018 the country has been governed by a pro-technology government and has been investing in new AI policy initiatives, including its AI strategy, the region's first AI ethics framework and a new international AI council. These efforts are further documented by the OECD Artificial Policy Observatory, according to which the

Colombian government spearheaded a particularly high number of AI initiatives in the region (30), ranging from initiatives focused on AI adoption in the public sector to the development of a dashboard for ethical AI principles. This compares with ten initiatives by Brazil; Argentina (11); Chile (10); Mexico (6); Germany (32); Italy (8); US (55); and India (23).⁶⁰ Carlos Santiso, director of digital innovation in government at CAF, the Latin American Development Bank, has examined AI policies throughout Latin America and confirms this point: "The region has worked hard in recent years to implement AI, putting special attention on the topics of ethics and law. Colombia has been a pioneer in the process, above all on the ethics component, driven from the center of government with a focus on implementation."⁶¹

Chile, on the other hand, performs well across all AI enablers compared with the rest of the countries in the region. However, it is by far the best-performing country in terms of inclusiveness of the internet and the smallest digital divide, which is an issue where the rest of the region scores poorly. In The EIU's Inclusive Internet Index, for example, it is ranked 21st, while Brazil is in 36th place and Argentina is placed 43rd, Colombia 44th and Mexico 46th.⁶²

These differences in strengths and capabilities present a very different image compared with other regions of the world. The Middle East and North Africa (MENA) region, for example, is characterised by a government-led investment strategy, where deep pockets of sovereign wealth funds stimulate the still nascent tech sector. Similarly, while European countries exhibit differences in capabilities, with France being particularly strong in AI policy and Luxembourg in Infrastructure, the EU has played a harmonising role for the region's AI policy.

“The region has worked hard in recent years to implement AI, putting special attention on the topics of ethics and law. Colombia has been a pioneer in the process above all on the ethics component, driven from the center of government with a focus on implementation.”

Carlos Santiso, corporate director, governance practice, digital Innovation in government, CAF

Political continuity

Although the years leading up to the pandemic witnessed the development of promising AI policies, the levels of implementation have varied. This is partly explained by changing administrations as a result of political elections. As suggested in our expert interviews, this has historically come with wholesale shifts in political and policy alignments. Even in cases where different governments had goals that were broadly similar, swings in the political pendulum resulted in difficulties regarding the implementation or the outright discontinuation of policies.⁶³

The same applies to AI policy. In Argentina, when the Macri government was defeated in October 2020, Alberto Fernández took over as president. Although he introduced new initiatives in the field of technology, such as the re-establishment of the Ministry for Science and Technology, the implementation of Argentina's AI strategy has in effect stopped.^{64,65} The Inter-American Development Bank (IDB) now describes the country's AI strategy as "to be continued",⁶⁶ but the new administration has published Resolution 90/2021, which mentions the need to address AI adoption in the public sector and skills development.⁶⁷

Mexico has not yet published an official national AI strategy. In 2018 Oxford Insights and C Minds published the Artificial Intelligence Strategy, accompanied by a white paper entitled "Towards an AI Strategy in Mexico", which was endorsed by government officials. However, since then AI has not been addressed significantly in the first three years of the administration of the president, Andrés Manuel López Obrador. For example, Mexico's National Development Plan of 2019-24 does not mention the role of AI in the country's economic development.⁶⁸

Colombia has been able to benefit from policy continuity in 2022, producing a disproportionately high number of AI-related policy initiatives. According to our expert interviews, the upcoming elections this year present an opportunity for the new administration to build on recent policy successes to further ensure the full benefits of AI in the years to come. "Continuity is going to be very important as Colombia's government changes," says the IDB's Armando Guio Español. "The government has carried out a large amount of technical work around AI because of the political will behind this project, and it is important that it continues."

José Guridi, head of the FAST unit at Chile's Ministry of Economy, acknowledged that the transition of government in March 2022 meant that some of the actions listed in the plan would not be completed. "We have included some suggested actions in the plan for the coming years," he says. "It will be up to the next government if they decide to act on them, but even if they rewrite the plan, these efforts should go on."⁶⁹

The biggest surprise has come from Brazil, which has been through a number of tumultuous political years. However, there is currently not enough evidence to suggest that when the government of Jair Messias Bolsonaro assumed power in 2019 it rolled back policy progress in the field of AI. This is probably due to the economic importance of the country's tech sector, which is the largest in the region.

The impact of policy discontinuity has had wide-ranging ramifications for the AI ecosystems of the region, as mentioned in our expert interviews. To begin with, it has thwarted the region's progress in AI over time by requiring countries to design initiatives from scratch instead of building on previous efforts. These consequences



have also extended to the private sector, where volatility and uncertainty about governments' commitment to developing AI capabilities create a less attractive environment for investors.⁷⁰

Enter covid-19

The covid-19 pandemic is largely seen as a catalyst for global AI uptake. Appen's 2021 State of AI report, for example, mentions that 41% of companies sped up their AI strategies during the pandemic.⁷¹ Global private-sector investment in AI increased by 40% between 2019 and 2020.⁷²

Latin America has been strongly affected by the pandemic. Since the start of the outbreak the region has recorded nearly 1.57m deaths (accounting for 28.2% of global deaths), and its economy contracted by 7% in 2020.⁷³ However, it has also given rise to an investment boom among Latin American

technology companies, driven by increased online activity and investors' recognition of huge AI opportunities. According to the Latin America Venture Capital Association (LAVCA), in 2020 tech startups received US\$4.1bn in venture-capital investment.⁷⁴ In 2021 that number almost quadrupled, reaching US\$15.3bn.⁷⁵

Figures for AI-specific investment are less readily available, but Alejandro Correa Bahnsen, chief artificial intelligence officer at Rappi Bank in Colombia, suggests that startups, in particular, drove AI adoption in the region. The reason for this is that startups are more agile in integrating AI into their operations, products and services, while the organisational culture at large firms can stymie the implementation of tools like AI. In contrast, during the pandemic larger firms faced increased difficulty integrating disruptive technologies like AI, despite their interest in doing so.⁷⁶

While the specific reasons for the investment boom vary, our expert interviews as well as desk research point to a number of reasons. Historically, the region was considered to be “underinvested in technology”.^{77,78} Investment in the tech sector had been growing throughout the previous years, but political volatility, low productivity and the countries’ protectionist policies had made the region a less attractive destination for investments.⁷⁹ With the covid-19 pandemic creating a shift to online transactions, this created a sense of needing to “catch up, where everyone is rushing to see what the opportunities are”.⁸⁰

Taken together, these various reasons lead to the conclusion that the region’s sectors were largely considered “ripe for disruption”.⁸¹ Some of the largest industries in the region, including finance, healthcare and infrastructure, were characterised by a few companies controlling the market. For example, 80% of Brazil’s finance sector is dominated by only five banks.⁸² The resulting public dissatisfaction, inefficiencies and archaic business models created the perfect storm that made it possible for these industries to be shaken up.⁸³

“Suddenly Latin America has become a very hot, pioneering land of opportunity, where unmet needs in the market have become very apparent in the midst of covid because so many sectors and services were not digitised,” says Constanza Gomez

“Suddenly Latin America has become a very hot, pioneering land of opportunity, where unmet needs in the market have become very apparent in the midst of covid because so many sectors and services were not digitised.”

Constanza Gomez Mont, chief executive officer of C Minds

Mont, chief executive officer of C Minds. In response, startups are investing in AI to meet some of these needs.

Continuing activity

At the government level, activity in the field of AI has continued since the start of the pandemic. Both Brazil and Chile unveiled their AI strategies in 2021, providing additional policy support to the region’s growing tech sectors. According to Mr Guridi, who co-ordinated the creation of Chile’s national AI plan, the government used “an open deliberation process to frame and construct the policy,” which included an extensive participatory process that involved more than 8,000 people via working groups, roundtables, online sessions and public comments. On top of its new strategy, Brazil established the National AI Innovation Network with an investment of US\$12m—a partnership of different research centres supporting the development of new AI applications and startups.⁸⁴

As AI proliferates across the region, however, increased attention is now being paid to its ethical implications. National AI strategies in Latin America establish plans and guidelines for AI development and adoption, but in some cases the reality of AI is overtaking policies and regulations. “We see a lot of AI initiatives in the region, but it is outpacing regulation and governance mechanisms,” says Marcelo D’Agostino, senior adviser on information systems and digital health at the Pan American Health Organisation (PAHO). He adds: “There are more AI developments being implemented regardless of public policies or national plans, and this must change urgently if we are to promote sustainable, secure and equitable implementations based on open algorithms

without biases of any nature.” In response to these issues the region’s governments are working on developing AI ethics policies. Colombia has published the first standalone AI ethics framework, while Brazil, Chile and Uruguay have all incorporated responsible AI principles into their broader AI policies and are due to publish their own AI ethics policies.

Moving forward: seizing the opportunity

The region has all it takes to make the AI revolution a success, but whether it will turn this potential into substantial results has yet to be determined. The past years’ investment in developing AI policies in Brazil, Colombia and Chile as well as the catalysing effect of the covid-19 pandemic on Latin America’s tech sector have provided the countries in the region with a unique opportunity to improve their AI capabilities and foster an uptake across their industries. Other countries, such as Mexico and Argentina, have yet to implement comprehensive AI policies, but the rapid growth of the region’s tech sector could put pressure on their governments and

inspire renewed investment in AI capabilities. For Latin America, the diversity of its AI ecosystems could prove to be a strength. Increased collaboration between the countries in AI development and greater exchanges of technology enablers such as semiconductors and talent could help the countries of the region to offset their weaknesses while capitalising on the areas where they stand out.

Whether the current investment trajectory and growth of tech companies at the private-sector level will persist in the next few years remains to be seen. Funding typically “ebbs and flows”, and with the region’s economy relying to a great extent on the export of commodities, it is susceptible to both “economic booms and busts”.⁸⁵ What is certain, however, is the importance of the government in helping the region’s tech sector develop its own AI success stories. With the right policy frameworks in place, the region’s governments can help ensure that this short-term boom in investments will facilitate the uptake of AI in the long term.

Chapter 2

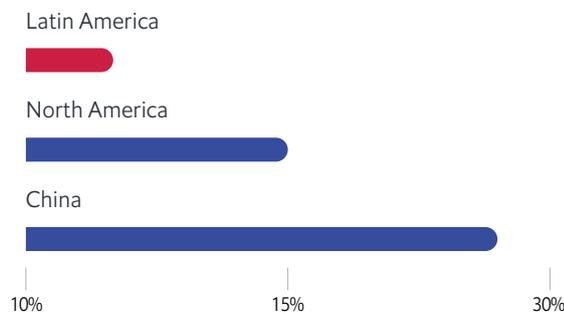
AI's impact across industries



Latin America is expected to gain 5.4% of GDP, equivalent to US\$0.5trn, as a result of AI by 2030.⁸⁶ While this is an impressive gain, it still falls behind China is set to gain 26.1% of GDP, and North America 14.5% by the same year. Since the covid-19 pandemic and its catalysing effect in the region’s investment in AI, however, this number is expected to rise. While post-covid data on AI’s contribution to the region’s economy are not readily available, separate analysis shows that in four out of our five priority countries AI is expected to boost GDP by an entire percentage point by 2035.⁸⁷

Research by the IDC, a market intelligence company, explains that Latin America’s growth in AI adoption will be driven by companies’ broader need to adopt digital transformation, the benefits they can gain from improved computing processing capacities, and greater resilience against unforeseen market changes.⁸⁸ In a region where there are structural problems that can be solved by new enterprises, company executives and policymakers are realising that AI is well positioned to help solve these regional problems.⁸⁹

FIGURE 2. AI is forecast to boost Latin America’s GDP by 5.4% by 2030



Contribution of AI to GDP by regions, 2030

Source: pwc (2018)

Even though forecasts for AI growth are lower than for the rest of the world, technology is expected to disrupt almost every sector in the region. While data and forecasts outlining the economic impact of AI by sector are limited, by assessing different use cases across the region we have identified four industries that are expected to be of particular relevance to our target countries in the next decade: government services, healthcare, agriculture and finance. In the next section we highlight some of the initiatives currently being taken in the region for each of these industries, together with expert views about some of the barriers to progress and what we might expect for the future.

GOVERNMENT SERVICES

The public-sector use of AI in Latin America has the potential to create opportunities for governments to solve some of the systemic challenges and inefficiencies that have been holding back the social and economic potential of LATAM. This has been recognised by many countries in the region, with many mentioning the need to apply AI in public-service provision in their AI strategy documents. For example, one of the main justifications for Colombia’s strategy is the potential of AI to increase the productivity and efficiency of public services, which is also one of the key pillars in Argentina’s national AI plan. Similarly, Chile’s national AI policy outlines as a key objective the need to accelerate state modernisation through AI. The Brazilian strategy’s third pillar focuses on how AI can be applied to public services for the benefit of citizens, including a commitment to implement AI in at least 12 of Brazil’s federal public services by 2022. Other countries are also making progress in this area, with Uruguay publishing an Artificial Intelligence Strategy for the Digital Government, for example.⁹⁰



Ms Gomez Mont of C Minds sees urgency in both the opportunity and the need for digitalisation and implementation of AI in the public sector. “This is not a luxury, especially in the context of the covid-19 pandemic; it’s a complete need and urgency to become digital,” she says. “Covid shocked the system and exponentially accelerated this interruption in a region with a very deep need for inclusion, for access to public services, for access to any type of services.”

Some use cases of AI in the public sector include improving service delivery and government operations. For example, according to the IDB, AI models have a 300% greater predictive capacity than traditional econometric models when forecasting regional trade scenarios, while using AI to personalise education models can increase pass rates by 15% and reduce remediation costs by 40%.⁹¹

One key example of AI adoption by the public sector can be seen in Chile, where predictive AI models are reaching the judicial, social welfare, environmental and labour sectors. In collaboration with experts from the University of Chile, the Ministry of Interior has

developed the use of AI for crime prediction and risk mapping.⁹² The Superintendence of the Environment employs “environmental intelligence” to review large amounts of environmental impact information, standardise datasets, implement warning systems and take a preventive approach to inspections and actions to protect the environment.⁹³

AI for anti-corruption in procurement

“Countries in the region have a lot of experience deploying AI to detect corruption; the experience of Brazil’s CGU [Office of the Comptroller General] is one of the most emblematic,” notes Maria Isabel Mejia, senior executive of digital government at the Development Bank of Latin America (CAF). All countries in our sample rank poorly in Transparency International’s Corruptions Perceptions Index apart from Chile, which ranks 27th out of 180; Colombia ranks 87th, Brazil and Argentina joint 96th, and Mexico 124th.⁹⁴ Moreover, estimates show that corruption costs the Latin America region over US\$200bn a year, equivalent to Peru’s entire GDP.⁹⁵ Utilising AI-based models has the potential to minimise this economic blow, while also reducing the resources needed to do so. In Colombia, for example, the District of Veeduría has deployed a machine-learning (ML) model to draw officials’ attention to the contractual processes most exposed to acts of corruption or inefficiencies.⁹⁶ The model leverages ML algorithms that trawl through a large database of district-level public procurement contracts to predict the level of corruption risk and inefficiency. The outputs of this are then inputted into an early warning system that allows users to visualise the risk of irregularities in public contracting. This tool plays an important role in a region that already lacks the financial

“This is not a luxury, especially in the context of the covid-19 pandemic; it’s a complete need and urgency to become digital”

Ms Gomez Mont, C Minds

and human capital resources required to manually audit subnational governments and public contracts. Despite having only been rolled out in Bogotá so far, a tool of this type can be easily replicated by other national and subnational governments in Latin America, drawing attention to a longstanding institutional problem.⁹⁷

Making government more responsive

At the provincial level, Argentina’s public sector has deployed robotic process automation (RPA) to automate bureaucratic tasks and improve public efficiency. The Ministry of Finance of the Province of Córdoba has introduced an RPA software called Laura, which connects a potential beneficiary with the National Social Security Administration (Administración Nacional de la Seguridad Social—ANSES) database to verify their pension situation and determine whether a national or provincial benefit applies as well as their retirement amount.⁹⁸ Moreover, since 2017 Buenos Aires has used Prometea, a system that leverages RPA and machine learning to automatically prepare judicial documents, reducing time spent by 99% for some processes.⁹⁹ The tool also uses natural-language processing (NLP) in a virtual assistant, or chatbot, which interprets spoken commands by the user and also provides responses that can guide the user throughout the process of preparing a legal document. By using RPA and NLP in these tools, traditionally complex and cumbersome processes, such as those in the justice system, are more efficient and responsive to citizens’ needs.¹⁰⁰

Job application support

In 2020 the unemployment rate across the region reached an average of 10.1%, according to the International Labour Organisation (ILO), compared with a global average of 6.5%.¹⁰¹ At the highest point of the covid pandemic alone, in the second quarter of 2020, job losses amounted to 49m.¹⁰² Despite strong economic growth across the region, recovering these lost jobs has been a sluggish process, with pre-pandemic levels of employment not expected to be reached much before 2024. The need to stimulate employment could open up opportunities for innovative AI-based solutions.

For example, the Chilean Ministry of Labour has launched Doctor CV, an AI-powered tool that helps individuals improve their CVs during their job search. The tool leverages RPA to assess CVs based on factors including density of action verbs, readability of the document, total reading time, repeated words, relevance of previous experience and evidence of skills, among other aspects. After assessing the document, Doctor CV then provides a set of clear recommendations for improvement. In partnership with the National Employment Exchange (Bolsa Nacional de Empleo—BNE) the tool also compiles information on labour market trends, so that job seekers can target attractive industries.¹⁰³ The AI helps guide workers on a personalised journey, so instead of spending five years retraining for a completely new profession the system identifies specific new skill sets, such as learning English, which will allow them to leverage their existing experience in new positions, according to Mr Guridi. He adds: “It’s about connecting them with more stable jobs in an efficient way.” By leveraging such tools, the government can dampen the negative impacts of AI on labour markets while contributing to workforce resilience.

When it comes to deploying AI in the public sector, however, governments in the region face human capital challenges. While governments can outsource the creation of AI systems to some extent to contractors, more training is required in the public sector to give officials the technical skills to identify problems that can be solved with AI, and then scope and design solutions that contractors can bid to create. “I think that’s the main challenge, to identify the right problem and implement the solution responsibly,” Mr Guridi says. Public-sector implementation of AI is progressing but has not yet scaled in the region. “There are many pilot projects,” according to Ms Mejia at CAF, “but we still have not seen mass use of AI solutions in the public sector.”

To move beyond the pilot stage, governments should rigorously assess current projects and invest in sharing successes and lessons learned via tools such as national AI dashboards, while ensuring that AI becomes a part of most ongoing policy discussions.

HEALTHCARE

AI adoption in healthcare in Latin America is increasing, especially for the purpose of screening and the early detection of conditions, potentially relieving healthcare systems that are overwhelmed by patient demand. The AI healthcare market in Latin America has been projected to grow in terms of revenue and to expand at a compound annual growth rate (CAGR) of 37.95% during the forecast years 2019-27, according to one report.¹⁰⁴ Currently 30% of the population lack access to healthcare, and most countries struggle with insufficient doctor-to-patient ratios.¹⁰⁵ Out of our five countries we analysed, almost all mention the importance

of AI in healthcare, but none goes into sufficient detail on what kind of contribution AI can make, and where. Leveraging AI in healthcare can play a critical role in improving public access to necessary health services, improve resource allocation, and potentially increase the capacity and resilience of the region’s workforce.

Cristina Campero, CEO at PROSPERiA in Mexico, says that driving more investment in AI for health will occur when startups can clearly articulate their model and impact. “The business models have to be a lot clearer and more transparent,” she says. “To be attractive for investment, to scale, and to get a VC’s attention you have to really nail down the business model.” Still, healthtech startups are already successfully attracting early-stage investors. In 2021, for example, 33 out of 36 startups in the sector had raised third-party capital and nearly two-thirds had closed a seed or Series A round, with eight of these



securing capital worth over US\$10m.¹⁰⁶ In particular, the region's regulatory framework provides flexibility for experimentation. Ms Campero found that launching in Mexico made sense because it offered regulatory flexibility while PROSPERiA refined its business model, which was attractive to investors. She notes: "Investors told us, 'You can really nail down your products and business model before you move to the US or Europe or other more regulated spaces'."

Prediction and prevention of blindness

Latin America's population aged 65 or older is expected to more than double in the next 30 years, from around 8% today to 17.5% by 2050. This share is expected to exceed 30% by the end of the century. As a result the healthcare sector needs to be well equipped to manage health issues that could affect this growing section of the population. One such issue is blindness. In Mexico, PROSPERiA has invested time and money in developing a model that utilises AI to help medical professionals detect causes of blindness by analysing high-quality digital images of patients' eyes. By using AI-enabled automated image recognition of retinas, doctors can automate the retinal screening process, detect patients at risk of developing retinopathy and provide treatment that could prevent this. The use of such automated tools represents an opportunity to reduce public expenditure associated with direct and indirect costs of such illnesses, while also indirectly addressing the shortage of ophthalmologists to treat a growing problem in the region. Similar research has also been conducted in Europe by Moorfields Eye Hospital in London and DeepMind, which found that an AI model used to predict the development of wet age-related macular degeneration (wet-AMD), which can lead to blindness, could outperform five out of six experts.

However, to be able to produce AI-driven innovations in the field of healthcare, access to health data is crucial. Sharing health data is not without its challenges, though, because it relates to patients' medical records and includes information that is considered intimate. A number of initiatives worldwide, however, have provided a way forward in this. In the UK, for example, the Data Trust Advisory Board, established by Health Data Research UK and the Open Data Institute, brings together patients, the public and experts to deliberate on data access requests by researchers. Similarly, the European Commission proposes in its Data Governance Act the establishment of data intermediaries enabling access to data for a public purpose. Although these data stewardship models are still in their early development stage, they represent a novel way for safe data sharing that Latin America could trial.

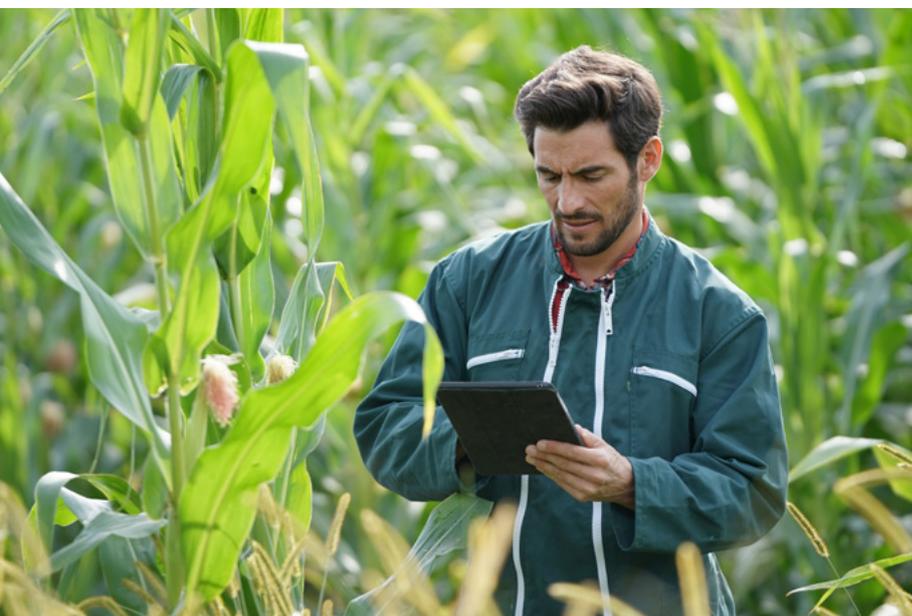
Managing mental health conditions

Research by the London School of Economics (LSE) shows that 15% of children and adolescents aged 10-19 in Latin America—equivalent to around 16m individuals—live with a diagnosed mental disorder, with more than ten adolescents losing their lives to suicide in the region every day. While the social impact on individuals, families and communities is naturally immeasurable, there is also a notable impact on the economy. The LSE estimates that the lost contribution to the economies in the region as a result of this amounts to nearly US\$30.6bn a year.¹⁰⁷ Adding to this is the stigma associated with mental health and suicide in the region, which often means that support services are limited.

To help overcome this stigma and support sufferers in Mexico, an application called Yana—standing for "You are not alone"—uses an AI-based chatbot that helps individuals

manage depression and anxiety.¹⁰⁸ The app, although not intended to support during times of crisis, can detect specific words associated with a crisis and will automatically direct the user to an SOS button that connects them to the government's suicide hotline. Since its official launch in March 2020 Yana has provided support to over 6m Spanish-speaking users and attracted more than US\$1.8m from investors.¹⁰⁹

As AI becomes more present in people's healthcare, equal access to the technology and the underlying infrastructure is becoming increasingly important. Even as data become more available, Mr D'Agostino notes that data availability is a risk when implementing AI. If important datasets are siloed away in obscure agencies, they may not be easily available when needed in urgent public health situations. Access to critical and quality data at the appropriate time and in the correct format is a foundational element for effective implementation of AI," he says. Data governance and sharing arrangements among governments and healthcare institutions are key enablers of AI.



The increasing use of digitisation and AI in healthcare also creates risks around inequality, and inequality that stems from digital health may manifest itself in different ways than economic or social inequalities. PAHO has worked with member nations in the Americas to include AI in its guiding principles for the digital transformation of public health and to reinforce the concept of "inclusive digital health".

"It's the perfect storm because you have groups in situations of vulnerability, and other groups that are okay from the economic or social perspective, but they lack the knowledge or skills required by the digital transformation, so if we do not address that we will face multiple inequalities everywhere," Mr D'Agostino says. For example, retirees receiving social security payments may be alright from an economic perspective, but if they lack digital literacy skills, such as using a smartphone for telehealth, video calls or an app for appointment scheduling, they could nonetheless face difficulties accessing healthcare services.

Given the importance of technology in the future delivery of healthcare AI, data governance, connectivity and bandwidth become new indicators for quality and access to healthcare.¹¹⁰ As such, ensuring that digital health and AI for health are inclusive remains a crucial basis for ensuring equal access to healthcare.

AGRICULTURE

All AI policy documents across the priority countries mention the strategic importance of the agricultural sector and highlight the role of AI in increasing efficiencies and resource use. For example, Brazil's national AI strategy highlights how AI systems can help analyse farm data in real time, anticipating the consequences of weather conditions,

water use, soil health and other variations. This can help farmers to increase the yield and quality of crops and identify what to plant, how and where.¹¹¹

In 2019 agriculture accounted for over 23% of Latin America's GDP, although this dipped during the covid-19 pandemic.¹¹² The sector also accounts for the majority of the region's exports. LATAM's agricultural exports increased by 8.5% between 2019 and 2020, despite a 30% decline in total exports.¹¹³ However, this broader picture masks the prevalence of poverty in areas of the region where agriculture dominates, reflecting imbalances between larger, more productive agricultural companies and poorer smallholder farmers.¹¹⁴

Improving productivity and efficiency and distributing wealth across the whole agricultural sector will require a greater uptake of digital tools, including AI-based solutions. Statistics about AI's contribution to the region's agricultural sector is limited, but agtech in general has grown remarkably in recent years, driving technological innovation in the agriculture and food industries. While the region ranks last in agtech investments in the world, with just US\$440m invested in 152 deals over the past five years,¹¹⁵ the number of agtech startups increased by more than 600% between 2005 and 2018.¹¹⁶ This growth, primarily concentrated in Brazil and Argentina, has been driven by large local markets, favourable conditions for entrepreneurs and a critical mass of agriculture professionals working with extensive systems. Fourteen percent of agtech startups are working specifically with AI.¹¹⁷

“As we collect data from satellites and farm machinery, we can see correlations among weather, seed types, location and other variables.”

Luiz Santana, CTO and co-founder of Brazilian start-up Leaf Agriculture

Aadit Patel, director of machine learning and data science at NotCo, a Chilean foodtech company, notes: “In the food industry, the technologies being deployed are not just pure AI plays, but are combining algorithms, machine learning, and data science to accelerate the core fundamental R&D of food science.” This phenomenon of combining technological tools with real-world processes continues to spread across the region and gain in importance.

Cost-effective allocation of resources

Given the region's reliance on the agricultural sector, it is unsurprising that 55% of the region's 450 agtech startups are using AI to increase efficiency.¹¹⁸ Resource efficiencies, in particular, are crucial: the agriculture sector, for example, consumes 70% of global water resources per year for irrigation use to ensure sufficient food production.¹¹⁹ Aimirim, a Brazilian startup which provides AI solutions for industry, increases the efficiency of sugarcane pulp combustion for energy production using AI to simulate, control and automate the process.¹²⁰ This system results in a 30% reduction of the inputs needed while generating the same calorific value. Brazil-based Leaf Agriculture is also working to improve resource allocation by aggregating and organising data from around the farm, making them accessible and useful for farmers and agribusinesses. “AI will help with the management of resources on the farm and also with the predictability of the future,” says Luiz Santana, CTO and co-founder of Brazilian start-up Leaf Agriculture. “As we collect data from satellites and farm machinery, it is amazing how we can start to see correlations among weather, seed types, location and other variables.”

Similarly, in Argentina, Kilimo is an AI-based solution that seeks to avoid water waste by optimising freshwater use in agriculture.¹²¹ The company, which is the first certified tool in the region that measures the water

footprint in irrigation fields, raised US\$1.2m in venture-capital funding in 2019.¹²² In 2020 Kilimo was expected to benefit over 2,200 small and medium-sized farmers in the region, save 179bn litres of water and save US\$22m in direct costs for farmers.

Emissions reductions

Another key factor affecting the livelihoods of farmers is the impact of climate change. Although the LATAM region as a whole accounts for only 5% of global emissions, this share is rising.¹²³ The World Bank forecasts that climate change will lead to an increase in extreme poverty in the region of up to 300% by 2030.¹²⁴ The agriculture sector is a key emitter of greenhouse gases (GHGs) in the region, accounting for almost half¹²⁵ of the region's total GHG emissions, according to research by the CGIAR Research Programme on Climate Change, Agriculture and Food Security (CCAFS).

To address this concern, the IDB has partnered with Japan's SoftBank to launch e-kakashi, an AI-powered tool that has been deployed in Colombia to improve

the productivity and sustainability of rice farming, a process that can emit almost 500m tonnes of GHGs worldwide.¹²⁶ The tool uses AI to collect large amounts of environment and weather data, which it then processes and analyses to help farmers navigate the cultivation process and create an optimal rice-producing environment that minimises emissions.¹²⁷

Two significant challenges could limit increased AI adoption in the agriculture sector. First, connectivity in rural areas is frequently an issue, and this creates disparities in access to technology and communications among farmers. Half of Brazil's farmers, for example, are not connected, so reaching them with these solutions would offer immense benefits, especially if they are made available to small farmers.¹²⁸ Second, the knowledge overlap between agronomists and AI experts is still limited. Training agronomists in AI design and implementation and creating pathways for AI experts to study and gain experience in agriculture will ensure that solutions meet real-world demands, while also contributing to an environment where farmers are comfortable and willing to adopt AI. This should be complemented by investing in the creation of multidisciplinary training programmes as an opportunity for higher education institutions in the region.¹²⁹

FINANCE

The fintech sector in Latin America receives a significant share of venture-capital investment, capturing nearly 40% of total VC investments.¹³⁰ While data on the adoption of and investment in AI in the region's financial sector is scarce, total fintech funding in the region has increased from US\$44m in 2013 to US\$2.1bn in 2019—an increase of over 4,000%.¹³¹ Neobank unicorns are



demonstrating that AI can play a pivotal role in their success in expanding financial inclusion and customer bases. This growth in fintech solutions in the region can be attributed to the growing demand for online banking solutions.

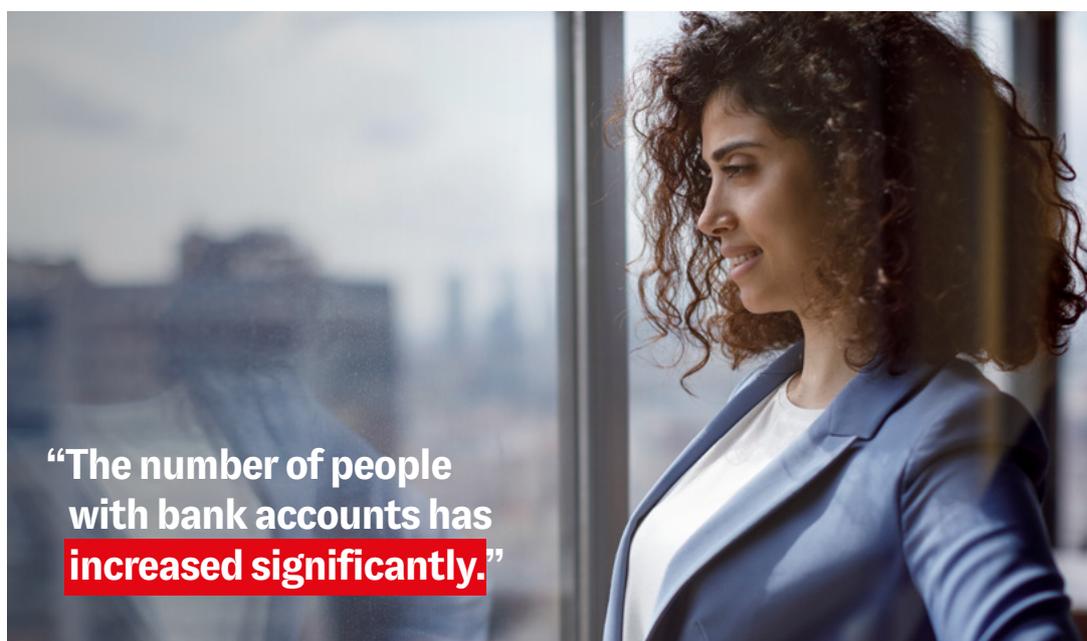
Financial inclusion through AI adoption

According to research by EY, a consultancy, improving financial inclusion can boost GDP by up to 14% in developing economies, suggesting a strategic and economic advantage of increasing access to financial services in the LATAM region.¹³² Only half of the region's population above the age of 15 has access to a bank account. Chile leads with 74% of its population having a bank account, followed by Brazil (70%), Argentina (49%), Colombia (46%) and Mexico (37%).¹³³ This regional disparity in access to finance stems from a high level of bank concentration, costly transaction fees, cumbersome regulatory procedures and stringent underwriting requirements that limit access to credit.¹³⁴

However, as a result of the covid-19 pandemic the number of people with bank accounts has increased significantly. In a number of countries in the region covid stimulus funds were provided digitally. Challenger fintechs and neobanks employed AI to onboard and provide previously unbanked people with quick and easy-to-use digital banking solutions. As a result, between May and September 2020, 40m people in the region opened a bank account.¹³⁵

The region is well positioned to adopt such AI solutions, with mobile penetration and internet penetration rates growing in recent years.¹³⁶ Ms Gomez Mont of C Minds sees the trend of using AI to reach unbanked individuals in Latin America as part of a global trend of firms using this technology to access previously excluded populations.

Leveraging AI makes financial products like loans more available to populations without a formal bank account, payslip or digital financial track record. With AI, disbursing small loans can become more feasible as



**“The number of people
with bank accounts has
increased significantly.”**

“Analysing data and drawing conclusions should drive business decisions”

Sebastian Silva, chief technology officer at Ualá.

the process is automated and scalable. One notable example in the financial sector, and in the region generally, is Brazil's Nubank, which reached a valuation of US\$45bn after its IPO in December 2021.¹³⁷ The neobank uses AI for credit decisions as well as to make financial intelligence recommendations to its customers.¹³⁸ Nubank has made it part of its goal to serve the currently underserved, which it is managing to do by removing fees, improving the ease of interaction with the technological platform, and ensuring more accessible communications. As a result, it has seen the number of its users expand from 3m in 2017 to over 40m in 2021, with 20% of its customers accessing a credit card for the first time since joining the bank.¹³⁹ Meanwhile, in Colombia, fintech MO Tecnologías uses AI and machine learning via a platform that connects traditional and digital banks with unbanked consumers and provides alternative credit scoring to facilitate loans.¹⁴⁰ In Mexico another fintech firm, Konfío, became the fourth startup in the country to reach unicorn stage, recording a market value of US\$1.3bn in 2021.¹⁴¹ Konfío is the largest online lending platform for small and medium businesses (SMEs) in Mexico and aims to empower underserved SMEs to benefit from the formal economy and access capital, including those without any formal credit history.¹⁴²

Improving the customer experience

With the pandemic shifting more individuals online, financial services have had to adapt to becoming more innovative and accessible. The risk of financial services failing to progress in line with advances in technology can impact customer engagement and retention significantly. For example,

research shows that over 25% of consumers considered their last application process for a financial product to be difficult, with over 60% abandoning an application and over 30% reluctant to start an application if they are required to take identification credentials to a branch.¹⁴³ Moreover, financial service providers' bottom lines can benefit from AI. According to a global study conducted by Capgemini, a French consultancy, in 2020 companies in the financial services sector were able to reduce their operating costs by 13% and increase their revenue per customer by 10% as a result of integrating AI into customer-facing solutions.¹⁴⁴

Creating more value at a lower cost also drives Ualá's investment in AI, allowing the Argentina-based fintech to understand how clients use its services and on this basis refine its features and offerings. “Analysing data and drawing conclusions should drive business decisions, like observing how customers use your existing services as well as potential new business lines,” Silva says. “Doing that manually is almost impossible, so one must have automated AI to make it workable.” He adds. “This is a very common challenge today: not only having enough information and the tools to understand it but also the mindset to have data insights to drive business decisions.”

Another example is Colombia-based RappiPay, which uses AI to make sense of its vast collection of data on consumer behaviour.¹⁴⁵ Recently, the neobank was able to use AI-driven language personalisation in its marketing efforts, which resulted in a significant conversion from views to sign-ups to the RappiCard waiting list.¹⁴⁶

Chapter 3

Barriers and enablers for AI uptake



The policy and business environment for AI in Latin America provides examples of both success stories and growing pains. This section sets out the policy context and ways to overcome constraints in order to facilitate safe and responsible AI deployment.

Digital infrastructure and divide

The lack of a digital infrastructure remains a significant challenge for the region as far as supporting its AI ecosystem is concerned. As mentioned by our expert interviewees, multinational companies have been trying to move into the region with the aim of developing regional hubs, but the essential infrastructure, namely 4G, 5G and fibre, is still lacking.¹⁴⁷ Chile and Mexico are the only LATAM countries with an existing 5G infrastructure, and Brazil announced the rollout of its 5G infrastructure in November 2021.¹⁴⁸

The issue is aggravated by a gaping digital divide between rural and urban areas. According to the Wilson Centre, an independent international think-tank, at present only 45.5% of households in the LATAM region have access to broadband.¹⁴⁹ This is of particular concern in rural areas, where only 23% households are connected to the web, as opposed to 67% in urban areas.¹⁵⁰ This divide has both economic as well as social consequences. With high-level connectivity being provided mostly in large cities, the majority of the AI economy ends up concentrated in large cities such as Buenos Aires, Bogotá or São Paulo. Since the development of AI relies on these basic

technologies for the transfer of datasets, its deployment remains challenging throughout the region.¹⁵¹

This disparity also exists between large firms, which have the available resources to ensure good connectivity, and smaller firms, which are basically excluded from the digital economy. “We are seeing a huge gap between the companies that are adopting these digital systems and the vast majority of smaller companies that are not yet participating in this digital economy,” Ms Gomez Mont cautions.

On a societal level, Latin America’s digital divide means that the benefits of AI are not evenly distributed, and this has significant ethical implications. As PAHO’s Mr D’Agostino notes, the implementation of AI in healthcare means that “data governance, connectivity and bandwidth should be considered as new determinants of health”. Similarly, as financial and other services move online and employ AI to increase efficiency and reduce costs, digital infrastructure could become a determinant of financial and other types of inclusion. PROSPERiA’s Ms Campero also sees the lack of a digital infrastructure as a risk as personal health data become more prevalent and more widely used in healthcare.

Investing in digital infrastructure and 5G networks thus remains a crucial policy priority for the region’s countries. Furthermore, with the rest of the region facing a gaping digital divide, expanding the availability of bandwidth from cities to rural areas represents a real opportunity for socioeconomic impact.

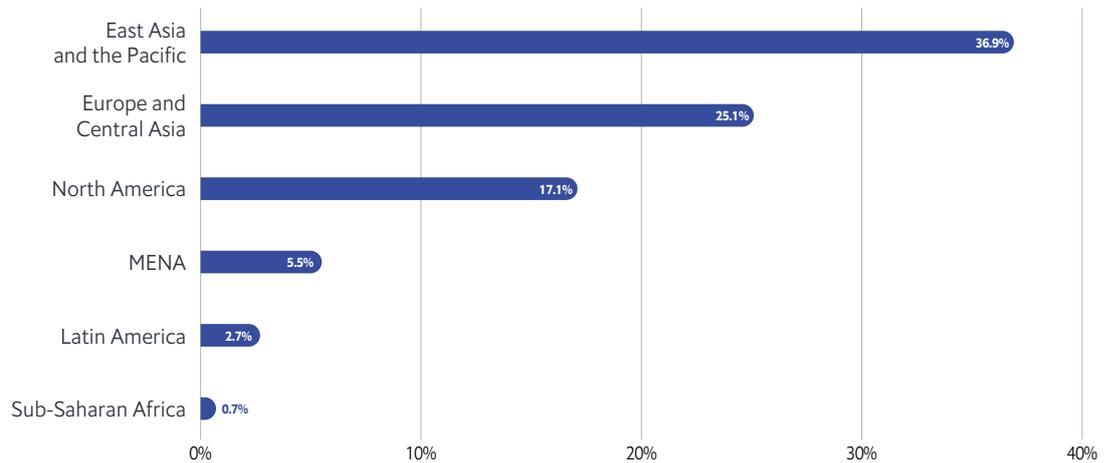
Talent

The availability of AI talent remains an important issue in Latin America, and virtually all the region’s published AI strategies make it a priority. According to our

“We are seeing a huge gap between companies adopting digital systems and the vast majority that are not”

Constanza Gomez Mont, chief executive officer, C Minds

FIGURE 3: Share of peer-reviewed AI publications



Source: Stanford HAI (2021)

expert interviews, acquiring the right mix of data science, machine learning and technical skills can be difficult in Latin America.¹⁵² Experts cite a lack of multidisciplinary expertise and a pool of talent that remains relatively shallow despite increased educational offerings, highlighting the need to improve talent availability over time.¹⁵³

Part of the challenge in finding experienced talent is also the relative newness of AI-driven businesses in the region. Mr Correa Bahnsen of Rappi Bank says that candidates for senior AI positions are limited to a few countries in the region and individuals recently returned from other regions or expatriates, although the situation is improving. According to PROSPERiA’s Ms Campero, fewer AI-related opportunities in the region mean that candidates lack experience but that the availability of data science degrees at universities is increasing, which will expand the talent pool over time. Until then the tight market for talent could constrain firms that are early in their journey to implement AI, because they may find it more difficult to compete with companies that have a more

clearly defined AI strategy and already have the bulk of their team in place.

Cultivating local AI talent is also complicated by academic constraints. Latin America, for example, is considered a minor player globally in terms of AI research. The region accounts for just 2.7% of peer-reviewed AI publications, only ahead of Sub-Saharan Africa with 0.7% and significantly behind East Asia and the Pacific (36.9%), Europe and Central Asia (25.1%), North America (17.1%) and the MENA region (5.5%).¹⁵⁴

AI onboarding programmes

In response to the region’s shortage of talent, our interviewees mentioned that private companies are stepping up to the plate and developing their own in-house AI onboarding programmes.

At NotCo, for example, on-the-job training is key to bringing new hires up to speed.¹⁵⁵ “It is hard to introduce someone to a new way of working immediately, so we have developed onboarding sessions, technology communication, showing past successes and

realistic use cases for our AI, as well as internal platforms and blogs and a science team showing how all the technology is used to develop a new NotCo product,” says Mr Patel. “We even have something called the Giuseppe [NotCo’s in-house AI] masterclass, where our chefs will actually show newcomers how the AI technology is being used.”¹⁵⁶

Similarly, Leaf Agriculture’s Mr Santana sees value in on-the-job training that can combine AI skills with other disciplines, such as agriculture. His firm has hired agronomists without any programming experience but has trained them to understand AI technologies.

More recently, governments have been choosing to partner up with the private sector to train people in relevant AI skills. As Mr Correa Bahnsen from Rappi notes, the

governments of Colombia, Chile and Peru have partnered with firms to offer a two-month data science certificate, which has already reached 50,000 students.

These onboarding programmes are providing the region’s firms with a quick supply of talent, matching the firms’ business needs directly. It is unlikely that these in-house initiatives will be able to match the talent gap in the region, but they could well form the basis for more orchestrated vocational programmes. The MENA region provides some lessons on how this could be achieved, with the UAE launching its National Programme for Coders, which teaches programming skills in partnership with local businesses.¹⁵⁷ Similarly, Germany has a well-established tradition of vocational programmes supplying companies with relevant talent without requiring individuals



“The positive side of that is that we were able to develop them in a participatory way and learn from other countries’ mistakes, but we are now late to the discussion about standards.”

José Guridi, head of the future and social adoption of technology (FAST) unit, Ministry of Economy of Chile

to embark on a full academic degree.^{158,159} For these vocational programmes to be successful in the long-term, however, governments will need to step in to scale them and build viable career progression for their citizens.

Preparing the workforce for an AI-enabled labour market

Investing in educational programmes and upskilling, however, is of paramount importance not only for AI development but also for safeguarding the region’s labour market against automation technologies. The proliferation of AI is often associated with rising unemployment and workers’ jobs being automated. However, evidence regarding the impact of automation on the labour market varies. One study by PwC argues that about 30% of jobs¹⁶⁰ are at risk of automation by the mid-2030s, while in Latin America specifically the Inter-American Development Bank (IADB) estimates that this number could be as high as 36-43%.¹⁶¹ However, other studies predict that there is simply going to be a shift in skills needed for performing future jobs, whereas others even go so far as to argue that AI will create more jobs in the future.¹⁶²

While more research is needed to understand the specific impact of automation on the labour market, there is agreement that policies need to be put in place to upskill the region’s workforce and enable labour mobility.¹⁶³ There are a number of policies that could prepare the region’s workforce to participate in an AI-enabled labour market. Life-long learning programmes, for example, can provide a starting point for ensuring that workers can develop market-relevant skills as technology uptake moves forward. Similarly, digital literacy programmes should be rolled out across the region to ensure that people have a basic

understanding of AI and how to work with emerging technologies, regardless of their technical background. Finally, as Latin American governments prepare their labour forces for an AI-enabled future, more research will be needed to understand the resulting impact on income distribution and ensure that the adjustment costs of the labour market will be shouldered evenly.¹⁶⁴

Perceptions and responsible use

In 2020 the IDB and C Minds reported that among respondents to a survey on AI 56% cited data privacy and security as a concern, 37% cited system reliability and safety, and 33% cited transparency.¹⁶⁵ Allaying concerns related to AI will require more than just ensuring data privacy. For many, how AI works and what companies and governments are using it for is still unclear. Although technical language lends precision to conversations among experts, it erects barriers to understanding for the general public. A mix of education, storytelling and public engagement is needed to build trust with the public.¹⁶⁶

“We must increase AI literacy among the population and present projects in clear, simple terms,” says Ms Gomez Mont. “When we’re talking about public consultations, we need to use a vocabulary that allows people to have a voice that democratises these spaces.”

Creating trust also requires that active efforts are made to identify the potential risks of AI applications. For Mr Santana of Leaf Agriculture the industry is not paying enough attention to this challenge, even though improvements have been made. A significant AI flaw or a related data leak could seriously affect the evolution of the technology and its acceptance in the marketplace.

Countries in the region have been relatively active in developing policies to mitigate negative consequences of AI. But creating effective regulatory mechanisms is also key to building trust in AI. Brazil, Chile and Colombia have all committed themselves to producing AI ethics policies, and in some cases these commitments are followed by action. However, these efforts will need to be complemented by continued investment in updating and implementing AI strategies that increase training and promote the collaborative development of regulatory frameworks. According to Mr Santiso, the use of biased datasets has already led to cases of biased algorithms that have damaged public perceptions of AI. As such, governments must work to prevent this type of digital exclusion among the population.

From here, there are a number of paths that the region can go down in order to safeguard the responsible use of AI based on international best practices. The Colombian AI ethics framework provides a regional example of a non-binding document that could function as a North Star to be followed by developers. However, non-binding frameworks have in the past been criticised for not having enough bite, and instead some are advocating for binding regulations similar to the EU's AI Act. However, this has been criticised for not allowing enough flexibility for companies to experiment and produce novel AI products and services.

Finally, discussions about the ethical use of AI should go beyond regional boundaries and instead contribute to a global AI policy. In the past years there has been a noticeable increase in responsible AI initiatives on a global level. In 2019 the OECD Artificial Intelligence Principles were adopted to “promote the use of AI that is innovative and trustworthy and that respects human rights and democratic values”. At the country level, for example, the US Department of Defence, Singapore's Personal Data Protection Commission and Australia's Department of Industry, Science, Energy and Resources have published AI ethics frameworks, and in November 2021 the UNESCO General Conference passed the world's first guidelines on AI ethics.

However, at present discussions about AI ethics are dominated by other regions, especially Europe, which has also led the conversation on data privacy with the EU's General Data Protection Regulation (GDPR). According to Chile's Mr Guridi, this is in part because engagement in international discussions on AI has been delayed. “We were two or three years late on our AI strategies and policies, and the positive side of that is that we were able to develop them in a participatory way and learn from other countries' mistakes, but we are now late to the discussion about standards.”

The countries of Latin America are now increasingly involved in high-level international discussions. Colombia, Chile and Mexico are participating in OECD dialogues. Brazil, Argentina and Mexico are members of the G20, where AI ethics have increasingly become a topic of discussion. Similarly, Uruguay is part of the Digital 9 group. Maintaining and increasing these international engagements will be a key priority for the region in order to influence the trajectory of AI development—not only domestically but also abroad.



Present discussions about AI ethics are dominated by other regions

Chapter 4

Policy futures



KEY DIMENSIONS

- a. **Nurturing local talent**
- b. **Fostering local research & development**
- c. **Safeguarding transparency and ethical use**
- d. **Creating a robust infrastructure and data environment**
- e. **Industry engagement**
- f. **Refining AI policies**

a. Nurturing local talent

As emphasised throughout this report, human capital is critical to realising a successful and thriving AI ecosystem. There is a need for policymakers in the Latin America region to pay greater attention to cultivating a highly skilled domestic workforce capable of both developing and using AI systems from a young age, while minimising the risk of graduates moving to the US, a global leader in AI. At the same time, policymakers should create incentives to attract and retain foreign talent to the region's AI research community.

AI has found fertile ground in Latin America. A number of regional success stories provide evidence that countries across the continent have the capabilities and talent to grow innovative companies with the potential to scale across the continent and contribute to economic growth. From healthtech startups forecasting and preventing illnesses that affect millions to agtech companies using AI to harvest soil more sustainably—the current growth trajectory suggests that these startup-led innovations are just in their infancy.

As the region continues to progress in the development and proliferation of AI across key economic sectors, it also faces challenges regarding talent, industry-government engagement and access to sufficient AI-related resources. To help policymakers in

the Latin America region consider how to tackle these challenges and what policies they should implement for both the short and the long term, Economist Impact has produced a policy playbook that analyses policies across six key dimensions.

Through a review of international case studies and academic literature and informed by expert interviews, Economist Impact policy analysts have assessed a range of policy options based on priority, time for implementation (0-3 years; 3-5 years; 5-10 years) and complexity. Policy assessments were arrived at through a double-blind coding process.

The policy options that we offer are not designed to be simply taken off the shelf and implemented in a top-down manner. As with all policies, new AI-related regulations and laws should be subjected to consultations with relevant stakeholders across the public and the private sector and academia.

Our policy playbook, in detail, is provided in the Appendix to this report. This can serve as a resource for policymakers who are interested in learning in detail what other countries in the region and globally are doing. In this final chapter of our report we provide the high-level takeaways from the playbook, presenting a selection of near-term solutions, medium-term approaches and longer-term strategic priorities.

Near-term solutions

Short-term policy options that can support the cultivation of AI talent can be targeted at supporting the existing batch of AI students and graduates and ensuring an effective transition from education to the local AI workforce.

Time to implement = 0-3 years

Establish and scale vocational programmes in partnership with industry

- A common issue with graduates of theoretical science degrees related to AI in the Latin America region is the attractiveness of job opportunities in the US, which is likely to offer more choice, a higher standard of living and better remuneration. Such opportunities are less available in Latin America, meaning that graduates with AI-related degrees may face the problem of a lack of on-the-ground applicability. To overcome this, policymakers can work with universities and companies to design and trial vocational programmes that offer tangible skills that complement theoretical academic instruction. These programmes would also allow students to build connections with industry players, which can support career development and prevent brain drain.
- One international example that policymakers can look to is the UK, where the University of Oxford's Department for Continuing Education offers short online courses in AI that are taught by industry leaders and academic experts, including a series of courses on blockchain taught by experts from IBM.¹⁶⁷ Some universities are also integrating industry experience with traditional AI and computer science degrees. For example, the University of Kent gives students the option to study for a bachelor's degree in AI with a year out in industry, including working with companies ranging from Intel to Disney.¹⁶⁸ Through this students can gain work experience and increase their chances of getting a longer-term job after graduation.

Longer-term strategies

In the longer term policymakers should focus on building a new and expanded constituency of STEM- and AI-focused students at all levels—from primary to tertiary education.

Time to implement = 3-5 years

Develop policy to boost the number of applicants for AI-related and STEM university degrees

- Fewer than 17% of graduates in the LATAM region obtained STEM degrees in 2017.¹⁶⁹ This is a problem when it comes to the development of both home-grown AI talent and a population that is comfortable using AI-based tools. To facilitate growth in these two cohorts, policymakers in the region should look to encourage the number of applicants in AI-related and STEM-focused degrees. One crucial approach to support this could be the provision of subsidies to universities offering STEM and AI-focused degree programmes to facilitate lower tuition fees and encourage admissions.
- In the UK, the government provided £23m in public funding in 2022 alone to support universities in the creation of more AI and data conversion courses with a particular focus on supporting young people from under-represented groups, including women, black people and people with disabilities, to join the UK's AI industry.¹⁷⁰

Launch life-long learning programmes to ensure labour market resilience against automation

- Life-long learning programmes can support employees who are at risk of being displaced by AI automation, by giving them opportunities to reskill to another profession. These programmes can also support mid-career professionals to upskill and improve their ability to work alongside

b. Fostering local research & development

The Latin America region accounted for only 1.3% of global AI journal publications between 2000 and 2020, indicating a dearth in research capabilities.²¹² Contributing to this is the global phenomenon of AI researchers and data scientists facing the temptation to move from academia to industry, attracted by lucrative salaries and better resources, such as higher computing power and better data.²¹³ To counteract this, policymakers can implement strategies that attract researchers from leading countries and institutions to the Latin America region, while creating an AI research agenda focused on local and regional AI challenges.

and operate new technologies, including AI. Policymakers can work with local universities to develop continued learning opportunities, both specific to AI and not. In addition to this they can incentivise employers to provide such lifelong learning opportunities to ensure that workers continue to upskill in line with changing industry needs. Time and investment will be needed to facilitate the development, rollout and uptake of such programmes.

- Brussels Vrije Universiteit Brussel (VUB) established its Artificial Intelligence Laboratory in 1983 with the aim of providing a range of AI-related educational offerings, starting with PhDs. Today the lab also offers AI-specific lifelong learning courses to working professionals, ranging from policymakers and journalists to CEOs and technology investors.¹⁷¹ The lab is partnered with the government of Belgium and the European Commission.
- Policymakers in Latin America can look to Singapore's SkillsFuture Credit, which aims to encourage individuals to take ownership of their skills development and lifelong learning. Introduced in 2015, all Singaporeans aged 25 and above will receive an opening credit of S\$500.¹⁷²

Introduce initiatives to support foreign inflows of AI expertise

- While developing a home-grown AI-focused workforce is critical to the region, in the near term policymakers need to rely on global expertise to learn from and share knowledge locally. One tool that policymakers in the region can leverage to attract foreign AI expertise could include introducing immigration incentives to attract external knowledge, e.g. a relaxed visa scheme targeted at AI and technology experts.
- The UK's Tech Nation Visa scheme is one such example through which the brightest and best tech talents from around the world are able to come and work in the UK's digital technology sector.¹⁷³ The scheme allows technical experts from around the world to obtain highly flexible visas for up to five years, without having to be tied to a specific job, company or location.

Create public awareness and AI literacy programmes to boost public trust in and acceptance of AI

- In a 2018 survey the share of members of the public who trusted AI systems was 56% in Mexico, 42% in Argentina and 41% in Brazil.¹⁷⁴ This compares with 70% of Chinese respondents who said they trusted the technology, and 64% in Saudi Arabia. While the general levels of trust in AI in these Latin American countries were still higher than in most other countries, there is a need to ensure that all groups are comfortable with using AI and are aware of the basics. To foster greater levels of trust, the governments in these countries should develop evidence-driven awareness campaigns to illustrate the fundamentals of AI and

c. Safeguarding transparency and ethical use

Globally, one of the most important conversations about AI focuses on transparency and ethics. Such risks include the perpetuation of real-world biases in algorithmic decision-making, potentially resulting in the discrimination of already disadvantaged groups such as ethnic minorities, women and people on low income. On top of this, governments are grappling with ensuring that different stakeholders are appropriately guided to understand and engage with AI effectively and safely.

its impact in layman's terms to the public. This could, for example, include government and industry collaborations to develop free, public courses in AI, public forums on AI impacts and benefits, media campaigns etc.

- The University of Helsinki in Finland has collaborated with tech company Reaktor to develop "Elements of AI", a series of free online courses to encourage as broad a group of people as possible to learn what AI is, what can (and can't) be done with AI, and how to start creating AI methods. The courses combine theory with practical exercises and can be completed at participants' own pace. Over 750,000 people have already taken part in these courses to date.¹⁷⁵
- Similarly, the Institute of Technical Education of Singapore has collaborated with Intel to develop "AI for Citizens: A Global AI Public Awareness Programme" to support AI awareness and appreciation.¹⁷⁶

Time to implement = 5-10 years

Promote STEM skills development in primary and secondary schools

- In the OECD's 2018 Programme for International Student Assessment (PISA), Argentina, Brazil, Chile, Colombia and Mexico all performed in the bottom 20 (out of 79 countries surveyed) in maths and science, with the exception of Chile, which was ranked 46th out of 79 in science. To address this STEM skills gap at an early stage, governments in the LATAM region should rethink their early-stage school curricula, with a particular focus on basic digital literacy, AI literacy and mathematics, which can play an important role as precursors to computer science degrees at a later stage.
- In 2016 Japan's Ministry of Education, Culture, Sports, Science and Technology revised elementary, middle and high school curricula and made programming a mandatory subject in Japan's elementary and middle schools. This will be a requirement for high schools in 2022 as part of the government's push to digitise education.¹⁷⁷

Near-term solutions

Although R&D efforts will take time to show results, there is scope to mobilise resources and encourage discussions to prioritise AI research on the most pressing regional challenges that AI can support in Latin America.

Time to implement = 0-3 years

Create an AI-specific R&D budget and allocate it to universities

- AI research, like any other research, depends on access to resources, ranging from the necessary hardware, computing power and storage systems to high-quality and expensive datasets. To show that they are serious to become global AI leaders, policymakers in the Latin America region need to set aside budget shares specifically to support researchers' access to such requirements through, for example, AI research grants at research centres and universities. This could help with researcher retention and also attract researchers from leading countries and institutions.
- On the back of its National AI Strategy, the UK government has set aside funding worth £300m for research in "data science and AI", which complements the establishment of 16 New Centres for Doctoral Training at universities across the country, delivering 1,000 new PhDs over the next five years.¹⁷⁸

Create new AI-specific fellowships to attract world-class researchers and professors

- In addition to resources, a thriving research community requires highly skilled expertise. Latin American governments could consider funding local research fellowships to attract foreign expertise to support local research development and knowledge sharing, while simultaneously strengthening local universities' reputation in global AI academia.
- Singapore's National Research Foundation (NRF) launched a NRF Fellowship for AI, which offers successful candidates a five-year research grant of up to S\$3m and the freedom to conduct ground-breaking AI research in their discipline of choice.¹⁷⁹
- The UK government has allocated £46m to the Turing AI Fellowship programme with the aim of attracting and retaining the world's most talented researchers in the field of AI and to build new domestic capability and capacity.¹⁸⁰

Identify region- and country-specific AI research goals and cultivate research partnerships between government and industry

- Since resources for researchers can be limited, research efforts should be targeted at region-specific challenges that AI can solve. As a first step, policymakers should identify long-term AI research priorities at the national and regional level to focus research on priority sectors (e.g. finance, healthcare, agriculture) and specific challenges within these sectors (e.g. financial inclusion, resource use efficiency).
- In the medium term policymakers should develop research-focused partnerships with stakeholders in industry and academia to develop solutions for some of the above-mentioned sectoral challenges using AI-based solutions. This is crucial to ensure that AI efforts are feeding directly into areas of strategic and economic importance.
- For example, the UK government has explicitly stated the need to support the transition to an AI-enabled economy, capturing the benefits of AI innovation in the UK and ensuring that AI technologies benefit all sectors and regions. As such the government has identified some key short-term priorities, for example applying more AI solutions in the National Health Service (NHS) and the defence industry.¹⁸¹

d. Creating a robust infrastructure and data environment

As mentioned above, infrastructure and data are two of the key enabling prerequisites of a robust AI ecosystem, along with skills and talent. As AI proliferates across sectors, so will the requirements needed to run such systems. While investment in AI is considerable in the region, this must be matched by accessible and robust data, which are severely lacking in the region at the moment.

Longer-term strategies

To make AI ethics, transparency and oversight the norm in the long run, policymakers need to invest in guidelines and tools which help developers to ensure that the AI systems they build are effective and trustworthy.

Time to implement = 3-5 years

Integrate ethics and responsibility into AI ethics guidelines and principles

- Currently, policies and guidance regarding AI ethics are either non-existent or very nascent in much of the world, including in Latin America. Some countries in the region, such as Chile and Colombia, have already made progress in this area, but in order to create AI products and services that are safe, countries in the region should develop national responsible AI guidelines setting out principles guiding the development and implementation of AI. Countries that have already developed such guidelines should ensure that they are regularly updating and revising them as global conversations on the issue evolve.
- The European Commission's High-Level Expert Group on AI has developed and published a set of Ethics Guidelines for Trustworthy AI with the aim of promoting the development of AI systems that are (1) lawful, complying with all applicable laws and regulations; (2) ethical, ensuring adherence to ethical principles and values; and (3) robust, both from a technical and a social perspective.¹⁸² These guidelines can provide a robust framework for Latin American countries to turn to when developing their own frameworks and regulations.
- In 2019 the OECD published its AI Principles, a set of five value-based principles which promote the use of AI that is innovative and trustworthy and that respects human rights and democratic values.¹⁸³ The five principles are: inclusive growth, sustainable development and well-being; human-centred values and fairness; transparency and explainability; robustness, security and safety; and accountability. In the same year the IDB created the fAIrLAC initiative, in which it has incorporated the OECD AI Principles.¹⁸⁴ The initiative was developed with the aim of bringing together multidisciplinary and multisectoral actors as a network of practitioners and experts to promote the responsible and ethical use of AI, improve social services and mitigate the region's growing social inequality.
- In 2021 UNESCO published the first ever global standard on the ethics of artificial intelligence—the Recommendation on the Ethics of AI. It has already been adopted by 193 UNESCO member states and spans six key policy areas: data governance, education, culture, labour, healthcare and the economy.¹⁸⁵

e. Industry engagement

Latin America is experiencing rapid growth in its AI ecosystem, with significant investment pouring into the private sector during the pandemic. To advance this progress, policymakers need to stimulate the private sector and the startup ecosystem further, which can, in turn, foster more innovation, drive economic growth and increase job growth in a fast-moving industry.²¹⁴ Policymakers can allocate budgets to explicitly support local AI startups, encourage home-grown innovation and collaborate with the private sector to ensure knowledge exchanges.

Develop or promote tools to assess AI models' responsibility and robustness

- Along with AI ethics and transparency guidelines, policymakers in Latin America should develop practical tools which organisations can use to ensure their algorithms and AI models are robust, reliable and responsible. This will involve collaborating with academia and industry to develop these tools to help organisations describe models, inspect them and make them more robust.

Trial responsible AI in government service delivery and policymaking. Publish case studies on AI in government to share learnings, success stories and challenges

- Governments should position themselves as role models in the responsible development and implementation of AI. A way forward in this is by trialling the responsible use of AI in government service delivery and policymaking through selected pilot projects. This could be in the form of new AI applications, developed in strict accordance with responsible use principles, as well as other innovative tools, such as algorithmic registries.¹⁸⁶
- These trials should be captured in case studies to be made available to businesses, academia and local governments. By publishing case studies on AI in government, sharing learning and success stories, governments can take an active approach to steering the development of AI implementation in a way that builds on previous efforts.
- To maximise the benefits of AI in the region, policymakers need to complement their investments in AI initiatives with improvements in data and the enabling infrastructure.

Medium-term approaches

Building reliable datasets is no easy feat because it requires robust data collection methodologies and sufficient public trust levels that support data sharing, both of which can be built up over the medium term. Similarly, connectivity infrastructure is needed to enable faster and more efficient AI decision-making.

Time to implement = 3-5 years

Build/expand national open-data platforms that allow startups and researchers access to high-quality data

- AI systems rely on comprehensive datasets, but emerging startups and underfunded researchers may suffer from a lack of access and the necessary funds to make use of



them. The region already struggles with a dearth of data, so to overcome this “cold start” problem, a key solution that policymakers should leverage is the development of national open-data platforms that are easily accessible and free for capital-strapped AI startups and researchers.¹⁸⁷ Argentina, Brazil, Chile, Colombia and Mexico have all established their own national open-data portals, but they require further opening. By producing high-quality, open-data platforms that house all public data in a well-organised and accessible way, startups and researchers can build AI systems using large and reliable datasets. Government across the region will need to ensure that these platforms are easily accessible and allow for data to be accessed in the standardised formats that are needed for AI and machine-learning applications.

- There are numerous examples of national open-data portals around the world, with some leading examples including Denmark’s Datafordeler (Data Distributor),¹⁸⁸ which provides “stable and secure access to coherent basic data from public registers for the benefit of authorities, companies and citizens”, and Austria’s Open Data Österreich, which aims to record metadata from over 1,300 government catalogues and make them accessible to the public.¹⁸⁹

Invest in connectivity infrastructure development to reduce the digital divide

- In 2018 the internet was not accessible to 41% of the Latin American population.¹⁹⁰ To increase the internet penetration rate, especially as novel AI applications continue to require increasingly larger data transfers, policymakers can allocate/ increase budgets explicitly focused on internet connectivity, including 5G and even satellite internet for rural areas. At the same time, policymakers need to be working with industry actors to supply the infrastructure for this. The focus should also be on enabling remote access to the internet and 5G, ensuring that the benefits of AI can reach the entire Latin American population, and not just select groups in urban areas.
- In the United States the US\$1trn-plus Infrastructure Investment and Jobs Act, which was signed into law in November 2021, will provide states with large grants to pay for internet improvements. The legislation provides for a federal discount on broadband services for low-income families and requires clear, uniform labelling of internet prices that will help consumers compare plans and understand the fees on their monthly bills. US\$42.5bn of this will go directly to states and territories to fund internet improvements.¹⁹¹

- In 2021 the Singaporean government announced a new US\$30m fund focused on building the necessary infrastructure, establishing industry partnerships to develop 5G talent, and develop solutions and services to drive 5G adoption.¹⁹²

Debate and explore the establishment of industry-specific data trusts to facilitate data sharing

- Data trusts, consisting of a managed data-sharing repository built around data privacy, security and confidentiality, are a new legal model for sharing data with third parties. While not widely used yet, such data trusts allow organisations to leverage large, anonymised datasets that are consistent and easily applicable to different software systems, while at the same time minimising stakeholder concerns regarding privacy.¹⁹³ Latin American policymakers can encourage academia and civil society organisations to consider the development of such data trusts, especially for data-rich industries, by hosting roundtables and producing frameworks around such models.
- The UK Universities of Cambridge and Birmingham have launched the Data Trusts Initiative, which is focused on conducting research and engagement activities related to facilitating the development of data trusts that can empower individuals and communities while supporting data use for social benefit.¹⁹⁴

Develop/update cybersecurity strategies to safeguard AI-based technologies

- According to Statista, a German database company, in the first half of 2020 the LATAM region recorded the world's highest rates of cyber-attacks, with nearly three times more attacks via mobile browsers than the global average.¹⁹⁵ As such there is a need to develop new policies and refine existing/ outdated policies outlining the obligations and standards for government bodies and other stakeholders to ensure cybersecurity.
- The Republic of Estonia is one of the leading countries in cybersecurity and has developed its Cybersecurity Strategy (2019-22), which is focused on ensuring that the country is a sustainable digital society relying on strong technological resilience and emergency preparedness; has strong, innovative, research-oriented and globally competitive cybersecurity covering all key competences for Estonia; is a credible and capable partner in the international arena; is a cyber-literate society and ensures a sufficient and forward-looking talent supply.¹⁹⁶

Longer-term strategies

In the longer term policymakers in the region can support more strategic approaches to building access and quality of data, with a priority on regional harmonisation. Such strategic approaches will require more time owing to the need for crossborder negotiations and greater diplomacy, given the competitive nature of the AI sector.

Time to implement = 5-10 years

Drive harmonisation of data governance laws across the region

- The region as a whole lacks harmonisation of data governance regimes. Therefore policymakers should engage in negotiations to develop harmonised data governance legislation that would allow governments in the region to share data across their borders and develop a region-specific database. This, combined with the above open-data portal approach, would support the access of local startups to large, contextually relevant datasets while also attracting foreign technology companies to establish regional hubs without being discouraged by having to adopt different AI and data approaches for each country. Such databases could also support research efforts across the region, with data being a crucial limiting factor for AI researchers. One of the most obvious examples of this approach is the EU's General Data Protection Regulation,¹⁹⁷ which enforces data privacy principles across the European Union and the European Economic Area. Other examples include the APEC Privacy Framework¹⁹⁸ and the ASEAN Framework on Personal Data Protection.¹⁹⁹

Establish national compute resources for researchers without access to the needed level of compute

- Governments should ensure that AI innovation is inclusive and that researchers and academic communities can participate irrespective of the resources at their disposal. To achieve this, governments should create a national AI research resource, providing computational, data and training resources. Standalone national AI research resources have not yet been fully implemented, although the US is currently in the process of establishing one, having created a specific task force.²⁰⁰

Refined data privacy regulation

- While most Latin American countries have already established their data privacy and protection strategies or laws, there is a need to revisit these policies and ensure that they align with the national AI strategies. By doing this, regional policymakers can instil trust in citizens that their data are safeguarded, while also attracting foreign talent and foreign companies to establish regional hubs.

Near-term solutions²⁰¹

Latin American policymakers should look to global examples of short-term strategies to support local AI private sectors and give them the opportunity to catch up with more established global players.

Time to implement = 0-3 years

AI procurement legislation

- Current AI procurement strategies tend to favour more established technology companies, often those that are foreign. This means that local startups may not have equal opportunities to win lucrative government procurement contracts. In Latin America, as elsewhere in the world, corruption still exists in public procurement processes. Refined policy focused on



procurement could support this issue, while specifically supporting local AI companies' access to government contracts. This may be achieved by adapting existing government procurement legislations to, first, incorporate AI-specific considerations, and second, include in these new considerations quotas or requirements for a certain share of government contracts to be awarded to local technology companies.

- In 2020 the UK published its first Guidelines for Artificial Intelligence (AI) Procurement with the aim of providing central public-sector bodies with a set of guiding principles for purchasing AI technology. The government aims to encourage the ethical adoption of AI in the public sector through these guidelines, along with providing opportunities for leveraging the most innovative solutions.²⁰²

Create AI challenges by inviting startups to bid for solving particular local challenges through AI products

- Non-financial and financial incentives can be useful tools to encourage innovation in the private sector, for example through AI innovation challenges. Such challenges are typically focused on using AI to solve real-world challenges in areas such as transport and public healthcare. Latin American governments can allocate budgets for awards to the winners of these challenges. This can support budding startups while solving actual problems and at the same time benefiting citizens. In more resource-scarce governments, organising these challenges without financial incentives can still be valuable, as it allows startups to gain public and investor attention.
- Multiple government-led AI challenges exist globally and can be held up as examples for Latin American policymakers to learn from, including Singapore's National Research Foundation Trusted Media Challenges, which are aimed at developing AI-based solutions for combating fake news media. Cash prizes range from S\$25,000 to S\$300,000.²⁰³ The Foundation also holds non-cash-based challenges, such as the AI Technology Challenge, which includes two types of challenges—open-theme challenges, which allow participants to create original solutions, and thematic challenges, which target predefined problems in areas that have strategic relevance to Singapore.²⁰⁴

Engage in multi-stakeholder consultations when developing AI policies and related policies

- To ensure that long-term AI and AI-related policy goals and targets (e.g. data privacy, cybersecurity, AI ethics) are comprehensive and engaging for all stakeholder groups, there is a need to consult a wide range of relevant stakeholders across the AI community (e.g. private sector, academia, NGOs, civil society) when refining existing legislation and developing new laws and regulations that determine how government bodies and other actors should store, process and use digital data for AI (e.g. through workshops, feedback surveys). This will be essential in driving a people-centric national AI policy, and more broadly a digital vision, which can further deepen trust in AI and digital technologies across the region.

- One example is the UK's AI Council, which demonstrates the importance of bringing together respected leaders in their fields from across industry, academia and the public sector.²⁰⁵

Longer-term strategies

Establish innovation fellowships to increase technological capacity in governments

- Given that the Latin America region has a thriving startup sector, there is an opportunity for the public sector to leverage this progress internally. Policymakers could work to establish fellowships and exchange programmes to increase technological capacity in governments. For example, this may involve public-sector workers' participation in vocational schemes at key industry players, or experts from these industry players working closely within specific departments to share skills and knowledge.

Near-term solutions

Time to implement = 0-3 years

Create AI learning tracks for government officials teaching the nature, opportunities and risks stemming from AI

- AI expertise within government remains a major issue across the region and the world more broadly. Latin American policymakers need to ensure that public-sector workers have the relevant skills to develop, refine and implement AI policy measures, track progress against set targets, and procure AI-related products and services. This could involve the provision of short courses through industry and university partnerships, linked to the above policy option focused on lifelong learning, and incentives for employees who complete them. Such training can also be focused on specific use cases that are relevant in the context of the region.
- In the UK, the govtech accelerator and investment fund PUBLIC launched a new Public School of Technology in 2021, which aims to boost UK public-sector workers' digital skills by exposing them to the working methods of the tech startup scene.²⁰⁶

Longer-term strategies

Looking to the future, Latin America policymakers should make the most of their existing national AI strategies by regularly reworking them as the technology advances further, and aligning them with the strategies of other regional actors.

Time to implement = 3-5 years

Establish AI working groups with policymakers from across the region to align policies

- Given the similar sectoral priorities and challenges across the Latin America region, there is an opportunity for the countries to learn from each other. One possibility would be an AI working group between regional policymakers that is focused on common goals and could even facilitate some of the strategies mentioned above, such as a common data privacy governance framework and a regional data-sharing initiative.

- There are multiple examples of regional and international collaborative initiatives focused on AI, such as the European Commission's High-level Expert Group on AI, which is made up of experts from across the EU and has the mandate of developing the European Commission's approach to AI, including guidelines for AI ethics.²⁰⁷

Develop, revise and monitor national AI strategies

- Latin American countries are making progress in developing national AI strategies. Many have already developed their own strategies and others are in the process of doing so or are revising their existing ones in response to recent government priorities. As such, there is a need for these countries to establish a set timeline to review and revise their strategies. Policymakers should regularly track progress against their own targets, periodically revising them against a set deadline. By doing this, governments will be able to ensure the successful implementation of their AI strategy while also taking into consideration changes in the AI landscape and related areas (e.g. changes in ethics regulation, data privacy, foreign investment etc.).
- One notable example of a government that regularly revisits its AI strategy is Finland's. Since 2017 the government has published its initial AI strategy, along with one updated strategy.²⁰⁸ Alongside these, the Finnish government has also published supplementary policy documents focused on, for example, the future of work in the AI age, with a particular emphasis on the impact of AI on labour and the skills required to offset this.²⁰⁹

Build dedicated offices within government empowered to co-ordinate cross-governmental AI policies

- To develop and harness AI expertise in the government further, Latin American policymakers could establish a dedicated AI office empowered to co-ordinate cross-governmental AI policies through a clear mandate. By establishing such an office, they would have a central point of expertise regarding investment and the development and implementation of AI, while simultaneously ensuring that policies are developed and implemented in the most effective manner.
- The UK government has established an Office for Artificial Intelligence, which is responsible for overseeing the implementation of its National AI Strategy. The Office also engages with different stakeholders to build public trust and support where AI development and innovation are concerned.²¹⁰
- Colombia has also established an AI Task Force with a similar mandate, which includes monitoring the use of AI systems by public entities and facilitating international co-operation and collaboration on AI-related issues.²¹¹

Annex A

Country profiles

The following section of country profiles presents policy snapshots and notable AI benchmark rankings for our country set: Argentina, Brazil, Chile, Colombia and Mexico. Each of the country profiles will include a section that includes policy options tailored to each individual country.



Argentina



Brazil



Chile



Colombia



Mexico

Argentina



Overview

Argentina ranked third in South America for tech-focused investment in 2020, while AI-specific investment targeted the financial, human resources and agricultural sectors. According to the Latin America Venture Capital Association, of the US\$4bn in tech investment in the region in 2020, US\$222m across 26 deals was concentrated in Argentina.²¹⁵

- In 2021 Argentina-based fintech Ualá raised US\$350m, achieving a valuation of US\$2.45bn.²¹⁶ Ualá deploys AI across its businesses, including the onboarding of new clients.
- AI-based talent management startups Emi Labs and Worcket received US\$2m and US\$1.5m, respectively, in seed funding in 2020.^{217,218}
- In 2019 agtech startup GBOT raised US\$500,000 in pre-seed funding.²¹⁹

Initiatives & Policies

Argentina published its National Plan for Artificial Intelligence in 2019. The plan focuses on five areas:

- AI's potential contribution to economic growth;
- developing inclusive AI, minimising the risks to data protection and privacy from AI;
- investing in AI talent and R&D; and
- enhancing collaboration around AI among government, researchers and businesses.

Since the new administration entered office in 2019 this plan has not been implemented, with the Inter-American Development Bank (IDB) describing it as "to be continued". However, the new administration has published Resolution 90/2021, which mentions the need to address AI adoption in the public sector and the necessary skills development.²²⁰

In 2019 the Argentinian Data Protection Authority (AAIP) issued guidelines regarding the implementation of personal data protection regulations in the context of AI systems.²²¹ Affected individuals can request clear and transparent information about systems that reach decisions using automated data processing. The AAIP has collaborated in drafting two regional guidelines issued by the Ibero-American Network of Data Protection Authorities (RIPD) on protecting personal data used by AI.²²²

Argentina's public sector has deployed AI to automate bureaucratic tasks and improve public efficiency.

- "Laura" is a software programme that has been used to verify retirement contributions and assist individuals in determining the retirement benefits for which they are eligible.²²³
- Since 2017 Buenos Aires has used AI to automatically prepare judicial documents, reducing time spent by 99% for some processes.²²⁴

Argentina's agtech sector is the second most active in the region, accounting for 23% of all agtech startups in Latin America between 2005 and 2018, according to a survey by the IDB.²²⁵

- Kilimo is an AI-based solution that seeks to avoid water waste, optimising freshwater use in agriculture.²²⁶
- GBOT combines AI and robotics to aid in the selection of crop varieties adapted to specific environments.²²⁷

Benchmarks

Across the benchmarks Argentina performs in the middle of our country set, only leading the group on the Automation Readiness Index (17th out of 25). The country lands in the top third of countries worldwide on the Government AI Readiness Index, coming in at 54th out of 160 countries. Argentina performs relatively well on the Network Readiness Index (60th out of 134) and Digital Adoption Index (57/141). It has the second-highest number of AI policy initiatives in the country group (11) and ranks 46th out of 62 countries on the Global AI Index.

Brazil



Overview

Brazil leads Latin America in tech-focused investment, and the country's private sector is rapidly deploying AI across sectors including finance and banking, health and agriculture. According to the Latin America Venture Capital Association, of the US\$4bn in tech investment in the region in 2020, more than half (US\$2.385bn) was clustered in Brazil.²²⁸

- Following its December 2021 IPO, Brazil's Nubank reached a valuation of US\$45bn, although this valuation has subsequently declined.²²⁹ The neobank uses AI for credit decisions, as well as to make financial intelligence recommendations to its customers.²³⁰
- Anti-fraud solutions provider idwall has secured US\$54m in investment since it was founded in 2016.²³¹
- In the agricultural financing sector, Traive obtained US\$17m in venture-capital investment in 2021, the largest sum ever raised for an agtech firm in Brazil.²³²

Initiatives & Policies

The country's government published the Brazilian Strategy for Artificial Intelligence in July 2021.²³³ The strategy proposes to:

- remove barriers to AI innovation;
- foster skills development;
- promote investment in AI R&D; and
- develop ethical principles for the responsible use of AI.

The strategy delves into specific actions, such as:

- developing techniques to deal with algorithmic bias;
- updating the national education curriculum to include data science; and
- educating the public on AI.

Furthermore, in late 2021 Brazil passed a draft law for regulating AI. The bill, which has been approved by the House of Representatives but still needs to be approved by the Senate, sets pro-innovation and technology-development standards and establishes guidelines as to how AI ought to be developed and deployed in Brazil.²³⁴

Public-private partnerships aim to support the creation of AI-focused startups.

Brazil's agtech sector leads the region, accounting for 51% of all agtech startups in Latin America between 2005 and 2018, according to a survey by the Inter-American Development Bank.²³⁵

Agriculture's app aggregates and organises data from around the farm, making them accessible and useful for farmers and agribusinesses.

- Agri-fintech startup Traive leverages AI to provide credit to small and medium enterprises, and particularly farms, in the agricultural sector.²³⁶
- Aimirim increases the efficiency of sugarcane pulp combustion for energy production using AI to simulate, control and automate the process.²³⁷

In the financial sector, anti-fraud startup idwall uses big data and machine learning to analyse data from the government and financial institutions to detect potential fraud related to online sign-ups and purchases, and to identify theft. Nubank uses AI to tailor its financial services offerings to customer needs.

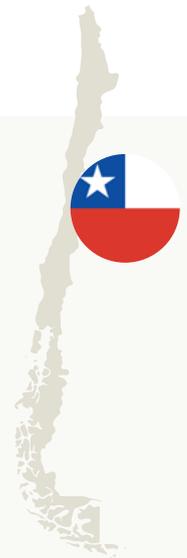
Two initiatives at Brazilian universities seek to leverage AI to assist in detecting health conditions.

- Machine-learning technology developed at the University of São Paulo will help healthcare professionals to assess whether patients have dengue fever, Zika or chikungunya.²³⁸
- The VisualLab at Fluminense Federal University (UFF) plans to use AI image processing for breast cancer screening.²³⁹

Benchmarks

Across the benchmarks Brazil leads our country set on two indexes, coming in at 38th of 62 countries on the Global AI Index and 40th out of 160 on the Government AI Readiness Index. The country has just eight AI policy initiatives, according to the AI Policy Observatory, and ranks in the top half of countries worldwide on the Network Readiness Index (59th out of 134) and the Digital Adoption Index (67th out of 141). Brazil achieves the second-highest ranking in our country set on the Automation Readiness Index, coming 19th out of 25 countries.

Chile



Overview

Chile saw its highest-ever level of tech-focused investment in 2020 and 2021, with AI investment and implementation driven by public-sector support and reaching the fintech and foodtech sectors. For example, the Agency for the Promotion of Foreign Investment, InvestChile, manages 170 projects in the technology sector as of 2021, which collectively represent an investment of US\$4.345m—a 1,200% increase since 2016.²⁴⁰ Moreover, according to the Latin America Venture Capital Association, of the US\$4bn in tech venture capital investment in the region in 2020, US\$136m across 31 deals went to Chile.²⁴¹

- Chile-based foodtech startup NotCo completed a Series D round in 2021, receiving US\$235m for a total investment of US\$360m since 2017.²⁴² NotCo's "Giuseppe" software programme supports the company's chefs and food scientists in the development of plant-based alternative foods.

Initiatives & Policies

Chile published its National Policy on Artificial Intelligence in October 2021, comprising 70 priority measures and 185 initiatives covering three main areas:

- development of enabling factors;
- adoption and development of AI; and
- regulation and social impact.²⁴³

An interdisciplinary group, including experts on AI, data, ethics and regulation, formulated the policy based on an extensive participatory process that involved more than 8,000 people via working groups, roundtables, online sessions and public comments.

The public-sector implementation of AI in Chile is widespread, reaching the judicial, social welfare, environment and labour sectors, among others.

- In collaboration with experts from the University of Chile, the Ministry of Interior has used AI for crime prediction and risk mapping.²⁴⁴

- The Superintendence of the Environment employs "environmental intelligence" to review large amounts of environmental impact information, standardise datasets, implement warning systems and take a preventive approach to inspections and actions to protect the environment.
- The Ministry of Labour uses AI tools to help individuals improve their CVs during their job search, as well as to compile information on labour market trends so job seekers can target attractive industries.^{245,246}

NotCo's Giuseppe AI system fulfils the firm's goal of combining fundamental science with deep learning and algorithms to produce plant-based meat and dairy substitutes. AI helps chefs and food scientists by suggesting novel plant-based ingredients to mimic meat and dairy foods and uses machine learning and optimisation to reduce the number of recipe trials required to arrive at the final product.

Benchmarks

Across global benchmarks Chile performs strongly. The country leads the Latin America region on three indices, placing it 34th out of 141 countries globally on the Digital Adoption Index, 50th out of 134 globally on the Network Readiness Index, and 41st of 160 globally on the Government AI Readiness Index. Chile lags behind the LATAM region on the Global AI Index, coming in at 50th out of 62, and has ten AI policy initiatives. Chile is not included in the Automation Readiness Index.

Colombia



Overview

Colombia ranked second in South America for tech-focused investment in 2020—high-level co-ordination has helped to position the country as an incubator for AI-driven firms. According to the Latin America Venture Capital Association, of the US\$4bn in tech investment in the region in 2020, US\$469m across 35 deals was invested in Colombia.²⁴⁷

- In July 2021 Colombia-based Rappi, which specialises in consumer delivery services and fintech, received investment worth US\$500m, bringing its total funding to US\$2.2bn.²⁴⁸
- Also in 2021 agtech startup Demetria received US\$3m; the firm specialises in AI-powered quality and taste intelligence for the coffee supply chain.²⁴⁹
- AI-driven distributed energy service provider NEU Energy received US\$3.5m in seed investment in 2021.²⁵⁰
- Fintech MO Tecnologias has received US\$5.5m in investment since 2017 for its AI-enabled credit-scoring system.²⁵¹
- In 2020 IBM opened Latin America's largest Cognitive Transformation Centre in Colombia.²⁵²

Initiatives & Policies

Colombia issued its National Policy for Digital Transformation and Artificial Intelligence in November 2019.²⁵³

- The policy is linked to the 2018-22 National Development Plan as well as the 2018-22 ICT Plan and is supported by a high-level task force within the Office of the Presidency, led by the national adviser for digital transformation.
- Experts note that the policy was carried from the beginning by the political will to drive implementation and involved ministries and agencies in developing concrete use cases early on. The policy also prioritises access to and the use of data.
- The government's creation of an AI dashboard for the public sector has helped to showcase the successful implementation of AI within the government, while also incentivising officials to define challenges where AI could contribute to solutions.

In May 2021 the government issued the Ethics Framework for Artificial Intelligence in Colombia, the first document of its kind in the region.²⁵⁴ The framework provides recommendations for public-sector projects that use AI, built around ethical principles:

- transparency and explanation;
- privacy;
- human-in/over-the-loop;
- security;
- responsibility;
- non-discrimination;
- inclusion;
- rights of children and adolescents; and
- social benefits.

Colombia also created an AI Experts Mission with the aim to provide technical guidance for the government regarding the development and implementation of AI.²⁵⁵

Colombia's fintech sector has actively driven AI adoption in the country.

- In 2021 Colombian regulators authorised Rappi's neobank operations, and the company has long used AI to make sense of its vast collection of data on consumer behaviour.^{256,257}
- MO Tecnologias uses AI and machine learning via a platform that connects traditional and digital banks with unbanked consumers and provides alternative credit scoring to facilitate loans.²⁵⁸

In the public sector, Colombia's prosecutor's offices utilise data to detect corruption in order to bring cases to courts quickly instead of years after a fraud has occurred. According to experts, at least 20 different projects within the government are using AI, from a system to review high court sentences and ensure decisions are followed, to using data analytics and image processing to help determine where tertiary roads should be built or improved.²⁵⁹

Benchmarks

Across the benchmarks Colombia performs in the middle of our country set, only leading the group on the number of AI policy initiatives, with 30. The country lags the group on the Network Readiness Index (72nd out of 134). Colombia ranks in the global top 50 on the Government AI Readiness index (45th of 160) and ranks 49th of 62 on the Global AI Index. It comes in at 20th of 25 countries on the Automation Readiness Index and 65th of 141 on the Digital Adoption Index.

Mexico



Overview

Mexico was ranked second in the region for tech-focused investment in 2020; the number of startups in the AI sector more than doubled to 100 in 2020 and experts note similar growth for 2021. According to the Latin America Venture Capital Association, of the US\$4bn in tech investment in the region in 2020, US\$831m across 94 deals was invested in Mexico.²⁶⁰

- Mexico-based Kavak, an online platform for buying and selling used cars, completed two funding rounds in 2021, together worth US\$1.185bn, bringing its total funding to US\$1.6bn.
- Nowports automates supply-chain processes for Latin American companies and has raised US\$92.6m in funding, with three rounds closed in 2021 worth a total of US\$81m.
- Conekta's online payment platform facilitates secure, optimised processes for financial institutions; it has raised US\$21.7m in funding.
- Yaydoo's AI-powered online procurement platform for businesses has received US\$20.4m in funding.

Initiatives & Policies

Mexico has not yet published an AI strategy. In 2018 Oxford Insights and C Minds published a white paper entitled "Towards an AI Strategy in Mexico", which was endorsed by some government officials.^{261,262} While not an official strategy, the paper highlights five overall actions that Mexico's government should focus on when developing its AI strategy:

- developing a governance framework for AI;
- mapping AI use, needs and practices in the private and public sectors;
- promoting Mexico's international leadership on AI;
- carrying out public consultation for recommendations; and
- working with experts and citizens.

The white paper sets out the foundations for a national AI strategy and includes quantitative analysis predicting the economic impact of AI on the Mexican labour market.

In 2018 a change of government halted Mexico's work on many digital initiatives, including the AI strategy, limiting its implementation.²⁶³

Startups in Mexico have implemented AI broadly, including in the health, retail, fintech, logistics and food sectors.

- PROSPERiA utilises AI to help medical professionals detect causes of blindness by analysing high-quality digital images of patients' eyes.
- Also in the health sector, Yana is an AI chatbot that helps individuals manage depression and anxiety and is moving into the wellness space.²⁶⁴

Small and medium fintech startups in Mexico are increasingly adopting AI.

- Coru provides financial wellness services to consumers, using machine learning and AI to provide financial coaching to individuals.²⁶⁵
- Bayonet employs machine learning to prevent fraud for e-commerce merchants while utilising fewer resources than current solutions.²⁶⁶

Benchmarks

Across the benchmarks Mexico performs respectably on the major indices compared with our country set, but it has only six AI policy initiatives. The country scores in the top half of countries worldwide on the Network Readiness Index (63rd out of 134) and the Digital Adoption Index (66th out of 141). Mexico is ranked 42nd out of 62 countries in the Global AI Index and 60th out of 160 on the Government AI Readiness Index. Mexico ranks near the bottom of the Automation Readiness Index, in 23rd place out of 25 countries.

Annex B - Policy Playbook

Goal	Policy Option	Summary	1	2	3	International Initiatives	Regional Initiatives	Argentina	Brazil	Chile	Colombia	Mexico
Nurturing local talent	Trial AI-based instruction tools in primary and high schools	Develop adaptive learning platforms that use AI to teach students to ensure AI familiarisation at an early age. Study the merits of these platforms and consider how to best roll them out, on a trial basis, and how to support teachers in the process.	●	●	●	Japan's introduction of mandatory coding classes in elementary and middle schools	In Brazil , the Ministry of Education sponsored an initiative for all the teachers in the country to take part in a self-assessment to diagnose their digital skills. Chile's Enlaces programme ran computer science training for primary school children from the 1990s up until 2020.	Implemented	Planning	Implemented	Planning	Planning
	Introduce initiatives to support foreign inflows of AI expertise	Introduce immigration incentives to attract external knowledge, e.g. a relaxed visa scheme targeted at AI and technology experts	●	●	●	UK's Tech Nation Visa scheme	Chile's Tech Visa, which cuts the visa approval process to just 15 days for founders and investors in tech businesses.	No plan	No plan	Implemented	No plan	No plan
	Promote STEM skills development in primary and secondary schools	Invest in STEM-related subjects at school level, including investing in teacher training and equipment (e.g. laptops, software etc.)	●	●	●	Australia's National STEM School Education Strategy 2016-26		No plan	No plan	No plan	Planning	Planning
	Boost the number of applicants to AI-related/STEM university degrees	Provide subsidies to universities offering AI-focused degree programmes to facilitate lower tuition fees and encourage admissions	●	●	●	UK - provision of £23m to create 2,000 scholarships in AI and data science.	Limited evidence of university-focused subsidies for AI- and STEM-related degrees in the region	No plan	No plan	No plan	No plan	No plan
	Establish certified vocational programmes in partnership with industry	Large-scale vocational programmes can provide a fast track for developing specific relevant skills for people without higher education. This should be done in close co-operation with businesses to ensure that skills match market demands	●	●	●	University of Oxford's Technology and AI online courses Saudi Arabia's Technical and Vocational Training Corporation (TVTC) The UAE National Programme for Artificial Intelligence signed an agreement with Dell to train 500 Emirati students in AI	Mexico's national AI centre is planning to provide a recommended list of vocational courses which can be taken and will promote their uptake by the public (to be emphasised by the next administration) Brazil's Ministry of Economy and Microsoft have partnered up to train millions of citizens in technology subjects between 2020 and 2023	Limited evidence	Planning	Planning	Limited evidence	Planning
	Launch life-long learning programmes to ensure labour market resilience against automation	As AI will automate a significant number of increasingly complex tasks, countries need to ensure they are prepared for labour market shifts caused by automation. Life-long learning and reskilling programmes provide a starting point for ensuring that the countries' workforces remain resilient to automation.	●	●	●	Brussel's VUB AI Lab's Lifelong Learning Program (LLL) is an outward-facing educational programme UAE's Virtual Academy under the Telecommunications and Digital Government Regulatory Authority (TDRA)	Argentina, Brazil, Colombia and Mexico have mentioned the importance of lifelong learning and potential associated plans for this in their AI policy documents (or related documents)	Planning	Planning	No plan	Planning	Planning

Nurturing local talent	Create public awareness and AI literacy programmes to boost public trust in and acceptance of AI	Develop evidence-driven awareness campaigns to illustrate the fundamentals of AI and its impact in laymen's terms to the public (e.g public forums on AI impacts and benefits, media campaigns etc.) Partner with private-sector and educational institutes to provide accessible and free online courses to foster AI literacy and improve levels of trust and acceptance of the technology.	●	●	●	<u>Elements of AI</u> run by the University of Helsinki and the tech company Reaktor Institute of Technical Education, Singapore-Intel AI for Citizens: A Global AI Public Awareness Program	Limited evidence of public awareness of AI campaigns or public AI literacy programmes led by the governments of Latin American countries	No plan				
Refining AI policies	Develop, revise and monitor national AI strategies	Some of the region's governments have designed national AI strategies while some are still in the process of doing so. Governments that have not developed AI policy documents should do so. Governments that have already developed these policies should ensure that they are regularly refined to align with their set timeline, and simultaneously monitor that over time they are aligned with the county's vision	●	●	●	Finland's ongoing publication of documents supplementing its National AI strategy	Not implemented	Implemented	Implemented	Implemented	Implemented	Not implemented
	Establish AI working groups with policymakers from across the region to align policies	A regional working group of policymakers could help countries across the regions align policy priorities and orchestrate areas of investment attention to ensure mutual growth	●	●	●	EU's Communication on Artificial Intelligence for Europe Consolidated Strategy on the Fourth Industrial Revolution for ASEAN	IDB has established its fAIRLAC network of professionals and experts from academia, government, civil society, industry who want to promote an ethical application of AI in Latin America and the Caribbean	No plan				
	Create AI learning tracks for government officials focusing on the nature, opportunities and risks stemming from AI	AI expertise within government remains a major issue across the region and the world more broadly, affecting the quality of strategic policymaking and procurement of AI-related products and services. A learning track for officials could provide a pathway for governments to build that expertise Collaborate with leading tech industry actors to develop a suite of short, accessible AI courses to support public-sector employees' professional development in a digital economy, with a focus on the fundamentals of AI, regional challenges of AI adoption, and the responsible and ethical use cases of AI	●	●	●	Singapore's SkillsFuture Credit programme Denmark's Disruption Council	Argentina's Design Academy (LABGobAr) aims to train public-sector employees in the skills of the future The Colombian AI Task Force is actively co-ordinating programmes for the preparation and training of the public sector in AI and officials working in public entities	Implemented	No plan	Planning	Implemented	Planning

<p>Refining AI policies</p>	<p>Build dedicated offices within government empowered to co-ordinate cross-governmental policies regarding investment, public-sector applications and responsible AI practices</p>	<p>Lessons from the UK and the rest of the world have shown that establishing AI-specific offices with its own budget and mandate can foster policy innovation and develop real expertise within government. Countries that haven't established them should create them, whereas those which already have them should strengthen their role.</p>	<p>●</p>	<p>●</p>	<p>●</p>	<p>UK Office for Artificial Intelligence Egypt's National Council for Artificial Intelligence Qatar's Cabinet approved a draft decision establishing an artificial intelligence committee in 2021 UAE's Artificial Intelligence Office Saudi Data and AI Authority (SDAIA)</p>	<p>Colombia's AI Task Force</p>	<p>No plan</p>	<p>No plan</p>	<p></p>	<p>No plan</p>	<p>No plan</p>
<p>Safeguarding transparency and ethical use</p>	<p>Integrate ethics and responsibility into AI ethics guidelines and principles, and offer high-level guidance on best practices, AI principles, and leveraging existing international principles (such as the OECD AI Principles)</p>	<p>Develop and publish an ethical framework for AI to supplement national AI strategies to guide companies</p>	<p>●</p>	<p>●</p>	<p>●</p>	<p>EU's Ethics Guidelines for Trustworthy Artificial Intelligence (AI)</p>	<p>Colombia's Ethical Framework for AI</p>	<p>Planning</p>	<p>Planning</p>	<p>Implemented</p>	<p>Implemented</p>	<p>No plan</p>
	<p>Develop or promote tools to assess AI models' responsibility and robustness</p>	<p>Collaborate with academia and industry to develop tools to help organisations describe models, inspect them, and make them more robust.</p>	<p>●</p>	<p>●</p>	<p>●</p>		<p>Limited evidence of such tools being developed in the region</p>	<p>No plan</p>	<p>No plan</p>	<p>No plan</p>	<p>No plan</p>	<p>No plan</p>
<p>Creating a robust in-frastructure and data environment</p>	<p>Invest in connectivity infrastructure development to reduce the digital divide</p>	<p>Incentivise private-sector investment in high-quality connectivity infrastructure (including 5G) by introducing tax breaks and other financial incentives Assign a share of the national budget to ensuring high-quality connectivity and the necessary infrastructure for hard-to-reach rural areas that private-sector actors are reluctant to work in owing to the lack of economic feasibility</p>	<p>●</p>	<p>●</p>	<p>●</p>	<p>Scotland's £103m allocated to connectivity infrastructure</p>	<p>Argentina's US\$37.9bn Plan ConectAR Mexico's Internet para Todos (Internet for All) connectivity programme - during the first quarter of 2020 spent around 448mn pesos (US\$18.5mn) on the</p>	<p>Implemented</p>	<p>Limited evidence</p>	<p>Limited evidence</p>	<p>Limited evidence</p>	<p>Implemented</p>

Creating a robust infrastructure and data environment	Build/expand National Open Data Platforms	This is especially the case for startups facing the “cold start problem”, in that they require data to produce an AI-driven product or service Some countries in the region already provide such platforms, however, this is not the case for all, and even where countries to provide them they tend to lack high-quality data	●	●	●	Denmark’s Datafordeler (Data Distributor) Canada’s Open Government Portal	Argentina, Brazil, Chile, Colombia and Mexico all have national open data portals. Colombia’s guidelines, “Guía para el uso y aprovechamiento de datos abiertos en Colombia”, support the Colombian Open Data Portal	Implemented	Implemented	Implemented	Implemented	Implemented
	Debate and explore the establishment of industry-specific data trusts	Although a very new model, data trusts can provide a mechanism for the sharing of data with third parties, allowing the production of innovations while maintaining trust This can be especially helpful in data-rich industries (including health, agriculture, government services and finance), where data are kept in silos	●	●	●	The government of Ontario’s consultation on data trusts The EU’s data consultation on “novel data intermediaries”	Limited evidence of data trusts being deployed in the region	No plan	No plan	No plan	No plan	No plan
	Drive the harmonisation of data governance laws across the region	Harmonising data governance regulation across the region could significantly help increase the transfer and cross-country flows of high-quality data used for developing products and services	●	●	●	APEC’s Cross-Border Privacy Rules (CBPR)	Condatos Latin America conference to bring together various actors from different sectors to discuss issues related to the open data ecosystem and open government Latin American Open Data Initiative (ILDA)	No plan	No plan	No plan	No plan	No plan
	Develop/update cybersecurity strategies to safeguard AI-based technologies	Develop new and refine existing/outdated policies outlining the obligations and standards for government bodies and other stakeholders in ensuring cybersecurity	●	●	●	Republic of Estonia Cybersecurity Strategy (2019-22) ASEAN-Singapore Cybersecurity Centre of Excellence	Argentina, Brazil, Chile, Colombia and Mexico have some form of cybersecurity legislation or strategy (apart from Brazil’s strategy these were all drawn up before 2017, so warrant updates	Implemented (outdated)	Implemented	Implemented (outdated)	Implemented (outdated)	Implemented (outdated)
	Establish national compute resources for researchers without access to the needed level of compute	Governments should ensure that AI innovation is inclusive and researchers and academic communities can participate irrespective of the resources at their disposal. To achieve this, governments should create a national AI research resource, providing computational, data and training resources. Collaborate with academia and industry players to understand AI research needs (e.g. computing power, data, access to test beds etc.) and develop a plan on how to bridge the gap between these resources and researchers	●	●	●	United States’ plan for developing a National Artificial Intelligence Research Resource (NAIRR)	Limited evidence of a dedicated plan to improve researcher access to resources	No plan	No plan	No plan	No plan	No plan

Creating a robust infrastructure and data environment	Data privacy regulation	Establishing data privacy regulations helps to ensure that citizens are able to maintain autonomy, while at the same time signalling to foreign talent that concerns around trust and privacy are taken seriously The key challenge will be to balance data protection with providing enough space for innovation.	●	●	●	EU's GDPR APEC Privacy Framework ASEAN Framework on Personal Data Protection	Mexico's Federal Law on Protection of Personal Data Held by Private Parties Chile's Law 19.628 "on protection of private life" (also known as the Chilean Data Protection Law, or CDPL). Brazil's General Data Protection Law (LGPD) , Federal Law no. 13,709/2018 Argentina's Personal Data Protection Act 25.326 (PDPA) (Ley de Protección de los Datos Personales)	Implemented	Implemented	Partly implemented	Implemented	Implemented	
	Fostering local research & development	Create an AI-specific R&D budget and allocate it to universities	Assign a share of the national budget to AI R&D efforts to encourage local innovation and research publication, which is currently very low in the region (e.g. through grants, tax incentives etc.)	●	●	●	United States' R&D Tax Credit	Argentina's Law 27,506, which enacts a promotional tax system for resident companies in the knowledge-based economy Brazil's Lei da Informática which grants tax relief to tech companies in return for investments in research and development Mexico reintroduced R&D tax incentives in the form of an incremental R&D tax credit in 2017 Chile's 2021 R&D law has led to 145 projects from 125 companies which received approval for an amount of US\$126m	Implemented	Implemented	Implemented	No plan	Implemented
	Create new AI-specific fellowships to attract world-class researchers and professors	Ground-breaking inventions in AI are frequently developed within universities by leading academics or PhD students. Creating prestigious AI fellowships would help attract world-leading AI professors and emerging academic talent, while simultaneously increasing the international reputation and ranking of local universities	●	●	●	UK government-funded Turing AI Fellowships	There is limited information available on fellowships to attract AI experts and professors in our set of countries	No plan	No plan	No plan	No plan	No plan	No plan
Cultivate research partnerships between government and industry	Develop research-focused partnerships between stakeholders in government, industry and academia to work together and develop solutions for some of the above-mentioned sectoral challenges using AI-based solutions	●	●	●	Singapore has provided S\$180m (on top of S\$500m) in funding to address the challenges of AI adoption	Argentina, Brazil, Chile, Colombia and Mexico have all outlined the importance of the private sector in their national AI strategies (or related documents)	Planning	Planning	Planning	Planning	Planning	Planning	

<p>Fostering local research & development</p>	<p>Identify region- and country-specific AI research goals</p>	<p>Identify long-term AI research priorities at the national and regional level to focus research efforts towards priority sectors (e.g. finance, healthcare, agriculture) and specific challenges within these sectors (e.g. financial inclusion, resource use efficiency)</p>	<p>●</p>	<p>●</p>	<p>●</p>	<p>The UK's national AI policy's focus on some key short term <u>priorities</u></p>	<p>Argentina, Brazil, Chile, Colombia and Mexico have all outlined the need for using and researching AI in the context of priority sectors</p>	<p>Planning</p>	<p>Planning</p>	<p>Planning</p>	<p>Planning</p>	<p>Planning</p>
<p>Industry engagement</p>	<p>Establish innovation fellowships to increase technological capacity in governments</p>	<p>Innovation fellowships offer the government the opportunity to have skilled tech talent to join the government for a specific period of time and work on a particular challenge or project. This allows governments to benefit from experienced developers while allowing tech talent to get involved in the workings of government</p>	<p>●</p>	<p>●</p>	<p>●</p>	<p>US <u>White House Innovation Fellowships</u> <u>UK No. 10 Fellowship</u></p>	<p>Mexico's <u>Nuevo Leon Institute of Innovation and Technology Transfer</u> aims to motivate and transfer applied research and technology development targeted at the market's needs in order to generate economic growth in the state</p>	<p>Planning</p>	<p>No plan</p>	<p>No plan</p>	<p>Planning</p>	<p>Implemented</p>
<p></p>	<p>Create AI challenges and invite startups to bid for solving particular local challenges through AI products</p>	<p>Public challenges are highly effective vehicles that allow SMEs to develop AI-driven solutions to public challenges, stimulating private-sector growth and benefiting citizens</p>	<p>●</p>	<p>●</p>	<p>●</p>	<p>Singapore's <u>AI Grand Challenge</u> The UK's <u>Turing AI Scientist Grand Challenge</u> India's National Informatics Centre's <u>Artificial Intelligence Challenge in 2020</u></p>	<p>In Colombia, the government implemented <u>MiLab</u>, a mechanism of "public challenges" in 2018. It is managed by the National Agency for the Promotion of Private Entrepreneurship</p>	<p>No plan</p>	<p>No plan</p>	<p>No plan</p>	<p>Implemented</p>	<p>No plan</p>
<p></p>	<p>AI procurement legislations Conduct public consultation with businesses, academia and civil society prior to enacting new laws</p>	<p>Create AI specific procurement legislations to speed up the purchase of AI products and services, stimulate growth of SMEs and create AI procurement expertise within government Adapt existing government procurement guidelines and incorporate AI procurement to encourage partnerships with local AI startups and foster further home-grown capacity and talent.</p>	<p>●</p>	<p>●</p>	<p>●</p>	<p>The UK's <u>Guidelines for AI procurement</u></p>	<p>Although Mexico has yet to update its national AI strategy, it emphasises the need to develop guidelines for smart AI procurement (specifically for the next administration)</p>	<p>No plan</p>	<p>No plan</p>	<p>No plan</p>	<p>No plan</p>	<p>Planning</p>

Industry engagement	Incubators and accelerators focused specifically on AI SMEs	Establish government-led incubators and accelerators to support the AI startup ecosystem	●	●	●	<p>Tech Nation UK's Applied AI growth programme</p> <p>The UAE's has <u>announced</u> the establishment of an incubator environment focused on AI development.</p> <p>The Saudi Data and Artificial Intelligence Authority (SDAIA) has launched the <u>T5 Smart City Accelerator</u></p>	<p>The Chilean government established <u>Startup Chile</u> as a public startup accelerator to help international entrepreneurs bootstrap their businesses</p> <p>Brazil's government-led <u>InovAtiva</u> is an accelerator focused on providing online mentorship to around 300 startups</p>	Unknown	Implemented	Implemented	Unknown	Unknown
	Engage in multi stakeholder consultations when developing AI policies and related policies	Consult a wide range of relevant stakeholders across the AI community (e.g. private sector, academia, NGOs, civil society) when refining existing and developing new laws and regulations that govern how government bodies and other actors should store, process and use digital data for AI (e.g. through workshops, feedback surveys)	●	●	●	<p>The UK AI Council</p> <p>Singapore's multi-stakeholder advisory council on the ethical use of AI</p> <p>The UAE's AI council. However, it does not include stakeholders from civil society, academia and industry</p>	<p>Colombia Technical AI Council</p> <p>Chile's roadmap to AI was built on meetings and events with academia, companies, scientists and civil society</p>	Implemented	Limited evidence	Implemented	Limited evidence	Limited evidence

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