Overcoming Development Traps in **Latin America** and **the Caribbean** in the Digital Age

The Transformative Potential of Digital Technologies and Artificial Intelligence

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eLAC 2026
Digital agenda for Latin America and the Caribbean

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This publication was supported by the European Union-Latin America and the Caribbean Digital Alliance.

United Nations publication
LC/CMSI.9/3/Rev.1
Distribution: L

Printed at United Nations, Santiago
S.2500036[E]

Global Gateway
EU-LAC Digital Alliance

EU ALC
DIGITAL ALLIANCE
POLICY DIALOGUE

This publication should be cited as: Economic Commission for Latin America and the Caribbean (ECLAC), *Overcoming Development Traps in Latin America and the Caribbean in the Digital Age: The Transformative Potential of Digital Technologies and Artificial Intelligence* (LC/CMSI.9/3/Rev.1), Santiago, 2025.

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Foreword

In the twenty-first century, digital transformation has ceased to be optional and has become a necessity for the development of societies. Globally, digital technologies are reshaping the way we live, work and interact, and the Latin America and Caribbean region is not exempt from these tectonic shifts that are reshaping the path of humanity. The region has a historic opportunity to use these tools to deal with the three traps that are holding back its development: a trap of low capacity for growth, a trap of high inequality, low social mobility and weak social cohesion, and a trap of low institutional capacity and ineffective governance.

Digitalization is a matter not only of technological infrastructure but of profound changes in production models, education systems, public services and social structures, i.e. in the way we understand our daily lives. Internet access, the adoption of artificial intelligence and the integration of new technologies can become the bridge whereby the region breaks from these development traps, closes historical inequality gaps and fosters more productive, inclusive and sustainable growth. However, this process requires a strategic and systemic approach to ensure that digital transformation fosters well-being and does not further widen existing gaps.

Latin America and the Caribbean has a unique opportunity to harness technology as a catalyst for development. The lessons of the past, which was marked by periods of economic stagnation and structural inequality, underline the importance of decisive action. Today, digital transformation offers a path to strengthened competitiveness, more rapid learning, innovation and improved quality of life for millions of people. But this change will not happen automatically; it will require a joint effort involving governments, the private sector and civil society to ensure that the benefits of the digital age are shared by all.

While much of the progress in this area will depend on the efforts made by countries and their territories, international cooperation will be essential to address the challenges posed by digital transformation, such as cybersecurity, protection of data and digital trade and the regulation of new technologies, among others. This collaboration serves to establish common principles that can ensure equitable access to digital technologies so that all the opportunities these present can be harnessed and their negative effects reduced. By joining forces and sharing resources, countries can adopt best practices, develop more robust infrastructure, mitigate risks and maximize the benefits of digitalization.

Regional cooperation is particularly important in Latin America and the Caribbean, owing to the structural inequalities that characterize the region and the fact that regional institutional mechanisms are imperfect and have little capacity for action. For this reason, initiatives such as the Digital Agenda for Latin America and the Caribbean (eLAC) are vital for closer collaboration and action on shared challenges.

To achieve this goal, it will be important to step up the efforts that are being made. On the eve of the twentieth anniversary of the Digital Agenda for Latin America and the Caribbean, the moment is opportune to recognize its valuable contribution and track record and to reflect on its great potential. The region has made major progress with digital transformation. Just as clearly, though, it is lagging behind regions that are at the forefront in this area, and there is an urgent need to address the growing challenges and opportunities posed by the new technological disruptions.

Against this background, the present document explores in detail the opportunities offered by progress towards real and effective use of digital technologies, in particular artificial intelligence, to address the region's core development problems. We hope it will serve as an input for the new stage in the Digital Agenda for Latin America and the Caribbean that is now beginning, in which concrete regional projects and actions should prevail, allowing us to take advantage of the possibilities offered by digital transformation. Digitalization is more than a tool: it is a unique opportunity to reshape the future of Latin America and the Caribbean, break from development traps and move towards a more productive, inclusive and sustainable model of development.

José Manuel Salazar-Xirinachs
Executive Secretary
Economic Commission for
Latin America and the Caribbean (ECLAC)

Introduction

Latin America and the Caribbean is affected by three development traps: one of low capacity for growth, one of high inequality, low social mobility and weak social cohesion, and one of low institutional capacity and ineffective governance. These traps not only operate independently as barriers to development, but are deeply interrelated and mutually reinforcing, making it ever more important to design and implement strategies and policies that can break this vicious circle of low growth, exclusion and institutional weakness.

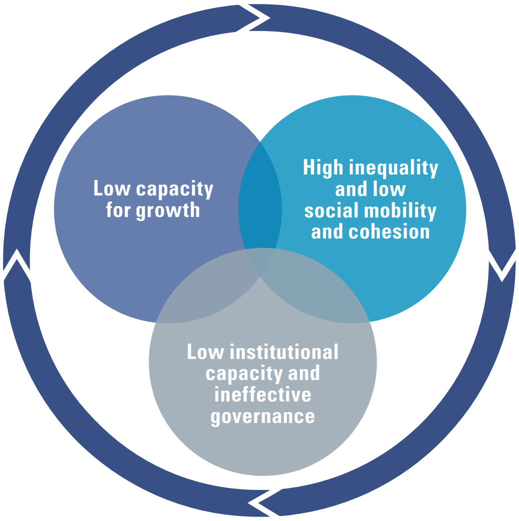
The low growth capacity trap is perpetuated by a number of interrelated factors. First, the region has an unsophisticated and undiversified economic structure and is overreliant on the export of raw materials or goods whose production is based on abundant cheap labour and generates less value added and quality employment than other more technologically advanced sectors. The inability to induce a productive transformation in its economies has resulted in poor productivity performance. In fact, productivity in Latin America and the Caribbean has stagnated, with the result that the region's position has worsened relative to that of the most advanced and emerging economies. For example, whereas in 1950 it took 2.5 hours in the region to produce the same amount of output as was produced in the United States in 1 hour, by 2023 it took almost 4 hours (ECLAC, 2024a). In addition, investment in the region has been historically low and stands at less than 20% of GDP, which severely limits long-term economic development. This is compounded by poor human capital development, with a labour force that lacks the skills needed to integrate into more dynamic and technologically advanced sectors. The low uptake of advanced technologies, especially among micro-, small and medium-sized enterprises (MSMEs), also affects and compounds the lack of access to finance and the technical skills gap. All this translates into low productivity and high productive heterogeneity, both between sectors and between firms of different sizes and territories within each country.

The trap of high inequality and low social mobility is characterized by high levels of poverty, lack of equitable access to basic services such as education, health care and housing, and a limited degree of social mobility, perpetuating the cycle of exclusion that hinders access to economic and social opportunities. Despite the reduction in poverty that took place in the 2000s, the region has not managed to continue moving in that direction, and 29% of the population of Latin America and the Caribbean is living in poverty and 11.2% in extreme poverty as of 2024 (ECLAC, 2024c). This is compounded by inequality that, as measured by the Gini index, has remained high and decreased only marginally in recent decades. At the same time, much of the population (over 55%) works informally or in low-productivity sectors, the result being low wages, a lack of social protection and few opportunities for economic advancement.

The trap of low institutional capacity and ineffective governance refers to the inability of the region's countries to develop sound institutions that can design and implement effective policies in response to people's needs. Bureaucracy, corruption and lack of transparency are persistent problems that perpetuate distrust in public institutions. All this contributes to political and social instability that hinders the implementation of long-term policies and negatively affects the capacity of the State to formulate and implement the reforms necessary for sustainable development.

These three traps do not exist in a vacuum; they are deeply interconnected and mutually reinforcing, creating a vicious circle that is difficult to break (see diagram 1). For example, low productivity, productive specialization in sectors lacking economic and technological dynamism and limited economic growth have their counterpart in low wages and high levels of informality, something that is linked to the limited capacity of governments to raise resources and invest them in social programmes that could help reduce inequality. High inequality limits access to education and economic opportunities, perpetuating low productivity and weak growth, which in turn reduces the scope for increasing the tax take and providing the services people need. High inequality also undermines social cohesion and trust in institutions, which can translate into greater levels of corruption and institutional weakness. In turn, weak institutions are less able to implement policies that could help increase productivity, improve wages and reduce inequality, thus perpetuating economic and social disparities.

Diagram 1
Development traps



Source: Economic Commission for Latin America and the Caribbean (ECLAC).

Breaking this vicious circle requires a comprehensive approach that simultaneously addresses the three structural challenges facing Latin America and the Caribbean: low productivity, high inequality and institutional weakness. In the logic of a comprehensive approach, the Economic Commission for Latin America and the Caribbean (ECLAC) has argued for the importance of targeting actions on 11 major transformations to promote a new development model, with digital transformation at the forefront because of its great capacity to catalyse other transformations and structural changes (ECLAC, 2024b).

As will be seen over the course of this document, digital transformation, following the logic of effective use of digital technologies, including artificial intelligence (AI), offers a unique opportunity to break out of these traps. Where the first trap is concerned, digital transformation of the business fabric would improve the efficiency of industrial processes, optimize supply chains and foster innovation in products and services. In addition, digitalization facilitates access to global markets, reducing reliance on traditional sectors and promoting the economic diversification necessary for sustainable growth. All this would be facilitated if the countries of the region and their territories succeeded in coordinating their digital transformation efforts with their productive development policies (ECLAC, 2024a).

The disruptive and transformative effect of AI is already starting to become evident, with studies and estimates beginning to measure its potential impact on economic growth and the labour market. The impact of AI is expected to grow in the coming years, driving investment and innovation in a variety of sectors, including some that are crucial to the regional economy, such as agriculture, mining and services. For example, according to a recent ECLAC study, the cumulative contribution of AI could reach 1.03% of the region's GDP by 2030, equivalent to some US$ 565 billion over the period 2024–2030 (Katz and Jung, 2024). Moreover, the impacts on the labour market will be substantial, and while it is estimated that about 60% of the labour force will be affected in the most advanced economies (Georgieva, 2024), the potential impact of AI on the labour market in Latin America and the Caribbean is projected to be around 40% (Katz and others, 2024).

Regarding the second trap, digitalization and emerging technologies have the potential to reduce inequality and improve inclusion via more efficient, personalized health-care and education solutions, at the same time as they can improve access to basic services and create employment opportunities in sectors of the digital economy, decreasing reliance on informal and substandard jobs.

Where the third trap is concerned, lastly, digital technologies and AI can strengthen governance and institutions in Latin America and the Caribbean as different tools such as the digitalization of government processes improve transparency, efficiency and accountability.

For digital transformation to have a significant impact, however, it is essential for policies to be designed and implemented with a coordinated and comprehensive approach that allows for the effective use of digital technologies, which hold out ample opportunities for improvement in Latin America and the Caribbean, as will be seen over the course of this document. Only insofar as these opportunities are seized will digital technologies contribute to the goal of moving the region out of the structural traps that have held back its progress, enabling it to move towards a more productive, inclusive and sustainable future.

The importance of policy and the need for an integrated approach become more obvious when the region's AI development and adoption situation is considered. The gap in AI between developed countries and those of Latin America and the Caribbean is manifest and, if left unaddressed, may create new inequalities on top of existing ones. This disparity is revealed not only in the capacity for technological innovation, but also in the implementation and exploitation of emerging technologies, which could have significant consequences in a number of areas.

It is important to consider that the developed countries, which have advanced technological infrastructure, greater financial resources and access to highly specialized talent, are better positioned to exploit the economic potential of AI. These countries not only invest significantly more in research and development (R&D) related to this technology, but also have the right ecosystem to implement AI solutions and apply them on a large scale (it is estimated that while Latin America and the Caribbean invests between 0.05% and 0.1% of GDP in AI-related R&D, countries such as the United States and China invest between 2.0% and 2.5%). This translates into the generation of new knowledge and the creation of new industries and companies based on AI, which in turn strengthens the competitive position of these countries as developed and emerging economies on the global stage. In contrast, developing countries, and those of Latin America and the Caribbean in particular, face considerable barriers to adopting and implementing AI solutions on a large scale. Lack of technological infrastructure and adequate resources and a dearth of skills hinder the effective implementation and development of advanced technologies. For example, according to data from the World Intellectual Property Organization (WIPO), while the number of patents in the area of AI in Latin America and the Caribbean was 1.2 per million inhabitants between 2010 and 2023, in the United States it was 60.4 per million inhabitants. Another parameter that reveals the geopolitical landscape in this area is the origin of advanced AI models. In 2023, the United tates led this development, with 61 machine learning models, followed by China, with 15, while only 1 originated in Latin America and the Caribbean (Epoch AI, 2023).

The growing gap in AI development and adoption between developed and developing countries therefore represents a significant challenge for global equity. Overcoming these barriers requires a comprehensive approach that combines investments in digital infrastructure, training in technology skills and public policies that foster inclusive innovation.

It is essential that the countries of the region not only seek to close the technology gap, but also adapt AI solutions to their local contexts, ensuring that these technologies benefit the entire population and not just a small elite. This is the only way to ensure that the benefits of AI are distributed equitably and help overcome the development traps faced by the countries of the region, preventing existing inequalities from widening and promoting fairer and more sustainable development.

This document, which is being made available to ministers, policymakers, experts and representatives of the private sector, civil society and academia participating in the ninth Ministerial Conference on the Information Society in Latin America and the Caribbean, is structured into four chapters. The first three discuss the three development traps already mentioned and the opportunities offered by digital transformation and by AI in particular to address these challenges. The last chapter analyses the main digital transformation policy agendas and strategies in the region. With the aim of breaking out of the development traps that Latin America and the Caribbean is caught in, the document identifies a number of initiatives and actions that need to be pursued in the interests of moving towards real and effective use of digital transformation, including the development of AI. It is hoped that the guidelines and recommendations put forward in this document will serve to inspire a regional work programme that creates progress towards the goals set out in the new Digital Agenda for Latin America and the Caribbean for attainment by 2026 (eLAC 2026).

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CHAPTER

I

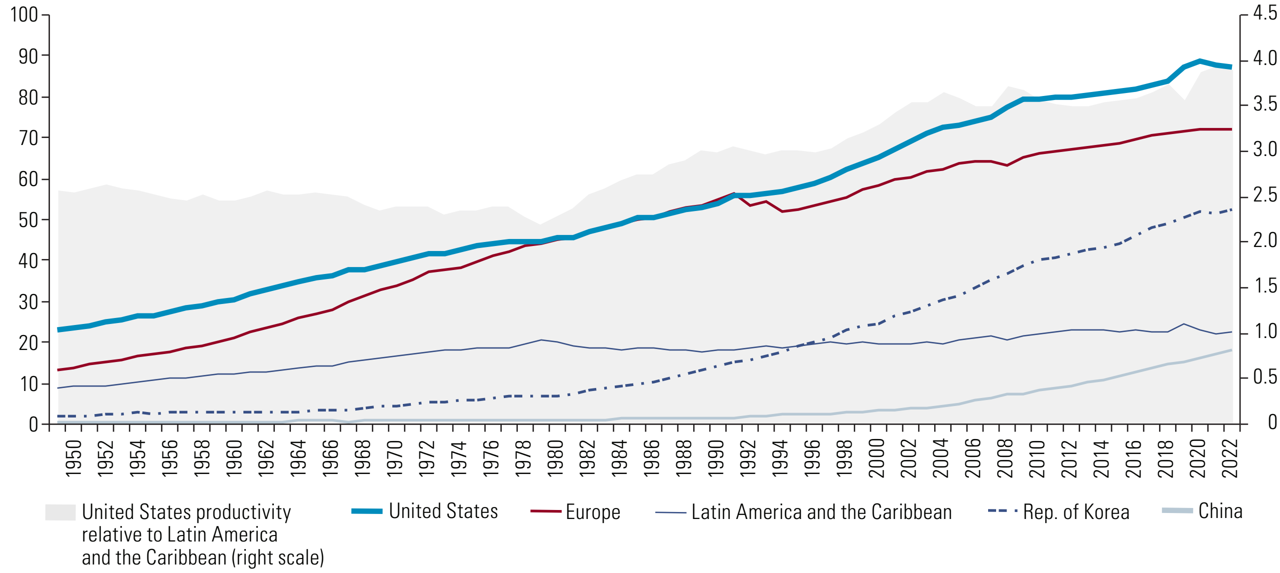
The productivity challenge in Latin America and the Caribbean: how digital technologies and artificial intelligence can be a crucial component of change

A. The structural barriers that condition low economic growth

The problem of low growth in the region is not merely a temporary phenomenon, but a structural and long-term one. Average trend growth has declined steadily over the past few decades, from 5.5% per year between 1951 and 1979 to only 1.6% per year between 2010 and the present. This poor growth performance has been associated with a permanent stagnation or even decline in productivity, preventing the region from achieving sustained economic growth and limiting its ability to converge on higher levels of income and welfare or to approach those of the most advanced economies. In other words, the first trap the region is caught in is one of low growth capacity.

Especially since the 1980s, labour productivity growth in Latin America and the Caribbean has been anaemic compared with that of other regions and countries, both developed and developing, such as a number of Asian economies whose production capacity has expanded rapidly (see figure I.1). While the latter have succeeded in diversifying their production base and adopting advanced technologies, Latin America and the Caribbean has remained dependent on sectors with low value added, especially those based on the extraction and export of raw materials. This pattern of specialization, which is associated with spurious competitiveness dynamics, has contributed to productive stagnation and regressive behaviour vis-à-vis the most advanced economies, widening the productivity gap and affecting the region's ability to innovate, compete in the global marketplace and integrate into global value chains.

Figure I.1
Selected regions and countries: value of output per hour worked and productivity gap between the United States and Latin America and the Caribbean, 1950–2023
(Dollars and ratios)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), *Panorama of Productive Development Policies in Latin America and the Caribbean, 2024* (LC/PUB.2024/17-P), Santiago, 2024.

Some of the factors that have perpetuated the low growth capacity and low productivity trap in the region are listed below (ECLAC, 2024):

(i) An undiversified economic structure: the region's economies rely heavily on the export of raw materials, which limits the creation of value added and high-quality jobs compared to what can be achieved in more technologically advanced industries.

(ii) Lack of investment: in Latin America, the level of investment relative to GDP has historically been low (around 20%), which hampers sustainable economic development and long-term growth.

(iii) Inadequate development of human talent: underinvestment in education and technical training has resulted in a labour force that lacks the skills needed to participate in more dynamic and technologically advanced sectors.

(iv) Low adoption of advanced technologies: the integration of technologies into production processes is limited, especially among small and medium-sized enterprises (SMEs), owing to barriers such as lack of finance and technical skills gaps.

(v) Infrastructure deficiencies: despite some progress, deficiencies in physical infrastructure and high-speed Internet connectivity persist, particularly in rural areas and among the most vulnerable socioeconomic groups.

(vi) Institutional fragility and weak governance: lack of transparency and administrative and regulatory capacity is a major constraint.

The stagnation of productivity at the aggregate level in the countries of the region, which can be explained by the factors set out above, can also be observed at the micro level, where large and small firms can be seen to have very contrasting behaviour, with substantial differences within countries, between different regions and even between different economic sectors. All the above-mentioned causes have resulted in the intensification or resurgence of productive heterogeneity.

These challenges underscore the need to foster sophistication, diversification and virtuous structural change in the region's economies by increasing investment, improving education and technical training, promoting the adoption of advanced technologies, strengthening infrastructure and reinforcing public institutions to boost productivity. This will require action on multiple fronts. Among other things, the countries and their territories need to scale up and improve their productive development policies, meaning efforts that directly target the productive transformation of economies (ECLAC, 2024).

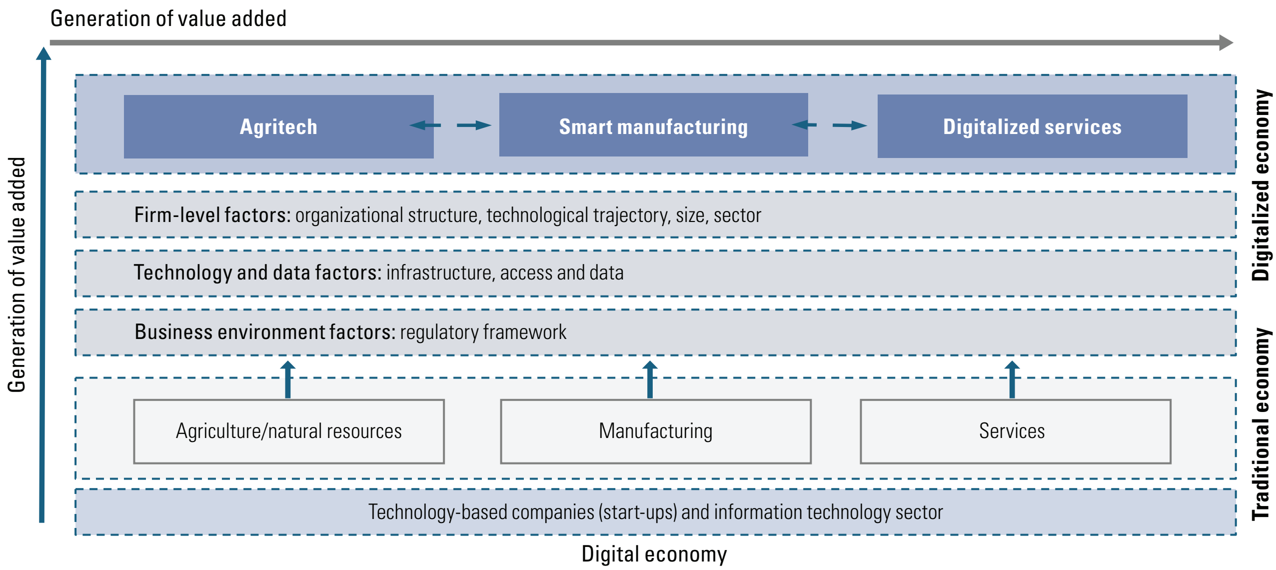
Digital transformation offers a vital opportunity to solve productivity challenges. At the enterprise level, digital technologies make it possible to reconfigure production processes, optimize resource management and reduce internal coordination costs, as well as significantly improving supplier and customer relationship management and boosting innovation in products and services. At the sectoral and territorial level, digitalization fosters innovation and adds value throughout value chains, facilitating the reorganization of skills and strategies and reducing information asymmetries. Taken together, these developments have the potential to increase the sophistication of economic activities, generate more value added and promote economic growth, as pointed out in several empirical studies (Dini, Gligo and Patiño, 2021).

This chapter examines how digital technologies and artificial intelligence (AI) can boost productivity in Latin America and the Caribbean and highlights the need to address complementary factors such as digital infrastructure and skills. It analyses the potential economic impact of AI in the region, where firms are increasingly adopting it, albeit with major sectoral variations. Lastly, it highlights the role of entrepreneurship as a key opportunity for the region to lead in the digital era, with emphasis on the importance of public policies that promote innovation and technological development.

B. The role of digital technologies and artificial intelligence in meeting the productivity challenge

Despite the opportunity that digital technologies represent for companies, there are a number of fundamental factors that condition their adoption, related to technology, companies and the business environment. First, access to technology depends on the availability of adequate and affordable digital infrastructure and data, an essential factor in digitalization and the development of personalized services, especially since the advent of AI. Second, the characteristics of companies influence their ability to adopt and incorporate different technological solutions: while large companies tend to be better positioned to invest and take advantage of economies of scale, SMEs face greater financial and human talent constraints. Lastly, the business environment, and the regulatory framework in particular, plays a crucial role in creating the necessary incentives for the adoption of technology (see diagram I.1).

Diagram I.1
Factors influencing the digitalization of production



Source: Economic Commission for Latin America and the Caribbean (ECLAC).

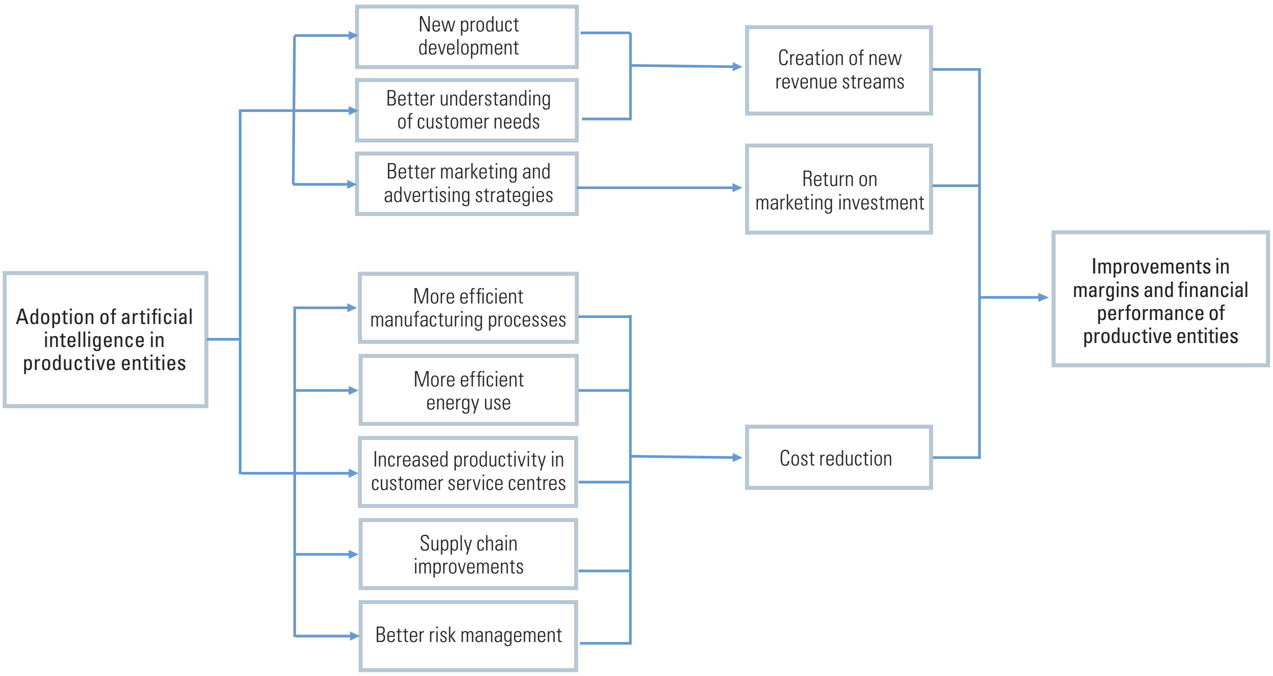
To address these factors, the first requirement is access to quality broadband connectivity that enables businesses to make intensive use of digital solutions. These policies need to be accompanied by a modern regulatory framework that is able to adapt to rapid technological change while building trust among users and businesses. Also essential is to step up efforts to ensure that digital technologies are adopted by all enterprises, especially micro-, small and medium-sized enterprises (MSMEs). A key strategy is to expand digital extension programmes, which provide specialized support to facilitate the adoption of technology among MSMEs. In addition, it is crucial for digital transformation to be integrated into broader productive development policies that include the digitalization of strategic sectors, the strengthening of technology clusters and the promotion of digital entrepreneurship ecosystems.

Artificial intelligence (AI), in both its machine learning and generative aspects,[1] has the potential to considerably amplify the positive effects of digitalization on productivity and economic development. Although the literature on the economic impact of AI is relatively recent, numerous studies have highlighted how this technology can increase firms' revenues by improving employee productivity and contributing to a better understanding of consumer behaviour, more competitive pricing and new skills (Hang and Chen, 2022; Moro-Visconti, Cruz and López, 2023). In addition, a number of studies have examined the impact of AI on specific company areas, such as management, marketing, sales, advertising, consumer behaviour analysis, supply chains and retail (Brock and von Wangenheim, 2019; Duan, Edwards and Dwivedi, 2019; Mustak and others, 2021; Huang and Rust, 2021; Davenport and others, 2020; Rai, 2020; Tong, Luo and Xu, 2020; Brill, Munoz and Miller, 2023; Kietzmann, Paschen and Treen, 2018; Luo and others, 2021; Sohrabpour and others, 2021; Syam and Sharma, 2018; Puntoni and others, 2021; Tassiello, Tillotson and Rome, 2021; Kim, Schmitt and Thalmann, 2019; Baryannis, Dani and Antoniou, 2019; Toorajipour and others, 2021).

[1] Machine learning focuses on prediction and data analysis, while generative AI creates content. Both technologies have a variety of applications that influence production processes.

In summary, the effects of AI on businesses can be grouped into three main key areas: the creation of new business opportunities, increased returns on marketing investment and reduced operating costs (see diagram I.2). These factors are essential to an understanding of how AI is transforming today's business landscape.

Diagram I.2
Possible effects of artificial intelligence



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of R. Katz and J. Jung, "Impacto económico de la inteligencia artificial en América Latina", Santiago, Telecom Advisory Services/Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished.

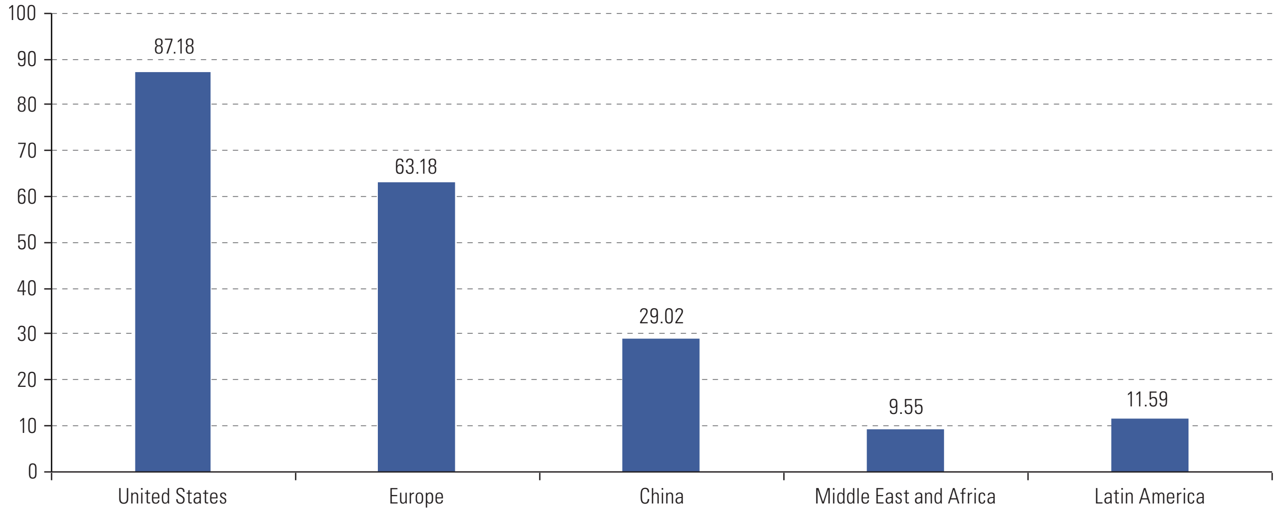
While the potential of AI is certainly enormous, it is important to stress that it can only be realized through investment in complementary infrastructure and the implementation of additional strategies, particularly in the area of training and skills. Without these essential components, the adoption and exploitation of AI will be limited.

Despite the many opportunities that AI offers, a number of indicators show that it is still being adopted far more slowly in Latin America and the Caribbean than in other regions of the world. There are a number of critical challenges that need to be addressed if AI is to become a driver of economic and social development in the region, including inadequate AI investment and spending, slow adoption by users and businesses and a lack of appropriate policies, aspects that will be elaborated on below.

C. Levels of artificial intelligence adoption in Latin America and the Caribbean

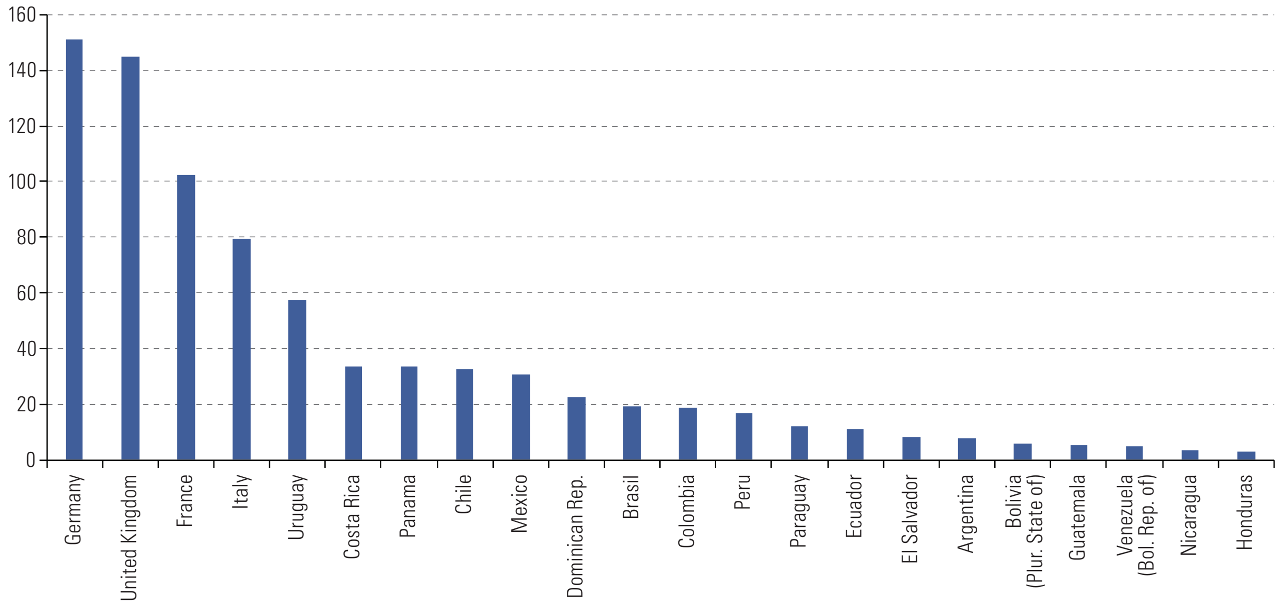
Latin America and the Caribbean lags significantly behind advanced economies in spending on AI. Spending in the region has been estimated at US$ 11.59 billion in 2023, representing only 3.7% of global demand (see figure I.2). This is slightly higher than estimated for the Middle East and Africa, but seven and five times lower than in the United States and Europe, respectively. As regards AI expenditure per capita, there is great dispersion by country, but even the top-ranked countries in the region lag behind the likes of Germany and the United Kingdom (see figure I.3).

Figure I.2
Latin America (17 countries)[a] and world regions: spending on artificial intelligence, 2023
(Billions of dollars)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Statista; R. Katz and J. Jung, "Impacto económico de la inteligencia artificial en América Latina", Santiago, Telecom Advisory Services/Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished.
Note: Spending was measured by the revenues of artificial intelligence providers.
[a] Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the Plurinational State of Bolivia and Uruguay.

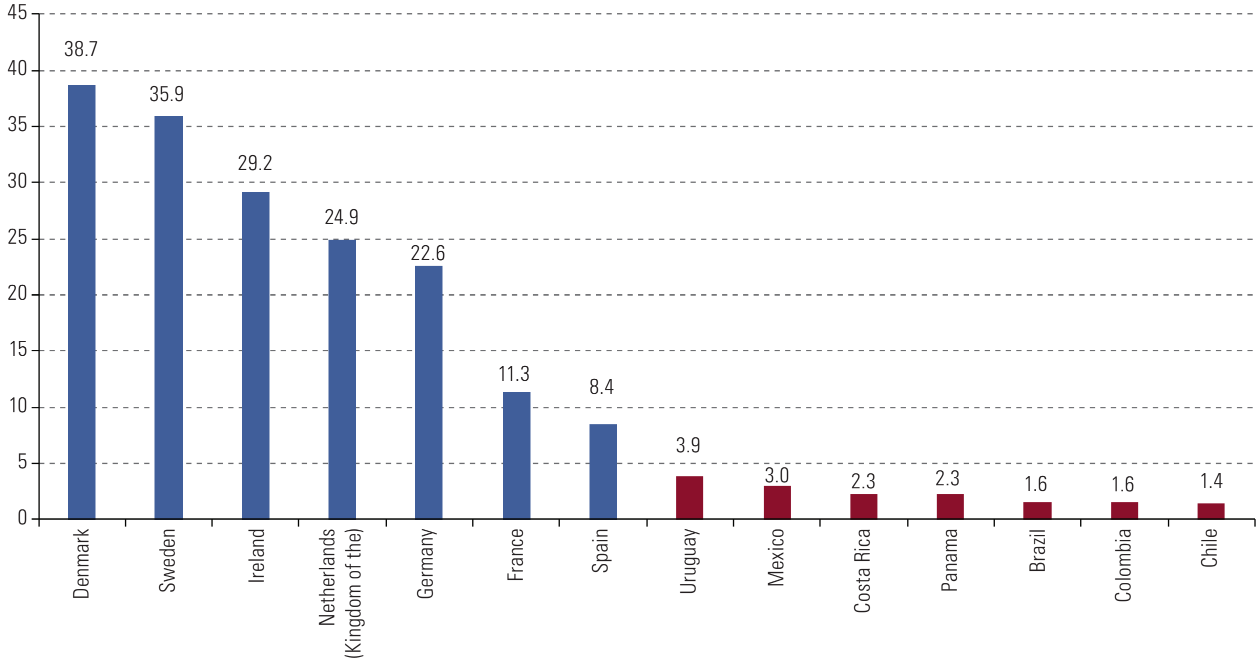
Figure I.3
Latin America (18 countries) and Europe (4 countries): per capita spending on artificial intelligence, 2023
(Dollars)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Statista; R. Katz and J. Jung, "Impacto económico de la inteligencia artificial en América Latina", Santiago, Telecom Advisory Services/Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished.
Note: Spending was measured by the revenues of artificial intelligence providers and the estimates were based on average revenue per user.

The number of users of AI tools is another indicator that is helpful for determining the level of AI adoption. Figure I.4 shows the number of users in a number of countries of Latin America and Europe, adjusted for population. European countries clearly dominate AI adoption: Denmark, where the level of adoption is 38.72% of the population, leads the way, followed by Sweden (35.85%), Ireland (29.19%), the Kingdom of the Netherlands (24.89%) and Germany (22.56%). In contrast, Latin American countries exhibit significantly lower levels of penetration. These figures reveal a large gap between Latin America and Europe with regard to AI adoption: while penetration in Europe exceeds 20% in most cases, in Latin American countries it is less than 4%.

Figure I.4
Latin America (7 countries) and Europe (7 countries): estimated penetration of artificial intelligence by shares of total population who are users, 2023
(Percentages)



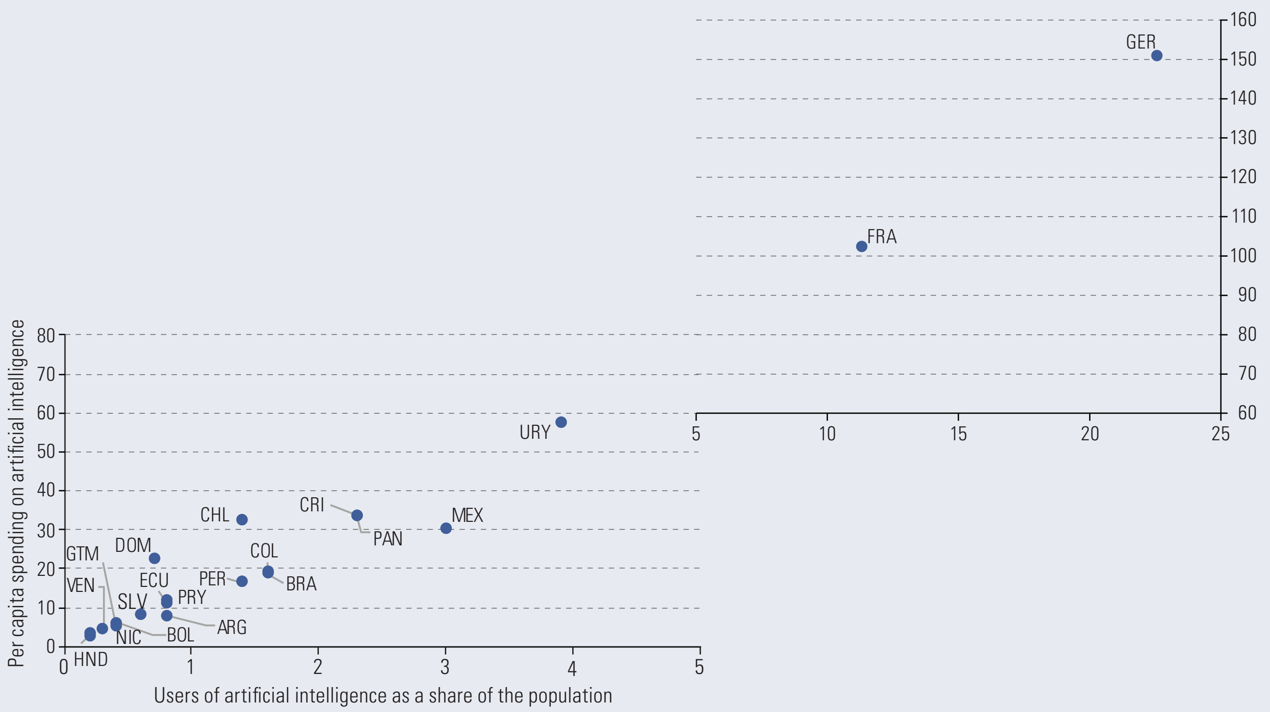
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Statista and International Monetary Fund (IMF); R. Katz and J. Jung, "Impacto económico de la inteligencia artificial en América Latina", Santiago, Telecom Advisory Services/Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished.

Note: A user of artificial intelligence is deemed to be someone who uses artificial intelligence tools. The penetration of artificial intelligence in each country is measured by dividing the number of users by the total population. To estimate regional penetration, we specify a regression with a panel of 240 observations at the world level and include per capita GDP and the percentage of Internet users as regressors, plus country and year fixed effects. This regression model explains more than 99% of the variability of the dependent variable.

As can be seen in figure I.5, when AI penetration rates are considered in terms of a combination of per capita expenditure and per capita adoption, there are large gaps between the countries of the region and some European countries, such as Germany and France. There are also differences within the region, with one group of countries at a more advanced stage (Uruguay, Panama, Costa Rica, Mexico and Chile), another group at an intermediate level (Brazil, Colombia, the Dominican Republic and Peru) and another group that is further behind.

The gaps identified in AI investment and penetration are key factors that need to be addressed to foster AI development and adoption in Latin America and the Caribbean. Limited AI investment and slow penetration reflect a technology ecosystem that is still in the process of forming, which constrains innovation opportunities and overall competitiveness.

Figure I.5
Latin America (18 countries), Germany and France: penetration of artificial intelligence as measured by countries' per capita spending and users as a share of the population, 2023
(Dollars and percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of FTI Consulting and Telecom Advisory Services; R. Katz and J. Jung, "Impacto económico de la inteligencia artificial en América Latina", Santiago, Telecom Advisory Services/Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished.

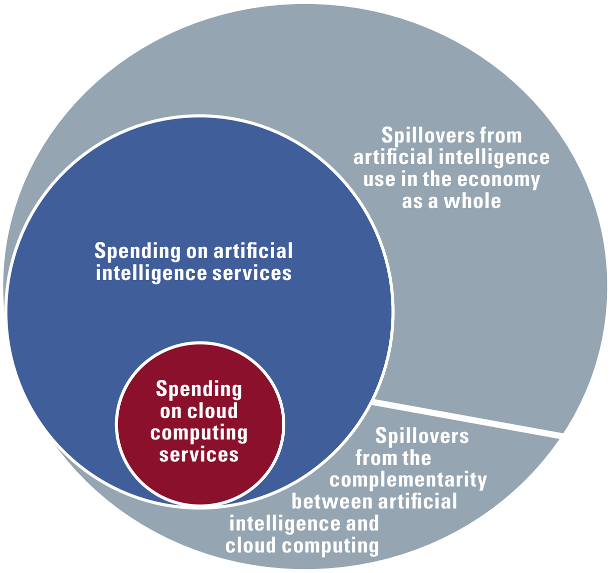
D. The economic impact of artificial intelligence

Analysing the potential economic impact of AI is crucial to the effort to understand and prepare for the transformations that this technology will bring. By anticipating its effects on productivity, employment and the economic structure, we can design policies and business strategies that maximize the benefits and minimize the risks. Moreover, this analysis allows us to determine the areas where complementary investments will be needed to ensure that society as a whole benefits from advances in AI.

The following is a model for assessing the economic impact of AI in Latin America and the Caribbean. The empirical strategy selected for this analysis is based on a theoretical model that estimates the indirect effects of AI use on economic output and its possible complementarities with cloud computing.[2] This aggregate economic contribution of AI to output (GDP) breaks down as follows: (i) spending on AI (as measured by the revenues of AI service providers); (ii) the indirect effects of AI services on the other sectors of the economy; and (iii) the indirect effects that the complementarities between AI and the use of cloud computing have on the economy, measured by the benefits from AI in terms of cost efficiency, new product development, support for start-up incubation and the like (see diagram I.3).

2 The econometric model uses a Cobb-Douglas production function and treats GDP as an outcome of physical capital and labour, together with total factor productivity, which depends on the use of AI and cloud computing. The interaction between these technologies is examined using a system of simultaneous equations to capture the bidirectional relationships between economic output and information and communications technologies (ICTs). The results show that both AI and cloud computing have a positive and significant impact on GDP, especially in countries where these technologies are used intensively.

Diagram I.3
The economic impact of artificial intelligence



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of R. Katz and J. Jung, "Impacto económico de la inteligencia artificial en América Latina", Santiago, Telecom Advisory Services/Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished.

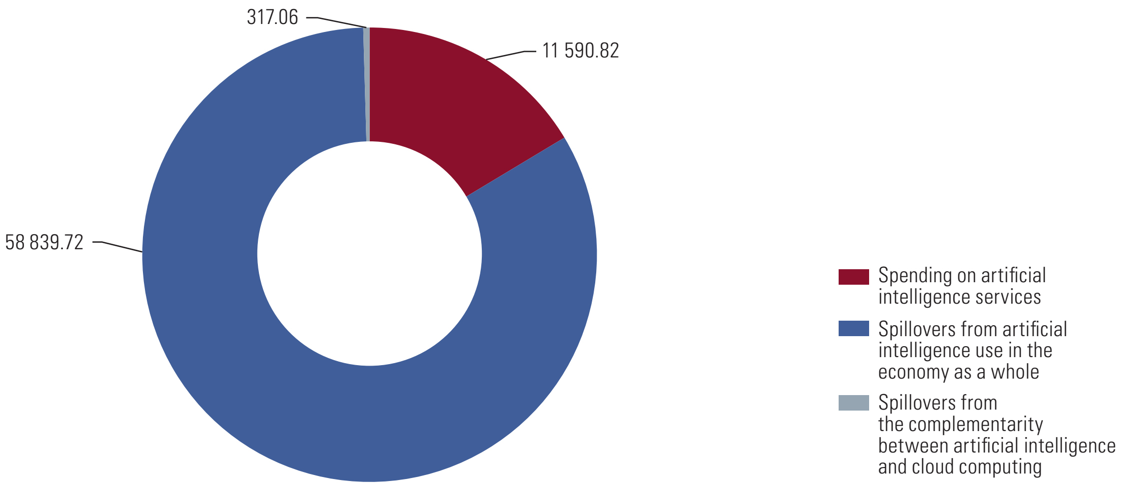
Importantly, cloud computing also plays a crucial role in the adoption of AI because it provides the computing resources needed to develop and use it, especially in the case of generative AI, which requires great processing power. Cloud computing offers a scalable and affordable solution to this challenge by meeting the growing demand for AI computing resources. This symbiotic relationship between AI and cloud computing represents a classic case of technological complementarity (Katz and Jung, 2024).

The estimates suggest that a 1% increase in AI penetration in a country is associated with at least a 0.02% increase in GDP, an impact that is even greater in countries where AI use is intensive, owing to the complementarities that arise with the use of cloud computing. Of this total impact, 16% is explained by AI spending, 83% by the spillovers from AI use to the economy as a whole and 0.4% by the spillovers from the complementarities of AI with cloud computing services. Adding all these effects together, the total economic contribution of AI in 17 countries of the region was estimated at US$ 70.75 billion in 2023, equivalent to 1.11% of GDP in an optimistic scenario (see figure I.6).

The rest of the model results are in line with expectations: broadband speed and urbanization have a positive effect on demand for AI and cloud computing, and prices have a negative effect. Similarly, human talent has a positive effect on demand for cloud computing, and GDP per capita has a positive effect on demand for AI. This model therefore provides a robust tool for estimating how AI adoption and its complementarity with cloud computing can drive economic growth in the region.

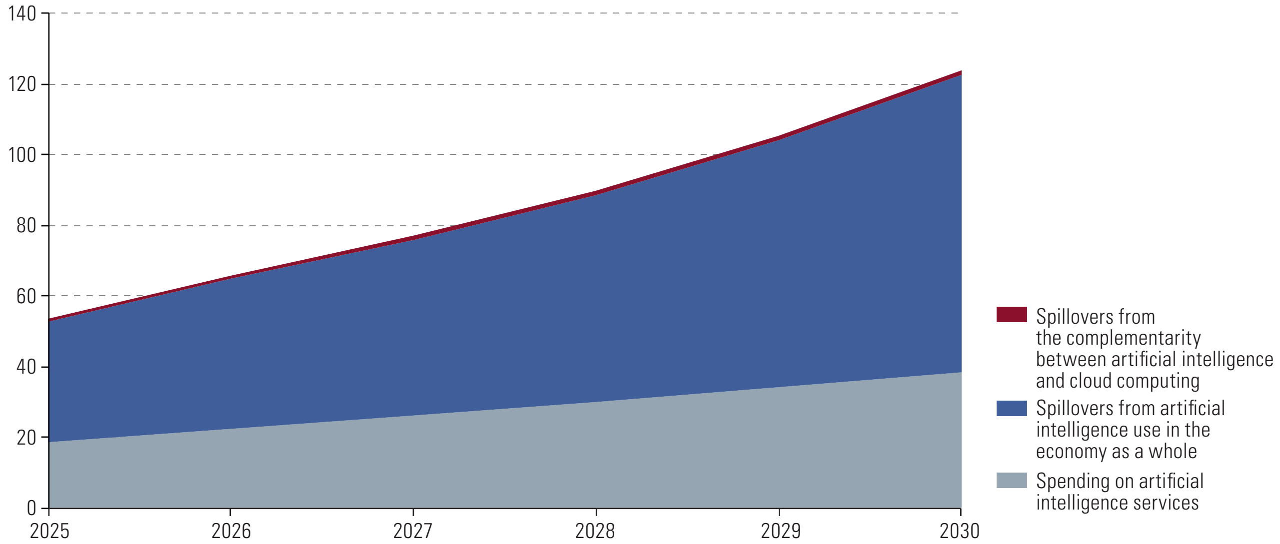
A more conservative approach is used to estimate the future impact of AI up to 2030. This conservative prediction assumes that AI adoption growth rates will be rationalized. The model includes fixed effects to capture the annual growth of AI and uses a conservative value as a target for 2030. In addition to the direct impact estimated from growth in AI spending, we calculate the spillover effect of AI use across the economy as a whole and the spillover effect of AI complementarity with cloud computing, depending on future penetration. From this analysis, it is estimated that AI will have a significant economic impact in Latin America and the Caribbean over the period 2024–2030, amounting to $565 billion or 1.03% of projected cumulative GDP by 2030 (see figure I.7).

Figure I.6
Latin America (17 countries):[a] economic impact of artificial intelligence, by source of effects, 2023
(Millions of dollars)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of R. Katz and J. Jung, "Impacto económico de la inteligencia artificial en América Latina", Santiago, Telecom Advisory Services/Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished.
[a] Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the Plurinational State of Bolivia and Uruguay.

Figure I.7
Latin America (17 countries):[a] projected impact of artificial intelligence, 2025–2030
(Billions of dollars)



Source: R. Katz and J. Jung, "Impacto económico de la inteligencia artificial en América Latina", Santiago, Telecom Advisory Services/Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished.
[a] Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the Plurinational State of Bolivia and Uruguay.

The results shown above highlight the importance of AI for economic development in Latin America and the Caribbean and the need to create the right environment to maximize its impact. The slow pace of penetration of this technology needs to be accelerated to benefit citizens and businesses. Policy implementation should prioritize investments and complementary strategies, such as the roll-out of broadband infrastructure. In addition, it is crucial to improve workers' skills and provide incentives to encourage the use of AI in production processes. Some of these aspects are discussed in more detail later in this paper.

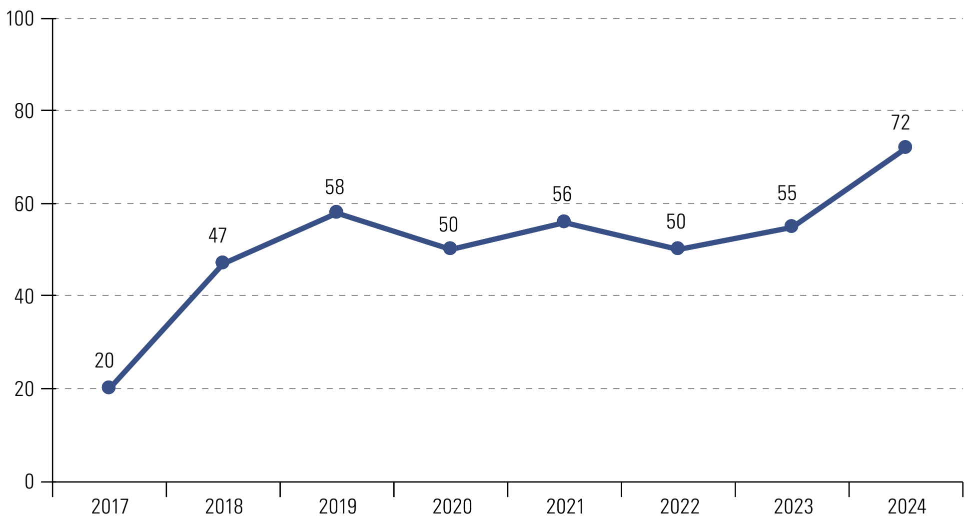
E. The adoption of artificial intelligence in business and its sectoral characteristics

As AI advances and becomes more integrated in companies, there is growing concern about how this technology will be integrated into production processes and business models, and what its impact on productivity will be (McElheran and others, 2024). Despite the difficulty of obtaining reliable measures of AI use by companies, there are some recent studies that identify some important trends in the adoption of this technology within the production fabric.

The United States Business Trends and Outlook Survey (BTOS), for example, shows that AI use increased from 3.7% in September 2023 to 5.4% in February 2024: the greatest take-up has been in the information sectors (18.1%) and the lowest in the construction and agriculture sectors (1.4%) (Bonney and others, 2024). Compared to previous surveys, such as that of 2019, the use of AI doubled. Other national surveys reflect similar growth: in the Republic of Korea, AI use rose from 1.3% in 2017 to 3.1% in 2019 (DeStefano and others, 2023), while in Germany it reached 5.8% in 2019 (Rammer, Fernández and Czarnitzki, 2021). In Canada, Denmark, France and Japan, AI use varies by firm size and ranges from 4% to 14.1% (Ek and Montagnier, 2021). Differences between countries are partly due to survey coverage and methodology and to differences in the definition of and approaches to AI, but overall these studies reveal a clear trend of increasing adoption of AI in enterprises.

With regard to private surveys, the annual global survey conducted by McKinsey & Company since 2017, involving between 1,300 and 1,850 executives, senior managers and middle managers worldwide, shows that 72% of respondents used at least one AI function in 2024 (in 2017 only 20% had done so), falling to 49% when only developing economies are considered (Singla and others, 2024) (see figure I.8).[3]

Figure I.8
McKinsey & Company annual global survey: share of organizations adopting artificial intelligence, 2017–2024
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of B. Díaz de Astarloa, "Inteligencia artificial en empresas de América Latina: medición, adopción e impacto", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished; A. Singla and others, "The state of AI in early 2024: gen AI adoption spikes and starts to generate value", New York, McKinsey & Company, 30 May 2024 [online] https://www.mckinsey.com/capabilities/quantumblack/our-insights/the-state-of-ai.

Note: In 2017, an organization was considered to have adopted artificial intelligence if it used it in a core part of its business. In 2018 and 2019, it was considered to have adopted it if it used at least one artificial intelligence capability in business processes or products. Since 2020, an organization has been deemed to have adopted artificial intelligence if it uses it in at least one function, with no further restrictions.

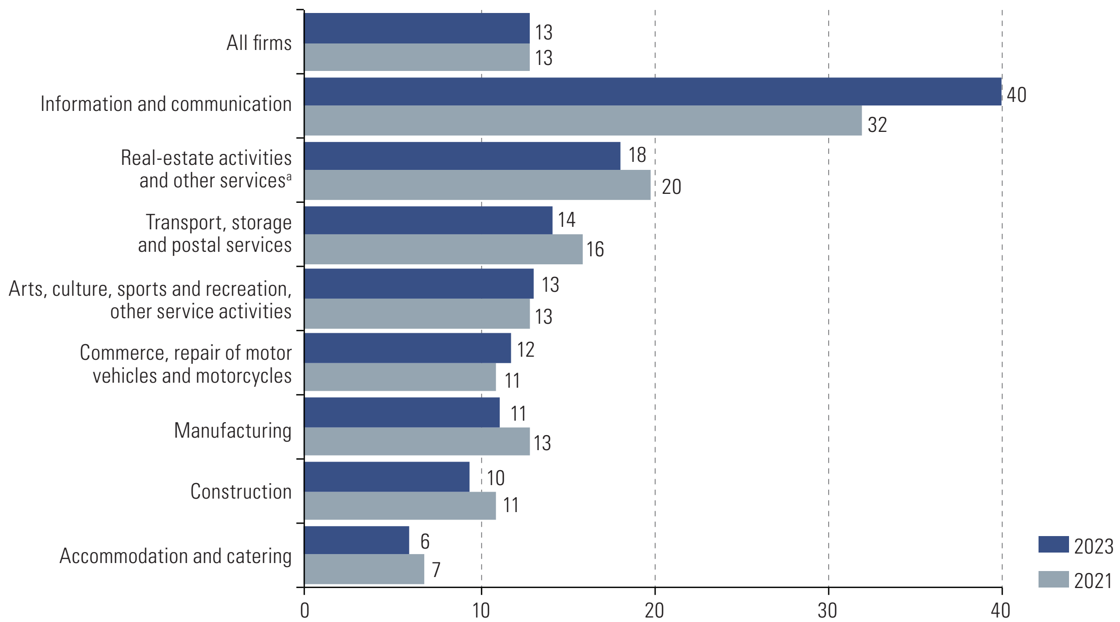
[3] The group of developing economies consists of India, Latin America, the Middle East and North Africa, with 16% of respondents belonging to this group. The public report does not provide information on which countries were surveyed in each region.

In 2023, similarly, in the context of a joint initiative with the World Economic Forum, Boston Consulting Group conducted a global survey of nearly 1,800 manufacturing executives in 15 countries (BCG/WEF, 2023). According to the survey results, 68% of companies had already begun implementing AI solutions in at least one use case, but only 16% had achieved their AI adoption goals. China, India and Germany led the way in AI adoption, but there was little dispersion across countries. Mexico was the only country in the region to be included in the survey, and its results were 10 percentage points lower than those of the leader, China.

Some regional initiatives to measure the adoption of AI tools in enterprises will now be discussed.[4]

Since 2005, Brazil's Regional Center for Studies on the Development of the Information Society (Cetic.br) has been conducting the ICT Enterprises survey to measure the adoption of information and communications technologies (ICTs) in enterprises with 10 or more employees. Questions on the use of AI technologies have been included since 2021. In 2023, 13% of Brazilian enterprises used AI, a proportion similar to that reported in 2021, with the highest use in the information and communications sector (40%) and the lowest in accommodation and catering (6%) (see figure I.9). The most common applications of AI in 2023 were for marketing or sales (47%) and digital security (43%) (see figure I.10).

Figure I.9
Brazil: shares of surveyed companies using artificial intelligence technologies, 2021–2023
(Percentages)

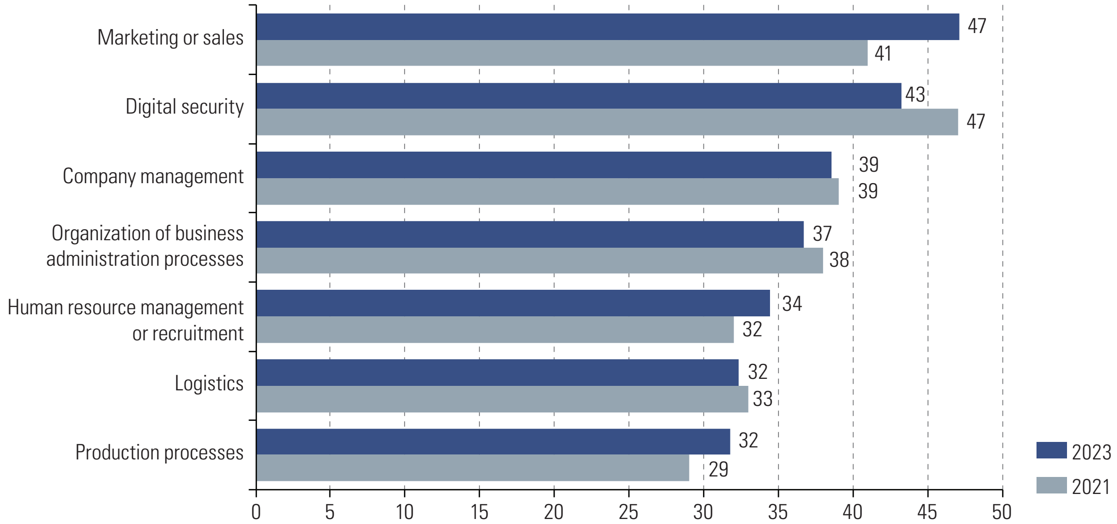


Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of B. Díaz de Astarloa, "Inteligencia artificial en empresas de América Latina: medición, adopción e impacto", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished; Regional Center for Studies on the Development of the Information Society (Cetic.br), "ICT Enterprises" [online] https://cetic.br/en/pesquisa/empresas/.

[a] Other services include professional, scientific and technical activities, administrative activities and complementary services.

[4] There are only four countries in the region whose official surveys of innovation and information and communications technology (ICT) use in firms include questions on AI use: Argentina, Brazil, Chile and Colombia.

Figure I.10
Brazil: surveyed companies using artificial intelligence technologies by business area, as a share of all companies using these technologies, 2021–2023
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of B. Díaz de Astarloa, "Inteligencia artificial en empresas de América Latina: medición, adopción e impacto", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished; Regional Center for Studies on the Development of the Information Society (Cetic.br), "ICT Enterprises" [online] https://cetic.br/en/pesquisa/empresas/.

In Colombia, the Survey of Information and Communications Technologies in Companies (ENTIC Empresas), carried out by the National Administrative Department of Statistics (DANE) under an agreement with the Ministry of Information and Communications Technologies (MinTIC), measured the introduction of AI into company processes. The survey was conducted among formal firms with 10 or more employees in the commerce, services and manufacturing sectors, and the information was collected by asking respondents to answer questions of their own volition in an online application. The survey was conducted in two editions, 2019 and 2020. The 2020 results indicated that 8% of Colombian companies had developed some AI tool or application, but there was a large disparity between sectors (see figure I.11). As expected, the highest proportion was in the computer systems development and data processing sector (28%), while the proportion was 6% in manufacturing and 5% in commerce.

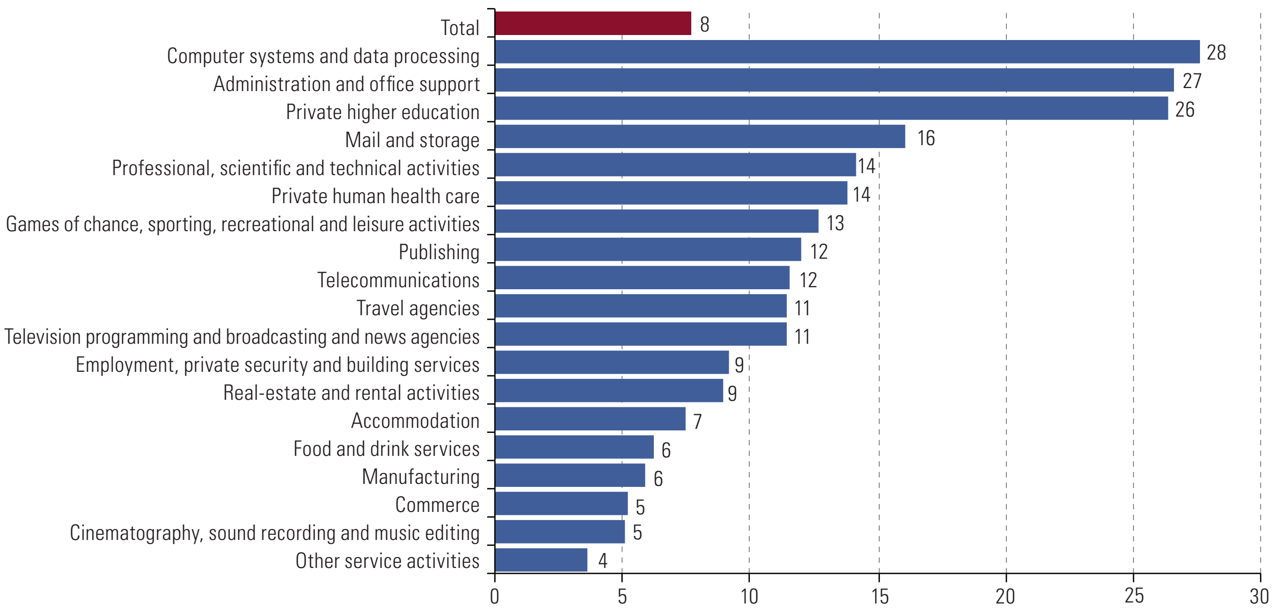
A differentiating aspect of the Colombian survey is that it measures the impact of AI adoption on firms. According to the 2020 results, 71% of firms reported that the quality of their products had improved and 55% that their sales had increased (see figure I.12).

The data analysed show that both at the global level and in the regional cases, the adoption of AI in enterprises exhibits a rising trend, albeit with significant variations between sectors. Although methodological differences complicate cross-country comparisons, the results for the region do not show large contrasts, which may suggest that the countries are at a similar stage of AI adoption.

This underlines the importance of dealing with the barriers to AI adoption in enterprises. Globally, it is generally agreed that there is a lack of clarity about the benefits of AI, the best way of implementing it in organizations and the adaptations required in processes, organizational structure and human talent (Hoffreumon, Forman and van Zeebroeck, 2024). In Latin America and the Caribbean, the main barrier seems to be the shortage of specialized talent (NTT Data, 2023), alongside other obstacles such as high implementation costs, lack of awareness of the benefits of AI and resistance to change within organizations.

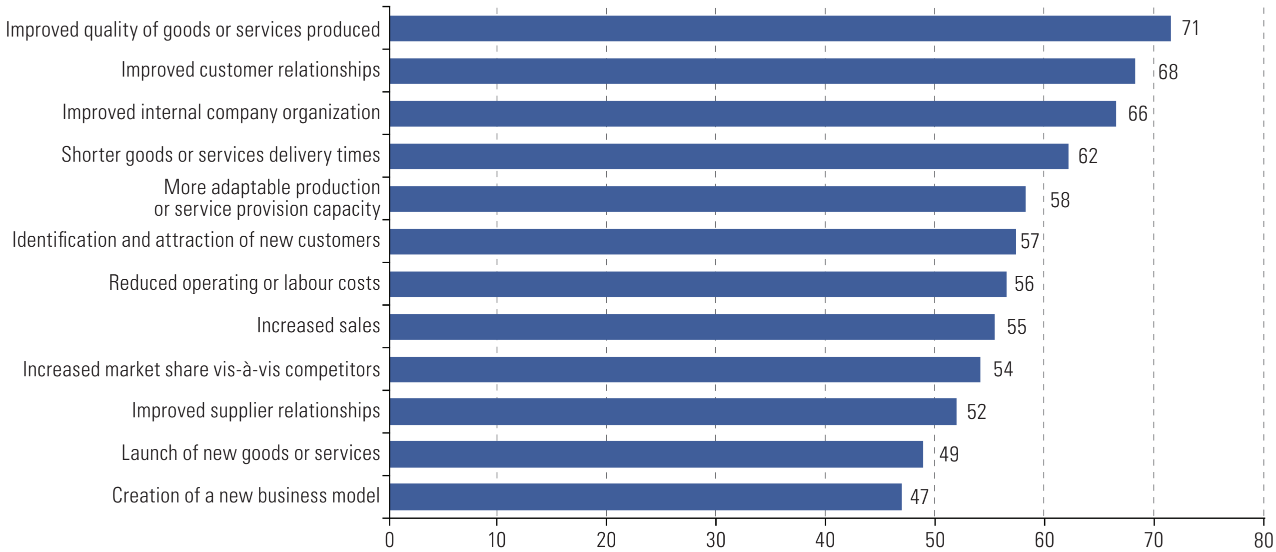
Furthermore, the barriers imposed by business size should not be overlooked (DeStefano and others, 2023), even though smaller firms appear to be increasingly adopting AI thanks to systems and software that facilitate its implementation (Hoffreumon, Forman and Van Zeebroeck, 2024). These are all issues for policymakers to consider.

Figure I.11
Colombia: shares of surveyed companies developing an artificial intelligence tool or application, 2020
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of B. Díaz de Astarloa, "Inteligencia artificial en empresas de América Latina: medición, adopción e impacto", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished; National Administrative Department of Statistics (DANE), "Encuesta de Tecnologías de la Información y las Comunicaciones en Empresas (ENTIC Empresas)", Bogotá, 2020 [online] https://www.dane.gov.co/index.php/estadisticas-por-tema/tecnologia-e-innovacion/tecnologias-de-la-informacion-y-las-comunicaciones-tic/encuesta-de-tecnologias-de-la-informacion-y-las-comunicaciones-en-empresas-entic-empresas.

Figure I.12
Colombia: surveyed companies reporting an impact from artificial intelligence, as a share of those developing any artificial intelligence tool or application, 2020
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of B. Díaz de Astarloa, "Inteligencia artificial en empresas de América Latina: medición, adopción e impacto", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished; National Administrative Department of Statistics (DANE), "Encuesta de Tecnologías de la Información y las Comunicaciones en Empresas (ENTIC Empresas)", Bogotá, 2020 [online] https://www.dane.gov.co/index.php/estadisticas-por-tema/tecnologia-e-innovacion/tecnologias-de-la-informacion-y-las-comunicaciones-tic/encuesta-de-tecnologias-de-la-informacion-y-las-comunicaciones-en-empresas-entic-empresas.

F. The artificial intelligence entrepreneurship ecosystem

To supplement this look at the adoption of AI in the production fabric, it is important to examine not only its take-up by businesses, but also the ecosystem of companies that create new businesses, innovate and develop solutions in the area of AI, as well as the resources devoted to the area. Entrepreneurship in the field of AI is crucial because it drives the creation of innovative solutions, fosters competition and energizes production sectors by introducing cutting-edge technologies. Moreover, AI ventures act as catalysts for the digital economy and generate new business models and highly skilled jobs, as well as contributing to economic diversification. Assessing how AI entrepreneurship is harnessed in an economy is key to understanding how adaptable and competitive that economy is in an increasingly knowledge-based high-technology global environment.

Information from Crunchbase,[5] a platform that provides data and foresight on companies in different sectors, with an emphasis on technology start-ups, was used to analyse the AI entrepreneurship landscape in Latin America and the Caribbean. The platform provides information on firms' location, number of employees and investments, a list of founders and acquisitions, and other data. There is also a special sectoral category for AI, listing the activities carried out by companies that work in the field (generic AI activities, generative AI, intelligent systems, machine learning, natural language processing, predictive analytics and robotic process automation).

According to the results of the analysis conducted, there were 2,277 companies in the AI industry in Latin America and the Caribbean as of September 2024 (table I.1). The country with the most companies was Brazil (1,312), followed by Mexico (286), Colombia (198), Chile (189) and Argentina (135). Except for Peru and Uruguay, the rest of the region's countries had fewer than 20 firms engaged in these activities. Most AI firms in the region are microenterprises and small firms: 78% have fewer than 50 employees and 34% fewer than 10. There are only 16 AI firms with more than 1,000 employees in the whole region, and they are in Brazil (14 firms), Colombia (1 firm) and Mexico (1 firm).

Table I.1
Latin America and the Caribbean (18 countries): enterprises engaged in artificial intelligence activities, by size, September 2024
(Numbers of enterprises)

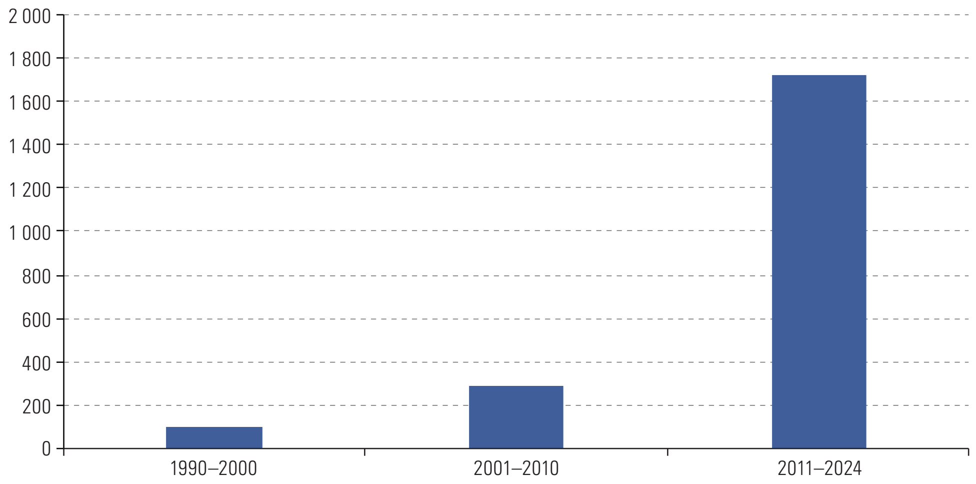
Country	Enterprise size				Total
	Microenterprises	Small enterprises	Medium-sized enterprises	Large enterprises	
Argentina	45	58	13	14	135
Belize	2	0	0	0	2
Bolivia (Plurinatiopnal State of)	3	0	0	1	4
Brazil	406	569	119	164	1 312
Chile	78	86	14	8	189
Colombia	77	82	8	21	198
Costa Rica	1	6	0	1	9
Dominican Republic	3	5	1	0	9
Ecuador	10	4	0	3	19
El Salvador	4	3	0	0	7
Guatemala	3	3	2	1	9
Guyana	0	1	0	0	1
Mexico	95	142	13	31	286
Panama	6	6	1	0	14
Paraguay	4	0	0	0	5
Peru	16	21	1	4	42
Uruguay	12	10	2	5	30
Venezuela (Bolivarian Republic of)	2	2	0	2	6
Total	767	998	174	255	2 277

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Crunchbase; B. Díaz de Astarloa, "Inteligencia artificial en empresas de América Latina: medición, adopción e impacto", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished.
Note: Enterprise size is defined as follows: a microenterprise has 1 to 10 employees, a small enterprise 11 to 50 employees, a medium-sized enterprise 51 to 200 employees and a large enterprise 201 employees or more. The total for each row may be greater than the sum of the columns because there are enterprises whose size is unknown.

[5] See [online] https://www.crunchbase.com/.

Regarding the age of AI companies active in the region, while some were founded as long as 50 years ago, the vast majority were founded between 2010 and 2024 (I.13). An analysis of the founding of AI firms by time period shows that 5% were established between 1990 and 2000, 13% between 2001 and 2010 and the remaining 82% after that year.

Figure I.13
Latin America and the Caribbean: enterprises founded in the artificial intelligence sector, 1990–2024
(Numbers)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Crunchbase; B. Díaz de Astarloa, "Inteligencia artificial en empresas de América Latina: medición, adopción e impacto", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished.
Note: Information on the date of founding is not available for all firms.

An analysis of investment in technology-based AI start-ups in the region's countries shows that 576 investors had made a total of 11,183 investments in the AI industry in Latin America and the Caribbean as of September 2024 (see table I.2). Financing or funding raised by firms in the industry across the region totalled upward of US$ 2.8 trillion; (this amount was for just 24% of the sample). Brazil was the location of just over half of all the region's investors and almost 70% of its total financing; 92% of investors, 93% of the number of investments and 99% of financing were accounted for by that country, Argentina, Chile, Colombia and Mexico between them.

Table I.2
Latin America and the Caribbean (18 countries): investors, investments and funding in artificial intelligence enterprises, September 2024
(Numbers and millions of dollars)

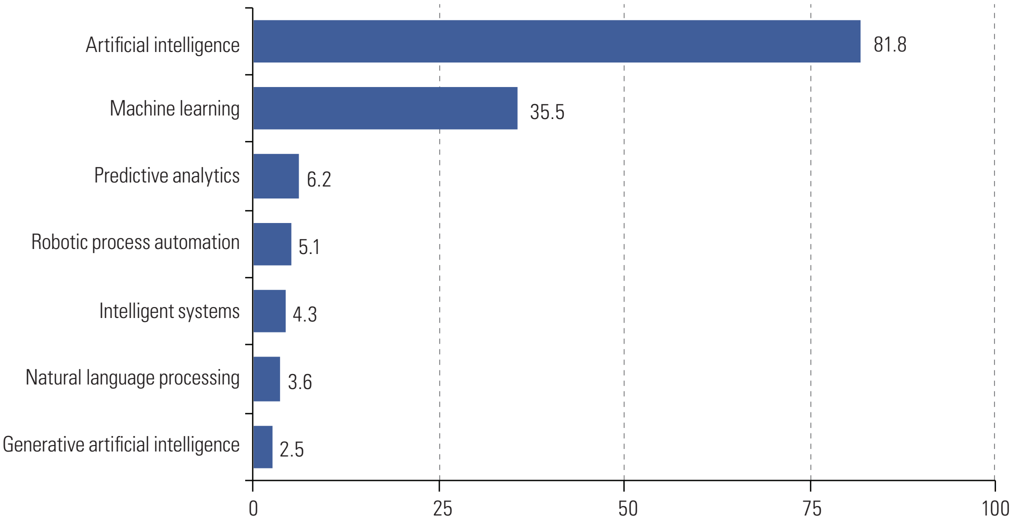
Country	Investors *(Number)*	Investments *(Number)*	Financing of artificial intelligence enterprises *(Millions of dollars)*
Argentina	46	782	34 470
Bolivia (Plurinational State of)	1	3	0
Brazil	307	6 360	1 943 173
Chile	45	1 582	629 922
Colombia	41	327	38 769
Costa Rica	3	59	1 600
Dominican Republic	...	...	5
Ecuador	5	33	3 325
El Salvador	2	141	1
Honduras	1	2	0
Jamaica	1	12	0
Mexico	91	1 390	159 694

Country	Investors *(Number)*	Investments *(Number)*	Financing of artificial intelligence enterprises *(Millions of dollars)*
Nicaragua	1	1	...
Panama	4	14	0
Paraguay	3	55	0
Peru	12	137	9 843
Uruguay	11	276	10 653
Venezuela (Bolivarian Republic of)	2	9	1 023
Total	576	11 183	2 833 570

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Crunchbase; B. Díaz de Astarloa, "Inteligencia artificial en empresas de América Latina: medición, adopción e impacto", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished.
Note: No information is available on the amount of funding received by 1,726 enterprises (76% of the sample).

As regards the main areas the region's AI companies are working in, most (81.8%) seem to be engaged in the development of generic solutions in this field. Machine learning is the second main area of interest, with 35.5% of companies involved in its development. This is followed by complementary technologies such as predictive analytics (6.2%), robotic process automation (5.1%), intelligent systems (4.3%) and natural language processing (3.6%). Generative AI, on the other hand, has been little explored and only 2.5% of companies are engaged in this field, which seems logical given that it emerged only recently.

Figure I.14
Latin America and the Caribbean: shares of firms in the artificial intelligence sector engaged in different activities, 2024
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Crunchbase; B. Díaz de Astarloa, "Inteligencia artificial en empresas de América Latina: medición, adopción e impacto", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished.
Note: The total does not add up to 100% because some enterprises engage in more than one activity.

As the above analysis shows, the ecosystem of technology start-ups involved in AI in Latin America and the Caribbean is growing strongly. This is a developing landscape of younger, smaller companies. While it is difficult to draw hard and fast conclusions, it seems that most companies are still focused on machine learning and similar systems, and more recently on generative AI, an emerging technology with more potential.

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CHAPTER

II

Skills, connectivity and infrastructure: key factors for harnessing the digital transformation and artificial intelligence to overcome inequality and low social mobility and cohesion

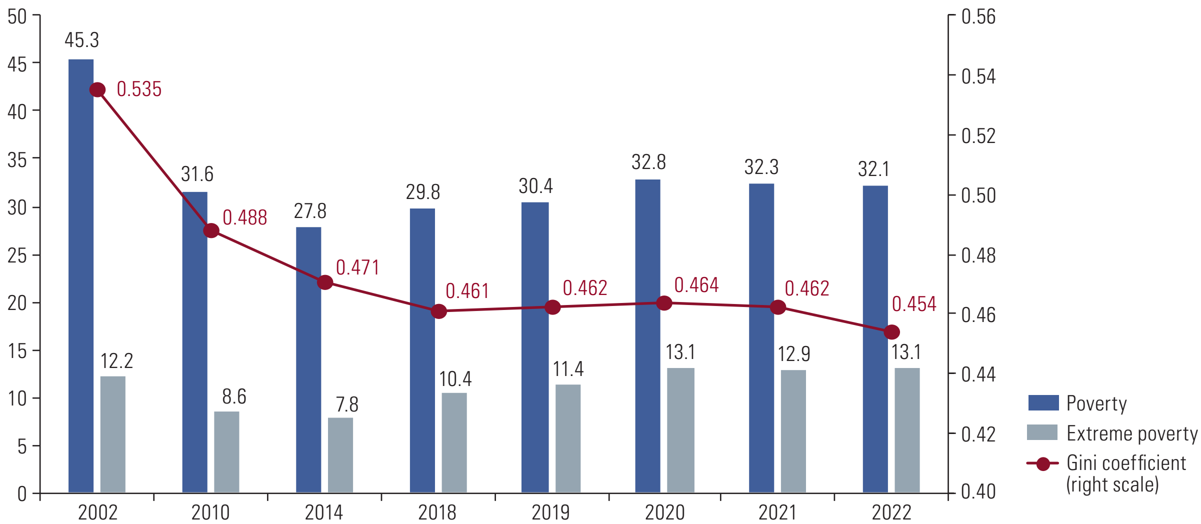
A. Low economic growth, poverty and inequality in Latin America and the Caribbean

As has already been indicated, one of the main structural problems or development traps affecting Latin America and the Caribbean relates to its high levels of poverty and inequality and limited capacity for social integration and mobility.

The social trap is a cycle of poverty and exclusion that prevents individuals and communities from escaping the disadvantaged conditions they live in. This cycle is perpetuated by various mechanisms that reinforce inequality and hinder access to economic, educational and social opportunities. Broadly speaking, the social trap can be understood as a set of conditions that limit people's ability to improve their economic and social situation over time. The following are some of the main factors perpetuating this trap: (i) low growth, (ii) regressive tax systems, (iii) weak social policies and social protection policies, (iv) fragile education systems, (v) gender inequality and (vi) marked inequalities and spatial segregation in urban areas. These elements are perpetuated over time and are reflected in exclusion and a lack of social mobility, which is why cross-cutting, comprehensive actions are needed for there to be progress towards a more equitable and inclusive development model in the region (Salazar-Xirinachs, 2023).

Structural, unfair and inefficient inequalities have been identified as one of the main structural constraints that must be addressed for progress to be made towards inclusive social development in Latin America and the Caribbean (ECLAC, 2023). An initial assessment of these inequalities, measured by the Gini coefficient, reveals the extent of the problem in the region. Despite some improvements in recent decades, inequalities have been reduced only slightly. In 2014, the region's Gini coefficient was 0.47, and by 2022 it had only fallen to 0.45, which reveals the persistence of inequalities (ECLAC, 2023) (see figure II.1).

Figure II.1
Latin America and the Caribbean: poverty, extreme poverty and the Gini coefficient, 2002–2022
(Percentages and Gini values)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), *Social Panorama of Latin America and the Caribbean, 2023* (LC/PUB.2023/18-P/Rev.1), Santiago, 2023; CEPALSTAT [online database] https://statistics.cepal.org/portal/cepalstat/index.html?lang=en.

At the same time, although the economic boom during the first decade of this century allowed poverty levels to fall significantly between 2004 and 2014, from 42.6% to 27.8%, this dynamic was not maintained and progress has stalled since then. In 2022, 32% of the region's population lived in poverty and 13% in extreme poverty (ECLAC, 2023).

ECLAC (2023) has pointed out that, among the factors conditioning inequality, the dynamics of employment and the labour market are crucial when it comes to strengthening mobility and social cohesion in Latin America and the Caribbean. These factors play a central role in people's development and open the doors to social inclusion. In this context, the aim of labour inclusion is to ensure that everyone in the labour force has access to decent work which ensures an adequate level of remuneration and social protection coverage.

A large portion of the population in the low-income stratum, including people who are not poor but whose earnings place them in that stratum, are engaged in activities that are either outside the labour market or of low productivity. In addition, about 50% of workers in the region are informally employed. This situation disproportionately affects women, a fact that also poses great challenges and opportunities when it comes to addressing the region's structural gender inequalities (ECLAC, 2023).

Labour inclusion policies therefore need to be based on greater labour market dynamism that reflects the peculiarities of the region, is anchored in productive development policies, boosts the development of growth-enhancing sectors and ensures not only greater creation of value added and employment, but also higher pay and social protection coverage.

Digital transformation can become an essential tool for creating quality jobs, improving wages and providing men and women with access to basic goods and services, thus helping to break the inclusion and social vulnerability trap. Digitalization provides opportunities to improve access to education, increase productivity and create quality jobs in traditional and emerging sectors of the economy. However, as will be seen in the following sections, unequal access to technology and the digital divide still represent significant challenges in the region and could actually widen existing social gaps.

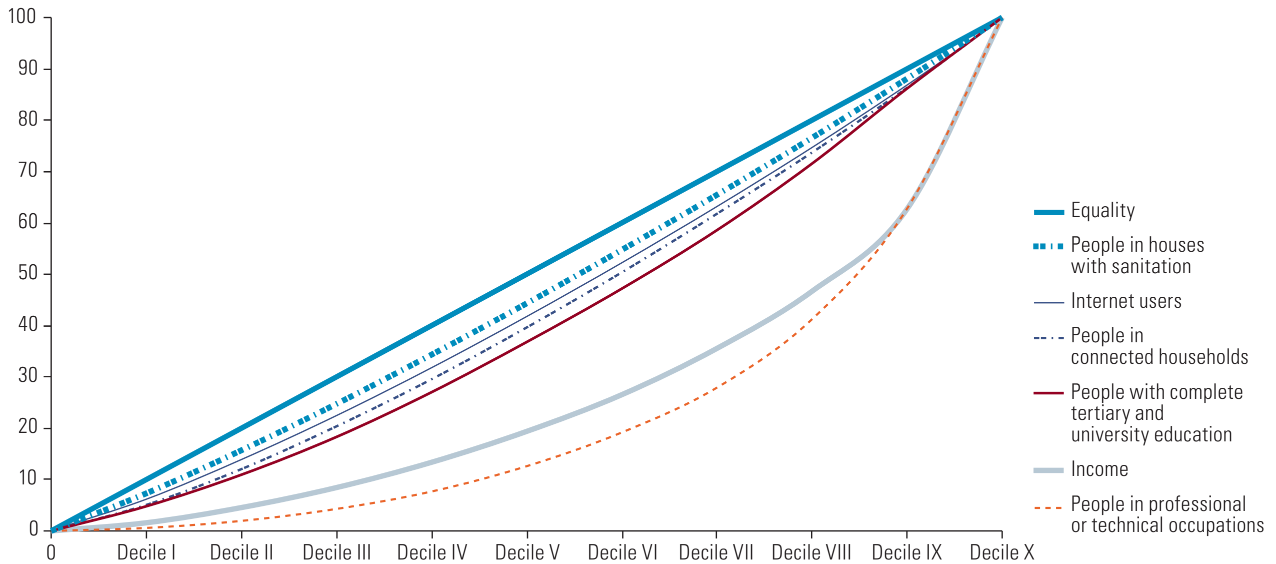
Against this background, the present chapter focuses on highlighting the opportunities to overcome the inequality trap that digital technologies offer. It analyses the concept of meaningful and universal connectivity as a central pillar in the effort to achieve real and effective use of digital technologies, and addresses the importance of a robust computing infrastructure as an essential factor in the development of artificial intelligence. The chapter also underlines the relevance of digital skills for social inclusion, as they are essential for people to improve their capabilities and employment opportunities in the digital economy. Lastly, it explores the changes that AI will bring to the labour market, emphasizing the need to understand these effects in order to reap its benefits and mitigate the negative consequences.

B. Digitalization, skills development and employment

Digitalization has increased considerably in Latin America and the Caribbean. Internet penetration rates have doubled in the last decade, with 80% of people using the Internet in the region as of 2023. Internet access is also more evenly distributed than tertiary and university education, and certainly more than income (see figure II.2). This means that digital technologies can play a crucial role in facilitating access to certain services and overcoming several of the factors that perpetuate the inequality trap and hinder social inclusion, especially by improving access to knowledge, education and training.

In education, digital technologies democratize access to high-quality educational resources. Through online learning platforms, educational applications and digital resources, people can access up-to-date and relevant educational content irrespective of their geographical location, age or socioeconomic status. This is particularly important in a region where inequalities in the quality and coverage of education and training are very marked, especially between territories or localities within the same country. In addition, digital technologies, and artificial intelligence in particular, can help to personalize learning by adapting its content and methods to individual needs and employment opportunities.

Figure II.2
Latin America (13 countries):[a] cumulative average distribution of Internet access and use, education level, professional or technical occupations, sanitation services and income, by household per capita income decile, 2022
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Household Survey Data Bank (BADEHOG).
Note: The percentages on the vertical scale represent the cumulative shares of each household per capita income decile.
[a] Brazil, Chile, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Honduras, Mexico, Panama, Paraguay, Peru, the Plurinational State of Bolivia and Uruguay. The data for the Plurinational State of Bolivia are from 2021.

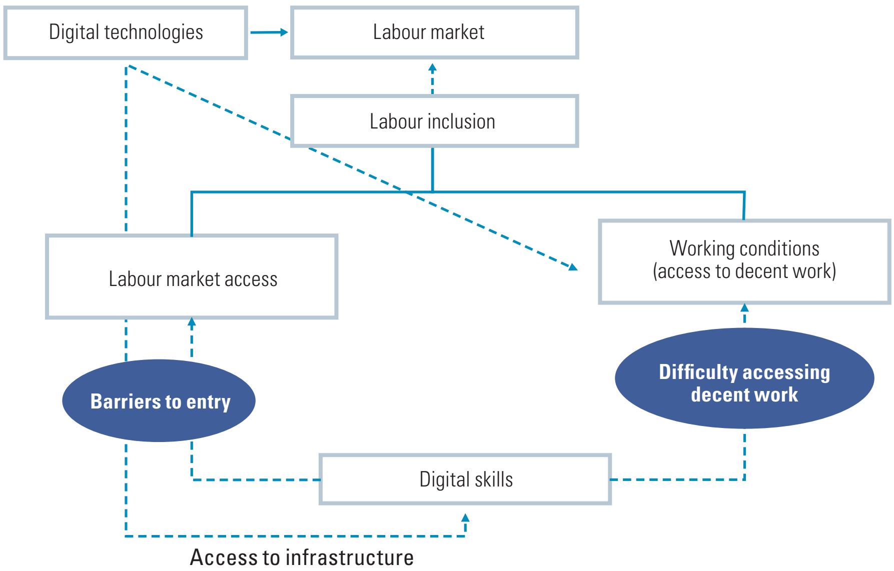
Digital technologies can play a crucial role in improving labour inclusion by creating employment opportunities that offer higher wages and better working conditions. As the global economy digitalizes, new industries and new jobs are being created, especially in high-demand sectors such as those linked to information and communications technologies and digital services. Some recent studies have shown a significant correlation between wages and levels of digital skills and Internet use, highlighting the importance of increasing people's digital skills as a mechanism for achieving better economic and social outcomes (Piroșcă and others, 2021).

Thus, digital skills have a key role to play in overcoming barriers to labour market participation, since one of the obstacles to access is a lack of the capabilities needed to attain better jobs and, ultimately, labour inclusion[1] (see diagram II.1). Jobs requiring digital skills tend to have a higher value set on them than others and so to offer better working conditions and more competitive wages. There is thus a positive relationship between the development of digital skills and the ability to overcome barriers to labour market entry. However, it is important to remember that the development of digital skills is conditioned in turn by access to digital infrastructure and technologies. This complex linkage is presented in diagram II.1.

It is important to note that the virtuous circle mentioned above relates primarily to jobs that require more complex digital skills (programming, data analysis, etc.), as distinct from jobs that do not usually require specific or more advanced technical skills but are facilitated digitally (such as collaborative digital platforms and those used to organize part-time employment). Despite the opportunities that digitalization offers, it is important to highlight the continuing importance of analytical and critical thinking skills, as well as so-called "soft" skills.

1 Labour market participation essentially means access to the labour market, while labour inclusion means not just access to a job but full and equal integration into the world of work with suitable working conditions.

Diagram II.1
Digital skills and their impact on labour market participation



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of ECLAC, *Social Panorama of Latin America and the Caribbean, 2023* (LC/PUB.2023/18-P/Rev.1), Santiago, 2023.

Digital technologies, and collaborative digital platforms in particular, have profoundly transformed traditional business models. These technologies have changed the way work is organized and delivered. This change has had positive implications, as it has opened up new employment opportunities, but it has also created major challenges, particularly as regards worker social protection and regulation, where there is a clear deficit (Robles, Tenenbaum and Jacas, 2023).

Moreover, bridging the digital divide is in itself a challenging issue that needs to be considered in detail so that strategies for effectively harnessing these technologies and realizing their full potential can be devised.

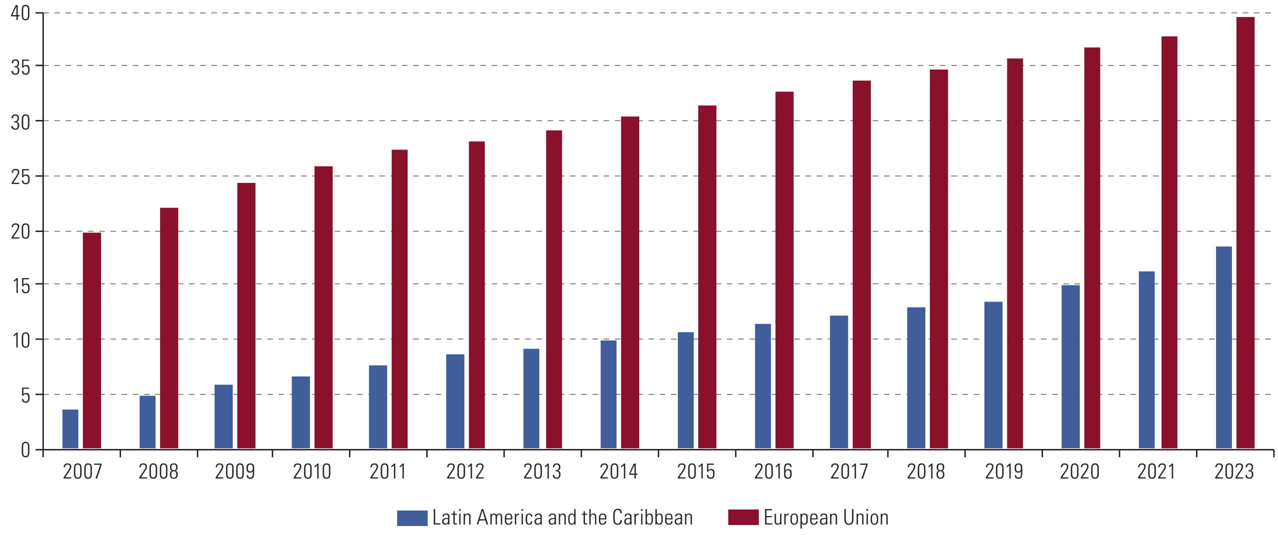
C. Access to broadband and "meaningful connectivity"

As noted above, while connectivity indicators in Latin America and the Caribbean have improved markedly, there are still major challenges regarding equality of access, service quality and coverage. These issues, together with that of the development of digital capabilities and skills, are limiting the efficiency and productivity of the digital transformation in practice and conditioning the region's participation in the global knowledge economy.

With regard to both fixed and mobile Internet penetration, Latin America and the Caribbean presents major gaps compared to more advanced regions. These differences, which are persistent, reflect structural challenges in technological infrastructure and the accessibility and affordability of the service in the region. The gaps are particularly wide in fixed broadband, where the disparity is most pronounced.

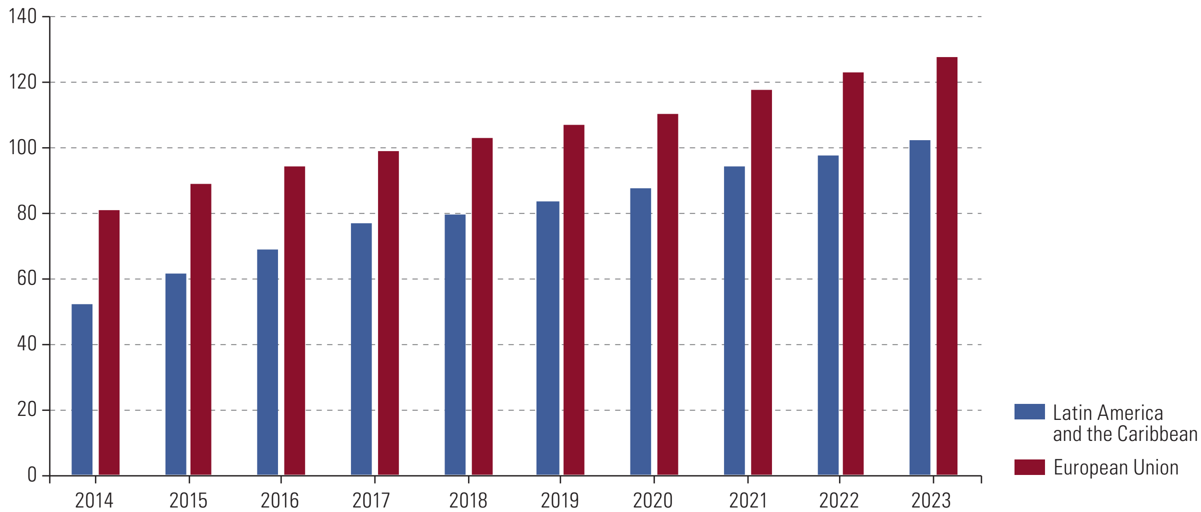
Fixed broadband remains a key enabling technology for advanced digital services such as teleworking, online education and some telemedicine services. However, its penetration in the region has been limited by a number of factors, including high infrastructure roll-out costs in rural and hard-to-reach areas and low investment in fibre optic networks (see figure II.3). Mobile broadband has grown faster, driven by the mass penetration of mobile devices and the roll-out of 3G and 4G networks. Despite the progress, however, there are still gaps relative to more advanced regions such as Europe (see figure II.4).

Figure II.3
Latin America and the Caribbean and European Union (27 countries):[a] fixed broadband penetration, 2007–2023
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), *Social Panorama of Latin America and the Caribbean, 2023* (LC/PUB.2023/18-P/Rev.1), Santiago, 2023; International Telecommunication Union (ITU).
Note: The latest information for the European Union is from 2023; for Latin America and the Caribbean, the latest data are from 2022 for some countries and 2023 for others.
[a] Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the Kingdom of the Netherlands, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

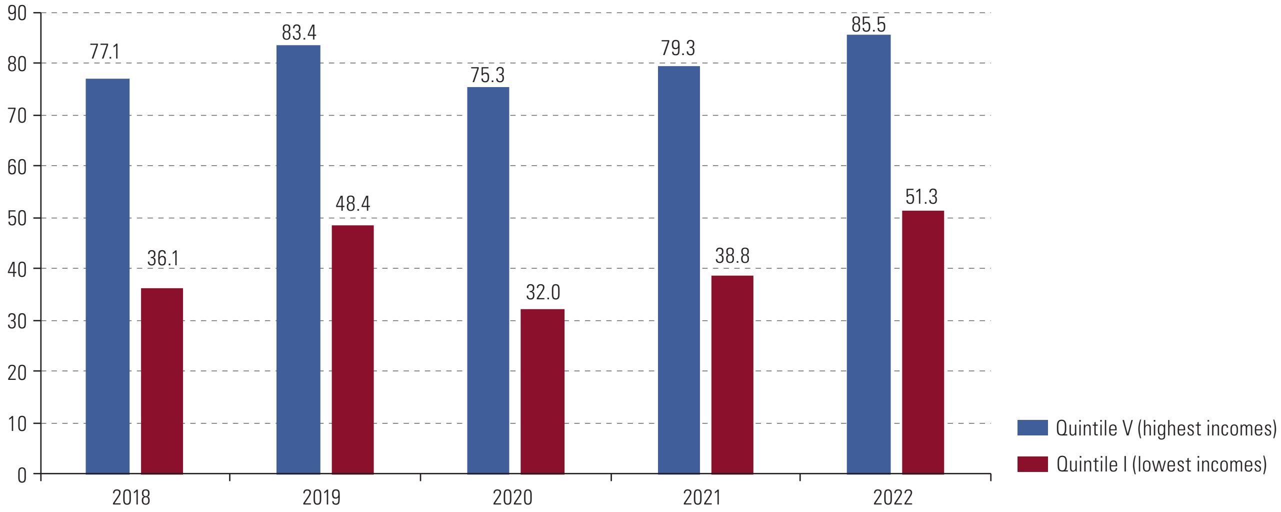
Figure II.4
Latin America and the Caribbean and European Union (27 countries):[a] mobile broadband penetration, 2014–2023
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), *Social Panorama of Latin America and the Caribbean, 2023* (LC/PUB.2023/18-P/Rev.1), Santiago, 2023; GSMA, GSMA Mobile Connectivity Index [online] https://www.mobileconnectivityindex.com/index.html.
Note: Figures are based on the number of subscriptions. This may exceed the number of individuals because there may be more than one subscription per individual.
[a] Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the Kingdom of the Netherlands, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

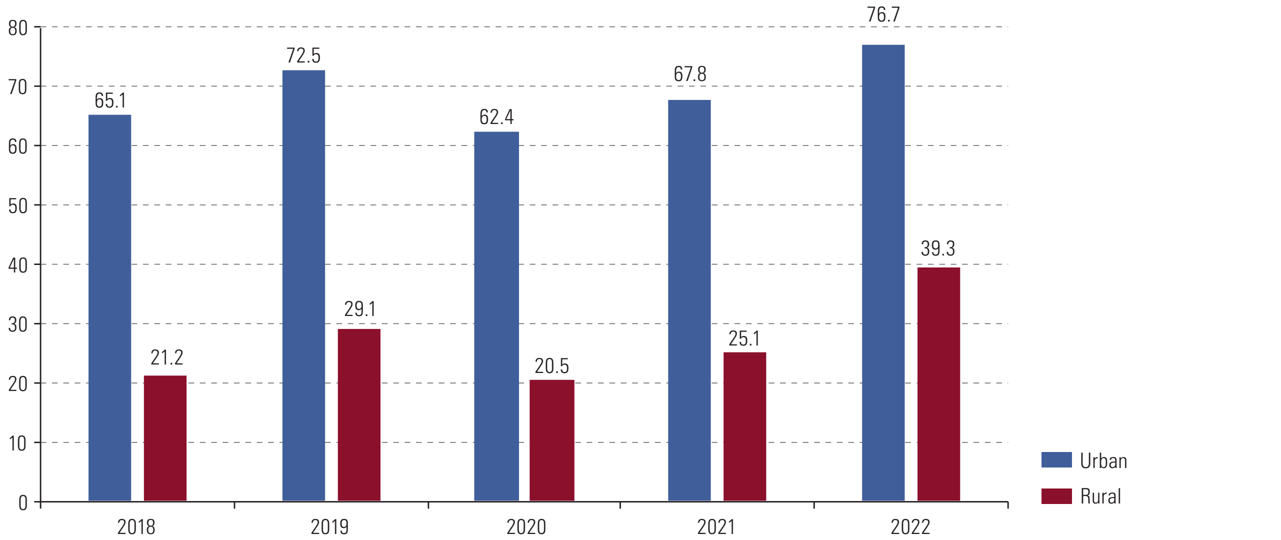
There are also significant differences in Internet access within the countries of Latin America and the Caribbean: these differences are related to income level and geographical location, resulting in gaps that can exceed 30 percentage points (see figures II.5 and II.6). The disparity particularly affects lower-income households and remoter areas, where lack of infrastructure and high costs limit access to the service. As a result, a large part of the population is excluded from Internet use and thus from the benefits associated with digital transformation.

Figure II.5
Latin America and the Caribbean: shares of households with Internet access, by income quintile, 2018–2022
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Household Survey Data Bank (BADEHOG).
Note: This indicator is calculated by dividing the number of households with Internet access in each quintile by the total number of households in each quintile. Internet access may be fixed or mobile.

Figure II.6
Latin America and the Caribbean: shares of households with Internet access, by area of residence, 2018–2022
(Percentages)

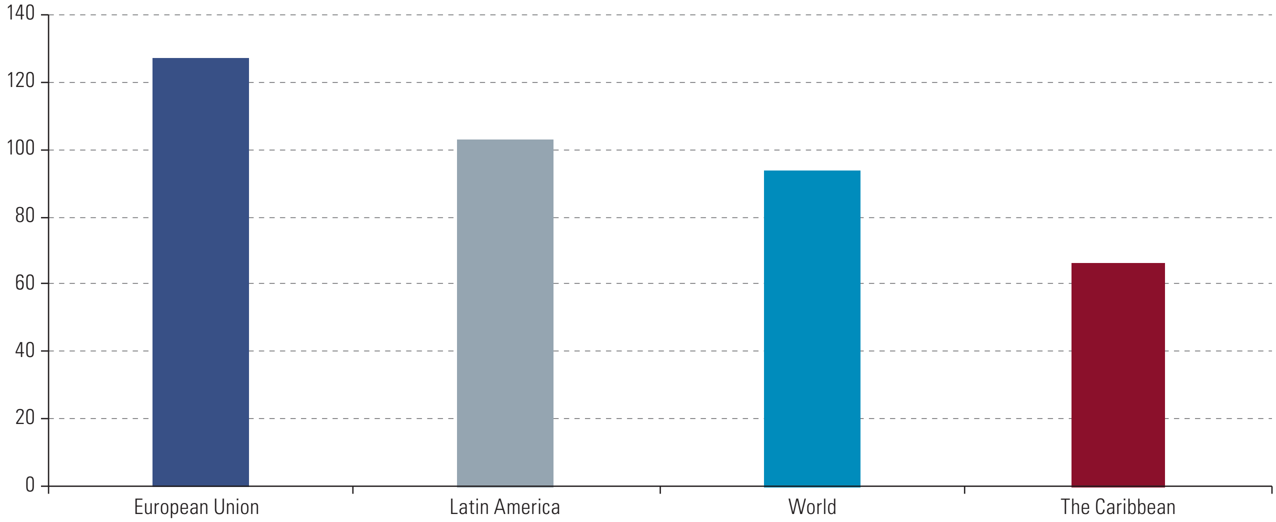


Source: Economic Commission for Latin America and the Caribbean (ECLAC), Household Survey Data Bank (BADEHOG).
Note: This indicator is calculated by dividing the number of households with Internet access in each area by the total number of households in each area. Internet access may be fixed or mobile.

Digital exclusion exacerbates territorial, social and economic inequalities, as people without Internet access are unable to take advantage of the opportunities offered by the digital economy and online education, health and government services. This reinforces the marginalization of the most vulnerable and increases the barriers to their development. It is essential that governments implement inclusive policies and pursue investments in infrastructure to reduce these gaps and ensure that the benefits of digitalization are accessible to everyone.

In addition to Internet access gaps, service quality is another key factor affecting connectivity. Analysis of connection speeds shows that the average situation in the region as regards fixed broadband is relatively favourable and indeed better than the world average (see figure II.7). However, the regional average masks large disparities between countries: while some have made major progress with fixed broadband quality, others still suffer from considerable limitations in speed and coverage.

Figure II.7
Latin America, the Caribbean (7 countries), European Union (27 countries) and world:[a] fixed broadband download speeds, June 2024
(Mbps)



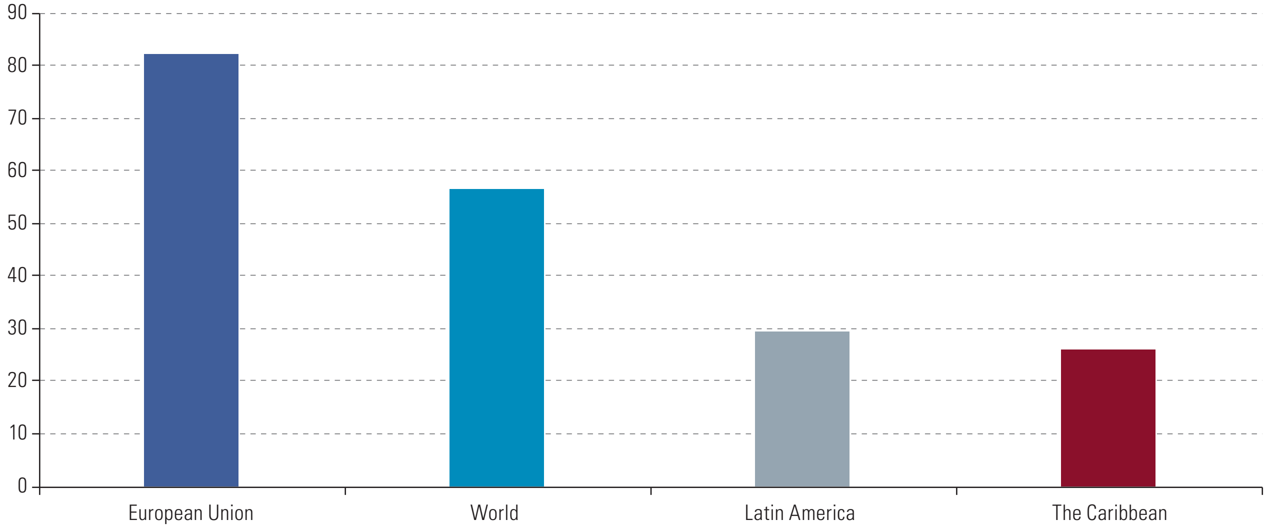
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Ookla, Speedtest Global Index [online] https://www.speedtest.net/global-index.

[a] The Caribbean includes Cuba, the Dominican Republic, Guyana, Haiti, Jamaica, Suriname and Trinidad and Tobago. The data for Cuba and the Dominican Republic are from June 2024 and those for the other countries are from May that year. The European Union includes Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the Kingdom of the Netherlands, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

The picture with mobile broadband is more challenging. First, mobile broadband speeds tend to be lower than fixed broadband speeds. Second, the quality gap with more advanced countries is larger: on this indicator, the region actually lags behind the world average (see figure II.8). Thus, although mobile broadband has grown considerably and enabled more people to access the Internet, there are still challenges with connection quality. One aspect that could be affecting this indicator is the speed of deployment of 5G technologies in more advanced countries in comparison with what has happened in the region (De León, 2023).

In the digital age, equating Internet access with access to a connection alone is inadequate to capture the true impact of connectivity on people's lives. As digital services and applications become more sophisticated, it has become clear that access alone is not enough for a connection to be effective, but that people must have the capacity to make full use of it for personal, social and economic development. The concept of "meaningful connectivity" has emerged, providing a more holistic approach to Internet access that incorporates factors such as quality, affordability, digital skills and security.

Figure II.8
Latin America, the Caribbean (7 countries), European Union (27 countries) and world:[a] mobile broadband download speeds, June 2024
(Mbps)



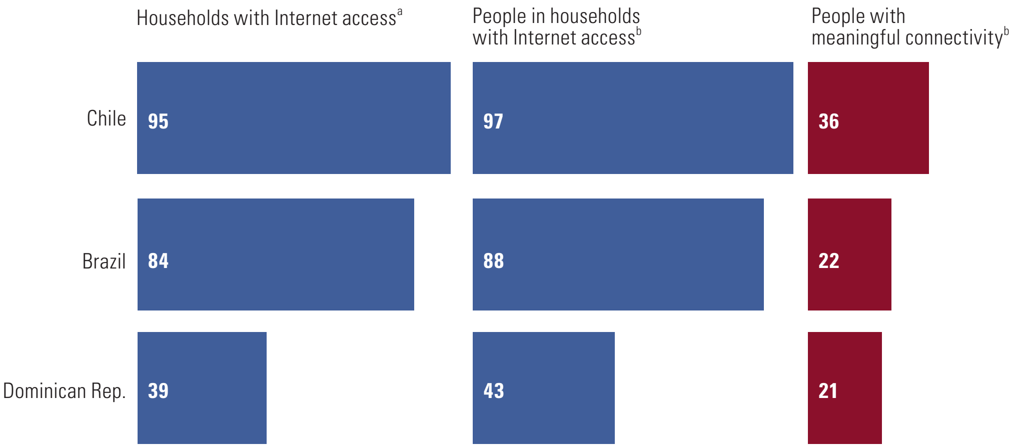
Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Ookla, Speedtest Global Index [online] https://www.speedtest.net/global-index.

[a] The Caribbean includes Cuba, Guyana, the Dominican Republic, Haiti, Jamaica, Suriname and Trinidad and Tobago. The data for Cuba and the Dominican Republic are from June 2024 and those for the other countries are from May that year. The European Union includes Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, the Kingdom of the Netherlands, Latvia, Lithuania, Luxembourg, Malta, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden.

ECLAC, in common with other organizations such as the European Union, the International Telecommunication Union (ITU) and the Regional Center for Studies on the Development of the Information Society (Cetic.br), has adopted and promoted this concept to enhance its analysis of connectivity. For connectivity to be meaningful, it is not enough for an Internet connection to exist: it must be fast, reliable and stable and capable of supporting activities such as video calls, file downloads and uninterrupted access to online services. Affordability is also a crucial component of this concept: connectivity must be accessible to all, regardless of geographical location or socioeconomic status, and this requires infrastructure to be expanded, in particular to cover rural and marginalized areas. This holistic approach also recognizes the importance of users having digital skills that enable them to take advantage of online tools and services, from information search to content creation and participation in virtual communities. Access to suitable devices is also essential to ensure that users can take full advantage of digital opportunities, since connecting from a basic phone is not the same as connecting from a computer with advanced capabilities.

ECLAC, in collaboration with Cetic.br, has worked to create a meaningful connectivity indicator that incorporates the aspects mentioned, the aim being to provide policymakers with a more complete tool for identifying the factors that determine connection quality and designing the policies needed for progress in this direction. The indicator includes dimensions such as affordability, frequency of use, available devices and the setting in which the Internet is accessed, allowing for a more detailed analysis of the barriers faced by different population groups. The results show that the share of the population with meaningful connectivity is markedly lower than the share of the population with Internet access and of connected households. These results illustrate that, despite progress with Internet access in recent years, there are shortcomings in other important dimensions that need to be urgently addressed. The analysis carried out in three countries of the region (Brazil, Chile and the Dominican Republic) illustrates this (see figure II.9).

Figure II.9
Brazil, Chile and the Dominican Republic: households with Internet access, people in households with Internet access and people with meaningful connectivity, 2023
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of Regional Center for Studies on the Development of the Information Society (Cetic.br); Undersecretariat of Telecommunications of Chile; National Bureau of Statistics of the Dominican Republic, National Multipurpose Household Survey; ECLAC, Household Survey Data Bank (BADEHOG).

[a] Calculated as a percentage of all households.

[b] Calculated as a percentage of the whole population.

In the light of rapid digital transformation and the veritable tectonic shifts affecting development globally, such as machine learning and generative artificial intelligence (AI), meaningful connectivity becomes a necessary albeit insufficient condition for effective appropriation of the benefits these transformations can bring.

For these advances to translate into real benefits, it is crucial to have enablers in place, such as the right technological infrastructure and training, to allow these technologies to be adopted and effectively used. But these enablers are not enough: AI also requires a certain type of computing infrastructure and specific skills, as will be seen below.

D. Computing capacity and access to the cloud in the region

While the theoretical foundations of AI were laid in the 1950s, it is only in the last few years that we have been able to witness the practical applications of this technology and its impact on economic and social development. One of the factors behind this dramatic progress and development is computing capacity and computing power (Titus and Russell, 2023).

The computing required for AI is characterized by a number of key attributes that are essential for it to perform efficiently. First, specialized hardware is needed, such as graphics processing units (GPUs), which are particularly effective at the parallel processing that is crucial for performing tasks such as deep learning. In addition, there is a need for optimized software layers, such as libraries, frameworks and tools designed to develop, train and deploy AI models. Lastly, scalability is essential, as AI computing must be capable of expanding to cope with the growing size of models and datasets, as well as the increasing complexity of applications (OECD, 2023; Sastry and others, 2024). As demand for these computing resources grows rapidly, they become crucial for research and development.

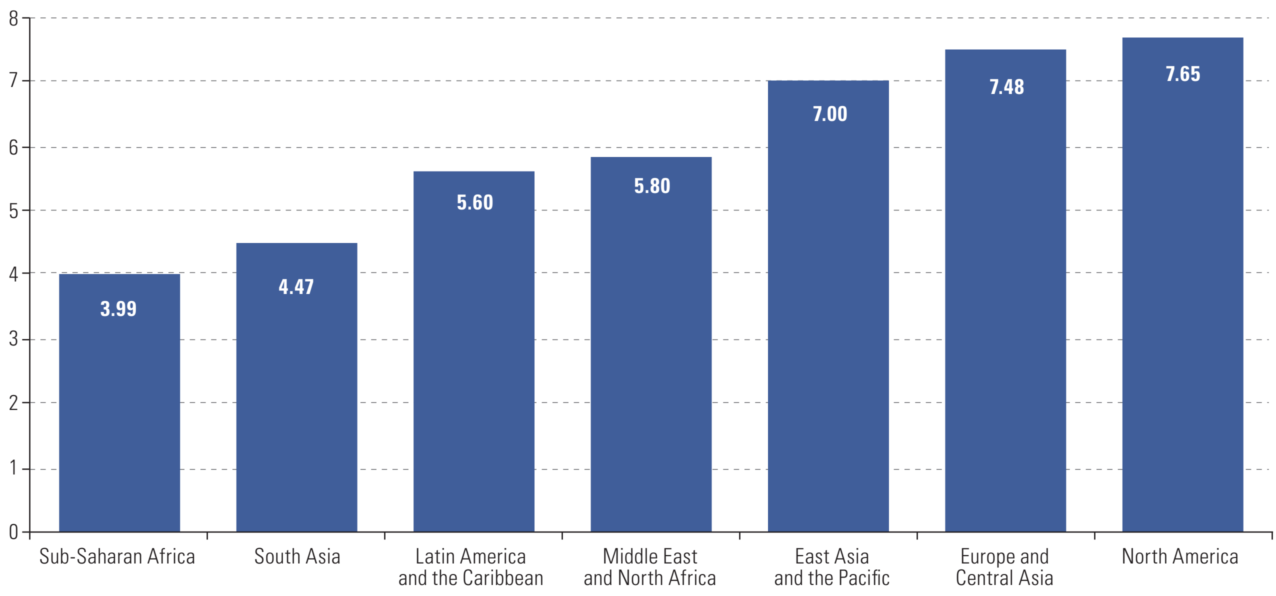
In Latin America and the Caribbean, as in much of the developing world, access to affordable and reliable computing resources is a persistent challenge (Hager and others, 2017; Sastry and others, 2024). Meaningful policies and initiatives are needed in this area, even in countries that have established national AI strategies. This disparity in information technology infrastructure and investment creates a major competitive disadvantage for the region, which is struggling to match more developed markets' pace of progress in the adoption of AI technologies (Yu, Rosenfeld and Gupta, 2023).

There is a close link between AI adoption and cloud computing. National AI computing capacity comprises resources that may be hosted in centralized data centres accessed through cloud services or located in the perimeter of decentralized devices, such as mobile phones or Internet of things (IoT) devices (OECD, 2023). In this way, cloud service providers enable organizations to make significant advances in their AI capabilities and contribute to a more equitable distribution of computing power (Sastry and others, 2024). This underscores the need to facilitate cloud-based services and to complement them with high-performance computing resources.

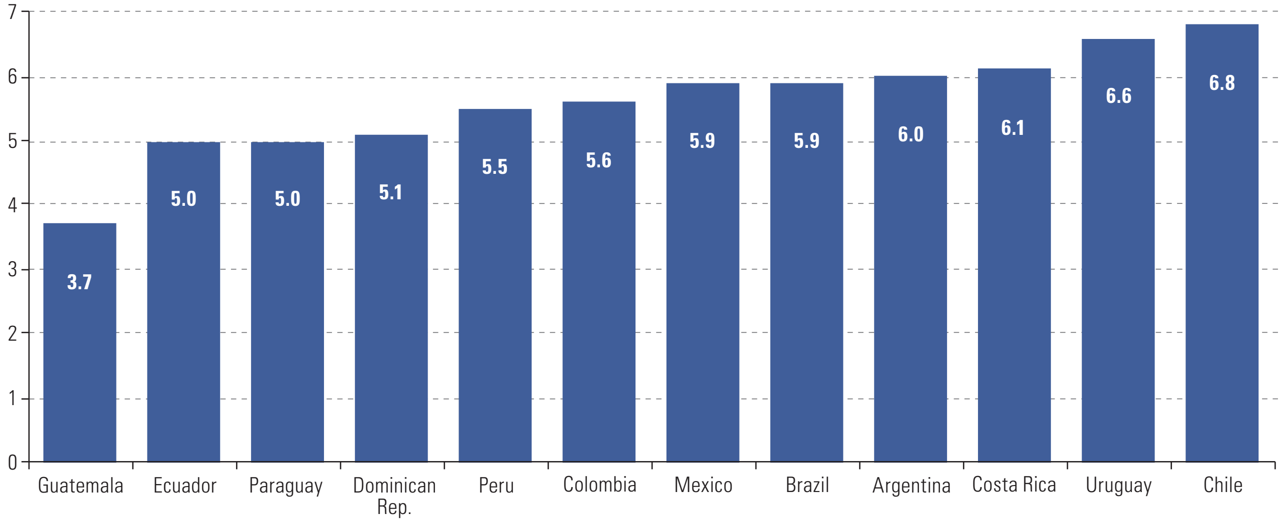
The global cloud ecosystem index 2022 (MIT Technology Review Insights/Infosys Cobalt, 2022) provides a detailed look at the global cloud computing landscape and ranks 76 nations, including 11 from Latin America and the Caribbean, by their ability to support cloud technology with infrastructure, ecosystem adoption, security and talent. The index values show that the countries of Latin America and the Caribbean score an average of 5.6 and lag behind more developed regions such as Europe and Central Asia (7.48) and North America (7.65) (see figure II.10). This highlights the need for the region to invest more in infrastructure and talent to drive cloud innovation. However, the regional picture is mixed, with some countries, such as Chile and Uruguay, leading the region in this area and exceeding the regional average with scores of 6.8 and 6.6, respectively, while others face challenges, scoring below average and lagging far behind global top performers such as Finland and Singapore, which score 8.5.

Figure II.10
Latin America and the Caribbean (12 countries) and world regions: global cloud ecosystem index, 2022
(Index values)

A. World regions



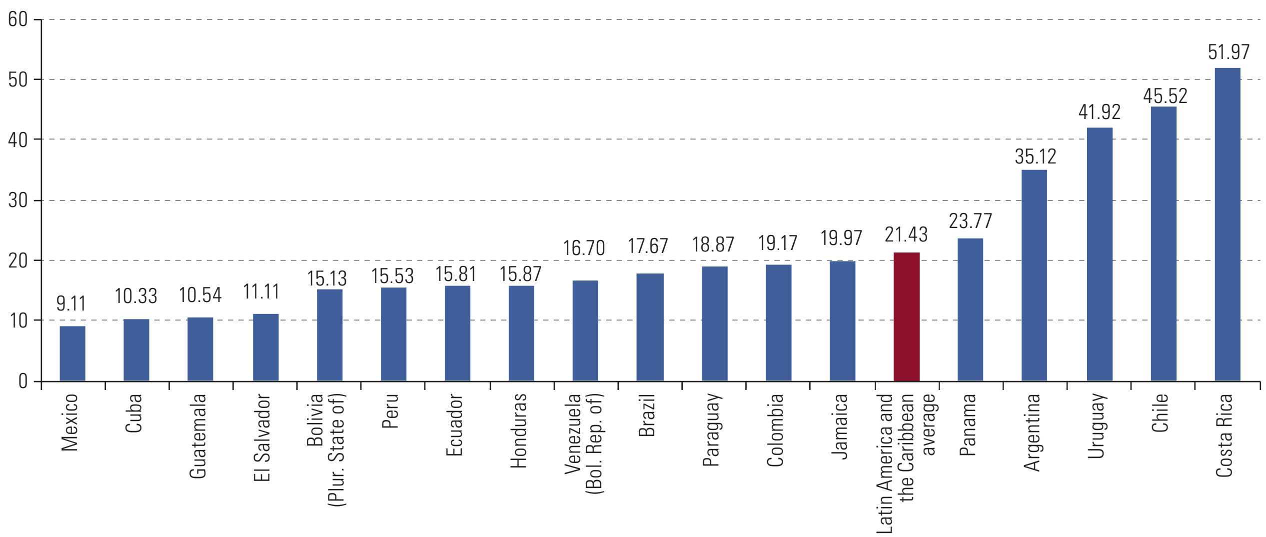
B. Latin America and the Caribbean



Source: MIT Technology Review Insights/Infosys Cobalt, "Global Cloud Ecosystem Index 2022", 2022 [online] https://www.technologyreview.com/2022/04/25/1051115/global-cloud-ecosystem-index-2022/.

Another indicator that can be used to assess AI computing capacity in the region is the computing component of the Latin American artificial intelligence index (ILIA) (CENIA and others, 2024), which measures aspects such as cloud computing, high performance computing (HPC) infrastructure, certified data centres, Internet exchange points (IXPs) and secure Internet servers in 19 countries. For the computing capacity subindicator, the average for the region is 21.43 points, and the countries are grouped into three categories: those with high capacity, such as Costa Rica (51.97), Chile (45.52) and Uruguay (41.92), which exhibit solid access to computing resources; those with intermediate capacity, such as Argentina (35.12) and Brazil (17.67), which have moderate infrastructure but room to grow; and those with lower capacity, which face significant challenges in developing adequate computing infrastructure.

Figure II.11
Latin America and the Caribbean: computing subindicator of the Latin American artificial intelligence index (ILIA), 2024
(Subindicator values)



Source: National Centre for Artificial Intelligence (CENIA) and others, "Índice latinoamericano de inteligencia artificial (ILIA)", 2024 [online] https://indicelatam.cl/.

Computing power, data and software development talent are critical to the deployment and growth of AI. A review of AI policy frameworks in Latin America and the Caribbean shows that while data and talent have received attention, computing power, despite its critical importance, remains an often overlooked component. To ensure the long-term success and competitiveness of AI development, governments need to formulate national strategies for expanding high performance computing (HPC) capabilities and decentralized computing resources.

E. The digital skills development gap

For workers, businesses and citizens to be able to participate successfully in today's and tomorrow's society, it is essential for them to possess the necessary digital skills or competences. Until the early 2000s, the emphasis in the countries was on the mathematical and reading comprehension skills necessary for industrialized society; in the last few years, however, digital literacy has gained in importance. In fact, digital literacy is one of the main components of the Sustainable Development Goals (SDGs). In particular, indicator 4.4.1 stipulates that countries should monitor and measure information and communications technology skills among youth and adults (United Nations, 2024).

Thus, the transition to a society that is hyperconnected and digitalized both economically and socially presents major challenges when it comes to ensuring that this change is inclusive. In the workplace, new modes of organization, production and governance are consolidating alongside declining traditional models, a situation that has become even more challenging with the recent advent of AI. In this context, it is essential to build a digitally empowered society where the conditions are in place for workers and companies to adopt digital tools that allow the latter to remain viable and competitive. This entails a process of digital transformation supported by strategies focused on the development of digital skills that enable effective use to be made of the new technologies.

Despite the importance of digital skills, there is still no consensus on how to define them. This definition is a fundamental premise that needs to be constructed, validated and rendered explicit with a view to devising specific strategies and targeting efforts.

What makes digital skills challenging to define is largely the speed of technological progress, which outstrips the ability of policymakers to understand it and of policy to adapt. Moreover, training in digital skills is a gradual process that takes place over the different stages of life, making it difficult to effectively ascertain when and how these competences are acquired. However, there are definitions that can help, such as the one provided by Delors (1996), who defines skills as a person's ability to cope with a large number of situations, and points out that training, meaning the process of enabling people to acquire these skills, is based on four pillars: learning to know, learning to do, learning to live together and learning to be.

Different frames of reference have been developed to address this challenge, such as the Digital Competence Framework for Citizens (DigComp) (Vuorikari and others, 2016), in which digital skills are organized into five key domains: information and data literacy; safety; digital content creation; problem solving; and communication and collaboration. These domains allow levels of attainment to be calibrated by age, education and work experience, which facilitates the provision of tiered training appropriate to the needs of different groups. There are also other taxonomies, such as the Bloom-Anderson taxonomy (Anderson and others, 2001), which offers an approach for linking digital skills to observable cognitive levels, from remembering to creating, thus enabling more effective teaching and assessment strategies to be designed. Although the implementation of these theoretical frameworks is challenging, costly and time-consuming, it can be crucial to effectively measure and develop people's digital skills.

Among international bodies, the International Telecommunication Union (ITU) also has a guide on assessing digital skills (ITU, 2018). The guide treats these skills as a broad set of capabilities that are divided into three levels: basic, intermediate and advanced. Basic skills include the ability to perform essential operations with devices, such as using keyboards and touch-screens, setting up accounts and browsing the Internet, that enable users to access essential online information and services. Intermediate skills involve more sophisticated use of digital technologies, such as digital publishing, graphic design and data analysis, and are necessary to integrate in a critical way into the digital work environment. Lastly, advanced skills are needed by professionals specializing in information and communications technologies (ICTs), and include capabilities such as programming, cybersecurity, application development, artificial intelligence and big data. According to the ITU guide, these skills are essential for participating in the emerging sectors of the digital economy.

The penetration of digital skills varies in different countries because of a range of socioeconomic, technological and educational factors. According to ITU (2018), the disparity between nations is mainly explained by unequal access to technological infrastructure, such as Internet connectivity, which is essential for the development of these skills. In addition, access to digital education programmes and the inclusion of technological aspects in educational curricula vary widely between countries. Countries with strong technology policies and education programmes focused on digital capabilities typically have greater penetration of skills, while those with fewer resources or limited strategies face greater challenges in developing a workforce that is ready for the digital age.

Although, as noted above, there are challenges that make it difficult to obtain comparable information for measuring people's digital skills, there are some sources that provide a rough idea of the level of digital skills in certain countries of the region. Figure II.12 compares the situation in these countries with that in the Republic of Korea. As can be seen, there is a clear divide in the penetration of basic, intermediate and advanced skills, although there are also substantial differences within the region. Indeed, three groups of countries can be observed in the region: a first group, comprising Uruguay and Chile, where the relative level of basic, intermediate and advanced skills exceeds the average; another group, comprising Mexico, Brazil and the Dominican Republic, with an average level of skills; and a last group of countries where the level of digital skills is below the average for the countries considered in the region.

Figure II.12
Latin America and the Caribbean (9 countries) and Republic of Korea: penetration of digital skills, 2023

	Uruguay	Chile	Mexico	Brazil	Dominican Rep.	Peru	Jamaica	Colombia	Ecuador	Average	Rep. of Korea
Basic skills	**68**	**54**	**50**	**45**	**40**	**37**	**37**	**33**	**24**	**45**	**81**
Using copy and paste tools within a document	63	...	30	23	18	25	16	30	24	26	95
Sending emails with attached files	73	65	32	25	18	24	24	30	23	29	94
Seeking health information	57	42	47	43	30	...	...	36	2	42	65
Reading or downloading newspapers, magazines or books	58	26	30	52	...	...	21	10	6	37	93
Getting information about goods or services	62	45	71	46	29	60	...	36	27	52	86
Making calls using VoIP or messaging app	80	76	68	65	80	...	70	...	62	67	68
Participating in social networks	85	68	74	59	64	...	56	57	...	64	67
Intermediate skills	**39**	**44**	**21**	**25**	**18**	**16**	**10**	**17**	**9**	**22**	**55**
Using basic arithmetic formula in a spreadsheet	38	45	25	14	13	18	7	22	11	20	57
Creating electronic presentations with presentation software	44	...	28	13	11	18	7	22	11	18	50
Transferring files between a computer and other devices	57	50	...	23	15	18	13	25	13	24	67
Using software run over the Internet for editing text documents, spreadsheets or presentations	43	...	...	16	...	...	6	7	...	15	18
Uploading self/user-created content to a website to be shared	...	53	3	30	31	...	...	...	...	22	62
Doing an online course	6	21	26	16	18	16	...	21	...	20	31
Purchasing or ordering goods or services	38	41	27	42	14	10	12	12	2	30	73
Internet banking	48	53	13	46	21	15	16	14	6	30	80
Advanced skills	**34**	**37**	**16**	**10**	**8**	**10**	**6**	**15**	**11**	**14**	**45**
Connecting and installing new devices	50	46	22	10	10	14	8	25	16	17	61
Finding, downloading, installing and configuring software	42	50	19	19	9	11	9	15	14	19	66
Writing a computer program using a programming language	10	16	6	3	4	3	1	5	3	5	8

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of International Telecommunication Union (ITU), "Individuals with ICT skills", 2024 [online] https://datahub.itu.int/data.

The digital skills divide between countries can significantly widen the technology development gap. Countries that fail to develop digital skills in their populations, both basic and advanced, struggle to adopt new technologies and thus to take advantage of the opportunities offered by the global digital economy. This lack of digital skills not only limits countries' ability to introduce advanced technologies such as artificial intelligence and automation, but leaves them lagging in terms of innovation and competitiveness. Furthermore, the acquisition of digital skills is essential to cope with the changes taking place in the labour market, particularly those driven by AI, which will be discussed in more detail below.

F. Artificial intelligence and its transformative impact on the labour market

There are several reasons why it is crucial to analyse the impact of digital technologies, in particular AI, on the labour market and employment. The automation of human tasks with the use of advanced technologies such as AI is profoundly and rapidly transforming the economy. This phenomenon is not new: previous industrial revolutions have led to significant changes in the global economy and in people's well-being. While these processes of technological transformation have led to economic growth and new job opportunities, they have also been accompanied by major challenges.

One of the main challenges of the technological revolution is the change in the composition of employment. While technology can create new forms of work and improve productivity, it can also displace workers whose tasks are automated, especially those employed in occupations where there is little scope to adapt or move to other sectors. This in turn could exacerbate labour market inequalities, especially in regions such as Latin America and the Caribbean, where the economic and employment structure may be particularly vulnerable to technological change.

The literature on the impact of automation has come on considerably over the last decade, exploring how technology is reshaping the labour market from a variety of perspectives. Some pioneering studies, such as Frey and Osborne (2017), have estimated the risk of automation across a wide range of occupations, while more recent research, such as Noy and Zhang (2023) and Eloundou and others (2023), has delved into the impact of generative artificial intelligence on specific tasks. In parallel, Felten, Raj and Seamans (2018 and 2023) have linked advances in artificial intelligence to occupational skills, providing a detailed view of how the technology can transform work. Another approach is task-based analysis, carried out in studies such as Arntz, Gregory and Zierhan (2016) and Nedelkoska and Quintini (2018), which highlights the heterogeneity within occupations and suggests a lower risk of automation than predicted when occupationally based methods are applied. Studies of this type also highlight the importance of considering the differences between labour markets in different countries. In Latin America, there are also studies that have analysed this phenomenon and the socioeconomic implications it will have in the region (Espíndola and Suárez, 2024; Brambilla and others, 2023).

Up-to-date information is essential in this area because it allows policymakers to design strategies that maximize the benefits of technology and mitigate its negative effects. It is important to note that while the impact of job displacement may be felt quickly, the reallocation of labour and the creation of new employment opportunities usually take longer to manifest themselves. Again, while technology has great potential to improve productivity and well-being, its ultimate outcome will depend on how its implementation is managed, as argued in Acemoglu and Johnson (2023). This means there is a need not only to stimulate job creation in emerging sectors, but also to invest in re-educating and retraining the workforce to adapt to the new demands of the market.

The following analysis uses a quantitative approach based on official statistics to examine the potential impact of AI on the labour force in a group of Latin American countries. It explores how different population groups might be affected by AI. The methodology used is based on the analysis by Espíndola and Suárez (2024); each task is evaluated for its susceptibility to automation, taking into account the "bottlenecks" that limit this, such as perception and manipulation, creative intelligence and social intelligence. Setting out from this analysis, indicators of non-automatable skills are identified and a probability vector is used to apply them to the occupational distribution in each country. The analysis covers two areas: the first centres on the impact of machine learning, and the second also considers the impact of generative AI.

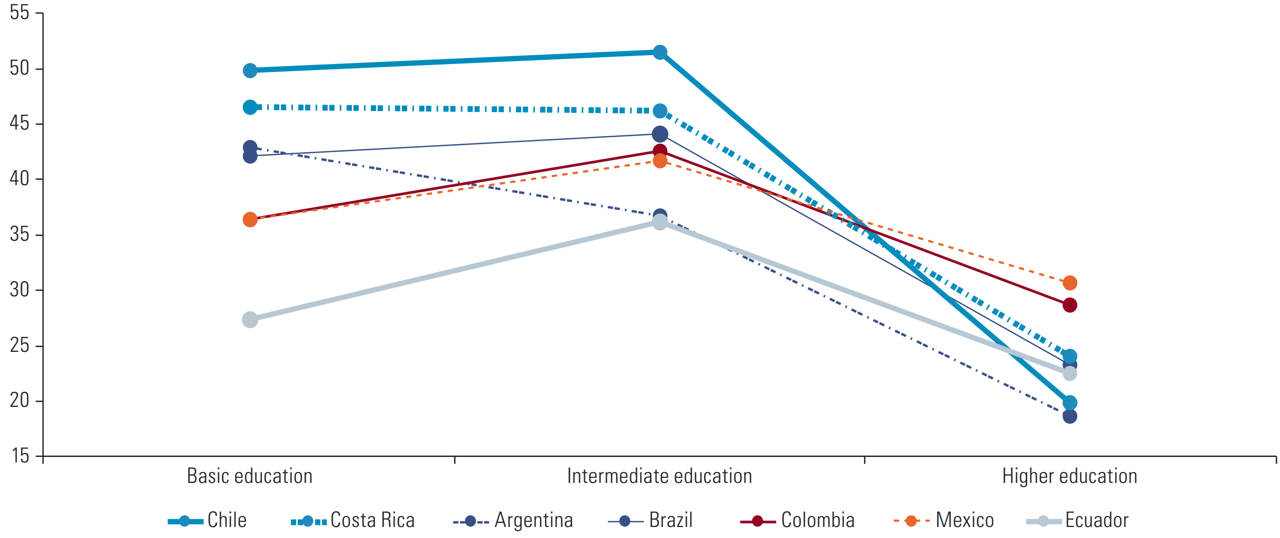
Machine learning, a subfield of AI, involves the design of algorithms that enable the autonomous improvement of systems based on data, whereas generative AI goes a step further by creating new content from learned patterns. This technology is widely used for tasks such as prediction, classification and analysis of patterns in large volumes of data (IBM, 2024). Generative AI is a branch of artificial intelligence in which machine learning techniques are used to create original content such as images, text or music. Unlike other AI approaches that centre on classification or prediction, generative AI specializes in producing new data from patterns studied (Pasick, 2023; Karpathy and others, 2016). The two technologies have different applications and effects on employment, which underlines the importance of understanding their methods and their impact on production processes.

The development of machine learning began to accelerate in 2012 with advances in methods such as supervised, unsupervised and reinforcement learning. Between 2013 and 2021, studies of the impact on employment and the labour market focused on this learning. Since the commercial launch of ChatGPT in October 2022, however, analysis has concentrated on determining the impact of generative AI.

Some assumptions are made to analyse the likelihood of AI affecting employment, one of which is a scenario of full technology adoption by firms. However, it must be borne in mind that technology take-up in the productive sector occurs gradually.

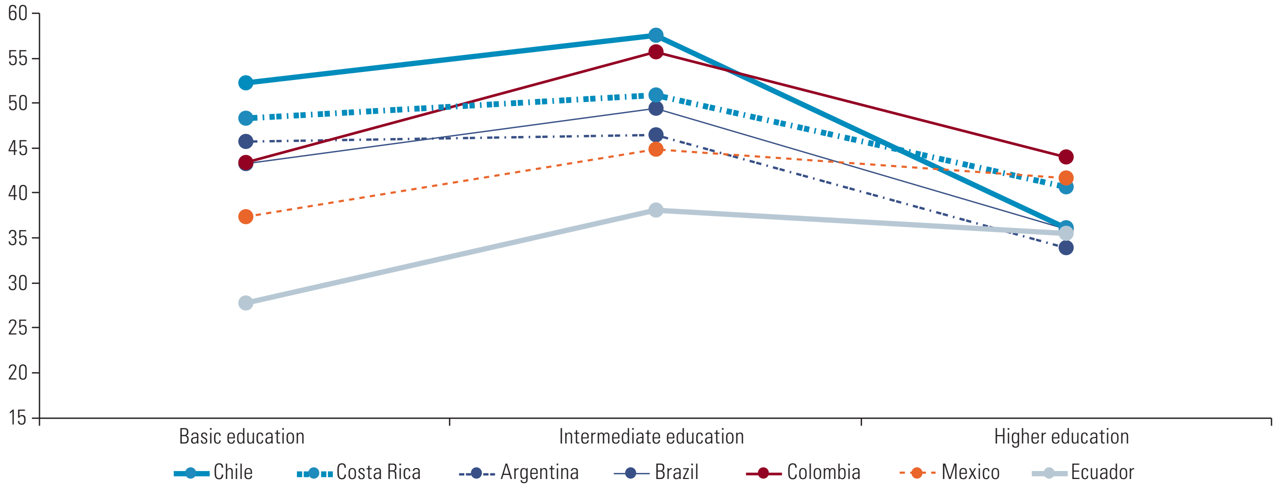
In the case of machine learning, when the percentage of the workforce affected is analysed by educational level, it can be seen that the most vulnerable jobs are those associated with basic education: overall, the risk probability associated with these jobs is almost twice as high as that associated with jobs requiring higher education (see figure II.13). This is because machine learning tends to mainly affect routine and mechanical jobs. In the case of generative AI, the magnitude of the impact by educational level changes, with a considerably greater impact on jobs requiring higher education, precisely because this type of technology enables more complex and knowledge-intensive tasks to be performed (see figure II.14). In the case of both machine learning and generative AI, the stratum most affected is employment requiring an intermediate level of education, with some exceptions.

Figure II.13
Latin America (7 countries): workforce affected by machine learning, by educational level, 2023
(Percentages)



Source: R. Katz and others, "Impacto de la inteligencia artificial en el empleo de América Latina (2015-2023)", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, forthcoming; ECLAC, *Social Panorama of Latin America and the Caribbean, 2023* (LC/PUB.2023/18-P/Rev.1), Santiago, 2023; on the basis of household surveys from the respective countries.

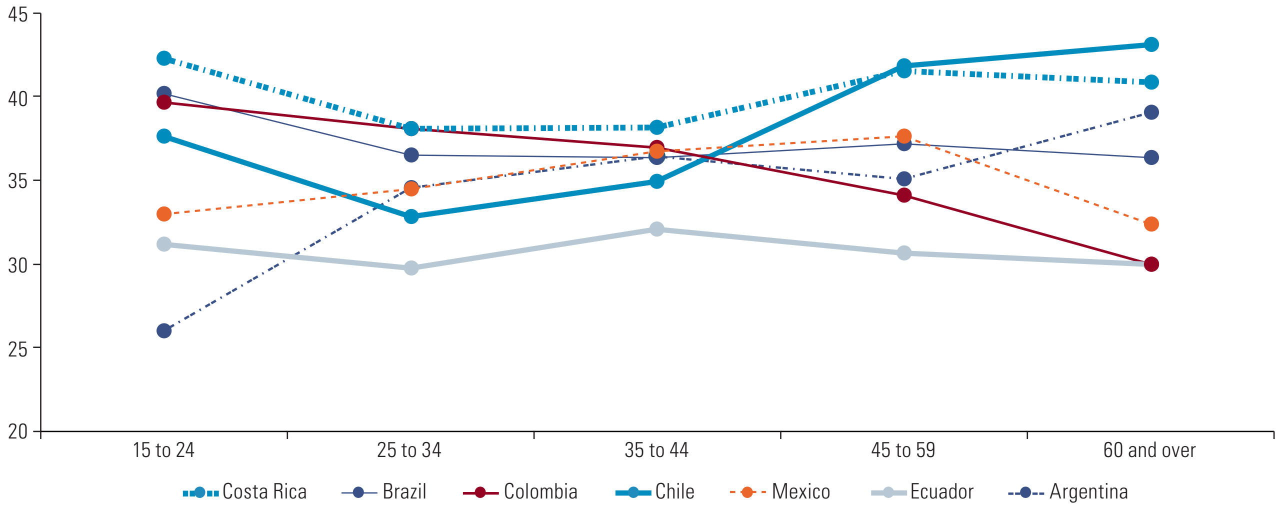
Figure II.14
Latin America (7 countries): workforce affected by generative artificial intelligence, by educational level, 2023
(Percentages)



Source: R. Katz and others, "Impacto de la inteligencia artificial en el empleo de América Latina (2015-2023)", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, forthcoming; ECLAC, *Social Panorama of Latin America and the Caribbean, 2023* (LC/PUB.2023/18-P/Rev.1), Santiago, 2023; on the basis of household surveys from the respective countries.

As regards the percentage of the labour force affected by machine learning in the different age groups, it is observed that the younger groups, in particular the group aged 15 to 24, are the most vulnerable in several countries (see figure II.15). This result suggests that youth, who tend to be employed in more repetitive and lower-skilled jobs, are at greater risk of being affected. In the case of older age groups, such as workers aged between 45 and 59 and those aged 60 and over, large proportions are also affected, but with differences from one country to another. In this case, the high impact could be owed to a lack of digital skills, and also depends on the level of participation of these workers in the most vulnerable sectors.

Figure II.15
Latin America (7 countries): workforce affected by machine learning, by age group, 2023
(Percentages)



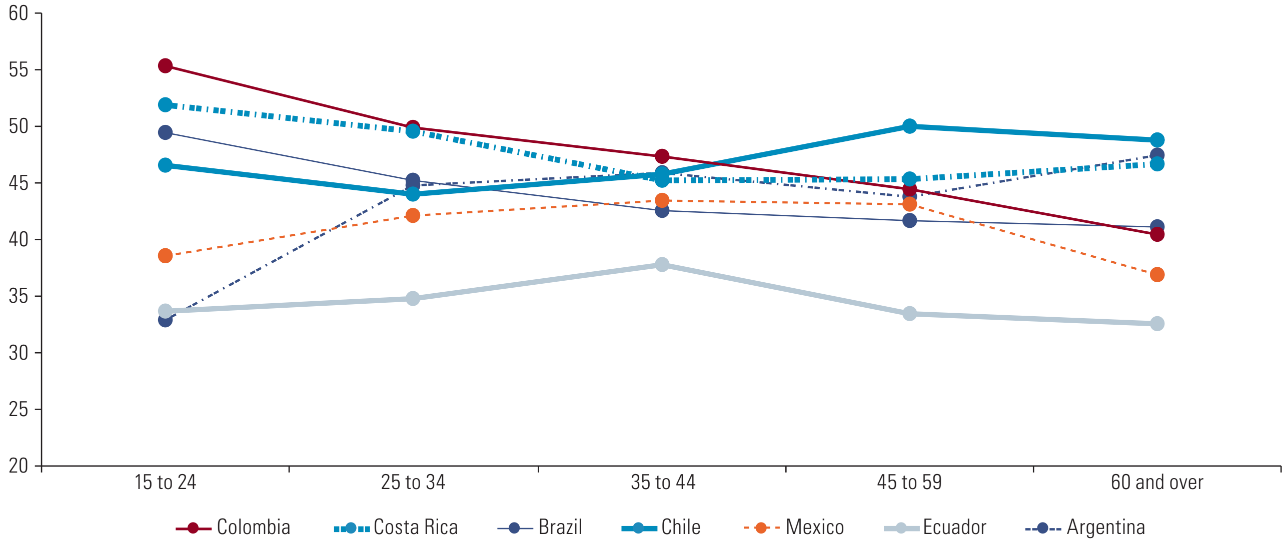
Source: R. Katz and others, "Impacto de la inteligencia artificial en el empleo de América Latina (2015-2023)", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, forthcoming; ECLAC, *Social Panorama of Latin America and the Caribbean, 2023* (LC/PUB.2023/18-P/Rev.1), Santiago, 2023; on the basis of household surveys from the respective countries.
Note: The data are from 2022 for Chile and 2021 for Colombia.

As for the impact of generative AI, its percentage impact appears to be higher across all age groups, which could be because its effects are further-reaching, as indicated above (see figure II.16). Youth aged between 15 and 24 tend to be the most vulnerable in countries such as Brazil, Colombia and Costa Rica, where entry-level or lower-skilled jobs are more susceptible. However, in countries such as Argentina, the risk is higher among older workers, reflecting a possible impact in sectors where people may be slower to adapt to technology.

Figure II.16

Latin America (7 countries): workforce affected by generative AI, by age group, 2023

(Percentages)



Source: R. Katz and others, "Impacto de la inteligencia artificial en el empleo de América Latina (2015-2023)", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, forthcoming; ECLAC, *Social Panorama of Latin America and the Caribbean, 2023* (LC/PUB.2023/18-P/Rev.1), Santiago, 2023; on the basis of household surveys from the respective countries.

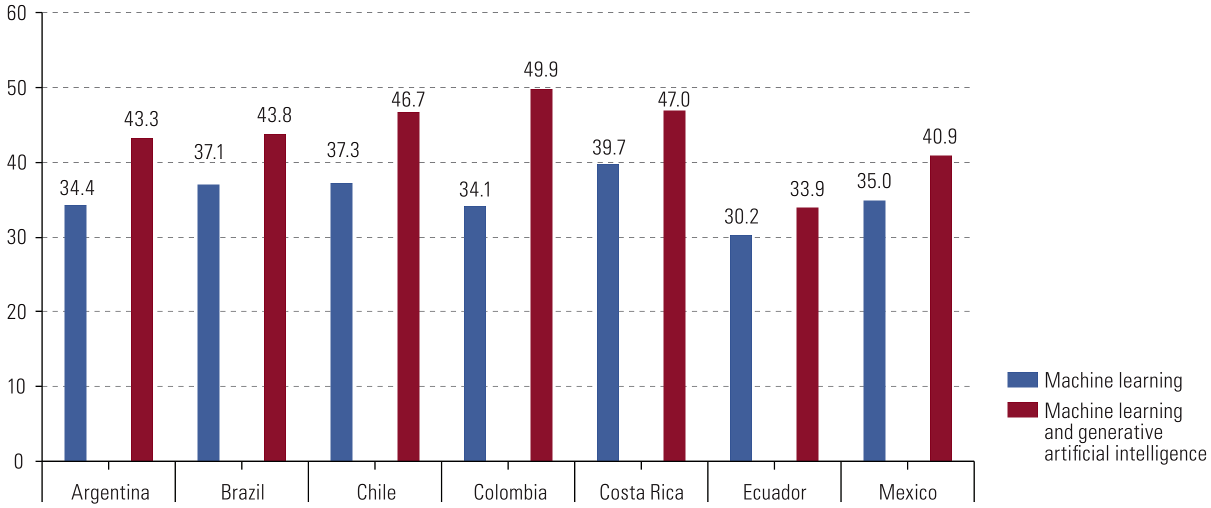
Note: The data are from 2022 for Chile and 2021 for Colombia.

Analysis of the percentage impact on overall employment in the countries of the region shows that, on average, about 44% of jobs are highly likely to be affected by AI, including machine learning and generative AI (see figure II.17). The impact of machine learning is considerably lower, at around 35% on average. The difference is explained by the fact that when generative AI is included in the calculation, the impact of AI spreads to sectors that were previously considered less susceptible.

With regard to the impact of machine learning and the overall impact of AI (including generative AI) in the different countries, significant differences can be observed. If the total is taken (machine learning plus generative AI), the dispersion is larger and can be as high as 16 percentage points. In the case of machine learning, the dispersion is substantial but smaller, at around 9 percentage points. The countries that appear to be most susceptible to the impact of machine learning are Costa Rica, Chile and Brazil, while in the case of AI, including generative AI, Colombia seems to be the most vulnerable. These differences might be due to the labour force structure of the countries and differences in the composition of employment.

As has been seen, the integrated coexistence of machine learning and generative AI represents a serious challenge for policymakers in Latin America and the Caribbean, but also a major opportunity to try for a labour market that is dynamic and highly permeable to change. Seizing this opportunity, however, will mean designing and implementing policies to maximize the positive impact on productivity and mitigate undesirable effects on the population.

Figure II.17
Latin America (7 countries): workforce affected by machine learning and generative AI, 2023
(Percentages)



Source: R. Katz and others, "Impacto de la inteligencia artificial en el empleo de América Latina (2015-2023)", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, forthcoming; ECLAC, *Social Panorama of Latin America and the Caribbean, 2023* (LC/PUB.2023/18-P/Rev.1), Santiago, 2023; on the basis of household surveys from the respective countries.

Note: The data were obtained from the following sources: in Argentina, the Permanent Household Survey (EPH); in Brazil, the Continuous National Household Survey (PNAD Contínua); in Colombia, the Large Integrated Household Survey (GEIH); in Costa Rica, the Continuous Employment Survey (ECE); in Ecuador, the National Survey on Employment, Unemployment and Underemployment (ENEMDU); and in Mexico, the National Occupation and Employment Survey (ENOE).

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CHAPTER

III

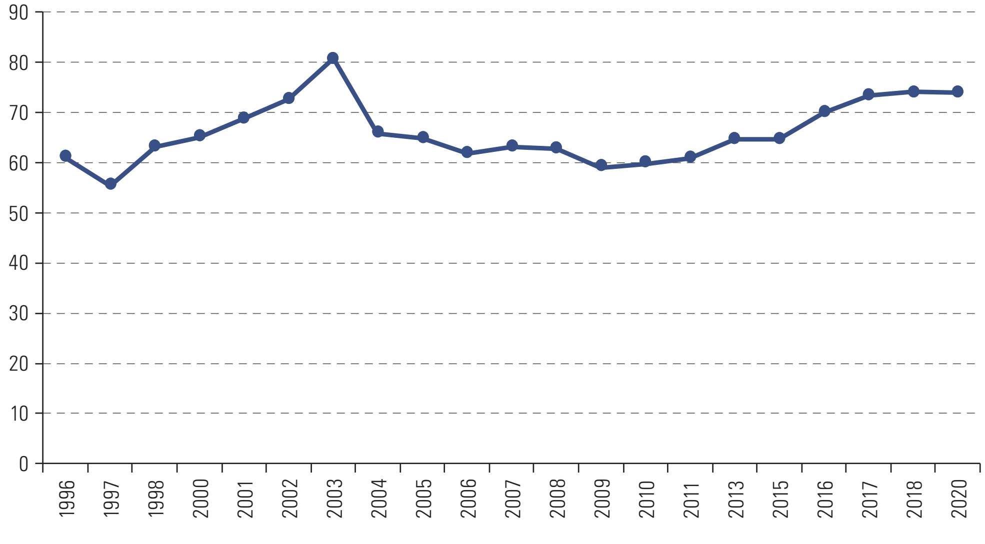
Digitalization as a vehicle for strengthening institutional and governance capacities

A. The trap of low institutional capacity and ineffective governance

As already indicated, Latin America and the Caribbean is caught in three development traps: a long-term inability to grow, high inequality and low social mobility, and low institutional and governance capacity (Salazar-Xirinachs, 2023). The last of these is reflected in a weakening of the social covenant, understood as the implicit agreement between the State and its citizens to guarantee rights, services and well-being. This phenomenon is manifested in a number of ways: perceptions of corruption, lack of transparency in public management, the ineffectiveness of essential services such as health care, education and security, and a growing disconnection between those in power and the demands of the population. As these problems worsen, the legitimacy of institutions is eroded, which can lead to lower civic participation, reduced trust in democracy and, in some cases, a rise in social protest action demanding profound reforms. Failure by the State to respond effectively to these challenges can lead to a spiral of disenchantment in which unmet citizen expectations fuel a crisis of governance and make it difficult to construct public policies that can promote inclusive and sustainable development in the region (ECLAC, 2020).

One indicator that can capture the lack of institutional capacity in Latin America and the Caribbean is precisely citizens' distrust of political and State institutions, a persistent and worrying problem in the region over the last few decades, and one that has if anything worsened during the last few years. The available data reflect the magnitude of this issue. In 2020, 7 out of every 10 people in the region expressed distrust in political and State institutions, which reveals a deep divide between citizens and their representatives (see figure III.1). This distrust is fuelled by a number of factors, cited above, and its consequences are hampering the implementation of the structural reforms needed to address the challenges facing the region, such as inequality, poverty and lack of opportunities (ECLAC, 2020).

Figure III.1
Latin America and the Caribbean (18 countries):[a] people expressing distrust in political and State institutions, 1998–2020
(Percentages)



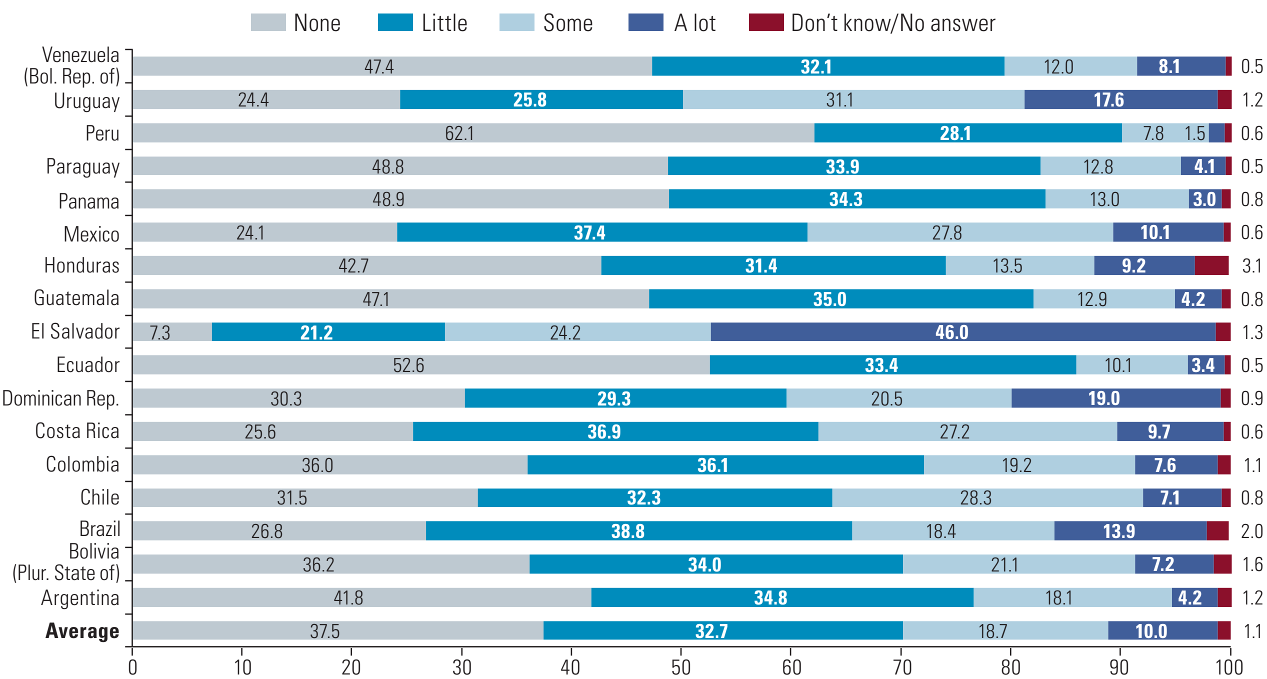
Source: Economic Commission for Latin America and the Caribbean (ECLAC), CEPALSTAT [online database] https://statistics.cepal.org/portal/cepalstat/index.html?lang=en.

[a] Argentina, the Bolivarian Republic of Venezuela, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Mexico, Nicaragua, Panama, Paraguay, Peru, the Plurinational State of Bolivia and Uruguay.

The data analysed above are supplemented by the Latinobarómetro results for 2023, which reveal a persistent and alarming lack of trust in government in the region. A resounding 70.2% of respondents say they have little trust in government (32.7%) or none (37.5%), which reveals a profound crisis of legitimacy and a disturbing lack of connection between citizens and their representatives (see figure III.2). One of the factors usually associated with this lack of trust is corruption, which is also endemic, eroding the credibility of institutions and undermining the political system. Latinobarómetro (2023) also finds that 66% of respondents perceive corruption as having decreased little (29.5%) or not at all (36.5%) in the last two years, suggesting that efforts to combat this scourge have not been sufficient or are perceived by the population as ineffective (see figure III.3). This perception of stagnation or even regression in the fight against corruption fuels distrust of government and reinforces the idea that institutions are not serving the common good, but rather private interests.

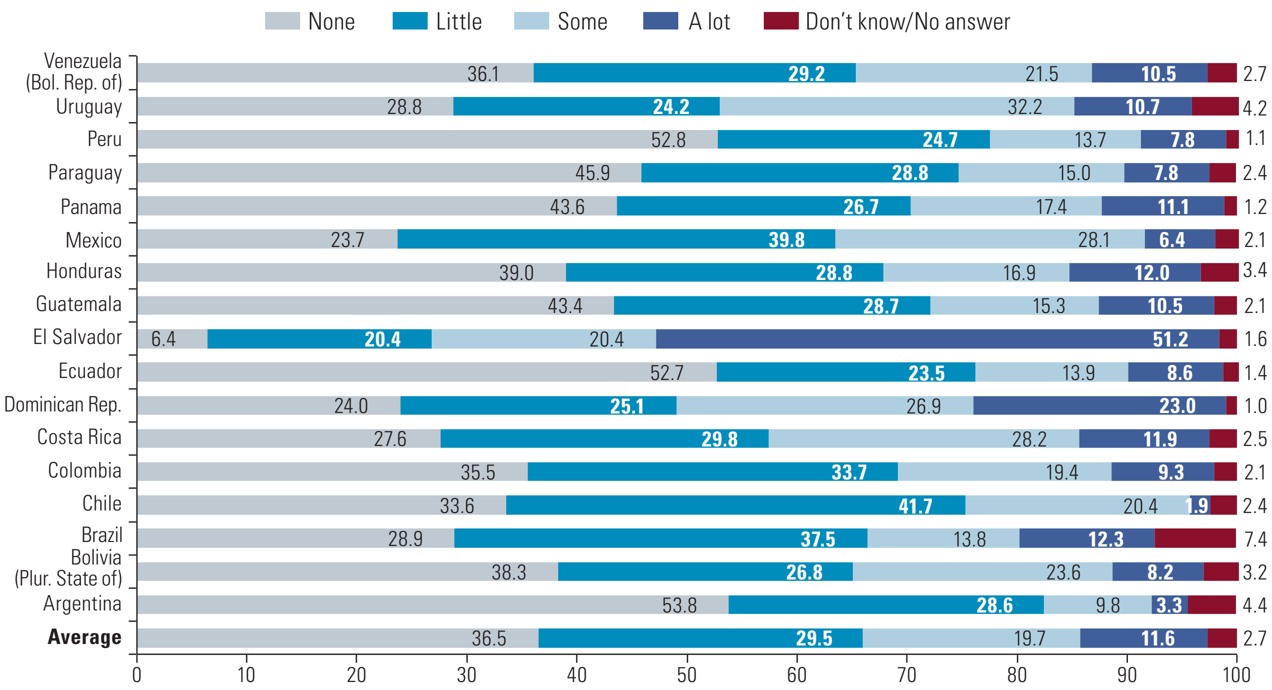
This distrust is of particular concern because it not only undermines the legitimacy of institutions and government but also has significant economic effects. Trust is a key factor in the functioning of the economy, as it facilitates cooperation and coordination between key actors such as firms, workers, government and borrowers. When trust in institutions is low, businesses may be reluctant to invest, fearing political instability or a lack of legal certainty. For their part, workers and citizens may reduce their participation in the formal market, lowering productivity and limiting economic growth. In addition, it becomes harder for the public sector to access the resources needed to implement effective policies, as mistrust leads to low tax morale and resistance to necessary reforms and the adoption of technological and administrative innovations. As Keefer and Scartascini (2022) point out, an environment of trust is essential for these relationships to develop smoothly and open the way to sustainable growth and robust investment. Without trust, transaction costs increase, as does the perceived risk in investment and development decisions, with negative effects throughout the economy.

Figure III.2
Latin America and the Caribbean (17 countries): trust in government, 2023
(Percentages)



Source: Latinobarómetro Corporation, "Latinobarómetro 2023", Santiago, 2023 [online database] https://www.latinobarometro.org/latContents.jsp.

Figure III.3
Latin America and the Caribbean (17 countries): perceived progress in reducing corruption in State institutions over the last two years, 2023
(Percentages)



Source: Latinobarómetro Corporation, "Latinobarómetro 2023", Santiago, 2023 [online database] https://www.latinobarometro.org/latContents.jsp.

Real and effective use of digital technologies, as discussed throughout this document, presents an invaluable opportunity to improve levels of trust, modernize institutions and raise the quality of public services in the region. While digital transformation also brings emerging institutional risks that need to be addressed prudently, it paves the way to more efficient, transparent, inclusive and innovative governments capable of responding effectively to the demands of the population. A distinctive factor in this new wave of digital innovations is artificial intelligence (AI), which is emerging as a disruptor with the potential to radically transform public management. AI can optimize processes, improve decision-making, personalize services and strengthen interaction with citizens. However, its adoption also poses crucial challenges of transparency, ethics, security and data protection, which need to be addressed diligently to avoid bias, discrimination and privacy violations. These areas will be addressed in more detail below.

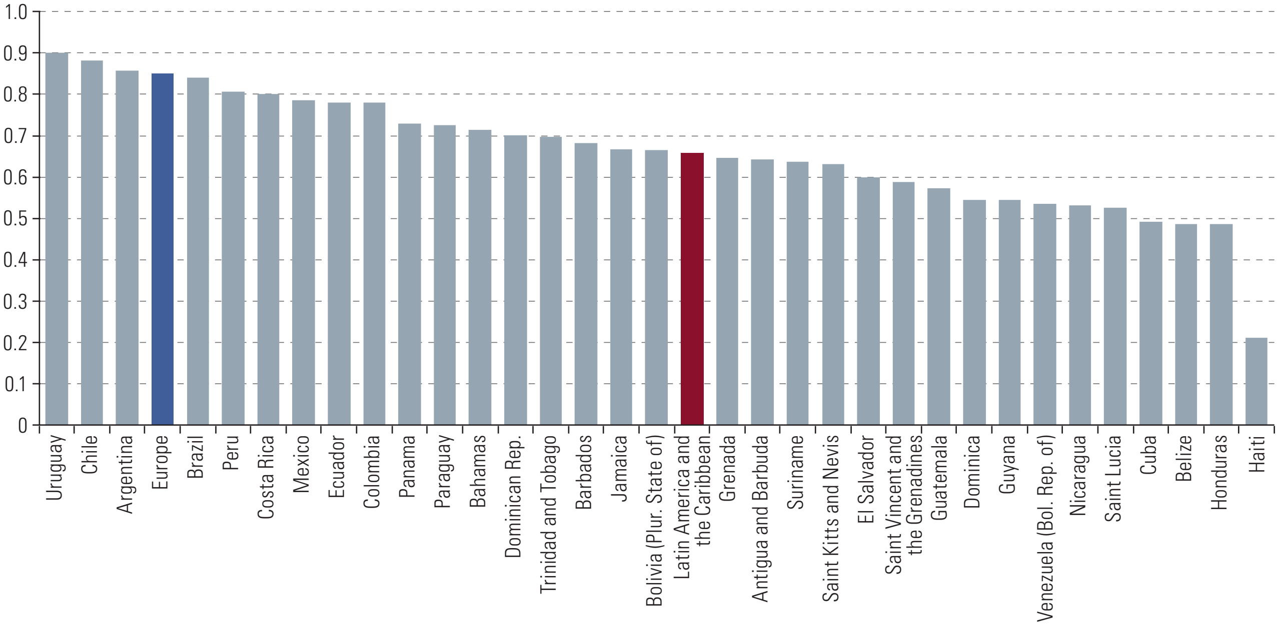
In the light of the weakness of institutions and governance capacity, this chapter aims to provide insight into the challenges and opportunities that digital transformation and AI entail for public institutions in Latin America and the Caribbean. Section B addresses the challenges the region faces in moving towards more effective government digitalization, examining the heterogeneity between countries in the adoption and development of digital government. Section C then discusses the importance of digital governance and its role in driving the transformation of the State and government services. Section D covers key issues related to the roll-out of AI, and section E analyses some of its risks and potential in the effort to create smart States in the region.

B. Digital transformation in the region's governments

Significant progress has been made with the digitalization of governments in Latin America and the Caribbean over recent years, driven both by growing technology use in the public sector and by the need to respond to the expectations of increasingly connected citizens. In some cases, this digital transformation of government even follows patterns similar to those observed in the countries of the Organisation for Economic Co-operation and Development (OECD), where the use of digital tools has been crucial for improving transparency and efficiency in government management. The reforms and strategies implemented in the region have focused on modernizing public services and digitalizing institutions, with the aim of addressing structural challenges. Despite progress, however, the governments of Latin America and the Caribbean still face major challenges in consolidating an inclusive, sustainable and people-centred digital transformation, something that requires ongoing efforts and more integrated strategies to maximize the potential of digital government (OECD/CAF, 2024).

Likewise, a review of progress in the digital transformation of the region's governments reveals major areas for improvement, with large differences between countries. For example, when the results of the most recent version (2024) of the e-Government Development Index (e-GDI)[1] are reviewed, they give an average for Latin America and the Caribbean of 0.66 (on a scale of 0 to 1), which is slightly above the world average (0.64) and that of Africa (0.42) and below those of other regions such as Europe (0.85). Moreover, there is great heterogeneity between the countries of the region: Uruguay, Chile and Argentina are the best performers on the index, with scores above 0.85, which is the EU average. Cuba, Belize and Honduras have values slightly below 0.5, while Haiti is the worst-ranked country, with a score of 0.21 (see figure III.4).

Figure III.4
Latin America and the Caribbean (33 countries) and Europe (43 countries): e-Government Development Index (e-GDI) scores, 2024

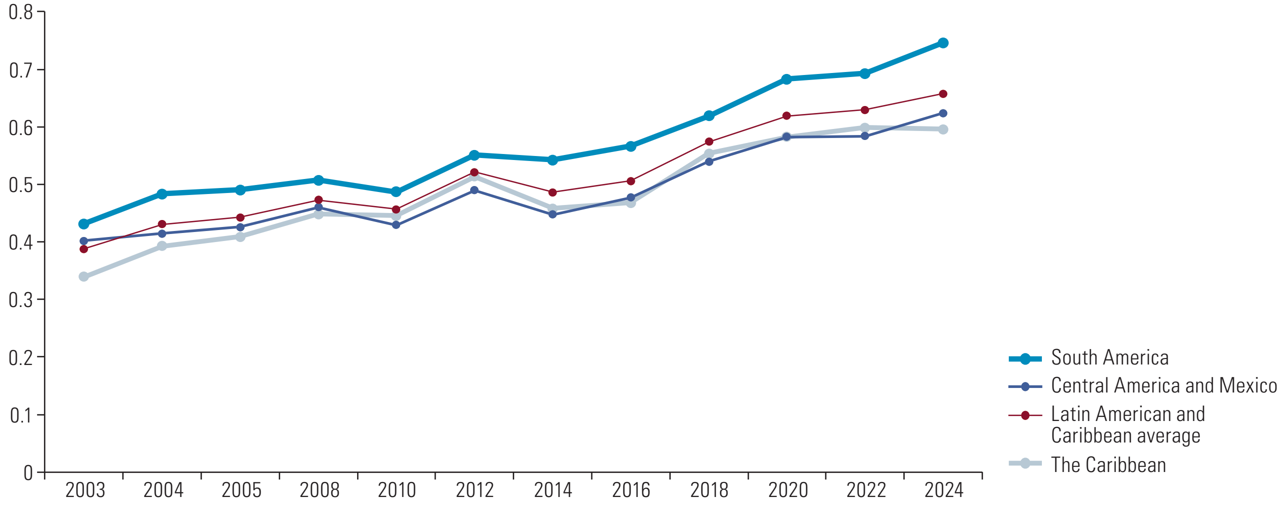


Source: J. Gutiérrez and S. Muñoz-Cadena, "La trampa institucional y el rol de las tecnologías digitales", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished; on the basis of United Nations, "E-Government Development Index", New York, 2024 [online database] https://publicadministration.un.org/egovkb/Data-Center.

[1] This is an index of the state of development of e-government in a country. It is a composite measure of three important dimensions of e-government: the scope and quality of online services, the state of development of the telecommunications infrastructure, and human capital. To construct it, the Department of Economic and Social Affairs (DESA) of the United Nations conducts a comprehensive survey of the online presence of all 193 Member States every two years. It evaluates countries' websites and the way e-government policies and strategies are implemented, in general and in specific sectors, for the delivery of essential services.

It is important to note that the average score for Latin America and the Caribbean on the e-Government Development Index has improved almost continuously since 2003, reflecting major advances in the digitalization and modernization of the region's governments, as shown in figure III.5. However, a more detailed analysis of the evolution of this index reveals that, while the region as a whole has made progress, the gap between South America and other subregions, such as Central America and the Caribbean, has widened significantly over the last decade. This indicates that while some countries have made faster progress with government digitalization, others are lagging behind, which could widen inequalities in access to digital services and the ability of governments to respond to citizens' demands.

Figure III.5
Latin America and the Caribbean: e-Government Development Index (e-GDI) scores, 2003–2024



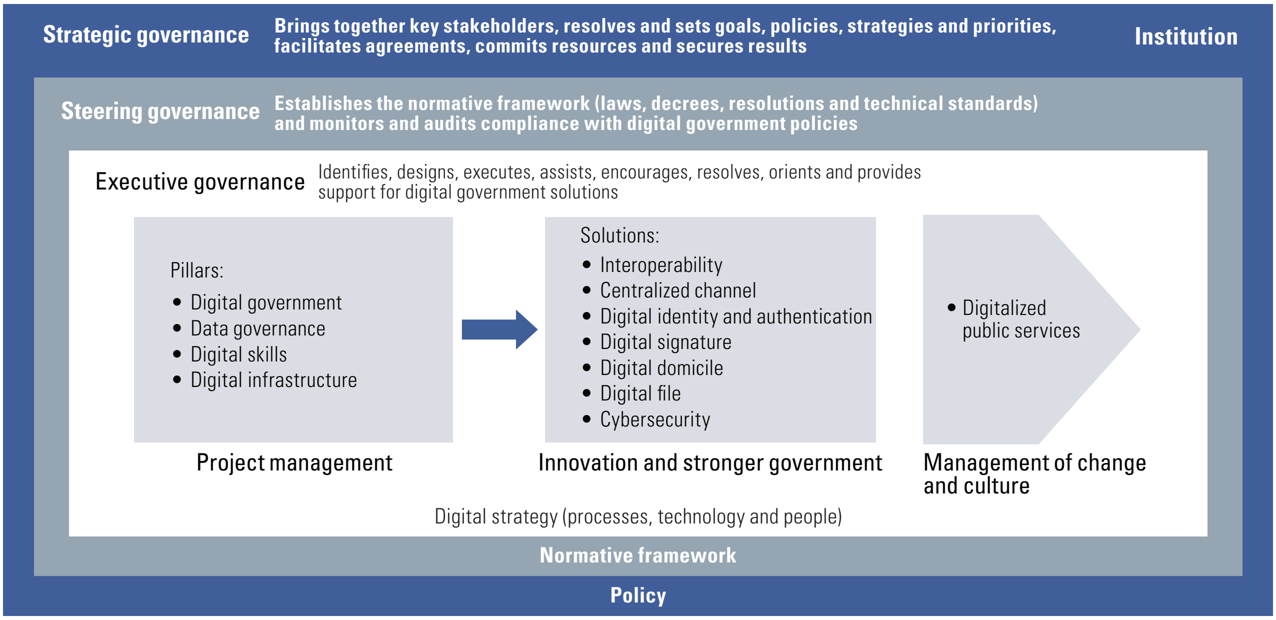
Source: J. Gutiérrez and S. Muñoz-Cadena, "La trampa institucional y el rol de las tecnologías digitales", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished; on the basis of United Nations, "E-Government Development Index", New York, 2024 [online database] https://publicadministration.un.org/egovkb/Data-Center.

C. Digital governance: structures and mechanisms for the digital transformation of governments

As ECLAC has pointed out (ECLAC, 2021 and 2022; Naser, 2021), digital technologies alone are not the solution for improving the efficiency and effectiveness of the public system. To achieve these goals, it is essential to consider other key factors, such as cultural, organizational, leadership and technical aspects, which are crucial to the consolidation of digital development in governments. It is a matter not just of implementing technology, but of adapting these tools to the real needs of citizens and public organizations by incorporating new knowledge that can advance evidence-based decision-making and the design of data-driven policies. Only a comprehensive approach can construct a path towards what may be called "smart government" capable of responding effectively to current and future challenges.

Thus, it is possible to establish that good digital government requires digital governance which brings together stakeholders, policies, resources and relationships and makes the implementation of digital government strategies and programmes feasible (Naser, 2021). Because digital governance brings together stakeholders, resources and initiatives in a coordinated and structured process, it requires the creation of specialized mechanisms to manage specific areas for planning and coordination purposes. Governance mechanisms are embodied in structures such as councils of ministers or high-level commissions that bring together representatives of various institutions, or in entities with specific powers conferred by law. The governance structure and approach will depend on the digital government strategy adopted by each country and will be tailored to its particular needs, rather than following a single model. Within this framework, three governance hierarchies will be considered: a strategic hierarchy, a steering hierarchy and an implementing hierarchy (see diagram III.1).

Diagram III.1
Digital governance



Source: Economic Commission for Latin America and the Caribbean (ECLAC), "Guía para el establecimiento de un marco de gobernanza de gobierno digital para países de América Latina y el Caribe", Santiago, 2024, unpublished.

At a first level, strategic governance facilitates linkages and coordination between different sectors and institutions with the aim of identifying components of shared value that can only be achieved through joint and coordinated actions. For this, it is essential to have a normative framework that provides the powers needed to select, resolve and set goals, priorities, policies and strategies. This level must also facilitate agreements, commit resources and ensure results to prepare the way for a cross-cutting strategic alignment that adequately represents the key institutions and stakeholders in the field of digital governance and government.

At a second level, the task of steering governance is to sponsor, coordinate and regulate the normative framework (laws, decrees, resolutions and technical standards), laying the foundations for the identification, design and implementation of digital government solutions. The steering authority is responsible for monitoring and auditing compliance with digital government policies and for proposing and executing incentives or actions that encourage adherence to the initiatives.

The third level, lastly, is executive governance, which is responsible for implementing decisions taken at the strategic governance level within the framework of the laws, standards and regulations established at the steering governance level. Executive governance has the capacity to act by identifying, designing, implementing and providing support for cross-cutting solutions that in turn contribute to the vertical solutions specific to each sector or institution. Its role includes guiding, assisting and facilitating the implementation of these solutions, ensuring their effectiveness and seeing that they are aligned with the strategic objectives.

Another key area for digital governance design is data governance at the institutional level. In the region, remarkable progress has been made within certain public organizations, but these remain isolated cases. Data governance specifically refers to the set of strategies, policies and processes that ensure the effective and ethical use of data. To accelerate the development of AI in the public sector, it is essential for policymakers to embrace a data culture as a key asset for progress (Cabello, 2023).

With sound digital governance, a State can effectively incorporate AI into its processes, preparing the way for the construction of a smart State. By establishing clear normative frameworks, efficient organizational structures and a culture of data-driven decision-making, a State with advanced digital governance can use AI to optimize public service delivery, improve administrative efficiency and anticipate citizens' needs.

D. The adoption of AI by the public sector in Latin America and the Caribbean

In recent years, there has been growing interest around the world in adopting AI systems on the part of both the private and public sectors. Governments in Latin America and the Caribbean have been part of this trend. Properly implemented, AI tools can help address some of the challenges faced by governments in the region. For example, these tools can reduce lead times, optimize resources and improve the quality of and access to public services. All this can be achieved because these systems are capable, among other things, of facilitating decision-making, transforming the mechanisms of interaction between government and citizens and improving the accessibility of State information and services.

On the other hand, the implementation of AI tools in the public sector can create a number of new challenges and risks that need to be managed.[2] For example, the adoption of AI systems that do not meet certain quality standards and the misuse of AI tools may prevent the public entity from fulfilling its purposes and may even lead to infringements of people's rights. Potential risks include the violation of human rights such as the right to equality before the law and non-discrimination, due process, privacy and personal data protection, and the right of access to information, among others.[3]

According to the results of the Government AI Readiness Index (Oxford Insights, 2023), which analyses how well prepared a given government is to implement AI in the delivery of public services, Latin America and the Caribbean has an intermediate index score (41.50) that places it sixth among the nine regions analysed, with a substantial difference of almost 40 points compared to North America, the leading region. There are also large disparities within the region, with a gap of as much as 42 points between the leading and the lowest-ranked country. One of the 10 dimensions of the index measures governance and ethics on the basis of five indicators: (i) data protection and privacy legislation, (ii) cybersecurity, (iii) regulatory quality, (iv) ethical principles and (v) accountability. The results for this dimension show the same tendency as the overall index, with very heterogeneous results and a marked difference between the region and Europe (see figure III.6).

To provide a more detailed analysis of progress with the implementation of AI systems by public sector entities in the region, information from online registers of AI systems used by governments will now be examined.[4] These registers vary in their format, the number of systems registered and the number of variables. In total, five Latin American countries have been identified as having such registers: Argentina,[5] Brazil,[6] Colombia,[7] Chile[8] and Uruguay[9] (Gutiérrez y Muñoz-Cadena, 2024b).

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2 The AI Risk Repository of the Massachusetts Institute of Technology has documented over 700 risks associated with AI. See [online] https://airisk.mit.edu/.

3 See OHCHR (2023) for a discussion of the human rights risks associated with generative AI systems.

4 Public registers are consolidated directories providing information about algorithmic systems used by public agencies in different jurisdictions (Ada/AI Now Institute/OGP, 2021).

5 Algorithmic Avengers algorithm observatory (see [online] https://www.algoritmosestatales.org/).

6 Transparency Brazil Catalogue of Artificial Intelligence Use by Government Agencies (see [online] https://catalogoia.omeka.net/).

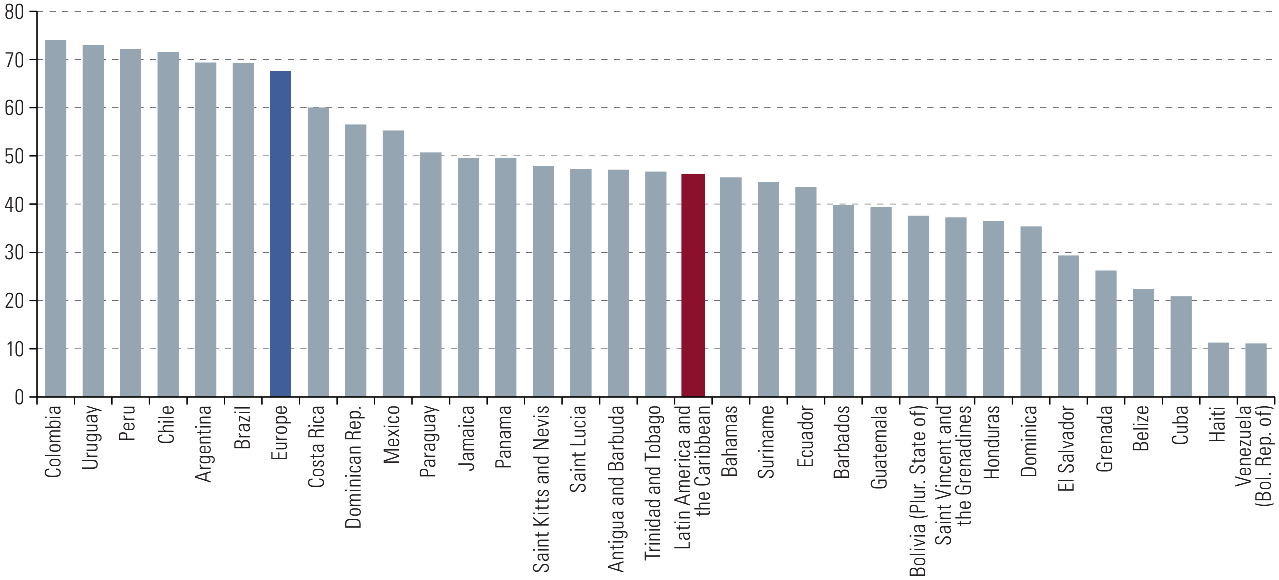
7 For Colombia, there is information from four registers, three governmental and one created by a university: (i) Ethical Framework Monitoring Dashboard of the Administrative Department of the Presidency of the Republic (discontinued in 2023); (ii) National Open Data Platform of the Ministry of Information and Communications Technologies (see [online] https://www.datos.gov.co/); (iii) Artificial Intelligence-based Innovation Exercises of the Ministry of Information and Communications Technologies (see [online] https://gobiernodigital.mintic.gov.co/portal/Proyectos/Ejercicios-de-Innovacion-Basados-en-Inteligencia-Artificial/); and (iv) Automated Decision-making Systems in the Colombian Public Sector of the University of Rosario (see [online] https://research-data.urosario.edu.co/file.xhtml?persistentId=doi:10.34848/YN1CRT/8OHRT0&version=1.0).

8 Register of Public Algorithms of Adolfo Ibáñez University (see [online] https://www.algoritmospublicos.cl/).

9 Artificial Intelligence Observatory of the Agency for Electronic Government and the Information and Knowledge Society (AGESIC) (see [online] https://www.gub.uy/agencia-gobierno-electronico-sociedad-informacion-conocimiento/observatorio-inteligencia-artificial).

Figure III.6

Latin America and the Caribbean (31 countries and territories) and Europe (43 countries): scores on the governance and ethics dimension of the Government AI Readiness Index, 2023



Source: J. Gutiérrez and S. Muñoz-Cadena, "La trampa institucional y el rol de las tecnologías digitales", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished, on the basis of Oxford Insights, *Government AI Readiness Index 2023*, Malvern, 2023.

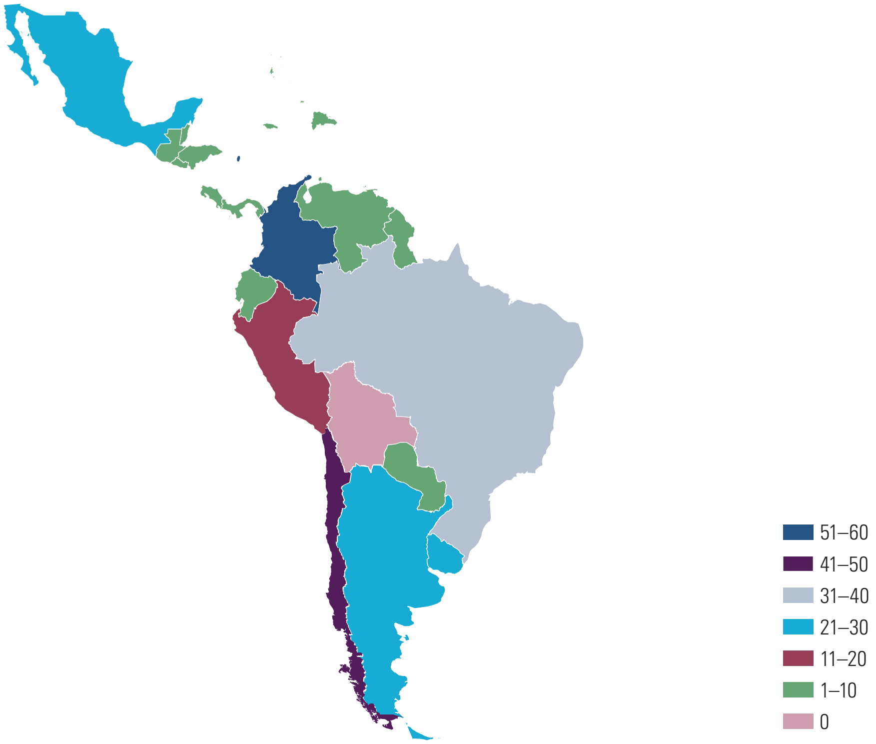
To map AI systems in the public sector, in addition to the public records cited above, data were collected from reports published by international bodies and academic publications. This work made it possible to document the AI systems that have been implemented in the last 10 years.[10] A total of 272 AI systems adopted in 20 countries of Latin America and the Caribbean were identified, plus 1 system funded by the United Nations Development Programme (UNDP) and the United States Agency for International Development (USAID), which was rolled out in several Central American countries. Of the 272 AI systems identified, 79% are in six countries: Colombia (65), Chile (45), Brazil (33), Argentina (24), Mexico (23) and Uruguay (21) (see map III.1). The concentration of identified AI tools in a few countries is partly explained by the fact that most of these systems have been catalogued or inventoried earlier in the public algorithm registers mentioned above. The remaining 21% of systems were implemented in the Bahamas, Belize, the Bolivarian Republic of Venezuela, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Panama, Paraguay and Peru.

To analyse the relationship between AI systems and the type of public entity where they are used, the United Nations Classification of the Functions of Government (COFOG) was used as a benchmark.[11] It was found that, of the total number of systems, 28% (76) were implemented by agencies belonging to the economic affairs category, 24% (66) were implemented by general public services agencies, 18% (50) were associated with public order and safety agencies, 11% (31) were linked to health care and 10% (27) to education, and the remaining 8% (22) were connected to one of four categories: social protection; environmental protection; recreational activities, culture, sports and other social services; and defence (see figure III.7).

[10] Includes information on systems listed in the registers of Argentina, Brazil, Chile, Colombia and Uruguay, reports published by multilateral entities (IDB, 2024; CAF, 2021; OECD/CAF, 2022; UNESCO, 2023) and academic articles and information publicly available on the websites of public entities and civil society organizations (Al Sur, 2024; Dejusticia, 2022). The list does not include systems that are in a pilot phase, proposed AI systems that have not yet been effectively deployed, or systems that were implemented at some point but are no longer operational.

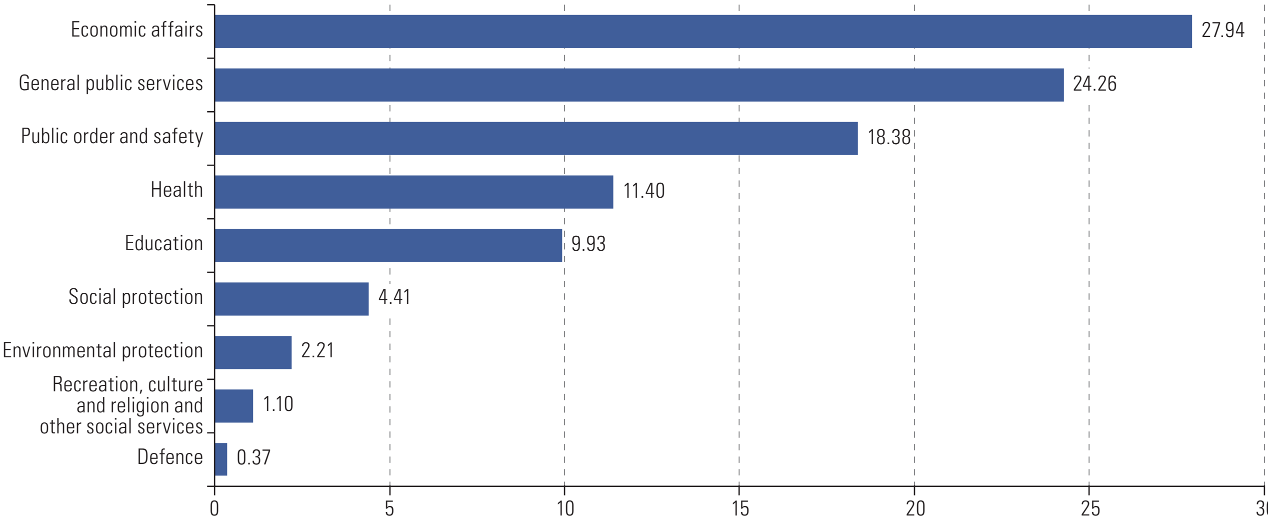
[11] The Classification of the Functions of Government (COFOG) has 10 level 1 categories: general public services; defence; public order and safety; economic affairs; environmental protection; housing and community amenities; health; recreation, culture and religion; education; and social protection.

Map III.1
Latin America and the Caribbean: artificial intelligence systems by country



Source: J. Gutiérrez and S. Muñoz-Cadena, "La trampa institucional y el rol de las tecnologías digitales", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished.

Figure III.7
Latin America and the Caribbean (20 countries):[a] use of artificial intelligence systems by type of public agency, according to the Classification of the Functions of Government (COFOG)

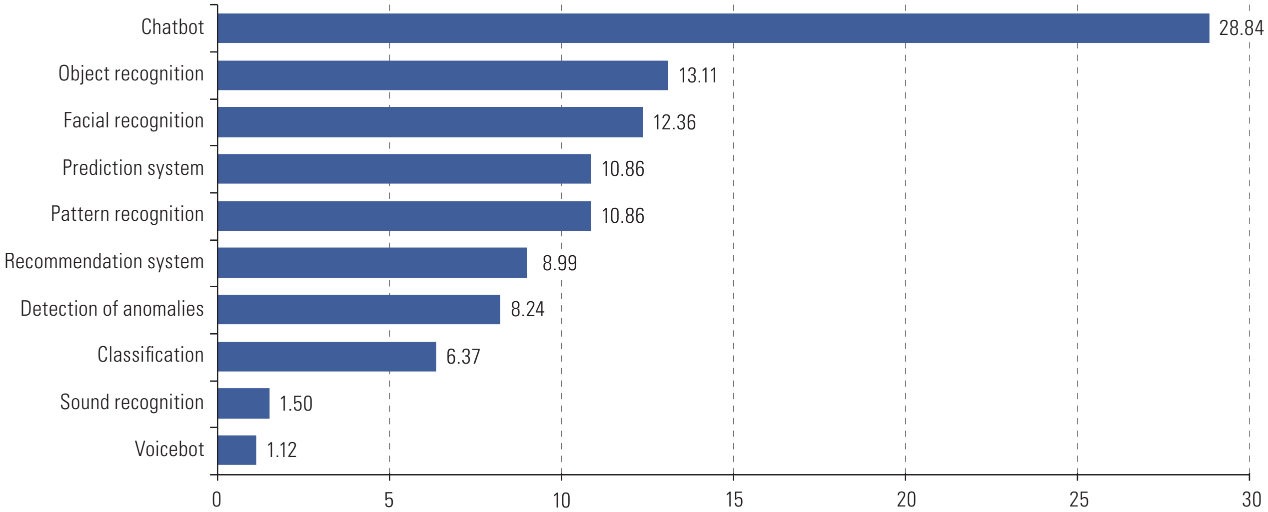


Source: J. Gutiérrez and S. Muñoz-Cadena, "La trampa institucional y el rol de las tecnologías digitales", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished.

[a] Argentina, the Bahamas, Belize, the Bolivarian Republic of Venezuela, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Panama, Paraguay, Peru and Uruguay.

Additionally, to identify and understand the kinds of tasks performed by the 273 AI systems mapped, we analysed the keywords describing the main characteristics of these systems in terms of the functions they perform or the types of technologies they represent. As can be seen in figure III.8, 29% of the systems mapped are chatbots and 13% are concerned with object recognition. Chatbots have been employed by both national and subnational entities, and one chatbot was actually brought into use across several Central American countries (see box III.1).

Figure III.8
Latin America and the Caribbean (20 countries):[a] classification of artificial intelligence systems by the functions they perform or the types of technologies they represent
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC).
[a] Argentina, the Bahamas, Belize, the Bolivarian Republic of Venezuela, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Panama, Paraguay, Peru and Uruguay.

Box III.1
Chatbots and public administration

The Tina chatbot in Argentina

Tina is the virtual assistant of the national State in Argentina, brought into use in 2022 to provide information and support for citizens needing to carry out procedures with the executive agencies of the national government. According to the official website of the Argentine State, Tina can be used to obtain information on 446 procedures with 55 State bodies. The chatbot also provides information on scholarships, subsidies and social programmes.

Chatico of the Mayor's Office of Bogotá

Chatico is the virtual agent of the Mayor's Office of Bogotá and uses artificial intelligence (AI) to give citizens access to different types of procedures and services, such as information about taxes and services, health care, mobility and the different types of support and benefits available from the district's agencies. Citizens can also use Chatico to participate in decision-making about, for example, the type of projects the Mayor's Office should invest in, as part of the participatory budgeting procedure. When water was rationed in Bogotá in 2024, citizens could ask Chatico about the water rationing schedule in their area and ask for advice on saving water.

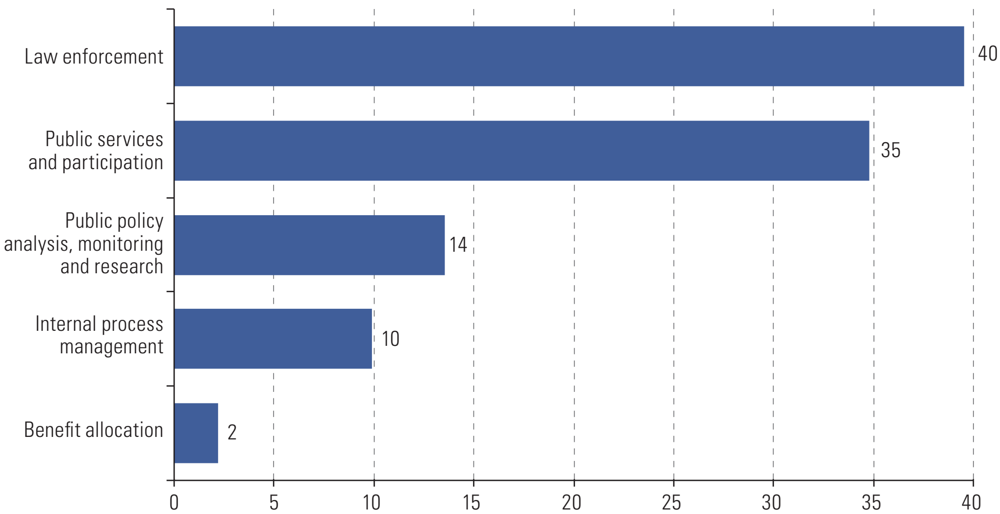
The Sara chatbot of the United Nations Development Programme (UNDP) and the United States Agency for International Development (USAID) for several Central American countries

The Automated Attention and Response System (Sara) chatbot has been implemented by UNDP and USAID in Central American countries to give information and guidance to women, girls and adolescents who may be at risk of gender-based and domestic violence. This tool provides them with an anonymous and confidential initial contact and information on the services available in their respective countries (e.g., emergency plans, shelters, legal and psychological assistance, and hotlines for victims of violence).

Source: Government of Argentina, "Tina siempre está: la asistente virtual del Estado nacional" [online] https://www.argentina.gob.ar/tina; Mayor's Office of Bogotá, "Conoce Chatico" [online] https://gobiernoabiertobogota.gov.co; United Nations Development Programme/United States Agency for International Development (UNDP/USAID), "Sara" [online] https://chatbotsara.org/.

Another way of cataloguing AI systems is by their potential contribution to government processes. This classification is carried out using the categorization proposed by the Joint Research Centre (JRC) of the European Union, employed for the analysis of the European Union's database of AI algorithms in the public sector (Samoili and others, 2020). On the basis of this classification, it is observed that, of the 272 AI systems in Latin America and the Caribbean, 40% contribute to tasks related to the law enforcement category, 35% are related to public services and participation, 14% are linked to public policy analysis, monitoring and research, 10% are associated with internal process management, and the remaining 2% are related to benefit allocation (see figure III.9).

Figure III.9
Latin America and the Caribbean (20 countries):[a] contribution of artificial intelligence systems to government processes
(Percentages)



Source: J. Gutiérrez and S. Muñoz-Cadena, "La trampa institucional y el rol de las tecnologías digitales", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished.

Note: The law enforcement category includes tasks carried out to identify or prioritize targets for agency enforcement actions, while public policy analysis, monitoring and research refers to tasks that involve collecting or analysing information for policymaking. The benefit allocation category covers tasks carried out to support the formal or informal granting of benefits or entitlements, while public services and participation covers tasks that facilitate the provision of direct services to the public or their notification for regulatory purposes. Lastly, the internal process management category groups tasks related to the management of agency resources, including personnel management, procurement and maintenance of technology systems.

[a] Argentina, the Bahamas, Belize, the Bolivarian Republic of Venezuela, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Panama, Paraguay, Peru and Uruguay.

In contrast to Latin America, the category with most systems in the database of AI systems implemented by public agencies in the European Union, which mapped 686 systems, is public services and participation (34%), followed by law enforcement (26%), public policy analysis, monitoring and research (22%), internal process management (16%) and, lastly, benefit allocation (2%). Table III.1 provides examples of concrete systems implemented in Latin America and Caribbean countries for each of these categories.

Another classification applied to analyse AI systems was the type of interaction these systems are used for. There are three types of interactions: government-to-citizen (G2C), government-to-business (G2B) and government-to-government (G2G).[12] In Latin America and the Caribbean, as can be seen in detail in figure III.10, 213 G2C systems, 39 G2B systems and 138 G2G systems generating interactions between different State agencies or different areas within the same agencies were identified. Table III.2 provides examples of systems for each of these categories.

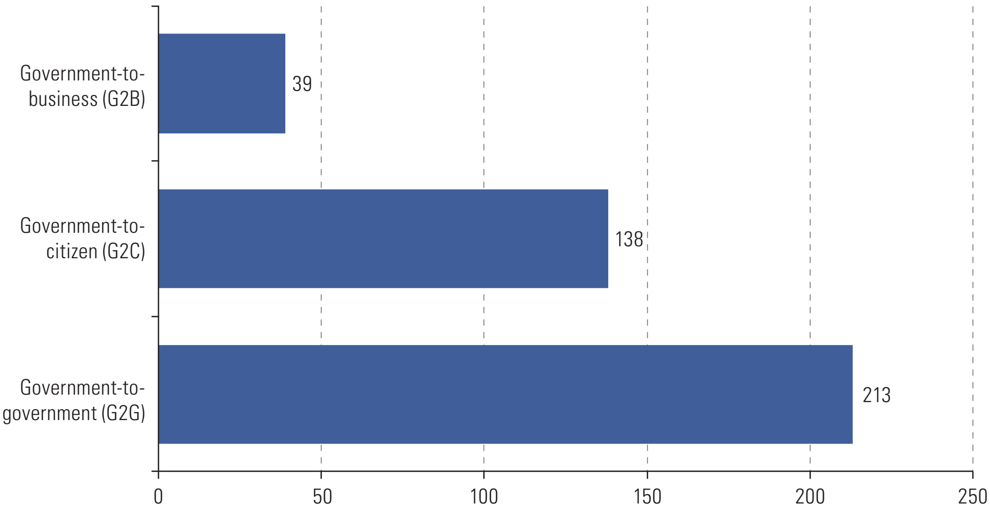
12 The European Union classification was used.

Table III.1
Latin America (4 countries): examples of artificial intelligence systems as an input for government processes

Government process	Country	Name of system	Purpose of system
Law enforcement	Argentina	System of Facial Recognition of Fugitives	System implemented in Buenos Aires in 2019 to identify fugitives from the law (Sandoval-Almazán, 2021).
Public policy analysis, monitoring and research	Uruguay	Projection of demand for gas oil, gasoline and liquefied petroleum gas (LPG)	"To project demand on the basis of past demand behaviour, public policies and market forecasts" with a view to "forecasting gas oil, gasoline and [LPG] needs for the period of analysis" (AGESIC, 2024b).
Benefit allocation	Chile	Allocation algorithm in the School Admission System of the Ministry of Education (Mineduc)	System designed to "do away with arbitrary discrimination and reduce waiting times for enrolment in the school admission process" (Adolfo Ibáñez University, 2024).
Public services and participation	Dominican Republic	RITA	Chatbot of the Superintendency of Pensions "designed to respond to citizens' concerns about the Dominican Pension System (SDP)" (Presidency of the Dominican Republic, 2024).
Internal process management	Uruguay	Chatbot for dealing with requests from the Human Capital division of the Banco de Seguros del Estado	Chatbot for internal use in the State insurance bank to resolve "queries and doubts about regulations that the Human Capital unit has to deal with on an individual basis" (AGESIC, 2024a).

Source: J. Gutiérrez and S. Muñoz-Cadena, "La trampa institucional y el rol de las tecnologías digitales", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished; R. Sandoval-Almazán, "Inteligencia artificial aplicada al gobierno: una exploración internacional de casos", *Inteligencia artificial y ética en la gestión pública*, Caracas, Latin American Centre for Development Administration (CLAD), 2021; Agency for Electronic Government and the Information and Knowledge Society (AGESIC), "Ficha 27: proyección de demanda de gas oíl, gasolinas y gas licuado de petróleo (GLP)", Montevideo, 15 July 2024 [online] https://www.gub.uy/agencia-gobierno-electronico-sociedad-informacion-conocimiento/comunicacion/publicaciones/ficha-27-proyeccion-demanda-gas-oil-gasolinas-gas-licuado-petroleo-glp; "Ficha 19: ChatBot para resolver solicitudes de la división Capital Humano del Banco de Seguros del Estado", Montevideo, 15 July 2024 [online] https://www.gub.uy/agencia-gobierno-electronico-sociedad-informacion-conocimiento/comunicacion/publicaciones/ficha-19-chatbot-para-resolver-solicitudes-division-capital-humano-del; Adolfo Ibañez University, "Algoritmo de asignación en Sistema de Admisión Escolar del Ministerio de Educación (Mineduc)", Santiago, 2024 [online] https://algoritmospublicos.cl/proyecto-algoritmo-asignacion-admision-escolar-mineduc; Presidency of the Dominican Republic, "Superintendencia de Pensiones innova con RITA: primer Chatbot de IA Generativa para el Sistema de Pensiones Dominicano", Santo Domingo, 17 June 2024 [online] https://presidencia.gob.do/noticias/superintendencia-de-pensiones-innova-con-rita-primer-chatbot-de-ia-generativa-para-el.

Figure III.10
Latin America and the Caribbean (20 countries):[a] types of interaction for which artificial intelligence systems are used
(Numbers of systems)



Source: J. Gutiérrez and S. Muñoz-Cadena, "La trampa institucional y el rol de las tecnologías digitales", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished.

Note: On the basis that a system could generate interactions with more than one actor, the 273 systems were classified by considering all the interactions for which each was used.

[a] Argentina, the Bahamas, Belize, the Bolivarian Republic of Venezuela, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Panama, Paraguay, Peru and Uruguay.

Table III.2
Bahamas, Brazil and Mexico: examples of artificial intelligence systems by interaction type

Interaction type	Country	Name of system	Purpose of system
Government-to-government (G2G)	Bahamas	Video surveillance programme	System that includes facial recognition cameras to help identify faces and licence plate numbers and detect guns, among other things, for the purpose of combating crime (Macdonald, 2024).
Government-to-business (G2B)	Brazil	Tax on the circulation of goods and services (ICMS) inspection model for goods in transit	System for cross-checking information to identify vehicles transporting cargo where there is evidence of tax evasion (Government of the state of Goiás, 2023).
Government-to-citizen (G2C)	Mexico	Adelita sin Delito	Chatbot of the Citizen Council for Security and Justice of Mexico City designed to "improve and facilitate dealings with citizens, information sharing, report handling and public service provision" in the reporting of crime (Arguelles and Amaro, 2023, p. 88).

Source: J. Gutiérrez and S. Muñoz-Cadena, "La trampa institucional y el rol de las tecnologías digitales", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished; E. Arguelles and M. Amaro, "Preocupaciones éticas en el uso de inteligencia artificial, transparencia y derecho de acceso a la información: el caso de los chatbots en el Gobierno de México, en el contexto de la COVID-19", *Estudios en Derecho a la Información*, No. 15, Mexico City, National Autonomous University of Mexico (UNAM), 2023; Government of the state of Goiás, "Governo de Goiás adota sistema com inteligência artificial para combater sonegação de impostos", Goiânia, 2 May 2023 [online] https://goias.gov.br/abc/governo-de-goias-adota-sistema-com-inteligencia-artificial-para-combater-sonegacao-de-impostos; A. Macdonald, "Bahamas, Guyana eye facial recognition surveillance projects to fight crime", Toronto, Biometrics Research Group, 2 February 2024 [online] https://www.biometricupdate.com/202402/bahamas-guyana-eye-facial-recognition-surveillance-projects-to-fight-crime.

E. The challenges of implementing AI systems in the public sector

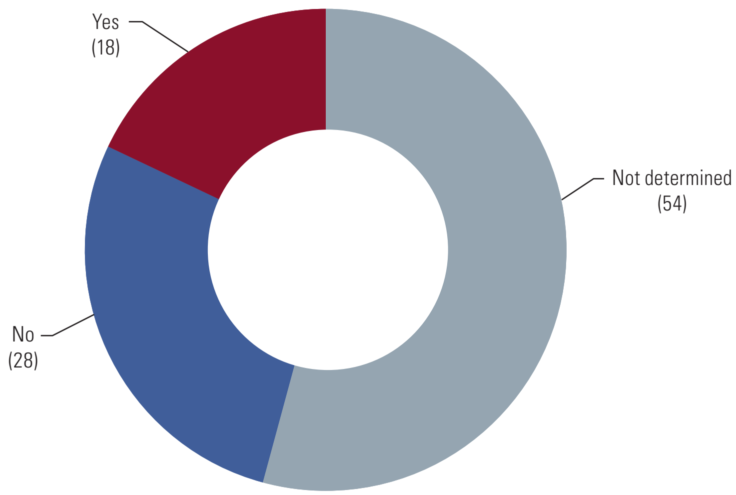
The implementation of AI systems not only offers great opportunities, but also poses a number of major challenges. For example, instances of negative incidents associated with the deployment and use of AI systems in both the public and private sectors have been documented by the OECD AI Incidents Monitor (AIM) (OECD, 2024). The AI Incidents Monitor database reported almost 13,000 incidents and hazards between 2014 and September 2024, of which almost 47% were reported in those first nine months of 2024.

Researchers at the Massachusetts Institute of Technology recently published a Domain Taxonomy of AI Risks constructed from a database documenting more than 700 types of risks associated with AI systems. The taxonomy classifies risks associated with the development and use of AI systems, by both State and private actors, into seven domains: (i) discrimination and toxicity; (ii) privacy and security; (iii) misinformation; (iv) malicious actors and misuse; (v) human-computer interaction; (vi) socioeconomic and environmental; and (vii) AI system safety, failures and limitations (Slattery and others, 2024).

Where the handling and protection of citizens' personal data is concerned, the main challenges include ensuring privacy, preventing the misuse of information and complying with data protection regulations, aspects that are particularly important in contexts where trust in institutions is limited (Chenou and Rodríguez, 2021). According to data collected on the 272 AI systems identified in Latin American and Caribbean countries, 54% of these systems use personal data to operate, which drives home the need for robust and effective normative frameworks to protect users' privacy (see figure III.11).

The use of sensitive data in these systems requires particular transparency on the part of governments and the implementation of measures to ensure both data security and the informed consent of citizens. In addition, it is essential that these challenges be addressed with policies that foster citizens' trust and control over their own data, to avoid the perception of surveillance or misuse of information.

Figure III.11
Latin America and the Caribbean (20 countries):[a] artificial intelligence systems implemented by public agencies that use personal data
(Percentages)



Source: J. Gutiérrez and S. Muñoz-Cadena, "La trampa institucional y el rol de las tecnologías digitales", Santiago, Economic Commission for Latin America and the Caribbean (ECLAC), 2024, unpublished.
[a] Argentina, the Bahamas, Belize, the Bolivarian Republic of Venezuela, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Mexico, Panama, Paraguay, Peru and Uruguay.

The readiness assessment methodology (RAM) designed by the United Nations Educational, Scientific and Cultural Organization (UNESCO) is a useful tool for assessing the potential risks of AI (UNESCO, 2023). To implement the Recommendation on the Ethics of Artificial Intelligence adopted in November 2021 by 193 member States, UNESCO has been implementing this tool in several countries of Latin America and the Caribbean since 2023.[13] To date, UNESCO has published RAM reports for Chile (2023) and Mexico (2024). These country diagnostic reports are also a very useful tool for identifying potential barriers to AI implementation while providing context-specific recommendations.

Public algorithm registers are also helpful for risk assessment, as they contribute to transparency by providing a "window" into what kind of AI systems are being used by public agencies. As mentioned earlier, only five countries in Latin America and the Caribbean (Argentina, Brazil, Colombia, Chile and Uruguay) have online registers of this type. These registers may also vary considerably in form and content, and this is an area where efforts could be made to foster harmonization (Gutiérrez and Muñoz-Cadena, 2024b).

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13 The readiness assessment methodology is a diagnostic tool designed to help member States sustain their commitment to the Recommendation by helping them understand how well prepared they are to implement AI ethically and responsibly for all their citizens (UNESCO, 2023).

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CHAPTER

IV

Towards a productive, inclusive and sustainable digital future: agendas, strategies and policies

Building on the analysis presented in the previous chapters, this chapter examines the framework of agendas and strategies that the countries are adopting to drive digital transformation and artificial intelligence (AI) adoption in the context of the new industrial revolution. The aim is to assess the evolution of these initiatives and highlight the ongoing design and institutional challenges that will have to be met to maximize their impact and achieve a productive, inclusive and sustainable digital future. The chapter also addresses the increasingly urgent need to focus regulatory and legislative efforts on AI. Lastly, it touches on the key areas that need to be considered in policy design to promote the effective use of digital technologies and AI.

A. The evolution of digital agendas in Latin America and the Caribbean

In line with the major structural changes that have occurred globally as digital transformation proceeds, the digital landscape in Latin America and the Caribbean has undergone profound changes over the last decade. Whereas only about 35% of the world's population was connected to the Internet in 2014, by the end of 2023 this figure had almost doubled to 67%. The Latin America and Caribbean region has mirrored the rapid digital transformation observed globally, with Internet users accounting for more than 80% of its population by the end of 2023 (ITU, 2024). This progress is the result of major technological innovation, but also of a process of policy and regulatory design and implementation.

Analysis of the evolution of digital policies in Latin America and the Caribbean shows that the region has gone through three main phases (ECLAC, 2020, 2021 and 2022):

(i) A first phase lasting from the late 1990s to the early 2000s that centred on basic infrastructure development and digitalization. Governments in the region focused on closing the digital divide, with priority given to Internet access among public institutions, especially in rural and underserved areas. During this period, marked by the World Summit on the Information Society (WSIS) in 2003 and 2005 and the adoption of the Plan of Action for the Information Society in Latin America and the Caribbean (eLAC2007) in 2005, policies to expand telecommunications networks and foster basic digital literacy were pursued, while e-government initiatives were introduced.

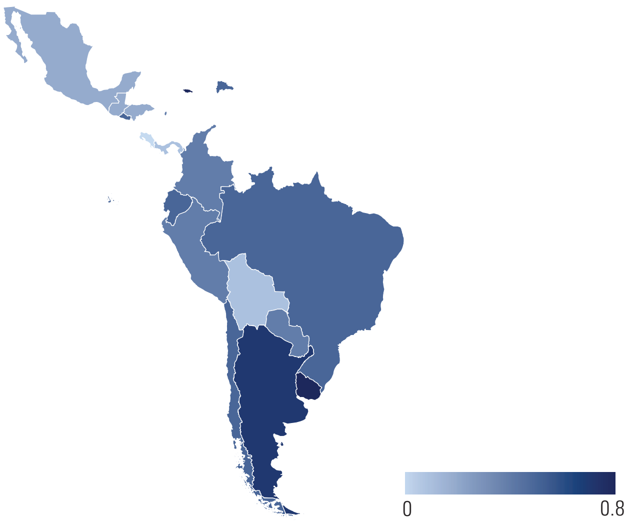
(ii) In the second phase, continuing until 2015, digital agendas began to focus on specific sectors, such as education, health care and small businesses. National broadband plans became more important, and there was support for the expansion of fibre optic networks and high-speed Internet access.

(iii) In the third and last phase, extending to the present day, digital agendas have succeeded in covering multiple policy areas, from digital infrastructure, with the roll-out of 5G networks and universal access, to digital education, with a focus on broadband, educational content and teacher training. Telemedicine is being promoted in the area of health and online services and citizen participation in the digital government sector. Also included are policies to support productive transformation via the digitalization of small and medium-sized enterprises (SMEs), Industry 4.0 and e-commerce, while key Internet governance issues such as data protection and cybersecurity are being addressed.

The Economic Commission for Latin America and the Caribbean (ECLAC) has developed a barometer to gauge the level of development of policies related to the digital transformation process, serving to analyse the complexity of the issues dealt with by digital policies (ECLAC, 2024). This instrument assesses two types of approaches that play complementary roles in a country's strategic planning for digital transformation. The first are digital agendas, which are comprehensive strategies aimed at driving digital transformation across all sectors of society and the economy, and the second are sectoral strategies or programmes, which translate the broad lines of the national agenda into concrete objectives and actions applicable to specific areas or sectors (e.g., health care, government, education) (see map IV.1).

Map IV.1

Latin America and the Caribbean (18 countries):[a] level of development of national digitalization policies in digital agendas and strategies, 2023



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Digital Development Observatory [online] https://desarrollodigital.cepal.org/en/home.

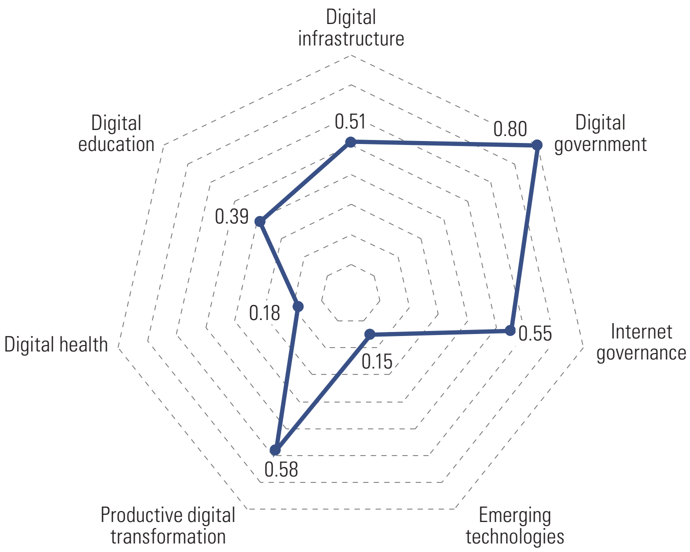
Note: The level of intensity in digital agendas and strategies is measured by three criteria: the existence of a current strategy, the scope of efforts to deal with major issues, and institutional aspects. The last include coordination, budgeting and monitoring mechanisms and gender mainstreaming. Each criterion is assessed on a scale of 0 to 3 and provides a clear picture of the development and effectiveness of digital policies in the countries.

[a] Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Panama, Paraguay, Peru, the Plurinational State of Bolivia, Trinidad and Tobago and Uruguay.

In the particular case of Latin America and the Caribbean, digital agendas have been widely adopted by the countries, with 14 of the 18 countries of the region analysed having such agendas in place as of 2023. In general, the most important issues on these agendas are digital government, productive digital transformation and Internet governance (see figure IV.1).

Figure IV.1

Latin America and the Caribbean (18 countries):[a] thematic intensity of digital agendas, 2023



Source: Economic Commission for Latin America and the Caribbean (ECLAC), Digital Development Observatory [online] https://desarrollodigital.cepal.org/en/home.

Note: Scores are based on whether reference is made to the theme in the agenda and whether quantitative goals, road maps or budgets are included.

[a] Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Ecuador, El Salvador, Guatemala, Honduras, Jamaica, Mexico, Panama, Paraguay, Peru, the Plurinational State of Bolivia, Trinidad and Tobago and Uruguay.

In the area of digital government, the countries have focused their agendas on the digitalization of public services and on the development of digital capabilities and skills. Regarding the digital transformation of production, the digitalization of SMEs and human capital formation are the most common themes. Where Internet governance is concerned, greater attention is being paid to cybersecurity, open data and personal data protection.

When it comes to the thematic analysis of digital agendas, one topic that has been relatively neglected are emerging technologies such as artificial intelligence (AI). Although these tools are increasingly recognized as key drivers of future productivity and competitiveness, their integration into national policies remains limited. While some countries have made progress in developing specific AI policies, as will be discussed further on, these initiatives are still in their infancy.

Another major challenge still facing digital agendas is the institutional weakness that limits their effectiveness. Many countries of the region lack the coordination bodies (21%), evaluation mechanisms (14%) or budgetary support needed to implement agendas. This often results in efforts being fragmented across different government ministries, with inadequate alignment between national digital policies and sector-specific initiatives.

Moreover, the lack of connection between national digital agendas and sectoral strategies hinders progress in key areas such as education, health care and infrastructure. There is the same lack of coordination between digital agendas and productive development policies, so that, for example, business digitalization efforts are not necessarily targeted on the sectors identified as promising by the countries and their territories in the context of their productive development efforts. Meanwhile, digital government has experienced a more robust development in comparison with other areas that often lack the political will or resources to implement significant changes.

B. Overview of the adoption of artificial intelligence strategies and agendas

As Latin America and the Caribbean navigates a new industrial and technological revolution, it faces the critical task of adopting comprehensive policies to harness the potential of emerging technologies, particularly AI. Unless countries adapt, evolve and develop well-structured policies, they risk being left behind and missing the opportunity to harness AI and other technologies to improve public services, governance and sustainable economic growth.

As already indicated, emerging technologies such as AI offer transformative potential for addressing structural development challenges in Latin America and the Caribbean. Among many other things, these technologies can reshape industries, increase the productivity and improve the delivery of public services, improve the efficiency of production processes and reduce environmental impacts.

In response to this opportunity, powers such as the United States, China and Japan have deployed various initiatives with the aim of strengthening their global positions in AI, but with specific approaches depending on their priorities. For example, the American AI Initiative in the United States is focused on improving private sector competitiveness by means of long-term investment in research and development (R&D) and human talent, with a special emphasis on advanced technology development and military security. China, with its New Generation Artificial Intelligence Development Plan, is pursuing large-scale government investment and human resource development, creating specialized platforms in key sectors and supporting leading enterprises. Japan's AI Strategy 2019 seeks to accelerate technological innovation to revitalize industry and address social problems such as population ageing by training 250,000 AI talents each year and positioning AI as a key factor in industrial and social competitiveness. Countries such as India, which initially lagged behind in AI adoption but has developed a strategy with a focus on AI talent development (see table IV.1), could also be cited as examples.

Table IV.1
Selected countries: artificial intelligence plans and strategies

Country	Instrument and main content
United States	**Executive Order of the American AI Initiative (2019).** Seeks to improve private sector competitiveness and prioritize investment in artificial intelligence through long-term government investment in research and development (R&D) and human talent. ► Focus: Next-generation R&D and military security.
China	**New Generation Artificial Intelligence Development Plan (2017).** Seeks to achieve large-scale government investment in AI and human resource development by creating specialized platforms for each industry. ► Focus: Nurturing leading companies such as Baidu, Alibaba and Tencent.
India	**National Strategy for Artificial Intelligence (2018).** Seeks to position the country as the world's leading power in AI talent. ► Focus: Improve use of AI as a key aspect of industrial competitiveness and social development.
Germany	**Artificial Intelligence Strategy of the Federal Government (2018).** Seeks to establish Germany as a world leader in AI with an investment of 3 billion euros by 2025, with priorities that include AI research and training and measures to foster cooperation. ► Focus: Increasing the competitiveness of German industry and pursuing the numerous opportunities available for using AI in all sectors of society.
Spain	**National Strategy for Artificial Intelligence (2024).** Seeks to strengthen AI infrastructures and capabilities, including supercomputing and specialized talent. Emphasizes the natural language model (Alia) in Spanish. Provides for investments of at least 600 million euros. ► Focus: Promoting the use of AI in the public and private sectors, with a focus on small and medium-sized enterprises (SMEs), and ensuring ethical development under the auspices of the Spanish Agency for the Supervision of Artificial Intelligence (AESIA).

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of official information.

Europe, meanwhile, is positioning itself as a region with a number of initiatives linked to the development of national AI strategies. For example, the Artificial Intelligence Strategy of the Federal Government of Germany, adopted in 2018, aims to establish the country as a world leader in AI while ensuring responsible development and integrating AI into society. With an investment of 3 billion euros by 2025, the strategy focuses on expanding research via the development of centres of excellence, increasing AI chairs and fostering cooperation. It also aims to promote the responsible use of AI by creating an AI observatory, supporting workforce training and funding environmental applications. Another example is Spain's National Strategy for Artificial Intelligence (ENIA), which is structured along three main axes. The first aims to strengthen infrastructure and capabilities, prioritizing supercomputing, data processing and talent training, with the creation of the natural language model (Alia) supervised by the Spanish Agency for the Supervision of Artificial Intelligence (AESIA). The second axis promotes the use of AI in the public and private sectors, with a special focus on SMEs. The third axis is designed to reinforce the ethical and transparent development of AI under the supervision of AESIA.

Despite differences in their approaches, all these strategies share a common goal: to promote innovation and economic growth while ensuring the responsible and ethical development of AI. They also consider the importance of AI as a key driver for the future of competitiveness and digital transformation. This is in fact a global trend, with about 30% of countries having such policies.

Against this backdrop, there are still critical gaps in Latin America and the Caribbean. Only six countries (Argentina, Brazil, Chile, Colombia, the Dominican Republic and Peru) officially have national AI strategies that cut across all areas. However, a variety of targeted or sectoral initiatives are also being pursued. As part of this group, mention should be made of Uruguay, which has approved the Artificial Intelligence Strategy for Digital Government and the Road Map on Data Science and Machine Learning and is in the process of approving a new AI strategy as of 2024. Mexico, likewise, has established the National Artificial Intelligence Partnership (ANIA) as a platform for advancing AI, and this has presented a National Artificial Intelligence Agenda Proposal for Mexico 2024–2030. Other countries that have initiatives in place and have begun discussions aimed at developing AI strategies to guide their technology and innovation efforts include Costa Rica, Jamaica, Panama and Trinidad and Tobago. Some of these initiatives are described below.

Colombia's national AI strategy was presented in 2019 in the National Council on Economic and Social Policy (CONPES) document titled "National Policy for Digital Transformation and Artificial Intelligence". The strategy focuses on harnessing AI for social and economic transformation in the context of the fourth industrial revolution. With 14 key principles, Colombia's AI strategy emphasizes evidence-based regulations, ethical use of AI and workforce development. The country aims to foster innovation, improve digital infrastructure and promote the mobility of local and global talent. This strategy highlights the adoption of a structured approach, with a budget and monitoring mechanisms, and positions Colombia as a regional leader in the implementation of AI policies. As of 2024, Colombia is in the process of reviewing a specific policy for AI under the leadership of the Ministry of Information and Communications Technologies, the Ministry of Science, Technology and Innovation, the National Planning Department and the High Council for Digital Transformation of the Presidency. The process has involved contributions from various government agencies in addition to these actors, and participatory exercises have been organized at the national and territorial levels involving the public sector, the private sector, academia, multilateral organizations and civil society.

The Brazilian Strategy for Artificial Intelligence (EBIA) was introduced in 2021 and serves as the country's fundamental policy for AI development. Coordinated by the Ministry of Science, Technology and Innovation, EBIA involves 48 institutions and more than 1,000 participants. It focuses on data governance, international collaboration, ethical AI development and productivity. Brazil's approach includes 74 specific objectives, covering areas such as training, ethics, governance and public administration. By facilitating data transparency and cross-border sharing of AI tools, Brazil seeks to position itself as a global player in the ethical development and governance of AI.

The Brazilian Artificial Intelligence Plan (PBIA), launched in 2024, is another ambitious initiative of the Brazilian government, whose purpose is to boost the development of AI in the country. The plan includes investment of approximately US$ 4 billion over four years and provides for the acquisition of one of the world's five most powerful supercomputers. This advanced technological infrastructure, powered by renewable energy, will make it possible to develop advanced AI models in Portuguese, tailored to Brazil's cultural and linguistic characteristics. PBIA is also focused on 31 concrete actions to address needs in key sectors such as health care, education, the environment, agriculture, industry and public services, and aims to strengthen technological infrastructure and turn AI into a source of job creation. This plan reflects Brazil's commitment to innovation and the development of cutting-edge technological capabilities, and positions the country at a level comparable to powers such as the European Union.

Chile's National Artificial Intelligence Policy was launched in 2021, with a vision that extends to 2031. This strategy aims to position Chile as a world leader in AI applications, particularly within the Latin America and Caribbean region. Chile's AI agenda is comprehensive and focuses on talent development, technology infrastructure, data management and ethical considerations. The government has updated its policy to include goals related to AI governance, school education and vocational training. By fostering collaboration between academia and industry, Chile seeks to promote AI innovation, align itself with international standards and address pressing issues such as climate change and social inclusion.

Peru launched its National Strategy for Artificial Intelligence (ENIA) in 2021 with a blueprint focusing on six strategic pillars: talent development, adaptation to the economic model, technological infrastructure, data governance, ethics, and collaboration. The strategy includes the establishment of a National Centre for Digital Innovation and Artificial Intelligence and the integration of AI into all value chains, particularly open data and the ethical use of AI. The Peruvian approach is comprehensive, with 14 strategic objectives and 75 subobjectives, but is still in the early stages of implementation. The emphasis on talent attraction and ethical integration of AI reflects Peru's goal of becoming a competitive player in AI development.

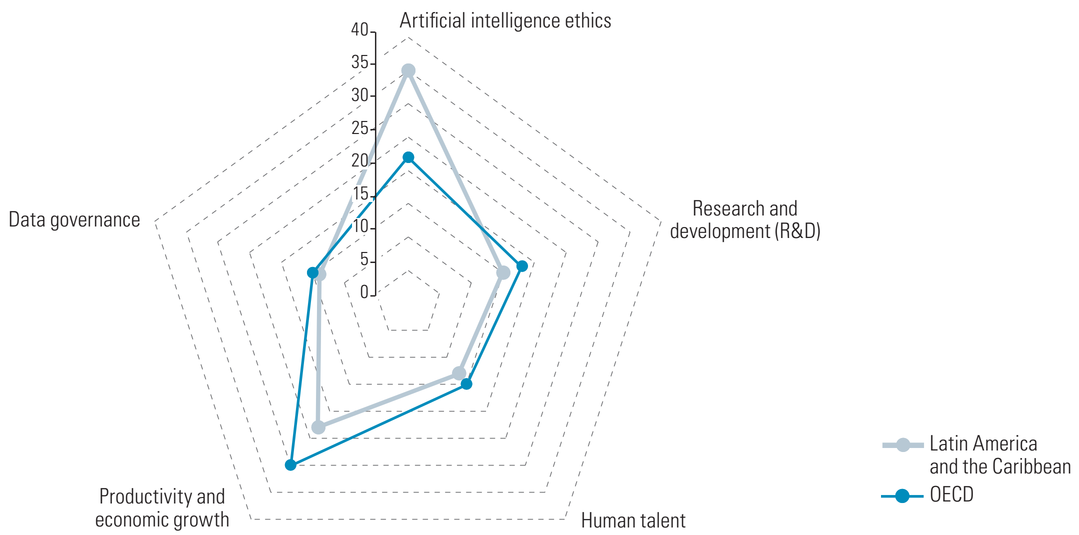
Argentina's National Artificial Intelligence Plan, developed in 2019 by the Ministry of Science, Technology and Innovation, sets out a comprehensive AI agenda. The plan includes 75 specific goals in 10 categories, such as talent development, public-private collaboration, supercomputing infrastructure and ethical regulations. The plan emphasizes multi-stakeholder engagement that takes in government, industry, academia and international partners. This inclusive approach is designed to foster innovation, improve AI-related education and ensure the ethical use of AI, thus positioning Argentina to harness AI for economic competitiveness and technological advancement.

The Dominican Republic launched its National Strategy for Artificial Intelligence (ENIA) in 2024, with the goal of becoming a regional leader in AI. Coordinated by the Ministry of the Presidency and the Government Office of Information and Communication Technologies (OGTIC), the strategy turns on four pillars: smart government, data centres, regional scale, and talent innovation. ENIA includes a comprehensive action plan with 50 initiatives designed to promote high-level political commitment and collaboration between government institutions. The goal of the strategy is for 1% of GDP to be invested in R&D by 2030, with a strong emphasis on monitoring, flexibility and stakeholder accountability.

The Uruguayan approach centres on the 2019 Artificial Intelligence Strategy for Digital Government, which establishes the initial actions for implementing AI in the public administration and whose development involved Uruguayan and international actors in a collaborative process. The aim is to ensure an equitable digital transformation, with continuous monitoring of technology use and outcomes. Uruguay also has its 2019 Data Science and Machine Learning Road Map, which is not an official agenda but serves as a strategic plan for improving the country's productivity and economic development. Led by the National System for Productive Transformation and Competitiveness, this initiative focuses on strengthening science, technology, engineering and mathematics (STEM) education, attracting global talent and harnessing the expertise of the Uruguayan diaspora. It also prioritizes research, development and innovation (R&D&I) and access to databases, while addressing the ethical implications of the use of data science and promoting international partnerships. The adoption of these technologies in the public and private sectors is meant to improve Uruguay's competitiveness and foster sustainable economic and social growth.

A comparison of the thematic approaches of AI policies between countries in Latin America and the Caribbean and selected countries of the Organisation for Economic Co-operation and Development (OECD) shows that the former attach greater relative importance to AI ethics and data governance than the latter. OECD countries, for their part, have a stronger focus on productivity and economic growth, which indicates a greater intention to integrate AI into production sectors and boost economic development (see figure IV.2).

Figure IV.2
Latin America and the Caribbean (9 countries)[a] and Organisation for Economic Co-operation and Development (OECD) (7 countries):[b] relative focus on thematic areas in digital policies and strategies, 2023
(Percentages)



Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of the Organisation for Economic Co-operation and Development (OECD).
Note: The analysis covers all policy and regulatory documents and initiatives included in the OECD AI Policy Observatory. Initiatives are grouped into five key AI-related categories, and each initiative is assigned to all relevant categories with a similar value. Relative values are then derived.
[a] Argentina, Brazil, Chile, Colombia, Costa Rica, the Dominican Republic, Mexico, Peru and Uruguay.
[b] Australia, Canada, France, Germany, India, the Republic of Korea and Spain.

C. Legislative and regulatory efforts related to artificial intelligence in Latin America and the Caribbean

Where AI regulation and legislation are concerned, bills are being debated in several countries of the region, with leading examples being Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Panama, Peru and Uruguay (see table IV.2). These initiatives seek to address a number of critical issues, such as personal data protection, transparency in the use of algorithms, the ethics of automated decision-making and legal liability for impacts deriving from AI. This landscape reflects a growing interest in addressing the challenges and opportunities presented by AI and a more active debate on the need to create legal frameworks in this area.

Table IV.2
Latin America and the Caribbean (10 countries): artificial intelligence-related bills currently in the legislative process

Country	Number of bills
Argentina	2
Brazil	1
Chile	2
Colombia	6
Costa Rica	2
Ecuador	1
Mexico	14
Panama	1
Peru	2
Uruguay	1

Source: Economic Commission for Latin America and the Caribbean (ECLAC), on the basis of J. Gutiérrez, "Regulación sobre IA", Foro Administración, Gestión y Política Pública (Foro GPP), 2024 [online] https://forogpp.com/inteligencia-artificial/regulacion-sobre-ia.

AI bills in Latin America and the Caribbean have a variety of regulatory approaches, which can generally be grouped into three broad categories: (i) bills laying down a set of principles for the development and the ethical and responsible use of AI systems that are inspired by recommendations and principles of the United Nations Educational, Scientific and Cultural Organization (UNESCO) and OECD; (ii) bills whose aim is for the State to facilitate and enable an ecosystem in which the private and public sectors can harness the opportunities associated with the development, deployment and use of AI systems; and (iii) bills inspired by the risk-based approach of the European Artificial Intelligence Act (Gutiérrez, 2024b).

Despite this diversity of regulatory initiatives, much of the debate centres on AI regulation itself, which often does not fully address the fundamental question of what kind of AI regulation is needed for both effectiveness and practicality. This question is particularly important for Latin America and the Caribbean, where AI adoption is still in its infancy, and where the risk of undermining innovation by overregulation can be a genuine concern. To achieve a balanced, forward-looking regulatory framework, it is essential for regulations not only to accommodate a rapidly evolving situation but also to be practical and context-specific, fostering technological development while safeguarding ethical, safety and rights considerations.

There are tools that can guide the design of regulations. For example, UNESCO suggests addressing four key questions before initiating a regulatory process. The first question is what should be regulated. It is essential to define precisely what is meant by "AI systems" in the proposed norm, specifying what types of systems and what activities in the AI life cycle will be covered. This clarity will allow the exact scope of the regulation to be determined. The second question is why regulation is needed. It is important to identify the public problems regulation can address, assessing which fundamental rights might be at risk and how regulations could facilitate a desirable future. When to regulate is the third question. Analysis is needed to determine whether regulatory instruments are more efficient and effective than other policy tools, considering their legal, political, financial and technical feasibility. The fourth question, lastly, is the form regulation should take. It is essential to adapt the regulatory approach to local needs and contexts. Although lessons can be drawn from foreign regulatory frameworks, it is not advisable to adopt them wholesale without considering the institutional, economic, political, social and cultural peculiarities of the country or region concerned. These principles seek to ensure balanced and contextualized regulation that protects fundamental rights and promotes the sustainable development of AI in the region (UNESCO, 2024a).

One of the main instruments for assessing the potential risks of AI in relation to surveillance and social control is UNESCO-led. With a view to applying its Recommendation on the Ethics of Artificial Intelligence (adopted in November 2021 by 193 Member States), UNESCO has been implementing its Readiness Assessment Methodology in Latin America and the Caribbean since 2023. This is an initiative that seeks to prepare and equip governments in the region with tools and strategies for adopting AI.[1]

It is also important to highlight the usefulness of regulatory sandboxes as a tool in the design of AI regulations. These instruments provide a safe, controlled setting for experimentation and development of new applications in a real but supervised environment, fostering innovation while mitigating the risks associated with the technology. In practical terms, a process of this type involves a specific regulatory framework in which innovations are tested under supervision, a group of companies or stakeholders is selected, controlled testing is carried out and, after evaluation, a decision on approving, adjusting or rejecting the product is made, thus contributing to the modernization of regulations.

Besides driving innovation, regulatory sandboxes also play a crucial role in the early identification of potential risks, such as algorithmic biases, discrimination or privacy violations. Active oversight by regulatory authorities within these controlled environments allows such issues to be assessed and addressed before AI solutions are implemented on a large scale, thereby safeguarding citizens' rights and freedoms. In addition, the learning and insights gained provide invaluable information for the development of effective and balanced regulations. By demonstrating that AI is being developed and tested responsibly, sandboxes also help to build trust in the technology.

ECLAC (Guio, 2024) recently published the Regulatory Sandbox Maturity Assessment (RESMA) tool, which is part of a digital transformation laboratory sponsored by ECLAC itself and Germany's Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). This tool was designed to assess a country's capacity to implement regulatory testing environments and is proving to be a valuable resource for governments seeking to foster AI innovation while managing the associated risks. RESMA can be used to conduct a thorough assessment of a country's readiness, considering key aspects such as the legal and regulatory framework, institutional capacity, technological infrastructure and stakeholder commitment to the development of a testing environment.

Lastly, it is important to note that AI regulations need to be operational and embodied in institutions that translate regulatory and safety principles into specific actions that can guide the development and use of AI. In many cases, their role goes beyond mere enforcement. They must also act as intermediaries between AI developers, industry, academia and society, which may require new institutional capacities. Traditional government institutions in Latin America and the Caribbean may be unequipped to regulate AI for a variety of reasons. It will therefore be necessary to strengthen the design of the AI institutional framework, with greater autonomy and flexibility and enough resources for it to effectively fulfil its mandate and face the challenges posed by an increasingly digital future.

1 The methodology "is a diagnostic tool intended to assist Member States in upholding their commitment to the Recommendation by helping them understand how prepared they are to implement AI ethically and responsibly for all their citizens" (UNESCO, 2024b).

D. Key aspects of complementarity between digital agendas and artificial intelligence strategies

While several countries in Latin America and the Caribbean have established AI policies and initiatives, as noted above, it is clear that the region's AI strategies largely focus on ethical development and regulation. In fact, 35% of AI-related policy and strategy initiatives in Latin America and the Caribbean focus on ethics, compared to 22% in OECD countries. This imbalance reflects a tendency to prioritize regulatory frameworks over the practical deployment of AI technologies in ways that could increase or limit the impact that AI adoption might have directly on productivity and economic growth, or the potential for the development of AI itself.

Something that is essential to strengthen the productive focus of these instruments is to link the digital transformation and AI agendas with productive development policies. Generating synergies between the two areas ensures that the use of digital technologies is aligned with broader economic development objectives. In practical terms, this integration can be fostered in several ways, such as incorporating specific digital transformation and AI objectives and instruments into productive policies. There is also a need to establish institutional frameworks for coordination between the entities responsible for digital and productive matters. In addition, specialized bodies or units can be created to encourage the adoption of these technologies in the production fabric. It is also essential to develop capacities among public officials so that they can design concrete actions to promote AI and advanced technologies, especially in key sectors such as manufacturing, agriculture and services. This coordination is essential to confront the challenges of productivity and competitiveness in the region.

Furthermore, whatever the focus of digital agendas or AI strategies, a major shortcoming of these instruments is the lack of earmarked budget allocations. In contrast to a number of advanced countries, where resources for implementing AI strategies are individualized, in the region, with the exception of Brazil and Colombia, specific budgetary provisions are not systematically included in strategies. This is compounded by the fact of many of these strategies having been developed before the mass roll-out of generative AI, which could affect certain aspects of strategy.

Another pressing problem is the absence of specialized institutions capable of effectively overseeing and promoting the adoption and regulation of AI. In the vast majority of Latin American and Caribbean countries, there is no centralized authority or institution with the expertise and mandate to oversee the AI sector. Effective regulation and support for the integration of AI into all sectors requires institutions with regulatory authority and technical capacity, a crucial element that is currently lacking in most countries of the region.

Complementing and coordinating the efforts of AI strategies and digital agendas is also important to maximize the impact of these technologies. Digital agendas address issues that are essential for AI adoption, such as technological infrastructure, digital skills development and various governance and regulatory matters. By complementing these agendas, countries can build on existing institutions to coordinate efforts and resources. The integration of the two agendas is also essential for improving and coordinating efforts to modernize regulatory frameworks, as well as facilitating international collaboration. Table IV.3 describes some of the areas where complementarities can be found and areas that need to be strengthened.

In conclusion, digital agendas and AI strategies present multiple areas of complementarity, as well as areas that need strengthening as a matter of priority. Where technological infrastructure is concerned, both strategies require robust connectivity and universal access, and it is essential to move ahead with the expansion of high performance computing (HPC) capabilities and decentralized infrastructure. As regards training and skills, AI requires specialized training, supported by basic digital skills, as well as incentives for bringing on and retaining specialized talent and for training and upskilling the workforce.

Table IV.3
Areas of complementarity between digital agendas and artificial intelligence (AI) strategies and priority areas of AI to be strengthened

Policy area	Areas in which digital agendas and AI strategies are complementary	Priority areas of AI to be strengthened
Technological infrastructure	Both initiatives need robust connectivity and universal access to be implemented effectively.	**Develop digital infrastructure.** Move forward with national road maps for high performance computing (HPC) and decentralized resources. Invest in public infrastructure and provide incentives for public-private partnerships to stimulate investments in specialized AI hardware, regional data centres and local cloud service providers.
Training and skills	AI requires specialized training, complemented by basic digital skills via the digital agenda.	**Promote talent development and retention.** Implement comprehensive programmes for training and attracting AI talent. This includes strengthening higher education in technology areas, creating incentives to retain specialized talent and supporting programmes to modernize and upgrade the skills of the existing workforce.
Digital government	AI can make digital services more efficient, improving the relationship between government and citizens.	**Pursue a digital governance model that incorporates AI.** Develop models of digital governance in the State that foster the use of AI. This also requires work on data governance.
Social inclusion	AI plays a key role in social inclusion by facilitating access to services and opportunities for traditionally disadvantaged populations.	**Avoid exclusion.** Promote AI policies that reduce exclusion, and in particular that promote gender equity, and create safeguards to ensure that AI models prevent discrimination.
Labour market	Certain key measures can be taken to better harness the opportunities offered by AI in the labour market.	**New employment opportunities.** Invest in lifelong learning for workers and strengthen social safety nets, while ensuring that the benefits of technology translate into better wages and working conditions.
Research and development (R&D)	AI research must be aligned with technological innovation priorities in broader development policies.	**Integration of R&D.** Ensure that AI research is effectively integrated into national technological innovation strategies and broader economic and social development objectives.
Productive development	AI can be integrated into productive digitalization policies, improving their impact on productivity and competitiveness.	**Improve linkages with productive development policies.** Link AI and digital transformation agendas with productive development policies to align the use of digital technologies with broader productive objectives. This requires institutional coordination, the creation of specialized units and capacity-building.
Entrepreneurship and innovation	AI plays a crucial role in entrepreneurship by enabling new business models to be created.	**Dynamize the entrepreneurial ecosystem.** Boost the AI start-up ecosystem by improving funding mechanisms.
Governance and ethics	Strengthen AI regulation with governance mechanisms that already exist in the digital agenda.	**Guide legislative interest.** Establish regulatory frameworks that meet economic and social needs and consider institutional challenges in their implementation.
International cooperation	Make use of existing arrangements for digital cooperation.	**Benefit from existing arrangements.** Strengthen existing arrangements and institutions to share knowledge, best practices and experiences that facilitate cooperation and enable shared challenges to be addressed.

Source: Economic Commission for Latin America and the Caribbean (ECLAC).

In the area of digital government, it is crucial to develop digital governance models that promote the use of AI, integrating data management in an effective way. Social inclusion is another important area where AI can play a key role in facilitating access to services for disadvantaged populations, promoting gender equity and preventing exclusion.

In R&D, it is important to align AI research with technological innovation policies and broader economic and social objectives.

In the area of productive development and the economy, AI must be adapted to the economic structure of each country, with sectoral strategies that maximize its impact while at the same time making it possible to move into new sectors and pursue structural change. Entrepreneurship and innovation can also benefit from AI if new business models and start-ups are supported with new financing mechanisms and institutional improvements.

In the area of governance and ethics, meanwhile, it is essential to strengthen AI regulation by creating legislative frameworks that meet social and economic needs, and in international cooperation there is a need to use existing arrangements to share best practices and develop common standards that address shared challenges.

Lastly, strengthened institutional capacity-building, secure budget allocations and closer linkages with productive development policies are vital for the region to realize the full potential of AI. Without these adjustments, the countries of Latin America and the Caribbean may continue to lag behind in the fourth industrial revolution, missing out on the transformative benefits that AI promises for dealing with development traps.

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Latin America and the Caribbean is affected by three major structural traps or challenges that are holding back its development: low capacity for growth, high inequality and low social mobility, and low institutional capacity and ineffective governance. These challenges are deeply interconnected and feed back into each other, and the result is a vicious circle of productive stagnation, social exclusion and institutional fragility. However, digital transformation and the use of new technologies such as artificial intelligence (AI) offer a unique opportunity to break this cycle.

This document explores how digitalization, and AI in particular, can catalyse productivity improvements, reduce inequality gaps and strengthen institutional capacities in the region. The transformative impact of AI is already beginning to be felt, and some preliminary figures suggest that its influence on economic growth and the labour market will be even greater in the coming years.

The document also presents an overview of the digital strategies being implemented by the countries of the region, along with a number of recommendations for optimizing the effectiveness of these and encouraging real and effective adoption of digital technologies. The purpose of these proposals is to guide the design of policies and initiatives as part of a regional digital agenda with targets for 2026.

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