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What Can Artificial Intelligence Do for Stagnant Productivity in Latin America and the Caribbean?

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ABSTRACT: Since 1980, income levels in Latin America and the Caribbean (LAC) have shown no convergence with those in the US, in stark contrast to emerging Asia and emerging Europe, which have seen rapid convergence. A key factor contributing to this divergence has been sluggish productivity growth in LAC. Low productivity growth has been broad-based across industries and firms in the formal sector, with limited diffusion of technology being an important contributing factor. Digital technologies and artificial intelligence (AI) hold significant potential to enhance productivity in the formal sector, foster its expansion, reduce informality, and facilitate LAC's convergence with advanced economies. However, there is a risk that the region will fall behind advanced countries and frontier emerging markets in AI adoption. To capitalize on the benefits of AI, policies should aim to facilitate technological diffusion and job transition.

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Keywords:	Artificial Intelligence (AI); Productivity Stagnation; Technological Innovation; Latin America; Caribbean; Economic Growth; Labor Productivity; Automation; Macroeconomic Impact; Digital Transformation; Cross-Country Analysis; Regional Development; Technology Adoption; Emerging Economies; Economic Policy.

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* The authors would like to thank Carlo Pizzinelli for his invaluable advice on analyzing the effects of AI on labor markets, Greta Polo for excellent assistance with data work, and the IMF departments and seminar participants for their useful comments.

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Contents

Acronyms

- AEs – Advanced Economies
- AI – Artificial intelligence
- AGI –Artificial Generative Intelligence
- AIPI – IMF AI Preparedness Index
- ASEAN – Association of South Eastern Nations
- Agrotech – Agricultural Technology
- BCRP – Banco Central de Reserva Del Peru
- CEB – Central Europe and the Baltics
- CENIA - National Center for Artifical Intelligence
- EAS - East Asia and the Pacific
- EAP – Employee Assistance Program
- ECLAC - Economic Commission for Latin America and Caribbean
- Edtech – Education Technology
- EMs – Emerging Markets
- ENAHO – Encuesta Nacional de Hogares (Peru's National Household Survey)
- EPO – European Patent Office
- EU – European Union
- FAO – Food and Agricultural Organisation
- Fintech – Financial Technology
- GAIL - Generative Artificial Intelligence Laboratory
- GDP – Gross Domestic Product
- IDB – International Development Bank
- ILO – International Labor Organization
- ICT – Information and Communication Technology
- IT – Information Technology
- LAC – Latin America and Caribbean
- LA5 – Brazil, Chile, Colombia, Peru, Mexico
- LA7 – LA5 plus Uruguay and Argentina
- MENA – Middle East and North Africa
- MIT – Massachusetts Institute of Technology
- OECD – Organisation of Economic Cooperation and Development
- PC – Personal Computer
- PPP – Purchasing Power Parity
- R&D – Research and Development
- ROW – Rest of the world
- SSA – Sub-Saharan Africa
- SMEs – Small and Medium sized enterprises
- TATT – Telecom Authority of Trinidad and Tobago
- US – United States
- YTEPP - Youth Training and Employment Partnership program

Executive Summary

Since 1980, income levels in Latin America and the Caribbean (LAC) have shown no convergence with those in the US, in stark contrast to emerging Asia[1] and emerging Europe[2], which have seen rapid convergence. A key factor contributing to this lack of convergence has been lackluster labor productivity growth. Unlike firms in Eastern Europe or Asia, which have narrowed the gap with US firms, the productivity of firms in Latin America has been declining. The decline has been broad based across sectors and firm types.

Part of the productivity problem has been the existence of a large informal sector that consists of small and unproductive firms. By its nature, productivity growth in the informal economy is likely to be low. In LAC countries, the size of the informal sector has not been declining over time, in contrast to Asia, where the fast-growing formal sector has absorbed a large part of the informal sector.

More important may have been the weak growth of productivity in the formal sector. Stagnant productivity in the LAC formal sector has led to limited output increases that were not sufficient to attract workers away from the informal sector.

The limited diffusion of technology has likely been one of the key reasons for low productivity and output growth in the formal sector in LAC. Over the long term, output growth differences are the result of productivity growth differences. The gap in technology diffusion since the Industrial Revolution can explain most of the cross-country differences in output and productivity growth (Comin and Mestieri, 2018).

Indeed, IT adoption in LAC has been slower and less intensive than in advanced economies or emerging market economies in Asia. Key factors for the low diffusion of technology include weak competition, poor governance, the proliferation of small firms, low R&D investment, and inadequate human capital.

Artificial intelligence (AI) is expected to resemble previous IT innovations, such as the invention of the PC and the Internet, in its impact. Historically, IT innovations have significantly boosted labor productivity growth. Similarly, AI is likely to enhance productivity, with its adoption lag potentially being even shorter than that of the Internet due to lower capital and infrastructure requirements for widespread adoption.

AI holds the potential to enhance productivity and expand the formal economy in LAC. The potential for AI to increase productivity, as measured by the level of exposure to AI, in the formal sector is comparable to that in advanced economies. AI could further accelerate productivity growth by enabling countries to leapfrog technologies and reach a technological frontier. For example, Brazil advanced to the forefront in payments systems by introducing the digital retail instant payment system, Pix, bypassing costly credit card technologies and significantly enhancing financial inclusion.

AI may not reduce overall employment. Technological innovations tend to increase rather than reduce overall employment. Indeed, every automation wave has created new jobs that previously did not exist (Autor, 2015).

[1] Refers to Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, Fiji, India, Indonesia, Kiribati, Lao P.D.R., Malaysia, Maldives, Marshall Islands, Micronesia, Mongolia, Myanmar, Nauru, Nepal, Palau, Papua New Guinea, Philippines, Samoa, Solomon Islands, Sri Lanka, Thailand, Timor-Lese, Tonga, Tuvalu, Vanuatu, and Vietnam.

[2] Refers to Albania, Belarus, Bosnia and Herzegovina, Bulgaria, Hungary, Kosovo, Moldova, Republic of Montenegro, North Macedonia, Poland, Romania, Russia, Serbia, Türkiye, and Ukraine.

However, as with previous innovations, AI is likely to lead to social challenges and labor market polarization, as some jobs will disappear, while other jobs will benefit from AI.

The jobs most at risk of being lost are those where AI can execute most of the tasks (*exposure* to AI) and replace workers (*complementarity* with AI). An example is call centers. About a quarter of jobs in the LA5 countries fall into this category of high exposure to and low complementarity with AI. The jobs most likely to benefit from AI are those where AI makes workers more productive without replacing them. An example is doctors—AI can sharply reduce the time they spend on administration and thereby allow them more time to spend on patients. About 20 percent of jobs in the LA5 countries fall into this a category of high exposure and high complementarity.

The impact of AI on employment within a sector is influenced by multiple factors beyond just productivity enhancements and labor substitutability. These include whether AI expands consumer access, improves the quality-to-price ratio, and increases market demand. For instance, in the early 20th century, automation in the US agricultural sector led to a significant reduction in jobs because the demand for food did not increase significantly as food prices decreased. In contrast, the automotive industry experienced a surge in employment due to substantial productivity gains that lowered car prices and boosted consumer demand. In the healthcare sector, AI has the potential to lower costs and expand treatment options for previously unaddressed conditions, potentially increasing demand for medical services and thereby impacting employment.

There is a risk that the region will fall behind advanced countries and frontier emerging markets in AI adoption. First, the same factors that have hindered the diffusion of previous technologies, such as market competition, regulations, industrial structure, and deficits in physical and human capital, are likely to impede the spread of AI. Second, due to the size of the informal sector, the region's overall exposure to AI is lower than in advanced economies; while AI exposure in advanced economies reaches 60 percent of the labor force, Latin America's exposure is below 40 percent. This results in fewer opportunities for AI adoption. A large informal sector poses challenges to AI adoption also due to a lack of specialized talent and the absence of economies of scale in innovation. However, AI can also create opportunities for the informal economy by fostering inclusion through a digital ecosystem in finance and trade.

Policies to harness AI for growth in LAC should focus on enhancing technology diffusion and supporting workforce transition. Key steps include fostering competition by lowering entry barriers for new firms, strengthening antitrust regulations, and promoting collaborations between academia, industry, and government. Upgrading regulatory and supervisory frameworks is essential, especially in data protection and cybersecurity. Addressing the skills gap through AI-focused education and training programs is crucial for equipping workers with necessary skills and ensuring inclusive workforce participation. Implementing appropriate unemployment insurance schemes could mitigate the negative impact of AI on workers, helping displaced individuals find jobs that better align with their skills (Brollo et al., 2024). Significant investments in digital infrastructure are needed, particularly in underserved areas, to ensure broader access to the digital economy. Complementary policies to reduce labor market informality and support AI adoption that enhances human capabilities are also vital. These measures will help mitigate job displacement risks, reduce labor market polarization, and ensure that AI adoption benefits the economy broadly and equitably.

Introduction

Figure 1.1. Average Annual GDP per Capita Growth and its Contributors, 1997-2022
(Percent)

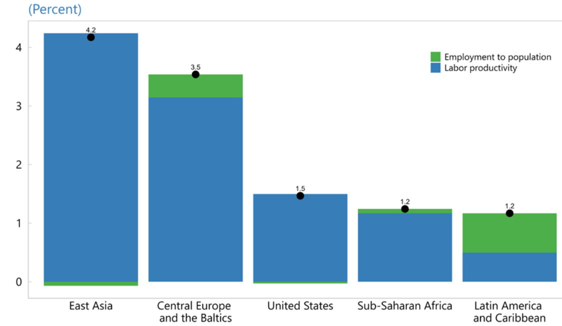
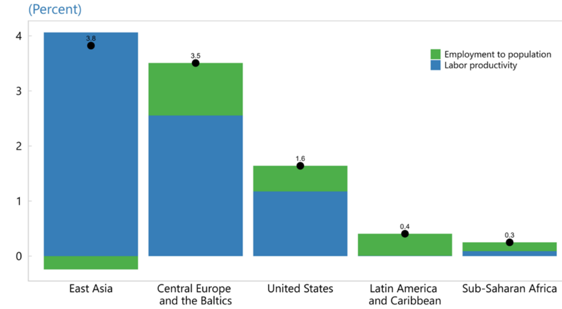


Figure 1.2. Average Annual GDP per Capita Growth and its Contributors, 2012-2022
(Percent)



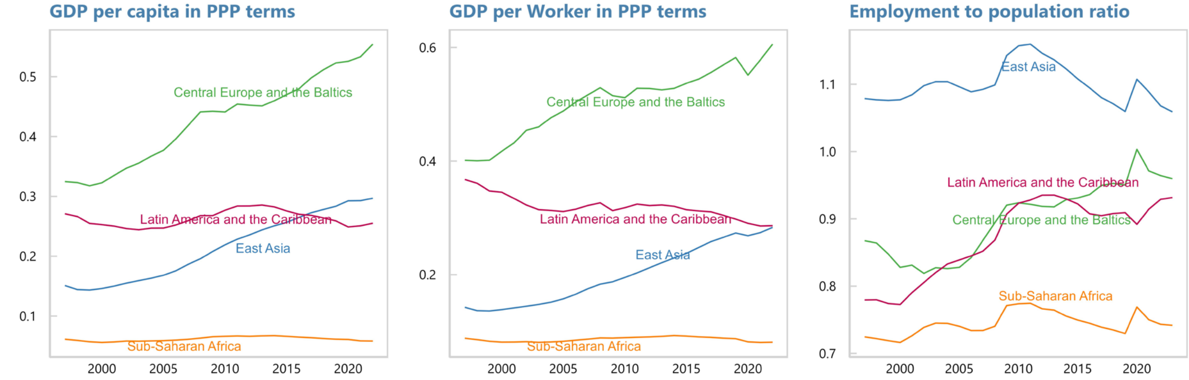
Sources: World Bank and IMF staff calculations.

In the past quarter century, per capita GDP growth in LAC has been low. It was not only well below East Asia and Central Europe and the Baltics (CEB), but also lower than in the much richer US. Low per capita GDP growth was the result of low labor productivity growth.

Labor productivity grew by only 0.5 percent annually, compared with 4.2 percent in East Asia, 3.2 percent in Central Europe and the Baltics, and 1.4 percent in the United States. In the last decade, GDP per capita growth was even lower. Between 2012 and 2022, GDP per capita grew only 0.4 percent annually, while annual labor productivity growth was zero.

As a result, despite a rapid increase in the employment-to-population ratio, LAC have seen no progress in bridging the income disparity with the United States. In 1997, the region's GDP per capita, adjusted for purchasing power parity (PPP), stood at 27 percent of the US's; by 2022, this figure had slightly declined to 26.4 percent. This stagnation contrasts sharply with the rapid economic ascents observed in East Asia and the Pacific (EAS) and Central Europe and the Baltics (CEB), where relative income levels have surged. Consequently, while LAC's income levels were nearly on par with those in CEB and significantly higher than EAS's in 1997, they have since fallen below EAS and diminished to less than half of CEB's.

Figure 1.3. GDP per Capita and Production Factors, 1997-2022
(Ratio to the US)



Sources: World Bank and IMF staff calculations.

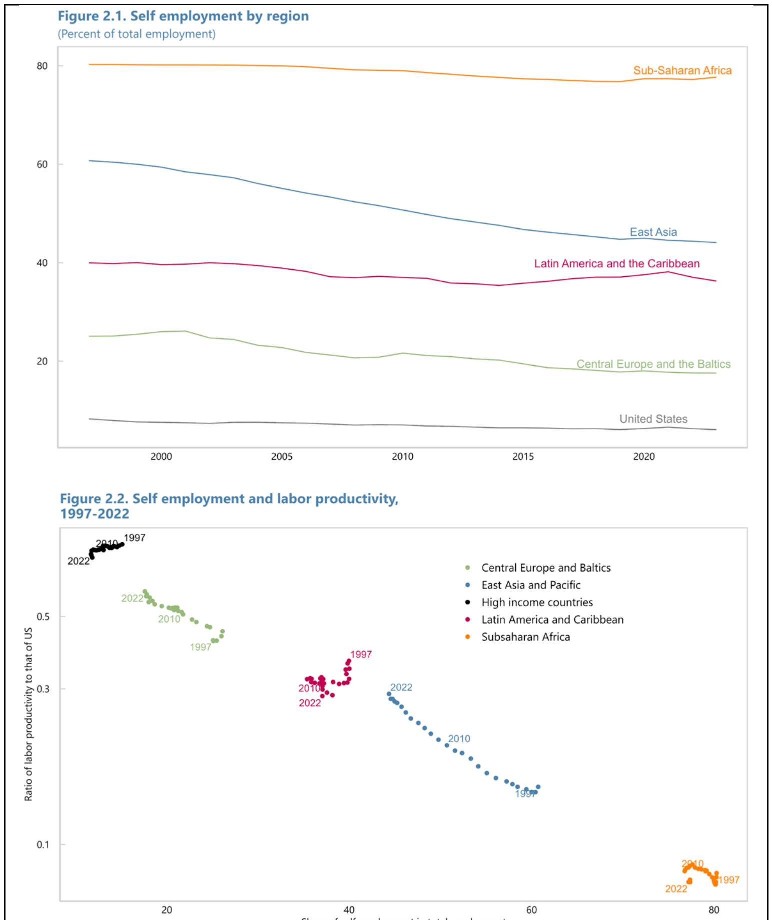
The advent of digital technologies and artificial intelligence (AI) presents a significant opportunity for enhancing productivity in LAC. This potential is particularly promising in the formal sector, where the adoption of digital technologies and AI could drive its expansion, reduce informality, and facilitate the region's economic alignment with more developed economies. Similar to how the mobile phone revolution enabled technological leapfrogging, AI offers the potential for rapid advancements in technological sophistication.

Nonetheless, there are concerns that LAC may lag behind more developed countries and emerging market frontiers in adopting AI. Weaker human capital indicators in LAC compared to EAS, CEB, and high-income countries, as well as the relatively small size of firms in the region, may limit the adoption and applicability of AI and affect cost efficiency.

To harness the transformative power of AI, policy measures in LAC should focus on promoting technological diffusion and facilitating transitions within the job market, thereby unlocking the potential for economic growth and productivity improvement across the region.

Low productivity growth in Latin America and the Caribbean

Stagnant labor productivity is associated with the region's persistently high level of informality.



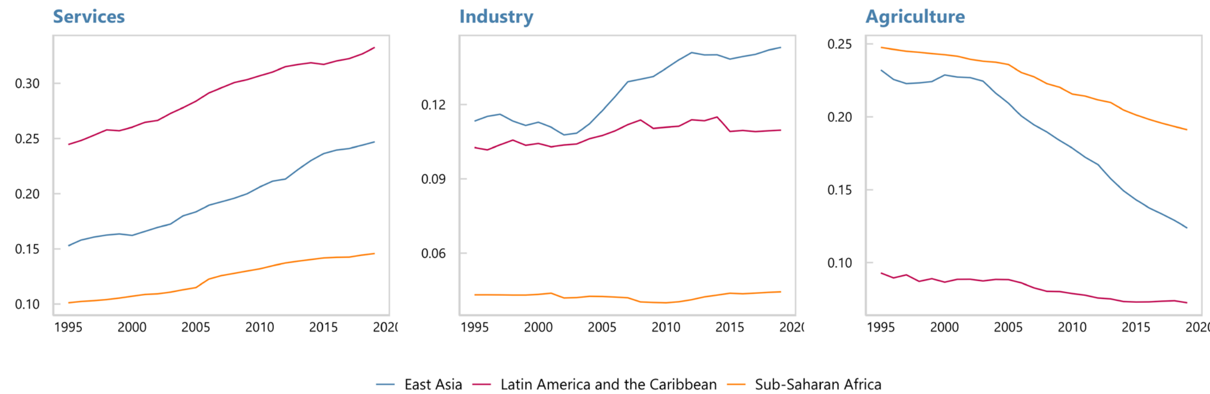
Sources: International Labour Organization, World Bank and IMF staff calculations.

Both labor and firm informality, often measured by self-employment, are negatively linked to productivity. There is a strong correlation across countries between the prevalence of self-employment and labor productivity. Informal workers are typically self-employed or employed in micro-firms, tend to have lower education levels, and earn lower wages. This situation limits their ability to acquire new skills and hampers their transition to formal jobs (ILO, 2018). Informal firms are generally small, have limited access to formal financial and legal systems, lack investment, and are less likely to adopt new technologies (Dabla-Norris and Inchauste, 2008; Gatti and Honorato, 2008; La Porta and Shleifer, 2014). Consequently, the productivity gap between formal and informal workers and firms is significant. One estimate indicates that informal firms are only 15 percent as productive as formal firms (La Porta and Shleifer, 2014). Notably, these productivity differences are not due to factors like firm age and size or worker education and experience, but rather to the nature of informality itself. For example, in Peru, workers who transitioned from the informal to the formal sector experienced a 54 percent wage increase, attributed solely to the transition to formality (Vostroknutova et al., 2015).

In EAS, a notable decline in self-employment rates coincided with a surge in labor productivity, largely attributed to the swift expansion and technological advancement of larger firms. This growth enabled them to absorb workers from the informal sector, as seen in the large migration of farm workers in China into the burgeoning manufacturing sector, as seen in the industry employment share in Figure 2.3.

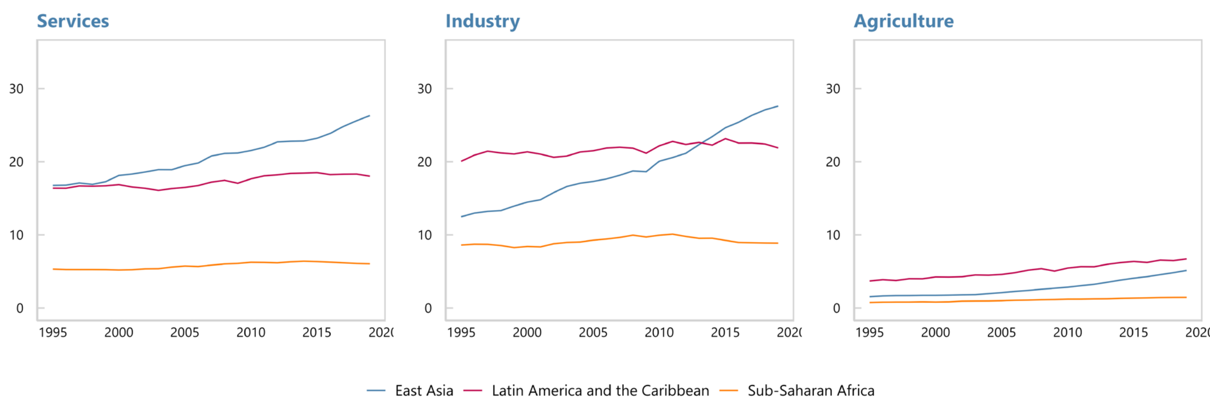
Conversely, LAC have seen little change in self-employment rates, likely due to insufficient productivity gains in larger firms and the formal sector to significantly impact self-employment levels. Unlike CEB and East Asia, LAC have seen virtually no productivity increases in services and industry in the last few decades (Figure 2.4).

Figure 2.3. Employment by Sector, 1995-2022
(Percent of population)



Sources: International Labour Organization, World Bank, and IMF staff calculations.

Figure 2.4. Labor productivity by Sector, 1995-2022
(Thousands of constant US dollars)



Sources: International Labour Organization, World Bank, and IMF staff calculations.

Theoretically, informality can be reduced through push factors, which originate in the informal sector and push workers and firms to formalize, or through pull factors, which originate in the formal sector and pull workers and firms from the informal economy (or allow unviable informal firms to exit). From a policy standpoint, push factors would include policies to formalize informal workers and firms, such as sanctioning informal firms or providing incentives to formalize. Pull factors would include policies to increase productivity, wages, and social protections in the formal sector. In practice, firms that begin in the informal sector are very unlikely to transition to the formal sector and interventions to formalize firms are generally unsuccessful (De Andrade et al., 2013; De Mel et al., 2013; Diao et al., 2018; Jaramillo, 2009; La Porta and Shleifer, 2008; McCaig and Pavcnik, 2021). The vast productivity differentials between formal and informal firms also suggest that most informal

2021). The vast productivity differentials between formal and informal firms also suggest that most informal firms would not be viable if formalized. These all suggest that reducing informality will require pull policies that boost growth and productivity in the formal sector.

The combination of weak aggregate productivity growth and a persistently large informal sector motivates a closer examination of productivity dynamics in the *formal sector*. This can help differentiate between two possible explanations (a) weak productivity growth in the formal sector has hindered aggregate productivity growth and limited its ability to absorb workers from the informal sector, and (b) strong productivity growth in the formal sector has occurred but other factors have prevented informal workers from transitioning to the formal sector and thereby overall productivity growth is limited. We document that firm-level productivity growth in the formal sector since 2016 has slowed in LAC, in line with the aggregate trends. Sectors with higher productivity growth in the formal sector also tended to have greater employment growth, indicating the importance of boosting productivity in the formal sector to attract workers and reduce informality.

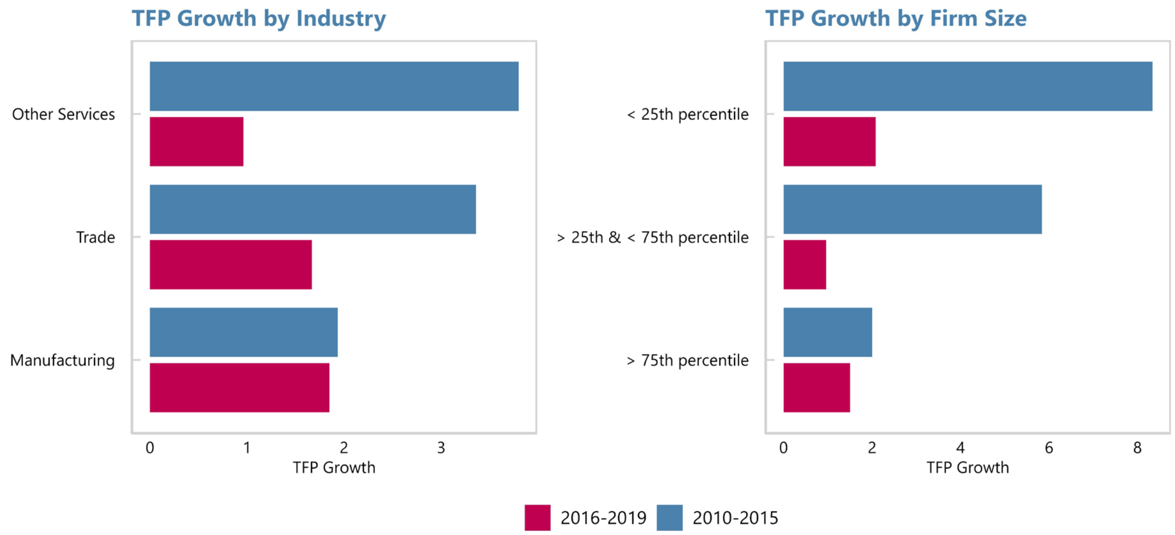
We compile firm-level data for formal firms in Chile, Colombia, Mexico, and Peru across 1997 to 2019 using Orbis and Peru's Annual Economic Survey. The sales of the firms in this dataset cover an average of 2 percent of GDP in their respective countries. Given the survey coverage, the data only include firms in the formal sector and overrepresents larger firms.[3] Thus, estimated productivity growth numbers may not be representative of aggregate productivity growth nor of productivity growth in the formal sector. Notwithstanding these issues, the sample is a panel of firms, allowing to follow productivity dynamics over time within a firm and can provide insights into firm-level productivity trends.

Overall, average annual firm-level total factor productivity growth in the formal sector since 2016 has been close to zero. Relative to 2010-2015, productivity growth declined in recent years across all countries in the sample.

The decline in total factor productivity growth has been broad-based across different groups in the sample (Figure 2.5). By industry, productivity growth has decelerated since 2016, relative to 2010-2015, in trade and other services sectors. By firm size, productivity growth has been low even among the largest firms, defined as the largest 25 percent of firms by annual sales in each country, which are also the most productive. Productivity growth, however, slowed the most among small firms, defined as the smallest 25 percent of firms by annual sales in each country. While employment data is not available for many firms, labor productivity growth has also uniformly slowed across industry and firm size. Taken together, these all point to a broad-based decline in firm-level productivity growth.

[3] In Orbis, many firms do not have sufficient data to estimate TFP; those that do are likely larger firms. In Peru's Annual Economic Survey, the sample frame oversamples large firms.

Figure 2.5. Firm-level Total Factor Productivity (TFP) Growth in Latin America



Sources: Orbis and IMF staff calculations.

Many factors could have driven the lackluster productivity growth. In the following two sections, we delve into two key factors— technology diffusion and labor allocation. We discuss how new technologies may affect labor market outcomes for different segments of the population, as well as the role of technology diffusion in aggregate productivity.

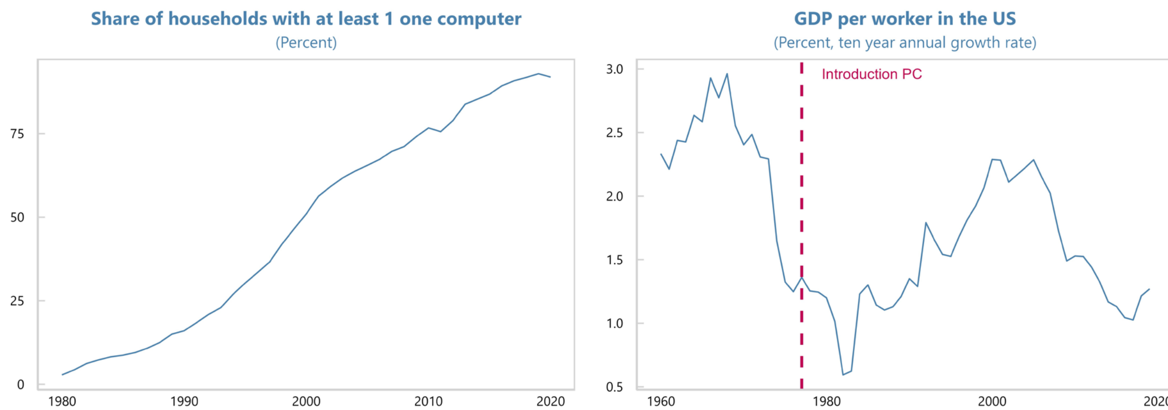
The Important Role of Technology Diffusion in Growth

Technological inventions typically do not boost productivity growth immediately, as they first need to be adopted. Take the example of the personal computer (PC). It was invented in the US in 1977[4] but its adoption was gradual. By 2000, only 50 percent of US households owned a PC (Figure 3.1). As a result, the arrival of PCs in the 1970s did not immediately reverse the decline in US productivity growth that had begun more than a decade earlier. An acceleration of productivity growth became evident only in the 1980 and 1990s.

Figure 3.1. ICT and Productivity in the US

The PC was adopted only gradually in the US.

The PC and other ICT boosted productivity in the US with a lag.



Note: In 1977, The 'Trinity' of personal computers was released: Apple II by Apple Computer, TRS-80 by Tandy Corporation (Radio Shack), Commodore PET by Commodore International.

Sources: Penn World Table, U.S. Bureau of the Census, Bureau of Labor Statistics and IMF staff calculations.

Adoption rates were even slower in other countries, including those in LAC. According to the Cross-country Historical Adoption of Technology data (CHAT) database, by 2000, PC adoption rates in Brazil, Colombia, and Peru had not reached the levels in the US in the mid-1980s. Moreover, only 21 percent of the LAC population used the internet in 2006, compared to 64 percent in advanced economies. A similar pattern emerges for internet and cellphone usage (Figure 3.4). Comparing across regions reveals a disparity between advanced economies and emerging markets, with North America, and Europe and central Asia leading the technological frontier, while LAC and other emerging markets lag behind.

Cross country differences in technology diffusion and income differentials

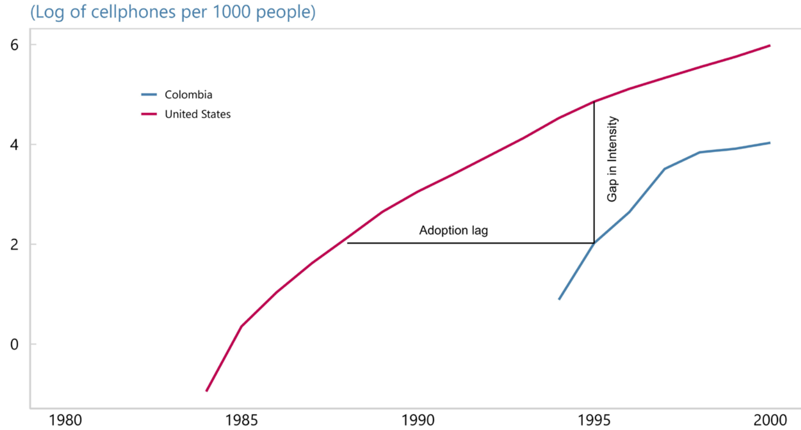
[4] The literature offers slightly different dating of PC. According to Britannica.com, the personal computer industry truly began in 1977, with the introduction of the Apple II, the TRS80, and the Commodore Business Machines Personal Electron. Jovanovic and Rousseau (2005) date the arrival of PC to 1971 with the Intel's invention of the "4004" microprocessor—the key component of the PC. The CHAT data date it to 1973.

Comin and Mestieri (2018) show that technology diffusion can account for 75 percent of the income disparities between Western and non-Western countries from the Industrial Revolution to the late 20th century.[5]

Take railway as an example for technology diffusion in Latin America. While railway freight transport started in the 1860s in the US, Latin American countries started using it only in the 1910s, with a lag of about 50 years. By the 1990 there was still a large gap in railway freight usage—it was much higher in the US than in Latin America.

To quatify cross-country differences in technology diffusion, Comin and Mestieri (2018) propose two measures: the difference in ***adoption lag***, which measures when a new technology is first introduced, and the ***gap in intensity of use***, which quantifies the extent to which the technology has penetrated the economy. To illustrate these measures, consider Figure 3.2, depicting the evolution of cellphones (in natural logarithm) per 1000 people in Colombia and the US. Under some parametric assumptions on the diffusion process, the adoption lag and gap in intensity of use can be estimated from the horizontal and vertical shifts in the diffusion curve.[6]

Figure 3.2. Adoption lag and gap in intensity of use: an illustration for cell phone use
(Log of cellphones per 1000 people)



Sources: World Bank and IMF staff calculations.

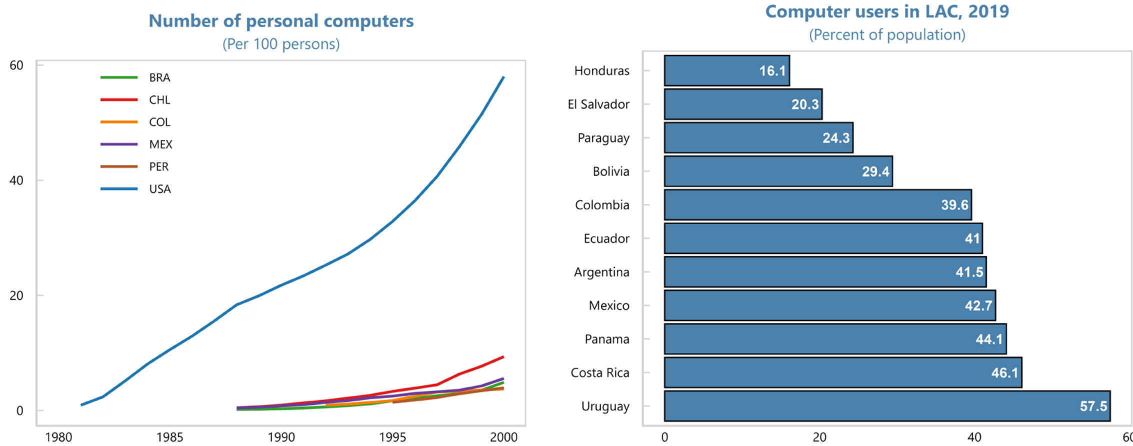
Comin and Mestieri (2018) estimate the diffusion curves of 25 major inventions between the late 18th century and 20th century across 139 countries. Their findings reveal that the gap in adoption lag between richer and poorer countries has narrowed, while the gap in intensity of use has widened.

[5] This classification is from Maddison (2004); Western countries include Austria, Belgium, Denmark, Finland, France, Germany, Italy, Netherlands, Norway, Sweden, Switzerland, United Kingdom, Japan, Australia, New Zealand, Canada, and the United States.
[6] The parametric assumptions restrict country-technology specific diffusion curves to have the same curvature. Therefore, the curves can be estimated using its curvature implied by the available data even if data on the exact adoption dates are missing.

Figure 3.3. Computer Use in Latin America

By the early 2000s, the adoption of personal computers in Brazil, Colombia, and Peru had not yet reached the level of the US in the mid-1980s.

Less than half of the population in Latin America were computer users as of 2019.

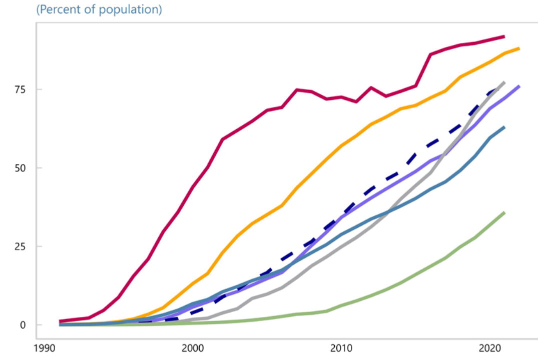


Source: CHAT, Economic Commission for Latin America and the Caribbean, and IMF staff calculations.

Figure 3.4. ICT Use and Access: Global Comparisons

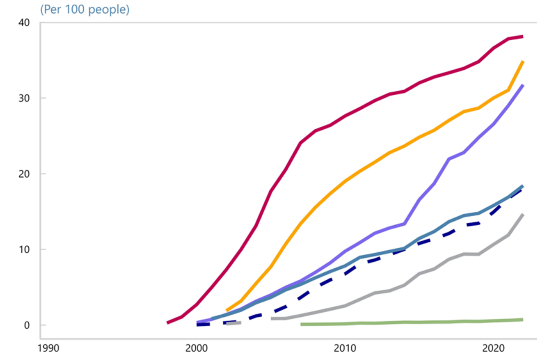
Internet usage in LAC lags behind North America and Europe/Central Asia, though it is higher than the world average.

Internet users
(Percent of population)



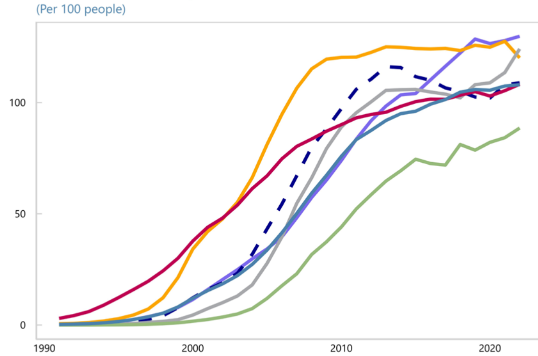
Fixed broadband subscriptions in LAC lag behind North America and Europe/Central Asia, and East Asia and Pacific, and are in line with the world average.

Fixed broadband subscriptions
(Per 100 people)



Mobile phone penetration in LAC lags behind Europe/Central Asia and East Asia and Pacific after a period of fast adoption that tapered off in the mid-2010s.

Mobile cellular subscriptions
(Per 100 people)



Fixed phone subscriptions in LAC lag behind North America and Europe/Central Asia, and are in line with the world average.

Fixed phone subscriptions
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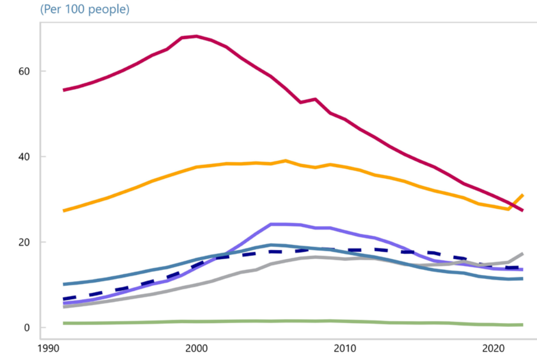
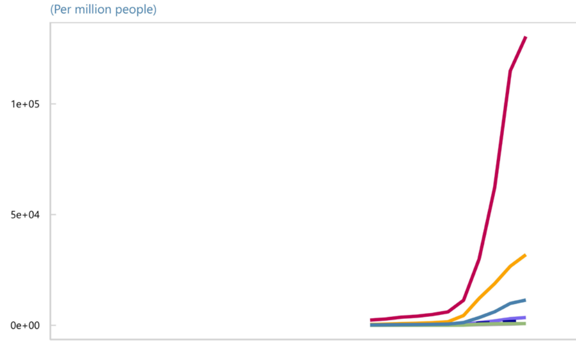


The number of secure internet servers in LAC lags far behind North America, Europe & Central Asia, and the world average.

Secure internet servers
(Per million people)

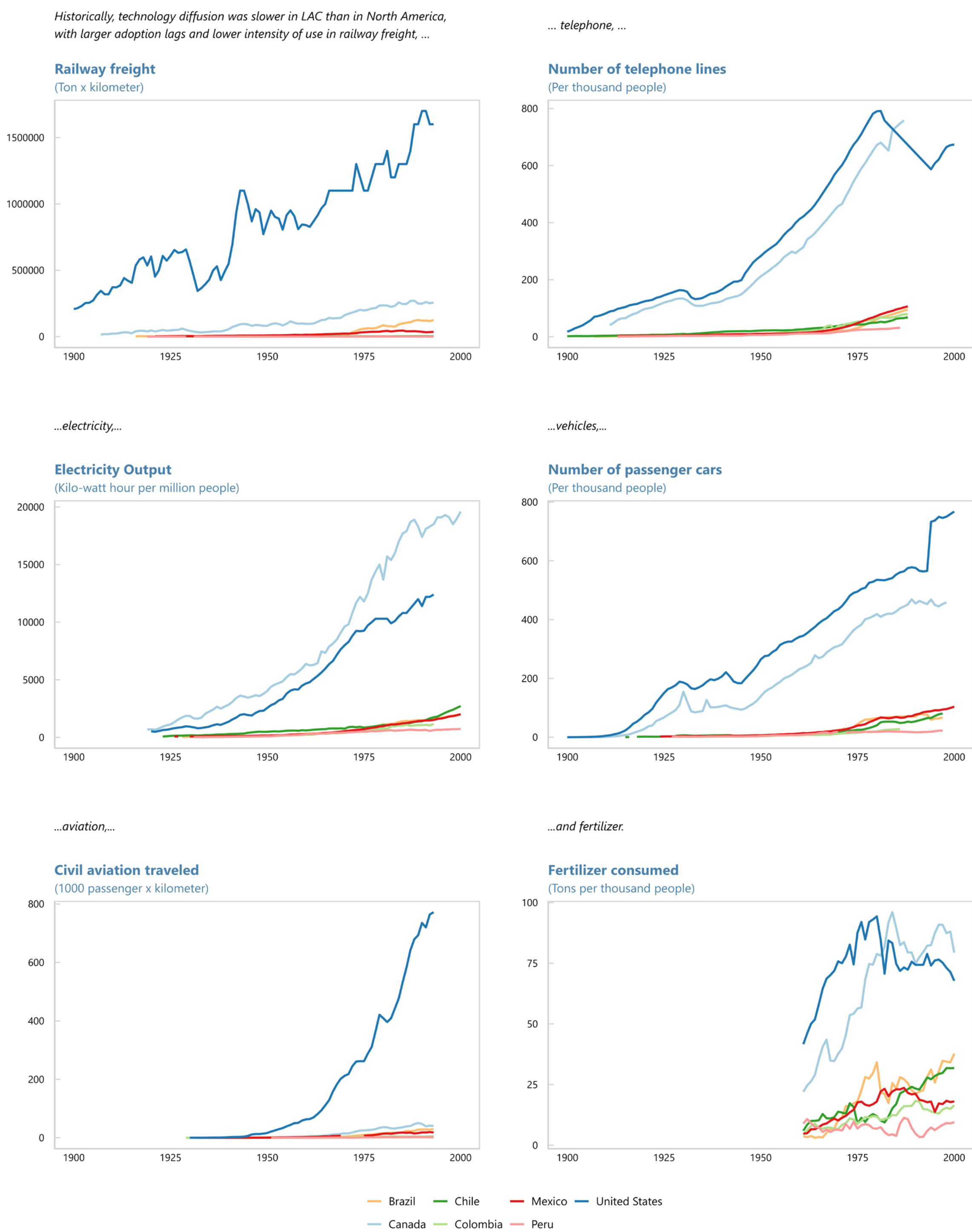


- East Asia & Pacific
- Europe & Central Asia
- Latin America & Caribbean
- Middle East & North Africa
- North America
- Sub-Saharan Africa
- World

Sources: Cross-country Historical Adoption of Technology (CHAT) dataset, and IMF staff calculations.

The slow diffusion of ICT in LAC (Figure 3.3 and 3.4) follows a broad historical trend observed across several major technologies invented in the 19th century and early 20th century, such as the railway, telephone, electricity, vehicle, aviation, and fertilizer (Figure 3.5). There was a significant adoption lag, and the intensity of use remained well below that in the US.

Figure 3.5. Technology Diffusion: Latin America and North America



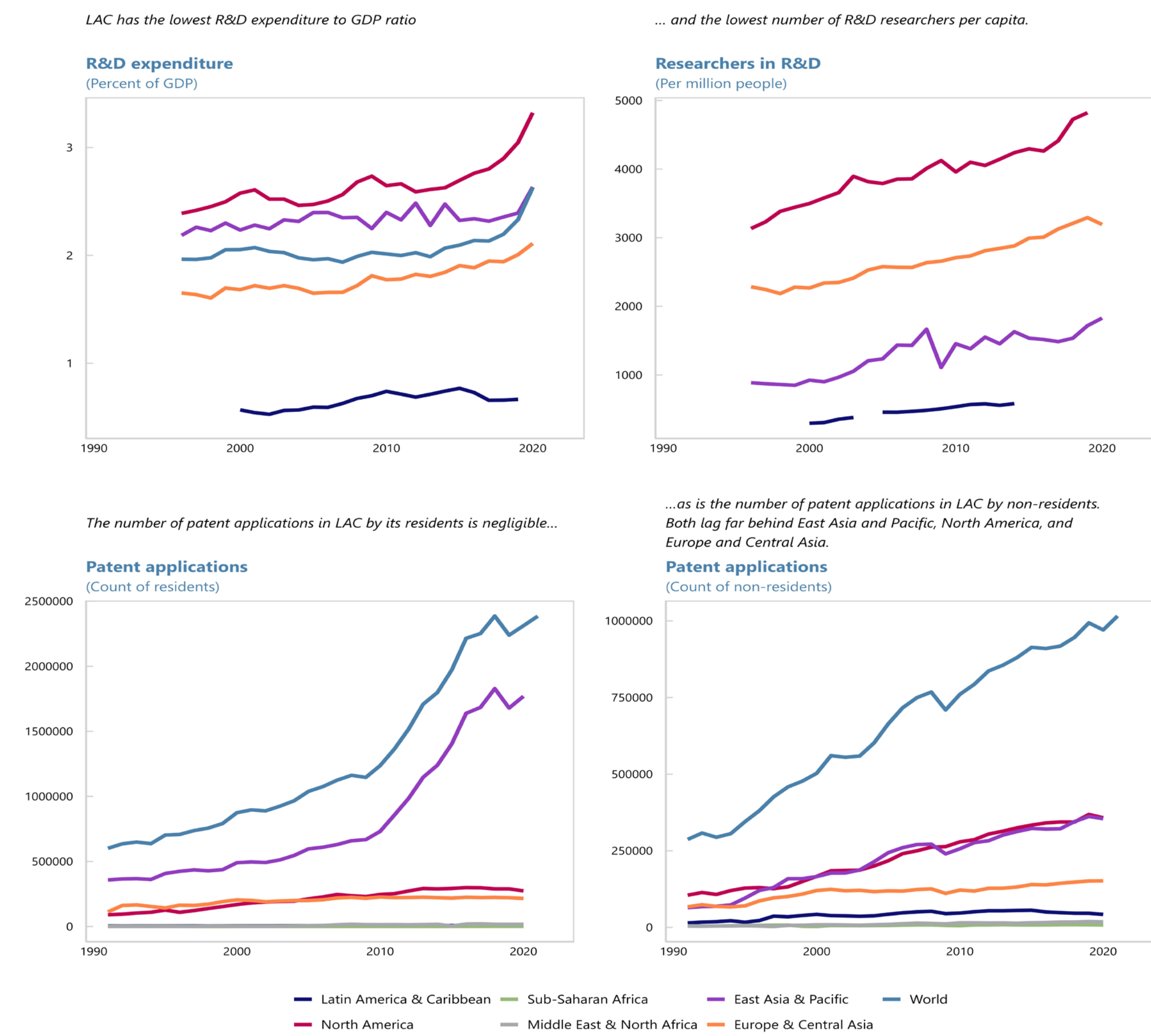
Sources: Cross-country Historical Adoption of Technology (CHAT) dataset, and IMF staff calculations.

Indicators of Innovation

If history serves as a guide, the diffusion of new technologies remains crucial for growth in the 21st century. Will the historical pattern of diffusion disparities persist with emerging technologies such as AI? To address this question, we turn to indicators of innovation, including research and development (R&D) and patenting activities. Innovation not only distinguishes leaders at the technological frontier from laggards but also serves as a precursor for future technological progress.

Over the past three decades, LAC have notably lagged other regions in R&D. The region has the lowest R&D expenditure per capita and the smallest number of R&D researchers. Moreover, patenting activities in LAC remain limited. Both resident and non-resident patent applications from the region constitute a negligible share of global patents. Additionally, there is no evidence of a notable increase in digital patenting activities in recent years, contrasting sharply with the upward trend observed in emerging Asia, emerging Europe, and North America (Figure 3.7).

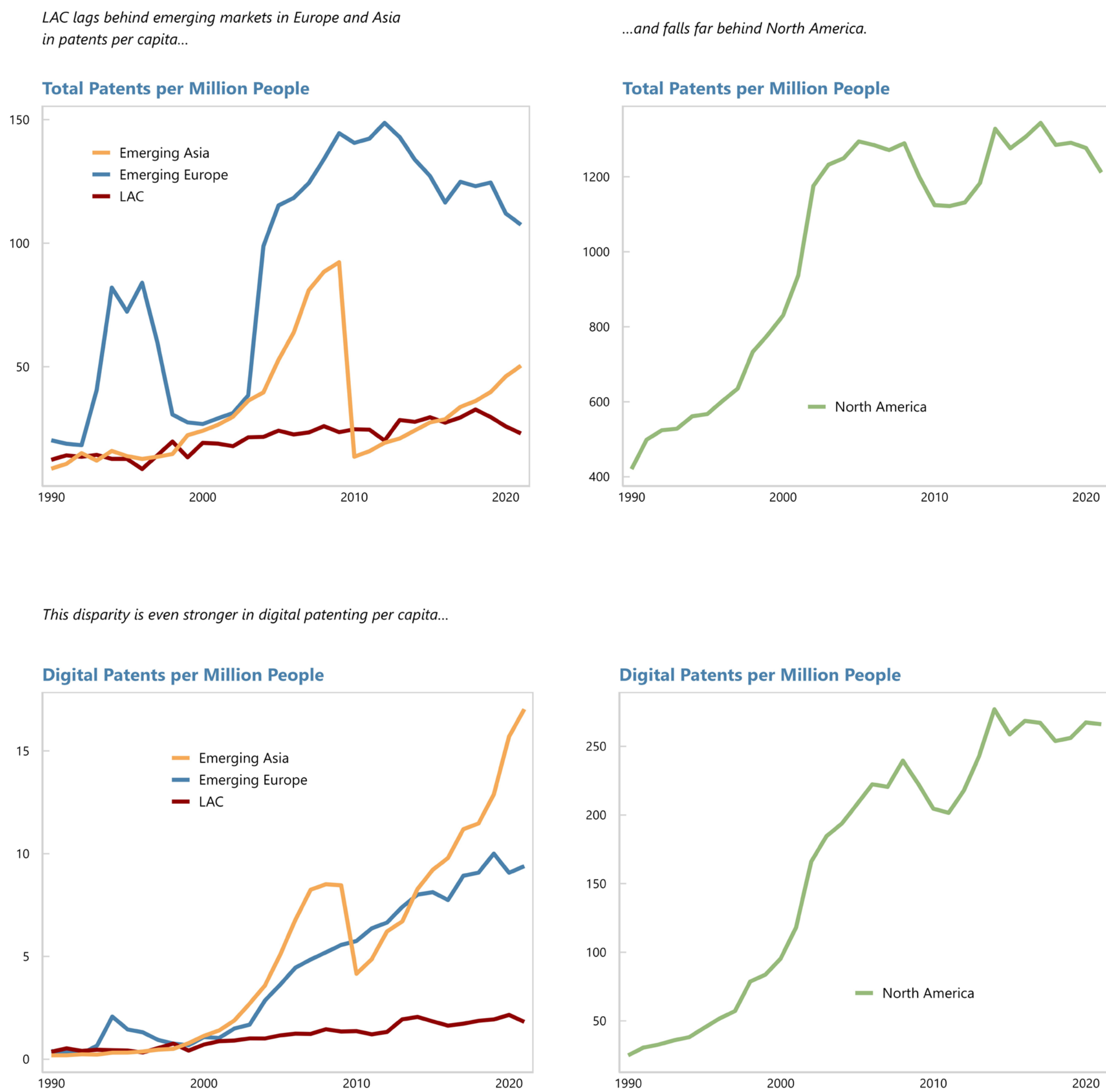
Figure 3.6. Research and Development (R&D): Global Comparisons



Sources: Cross-country Historical Adoption of Technology (CHAT) dataset, and IMF staff calculations.

Focusing on digital patenting activity, we observe that LAC lag other emerging markets in Europe and Asia in patents per capita (Figure 3.7). The region's digital patents constitute less than 2 percent of the total digital patents registered in North America. Moreover, the growth rate of digital patenting in the region shows no sign of acceleration over the past 30 years. While innovation does not preclude the possibility of LAC rapidly adopting emerging technologies as they expand beyond pioneering markets, it does suggest that the region may struggle to fully capitalize on these technologies compared to regions that innovate at a faster pace.

Figure 3.7. Per Capita Patenting Activity

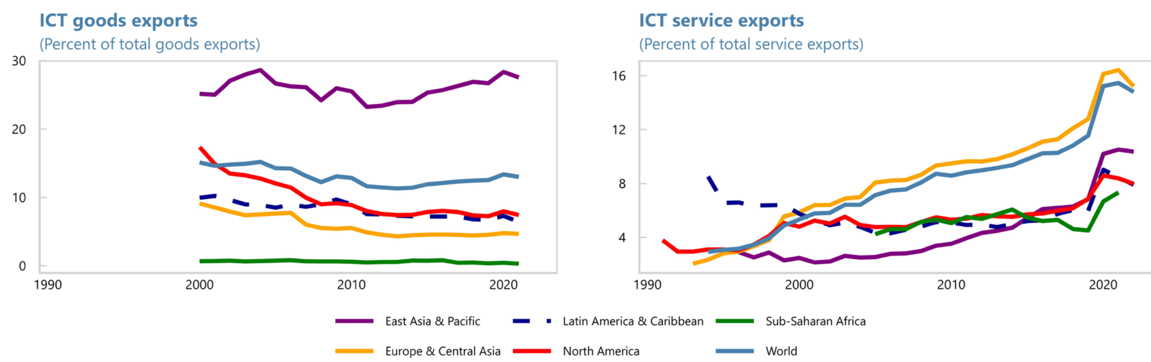


Source: Patstat; IMF Staff Calculations.
Note: Digital encompasses the computer technology, digital communication, and audio-visual technology patenting categories. North America is comprised of the United States and Canada.

The lagging digital patenting activity in LAC likely reflects a lack of innovation rather than underdevelopment in the ICT sector. In fact, when measured as a share of total exports, LAC's ICT exports are on par with North America in ICT goods and with both Asia and North America in ICT services.

Figure 3.8. ICT Exports: Global Comparisons

LAC's share of ICT goods in goods exports is on par with North America... *... as is its share of ICT services in services exports.*



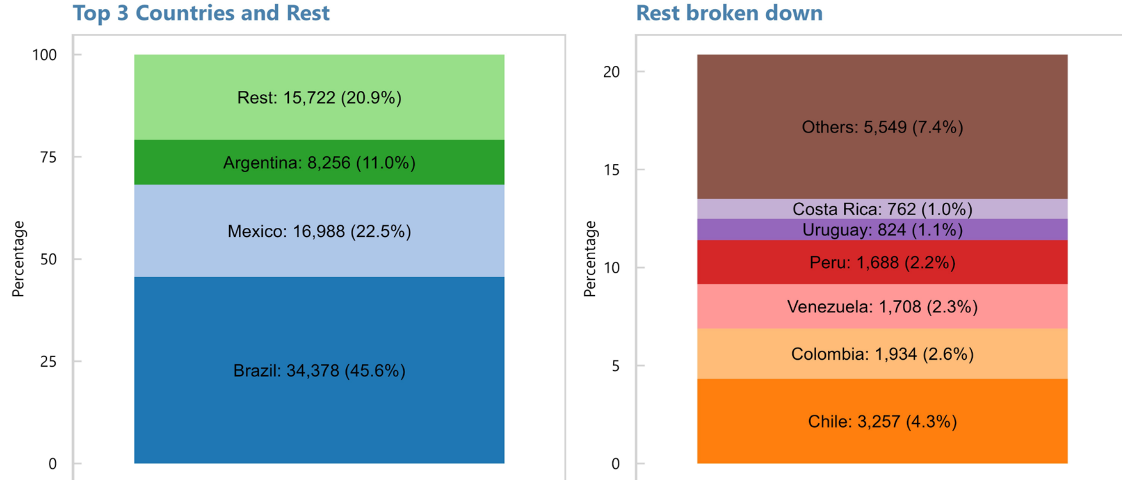
Sources: World Development Indicators and IMF staff calculations.

Digital patenting activity in LAC is not evenly spread across countries, with significant concentration observed in a few countries, notably Brazil and Mexico. Our empirical analysis indicates that access to financing has been a significant contributor to the advancement of digital technologies in these countries (Box 1). Interestingly, while the level of financing is important, our findings suggest that the financial structure matters less. We do not find any discernible difference between the effectiveness of debt and equity financing in fostering innovation.

Box 1. Financing Innovation in LAC

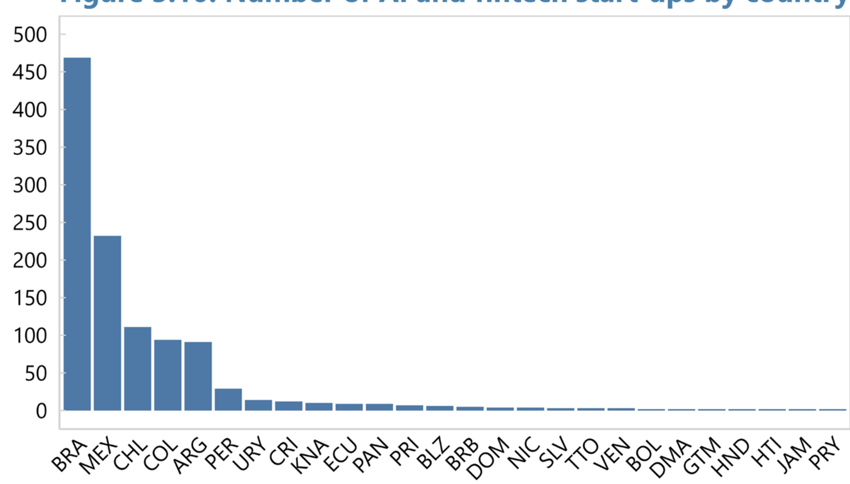
The landscape of patenting differs significantly across countries, as illustrated by Figure 3.9. The distribution of digital startups is also highly unequal, as shown in Figure 3.10. Annex 1 presents a formal empirical analysis showing that access to financing can explain a large part of these disparities.

Figure 3.9. Number of patents by inventor origin



Sources: Patstat and IMF staff calculations.

Figure 3.10. Number of AI and fintech start-ups by country



Sources: Crunchbase and IMF staff calculations.

Data on financing for digital innovation was obtained from the Crunchbase database, which is a comprehensive source for information about startups, investors, funding rounds, acquisitions, and exits within the entrepreneurial ecosystem. We identify digital startups using textual analysis of the self-identified industry of these entrepreneurial firms. To measure innovation activity, we rely on data on patent application, granted patents, assignees, and related metrics from Patstat. We regress patents on the amount of financing received by startups, while controlling for financing rounds, the number of investors, as well as time-varying macroeconomic shocks and country-specific idiosyncratic shocks.

Higher entrepreneurial financing is associated with a significant increase in the number of patents applied and eventually granted in Latin American and Caribbean countries. This effect is particularly pronounced in later financing rounds and in cases involving co-investment. Surprisingly, the type of financing does not significantly affect the level of innovation: both debt financing and equity financing stimulate innovation. These results remain robust across alternative specifications and when employing an instrumental variable approach. Enhanced access to financing, therefore, is an important determinant of innovation output for AI and fintech start-ups in the LAC region.

The Difference AI Can Make

AI is poised to enhance economic efficiency and productivity growth by transforming the nature of work and the methods we use. In this section, we will estimate LAC's exposure to AI through labor and evaluate how complementary jobs in the region are to AI. Using these estimates, we will assess the long-term impact of AI on growth under different scenarios. We will conclude by discussing the effects of AI on employment and unemployment.

Exposure to AI Through Labor

AI exposure refers to the degree to which AI technologies can perform tasks currently done by humans and increase *overall* productivity. AI complementarity assesses whether AI enhances human labor and increases *labor* productivity.

Our analysis of LAC countries applies occupation-specific indices of AI exposure and complementary from Pizzinelli et al. (2023) to employment data. Our findings indicate that about a quarter of jobs in Brazil, Chile, Colombia, Mexico, and Peru (henceforth LA5) have high exposure but low complementarity with AI–thus, are highly susceptible to automation–such as those in call centers. Conversely, around 20 percent of jobs, like those in medicine, have high exposure and high complementarity with AI and could see significant productivity boosts from AI without job displacement.[7]

Importantly, the overall exposure of LAC's labor force to AI is lower than in advanced economies due to the region's sizable informal sector. However, in the formal sector, AI exposure and its potential benefits are comparable to the level in advanced economies, especially within large firms.

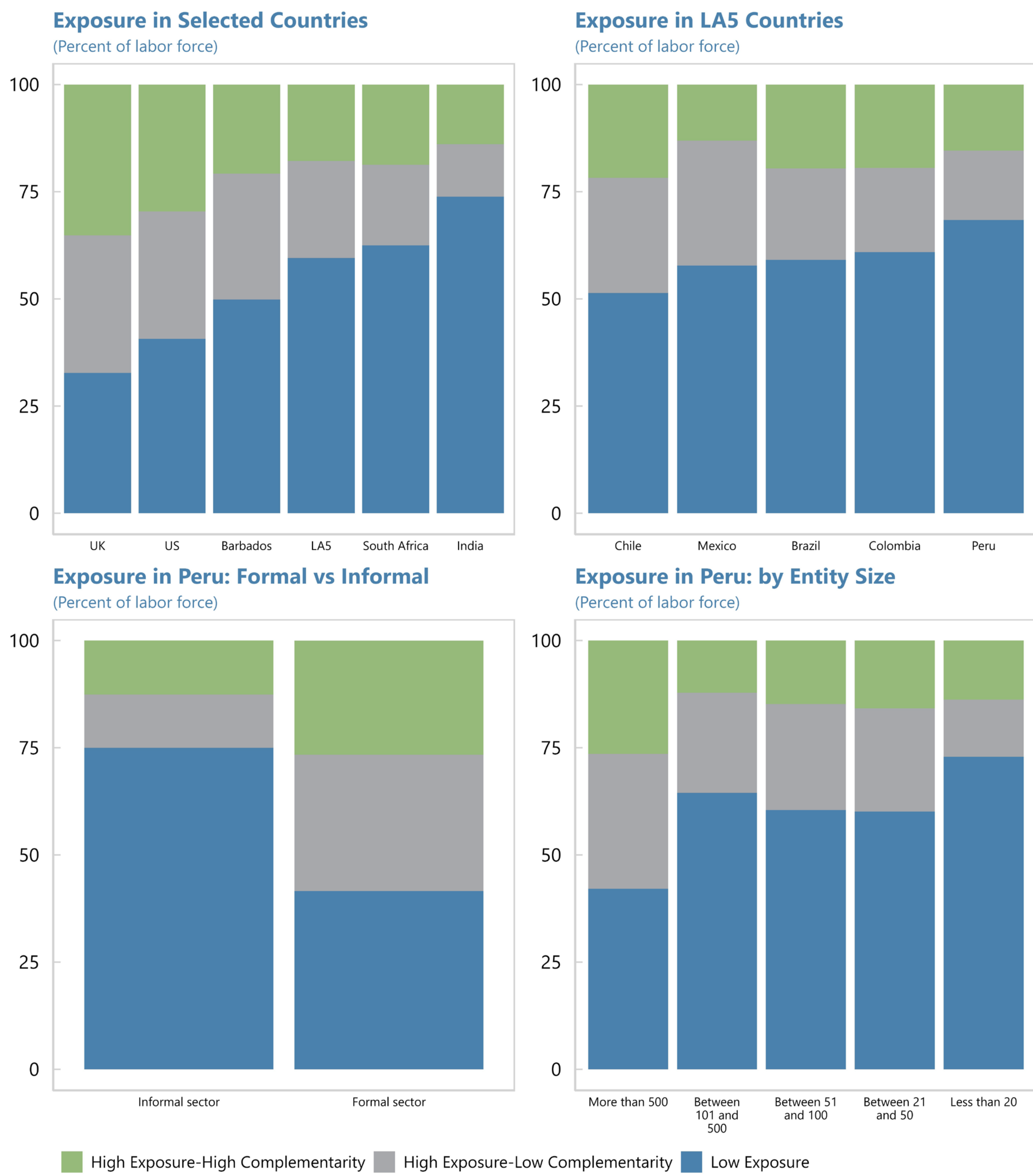
AI presents a strategic opportunity to enhance productivity in LAC's formal sector, potentially encouraging a shift from informal employment. This shift, along with productivity gains from AI, could lead to higher wages and increased labor demand. The actual impact on employment levels in various sectors will depend on factors such as productivity gains from AI, demand elasticity, and existing demand shortages in sectors like construction.

In summary, while a small portion of LAC workers are in roles that AI can significantly augment, the overall potential for AI to enhance job productivity in the region exists, albeit less pronounced than in advanced economies.

[7] Sectoral analysis was conducted using data from Peru's National Household Survey (ENAHO).

Figure 4.1 Labor Force Complementarity and Exposure to AI

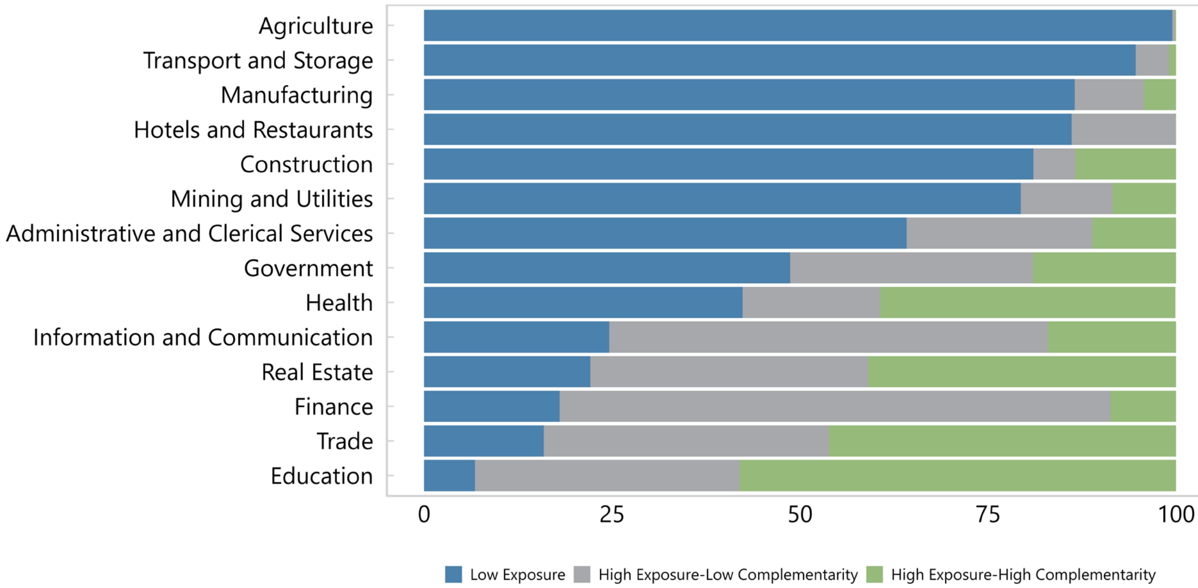
(Percent of labor force)



Sources: ILO, Peru ENAHO; Pizzinelli et al. (2023); IMF staff calculations.

Sectors that have the largest potential gain from AI are education, trade, finance, real estate, IT, government, and health. Over 50 percent of the workforce in these sectors is significantly exposed to AI (Figure 4.2). AI is also complementary to a substantial share of the workforce in these sectors. Other sectors, such as mining and manufacturing, will also be able to use AI technologies, but to a lesser extent, due to their smaller labor force exposure to this technology.

Figure 4.2. Exposure to AI by Sector
(Percent of labor force)



Sources: ILO, Peru ENAHO; Pizzinelli et al. (2023); IMF staff calculations.

Exploring AI's role in growth convergence

Leveraging insights on technological diffusion and labor market exposure to AI, we now turn to the question on how AI could contribute to growth in LAC. To do this, we use a structural model to link AI diffusion to growth. We claim that the potential diffusion of AI is related to AI exposure. In countries with higher exposure to AI, enterprises have greater incentives and better opportunities to introduce AI. We incorporate the estimated exposure to AI discussed in the previous section to model AI diffusion and explore whether AI diffusion will follow or diverge from historic trends observed with major technologies.

We build on the model framework of Comin and Mestieri (2018). As we discuss earlier, the model features two key aspects of technology diffusion, adoption lag and the intensity of use, and offers a quantitative link between technology diffusion and growth. The CHAT data on past major technologies show that the difference in adoption lag between richer and poorer countries has narrowed, but the gap in intensity has widened.

How would AI compare to this historic trend? Early evidence from generative AI technologies suggests that AI adoption delays between LAC and advanced economies (AEs) were shorter than with previous technologies

(ElectronicHub),[8] hinting at a potential narrowing of the cross-country gap in adoption lag, consistent with the historic trend.

However, there is more uncertainty regarding whether the historical pattern of diverging intensity of technology use will persist. The intensity of use of AI crucially depends on an economy's AI exposure discussed in the previous section, as well as structural factors that affects technology use. AI exposure matters because jobs more exposed to AI are more likely to use AI. In addition, a number of structural factors have been shown to affect past technology use. For example, better competition could help spur new jobs and economic activities to use new technology; better regulations could help avoid misuse of new technology industrial structure; upgrades in physical and human capital could help better integrate the new technology in production; better integration of economic activities could catalyze further gain, for example, through economy of scale and network effects. These factors remain highly relevant for AI. Especially given the high cost of development and deployment of AI, market competition, regulation, and investment in physical and human capital will likely play an important role in future AI use.

We integrate these intuitions in a structural model based on Comin and Mestieri (2018). Our goal is to illustrate how different scenarios of AI use may affect growth in LAC relative to North America. The model, as estimated by Comin and Mestieri (2018) using pre-AI data captures well the growth difference between LAC and North America (the US and Canada) (Table 1).[9]

Table 1. Annual growth rates of GDP per capita: regional comparison

	Simulation			Data		
	1820-1913	1913-2000	1950-2000	1820-1913	1913-2000	1950-2000
US and Canada	0.7	1.8	1.9	1.6	1.9	2.3
Latin America	0.4	1.3	1.4	0.6	1.5	2.2

Source: Comin and Mestieri (2018); Maddison (2010); World Bank, and IMF staff calculations.

We consider two scenarios of AI intensity of use in LAC:

1. Pessimistic AI Scenario:
The pessimistic scenario assumes that the AI penetration gap with the US follows the trend of past technologies. In addition, LAC's AI exposure (estimated at 0.66 of the US level) exacerbates the use of technology gap.

2. Aspirational Scenario:
This scenario assumes that by 2050, the accumulated gap in technology use intensity between LAC and the US is halved. In addition, the gap in AI exposure is also halved. This could result from LAC overcoming structural barriers and increasing AI exposure by adapting industry or occupational structures to better use AI.

[8] Source: Generative AI Global Interest Report 2023 - ElectronicsHub.
[9] The Latin America sample includes Argentina, Brazil, Chile, Colombia, Mexico, Peru, and Venezuela.

Box 2. Simulation model and scenarios

We model two aspects of technology diffusion—adoption lag and the intensity of use—following Comin and Mestieri (2018). They empirically estimate the processes of adoption lag and the intensity of use for each region based on the CHAT data. Adoption lag is estimated using the following equation:

$$\ln(D_\tau^r) = \rho^r + \omega^r \cdot (\text{Invention Year}_\tau - 1820) + \varepsilon_\tau^r,$$

where r and τ denote region and technology respectively; D is adoption lag; ρ is a constant; ε_τ^r is an error term. The coefficient ω^r captures the region-specific process of adoption lag over time. In our simulation scenarios, we assume the historic trend of adoption lag continues. Therefore, we calibrate adoption lag process for LAC and north America using the estimates in Comin and Mestieri (2018).

Intensity of use is estimated using the following equation:

$$\ln(I_\tau^r) = \theta^r + \mu^r \cdot (\text{Invention Year}_t - 1820) + \varepsilon_\tau^r,$$

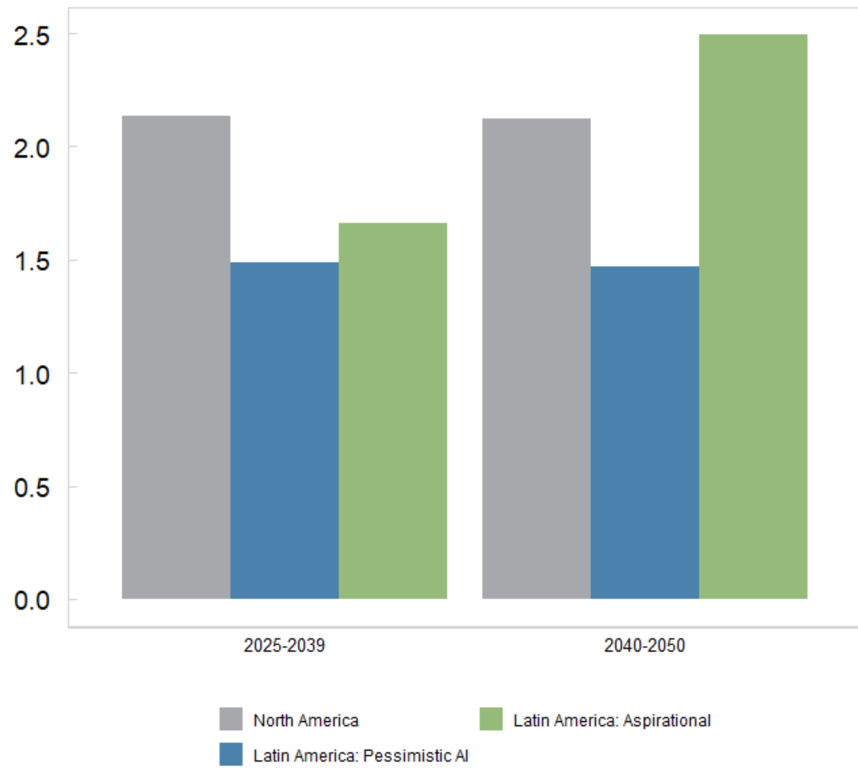
where r and τ denote region and technology respectively; I is the intensity of use; θ is a constant; ε_τ^r is an error term. The coefficient μ^r captures the region-specific process of intensity of use over time.

In the pessimistic scenario, we assume μ captures the effects of structural factors on the intensity of use. In addition, the differences in AI exposure exacerbates the regional differences in the process. Hence the process after AI is given by $\mu^r/dAIOE$, where $dAIOE$ captures the different exposure to AI in LAC and the US As we discuss earlier, we estimate 39 percent of the labor force in LAC is highly exposed to AI compared to 59 percent in the US. Hence $dAIOE = \frac{39}{59} = 0.66$.

In the aspirational scenario, we assume that LAC halves the gap in its intensity of use compared to the US. In other words, $\mu^r/dAIOE$ is halved by 2050.

Under these assumptions as detailed in Box 2, we simulate output growth in LAC under each scenario and benchmarking it to growth in North America (Figure 4.3). The growth impact of AI is illustrated through a comparison of the different scenarios. In the pessimistic scenario, LAC's gap with North America persists and its growth rate is at about 65 percent of the US by 2050. In aspirational scenario, reducing the intensity gap boosts LAC's growth. Initially, the growth rate increases modestly, as the intensity of AI usage is expected to remain relatively low. However, as AI becomes more widely integrated into the economy and the technological gap narrows, the growth rate in LAC surpasses that of North America before 2050. It is worth noting that the aspirational scenario is designed to show a drastic transformation in the intensity of use process in order to show the importance of utilizing AI intensely. A less drastic assumption on reducing the intensity gap will deliver qualitatively similar result but a longer catchup period. Overall, the simulation results show the potential of AI to transform the growth trajectory of LAC and utilizing AI intensely holds the key to realizing this potential. Overcoming structural barriers and increasing AI exposure by adopting the industrial and occupational structures to better use AI can help achieve this.

Figure 4.3. Simulation scenarios
(Average growth in percent)



Sources: ILO; Peru ENAHO; Pizzinelli et al. (2023); IMF staff calculations.

Qualitatively, AI has the potential to widen consumer access and foster the development of innovative products, improving the quality-to-price ratio and thus expanding market demand in various sectors. Digitalization, for instance, is enhancing financial inclusion with tools such as digital wallets (see Box 3 on the emerging digital ecosystem in Peru). Similarly, telemedicine is making healthcare more accessible, while online courses are democratizing education. AI's role in discovering more efficient or cost-effective medical treatments showcases the generation of new products that offer better value for money. Such advancements can increase the sector's demand by delivering greater marginal utility compared to “old” products and services.

Box 3. Emerging Digital Ecosystem in Peru

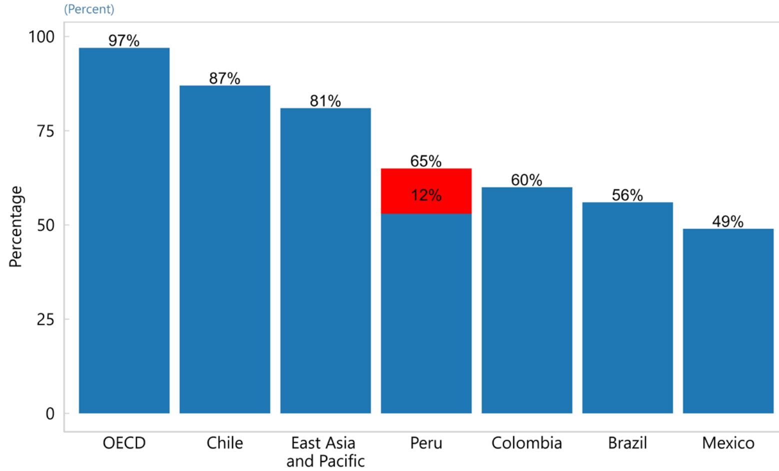
Digitalization is revolutionizing the financial and trade sectors in Peru. Given a notable pre-existing preference for cash transactions, the private sector's introduction of digital wallets marks a significant shift. Since the pandemic, the rapid advancement of digital wallets has propelled financial inclusion from 53 percent to 65 percent among the adult population. This technological leap is not merely about providing digital financial accounts to consumers and merchants but also about generating their digital footprint.

Banks are now leveraging this wealth of digital data on payment transactions and cash flows to assess creditworthiness and extend loans, thus broadening access to credit. Concurrently, the rise of e-commerce platforms is empowering small merchants to replenish their inventories through digital channels.

The simultaneous growth of electronic payments, digital finance, and online commerce is fostering a conducive environment for AI solutions in these sectors.

Figure 4.4. Adults with Financial Accounts

(Percent)

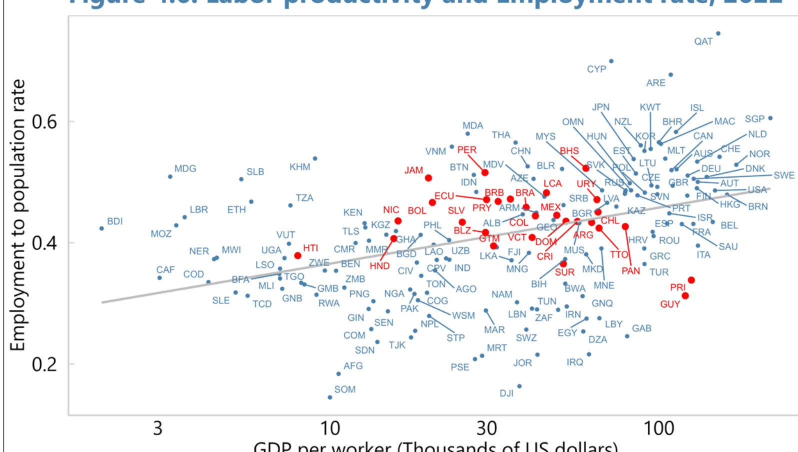


Sources: World Bank Findex Database, BCRP, and IMF staff calculations.
Note: Chart includes end-2023 data for Peru from BCRP highlighting the impact of digital wallet proliferation (indicated in red); Findex data for other countries correspond to 2021, with the exception of Mexico, which is updated for 2022.

Labor market implications of AI

How might AI affect labor market outcomes for different segments of the population in LAC? The link between new technology and labor market outcomes is complex and crucially depends on how the technology influences the allocation of labor and other production factors. Enhancing productivity growth in the formal sector will play a vital role in attracting workers and reducing informality. However, the region grapples with challenges such as misallocation of factors of production (Hechman, Pagés, 2004; Busso, Madrigal, Pagés, 2013; Restuccia, 2013; Hsieh and Klenow, 2014) and high non-wage labor costs (Alaimo et al., 2017), which hinders

Figure 4.6. Labor productivity and Employment rate, 2022

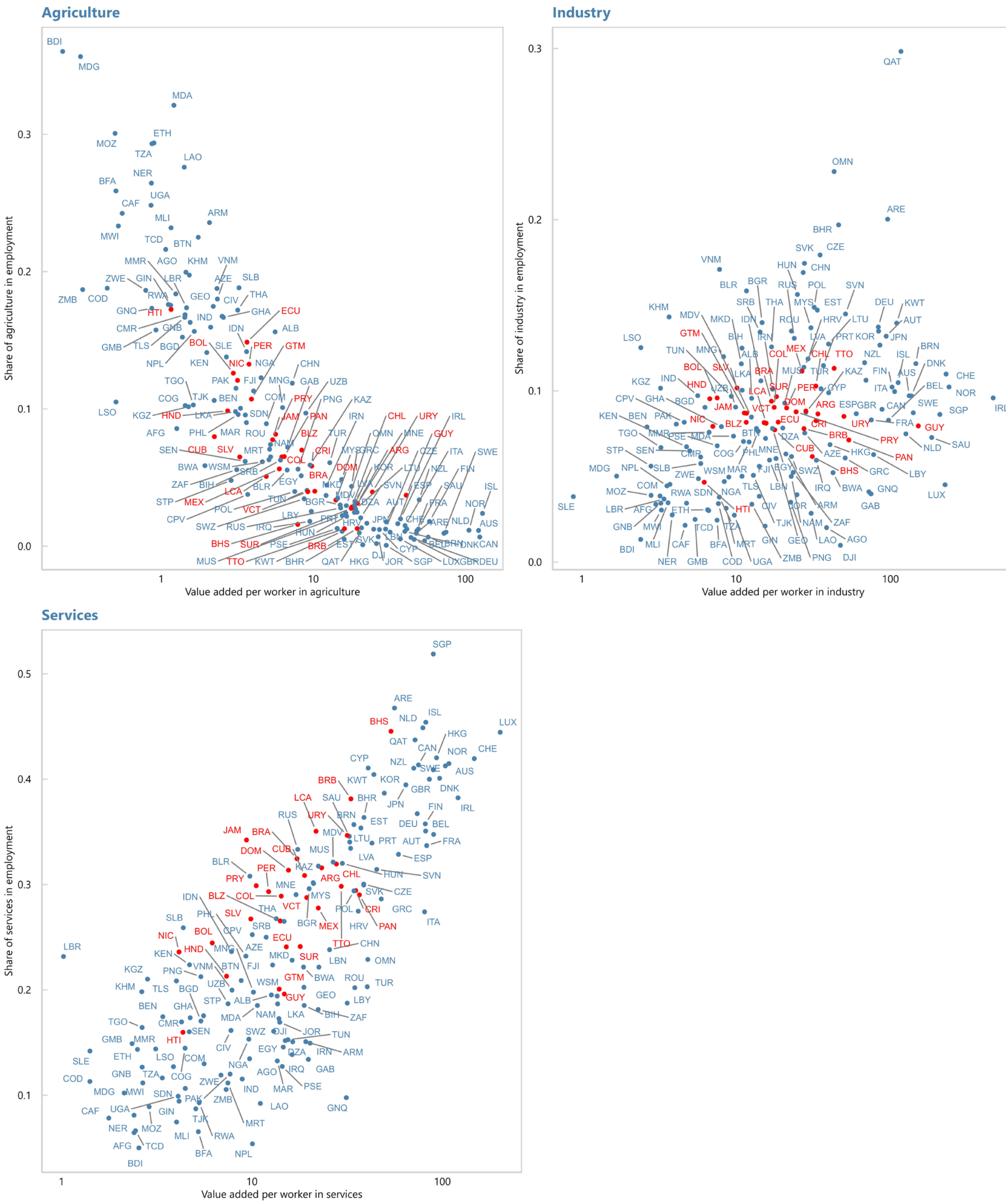


Sources: World Bank and IMF staff calculations.

labor flow to the most productive sectors of the economy. AI presents unique challenges and opportunities for labor allocation. AI's potential impact on employment is complex and multifaceted. Despite common concerns, history shows that technological advancements often lead to a net increase in jobs. Each major wave of automation has historically led to the creation of more jobs than those lost, both by stimulating higher demand for labor in more productive jobs and creating new job categories that did not exist before (Autor, 2015). Similarly, across countries, the link between productivity and the employment rate is (slightly) positive—not negative.

Figure 4.7. Sectoral Labor Productivity and Employment Share, 2022

(In thousands of US PPP dollars)



Source: World Bank and IMF staff calculations.

However, the introduction of AI, similar to past innovations, will bring social challenges. Certain jobs may become obsolete, while others will evolve and possibly benefit from AI integration. The effect on different sectors largely hinges on whether AI technologies replace human labor or enhance it. For example, automation has replaced manual tasks such as telephone operating and certain agricultural jobs. On the other hand, advancements in medical technology have not reduced the demand for doctors; instead, these technologies have enabled new treatments and diagnostic tests, thereby augmenting the work of medical professionals.

The impact of AI can similarly vary. AI has the potential to replace roles like stenographers and translators, whereas in fields like medicine, it can provide doctors with valuable data analysis and insights, enhancing their work without replacing them.

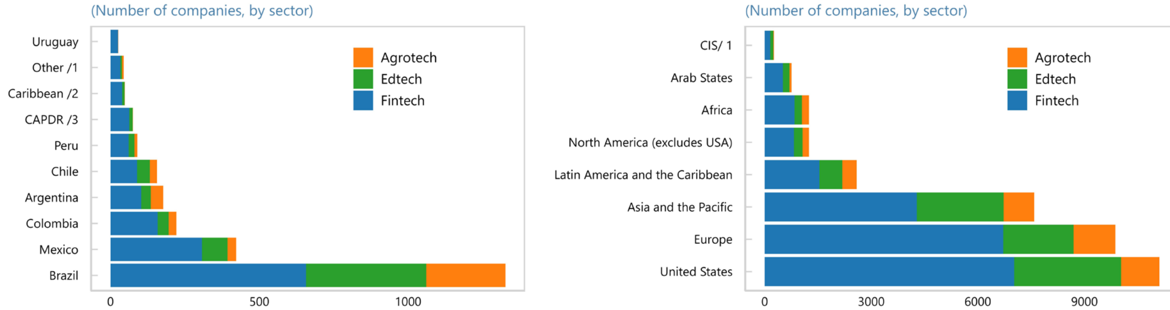
Adoption of AI in LAC

While there is clear potential for AI-powered growth in the region, continued efforts are needed to promote wider diffusion of AI and fully leverage its transformative power. The region's digital ecosystem is expanding, creating fertile ground for AI adoption. Technological companies in the financial sector are leading the charge, with the region producing major digital banks and digital payment innovations (Bakker et al., 2023). Technology adoption in the health and education sectors is also growing. However, despite some successes and bright spots, such as the Pix instant payment system in Brazil, LAC countries still lag behind the US, Europe, and Asia-Pacific in the number of tech companies.

Figure 5.1. Distribution of Fintech, Agrotech and EdTech Companies, 2023

Tech companies in LAC countries
(Number of companies, by sector)

Tech companies by region
(Number of companies, by sector)



Sources: ECLAC and IMF staff calculations.
1/ Bolivia, Ecuador, Paraguay, Venezuela
2/ Antigua and Barbuda, Bahamas, Barbados, Belize, Dominica, Hait
Saint Lucia, Saint Kitts and Nevis, Suriname, Trinidad and Tobago
3/ Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panam

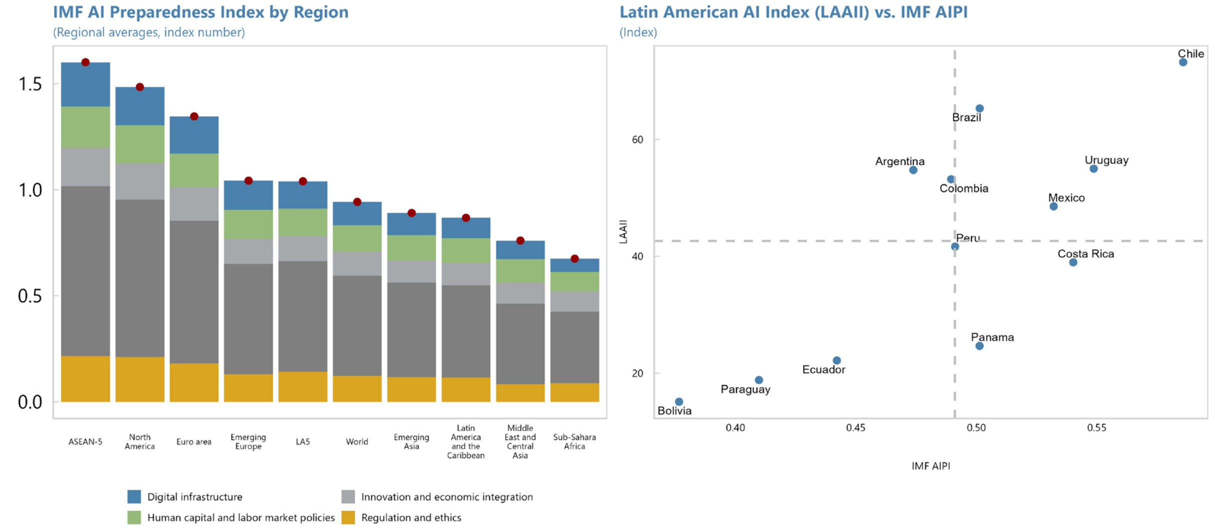
Sources: ECLAC and IMF staff calculations.
1/ Commonwealth of Indpenedent States

Preparedness to use AI

Relative to ASEAN-5 countries, LAC countries are less prepared to adopt AI, according to the IMF AI Preparedness Index (AIPI) (Figure 5.2). This index aggregates information on the countries' digital infrastructure, human capital and labor market policies, innovation and economic integration, and regulation and ethics.[10] The LAC region shows the most significant gaps in digital infrastructure and supporting regulations, followed by human capital and innovation. However, the LA5 countries perform above the world average, aligning with emerging Europe.

[10] https://www.imf.org/external/datamapper/datasets/AIPI

Figure 5.2. AI Preparedness of LAC: Cross-regional and Cross-Country Perspectives



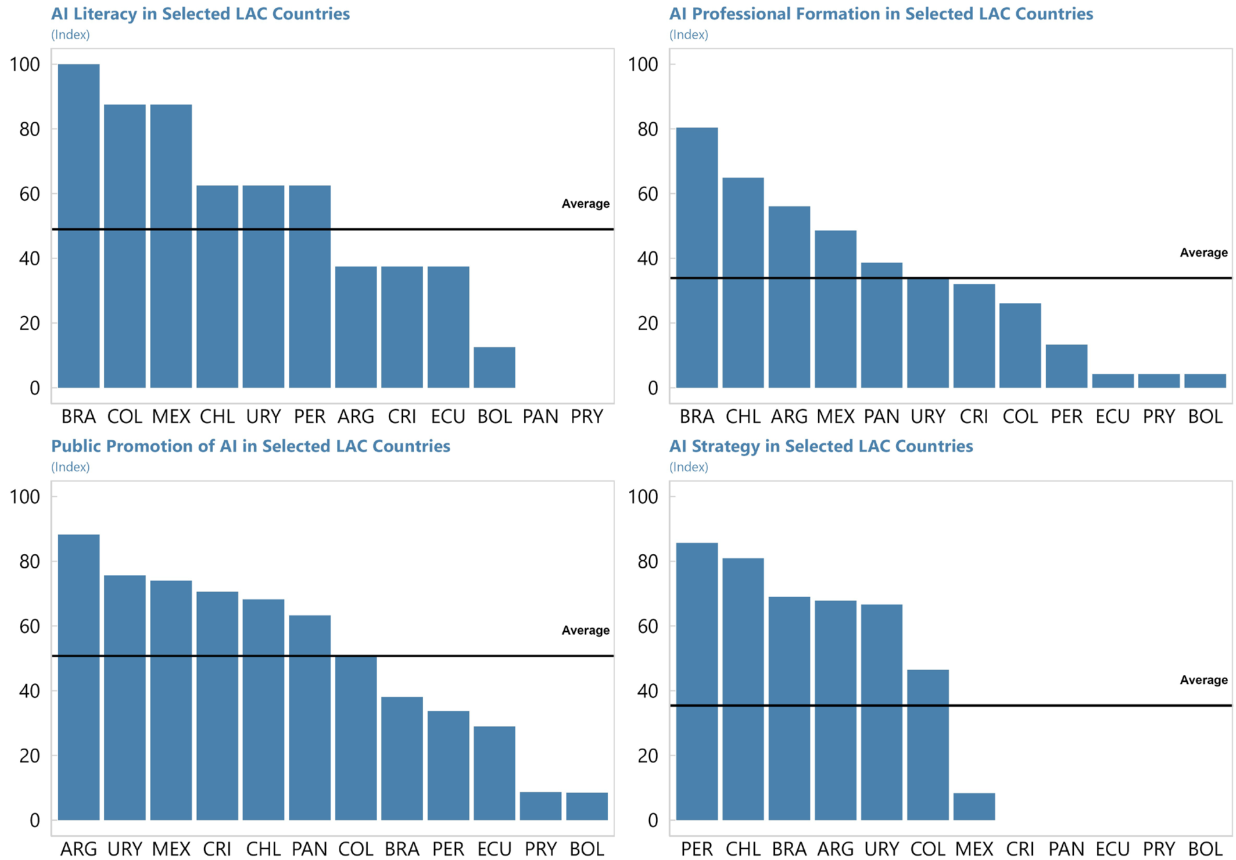
Sources: Cazzinga, Jaumotte, and Li (2024). IMF Staff Discussion Notes No. 2024/001 and Índice Latinoamericano de Inteligencia Artificial, and IMF staff calculations.

The Latin American AI Index (LAAII) complements the IMF AIPI. A close look at the AI-specific subcomponents of the LAAII reveals the strengths and weaknesses of individual countries in their potential to adopt AI.[11]

- Brazil leads in AI literacy, being the only country in the region with AI-specific courses in the school curriculum, followed closely by Mexico and Colombia, which include ICT and open AI classes in their formal curriculums. Chile, Uruguay, and Peru also score above the regional average, while Panama and Paraguay have zero scores in this category.
- In terms of AI professional formation, Brazil leads again, followed by Chile, Argentina, and Mexico, while other countries lag in workforce technology skills, university programs, and vocational training.
- AI promotion is highest in Argentina, with designated institutions responsible for this task, followed closely by Uruguay, Mexico, Costa Rica, Chile, and Panama.
- Lastly, AI strategy is strongest in Peru and Chile, with Brazil and Colombia not far behind. However, Mexico has faced setbacks in adopting national AI frameworks, and Costa Rica, Panama, Ecuador, Paraguay, and Bolivia have yet to begin their formulation, highlighting a need for action in these areas.

[11] Developed by the National Center for Artificial Intelligence (CENIA), the LAAII measures the state of development of AI in several LAC countries (Argentina, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Mexico, Panama, Paraguay, Peru, and Uruguay). The index has three dimensions: (i) enabling factors; (ii) research, adoption, and development; and (iii) governance. The first dimension covers infrastructure (connectivity, computing, devices), data availability, and the talent development (AI literacy, AI professional formation, and advanced human capital). The second dimension captures advances in the AI-related research, innovation and development, and adoption (the latter comparises use of AI in companies and public promotion of AI). Third dimension averages scores for the state of vision and institutionaity (measured by the AI strategy, social involvement, and institutionality), international vinculation, and regulation. See https://www.cenia.cl/en/home/ and https://indicelatam.cl/home-en/.

Figure 5.3. LAAII: Literacy, Professional Formation, Promotion, and Strategy

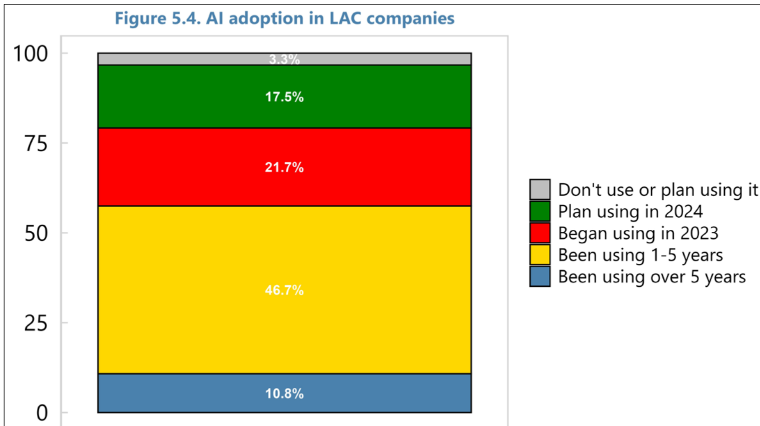


Sources: Índice Latinoamericano de Inteligencia Artificial, and IMF staff calculations.

Use of AI

While comprehensive data on the extent of AI-executed tasks in LAC economies is still lacking, available surveys indicate that companies in the region are increasingly aware of and embracing AI technologies. According to Insider Intelligence, approximately 80 percent of companies surveyed are already using AI solutions. Initial adoption has been most prominent in sectors such as finance, customer service, R&D, IT management, and marketing. This trend is driven by expectations of improved operational efficiency, cost savings, revenue growth, enhanced decision-making, better risk

Figure 5.4. AI adoption in LAC companies

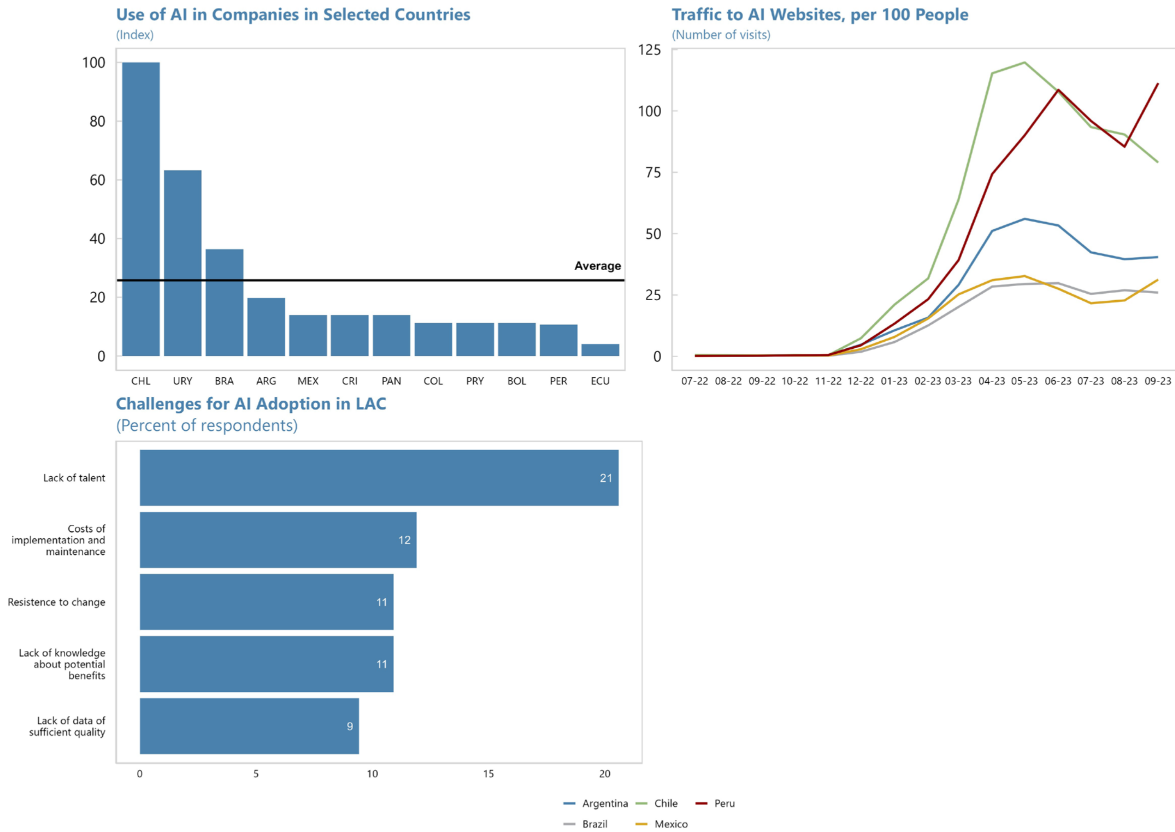


Sources: Insider Intelligence, eMarketer, NTT Data
MIT Technology Review and IMF staff calculations.

management, superior customer experiences, and strengthened compliance efforts. Notably, Chile, Uruguay, and Brazil are leading AI adoption in the region.

At the same time, MIT Technology Review (2023) identifies several challenges impeding wider AI adoption in Latin America, including the scarcity of AI-specialized talent, high implementation costs, limited awareness of AI's potential benefits, resistance to change, and issues with data quality.

Figure 5.5. Use of AI in LAC in 2023

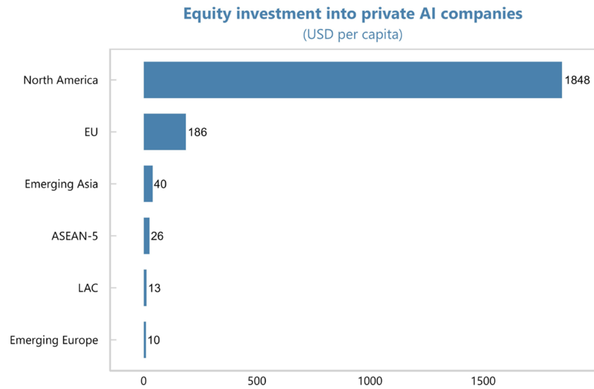


Sources: Índice Latinoamericano de Inteligencia Artificial, Economic Commission for Latin America and the Caribbean, Similarweb, MIT Technology Review 2023, and IMF staff calculations.

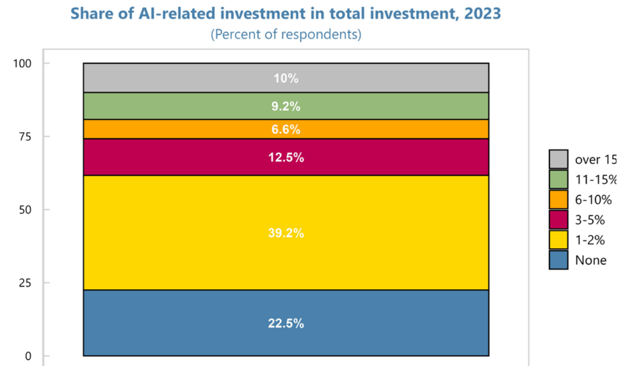
Investment in AI

Investments in AI technologies are increasing as companies recognize their critical role in maintaining competitiveness in the global market. Although investment in AI firms in LAC trails that in Asian emerging markets, it is on par with investments seen in European emerging markets. In 2023, only 22.5 percent of surveyed LAC businesses did not invest in AI. Approximately 20 percent of firms allocated over 10 percent of their total investments to AI adoption.

Figure 5.6. Investments in AI by region and share in total investment



Source: Emerging Tech Observatory, Crunchbase, IMF staff calculations. Due to data limitations sample sizes include 10, 17, 8 and 19 countries for emerging Europe, LAC, emerging Asia, and EU respectively. North America includes the United States and Canada.

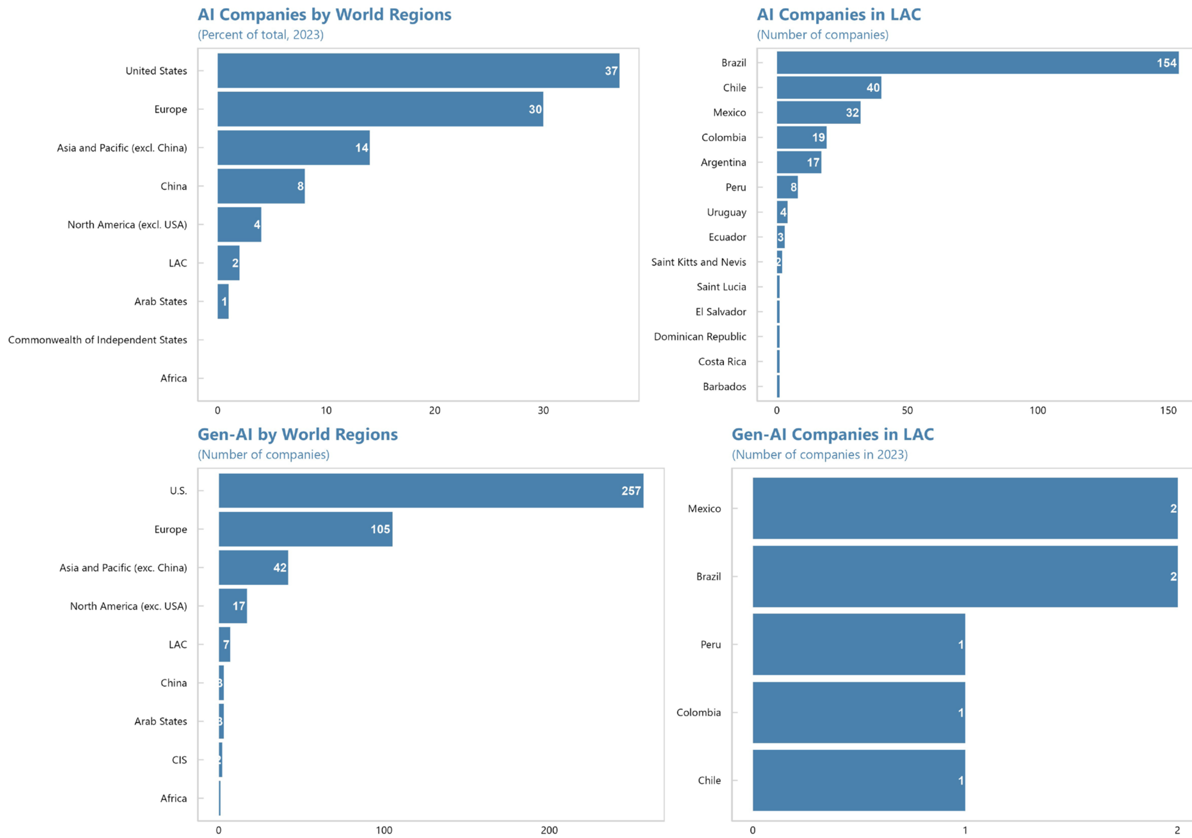


Sources: NTT Data Inteligencia Artificial 2023 and IMF staff calculations.

Region hosts few AI technology producers

LAC countries are increasingly adopting AI technologies, yet the region is home to relatively few AI technology producers. The global AI industry is heavily dominated by the US, which hosts 37 percent of all AI companies worldwide. Following closely, Europe and Asia-Pacific account for 30 percent and 15 percent of AI businesses, respectively. In contrast, LAC houses just 284 AI companies, constituting approximately three percent of the global total. Among these, Brazil is leading the pack.

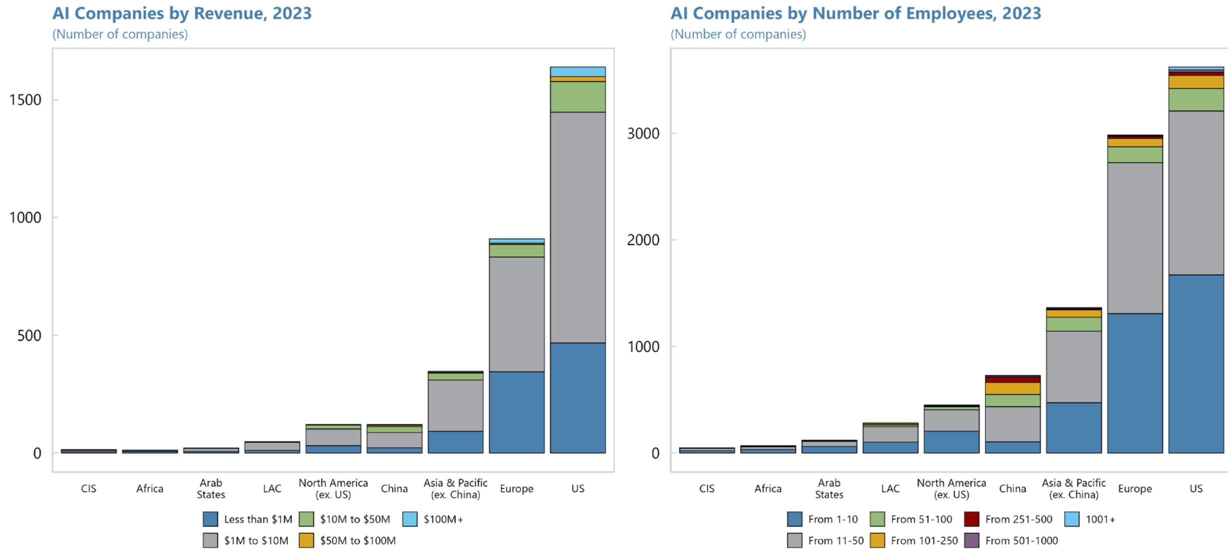
Figure 5.7 Diffusion of AI and Gen-AI Companies Globally and in LAC, 2023



Sources: Economic Commission for Latin America and the Caribbean and IMF staff calculations.

Many AI companies in LAC are small startups, with few achieving "unicorn" status. According to ECLAC data, over 90 percent of AI companies in the region employ up to 100 workers and generate revenues under 10 million USD, aligning with global trends (excluding China). Only around two percent of AI businesses in LAC have revenues exceeding 100 million USD.

Figure 5.8 Distribution of Employment and Revenues in AI Companies



Sources: Economic Commission for Latin America and the Caribbean and IMF staff calculations.

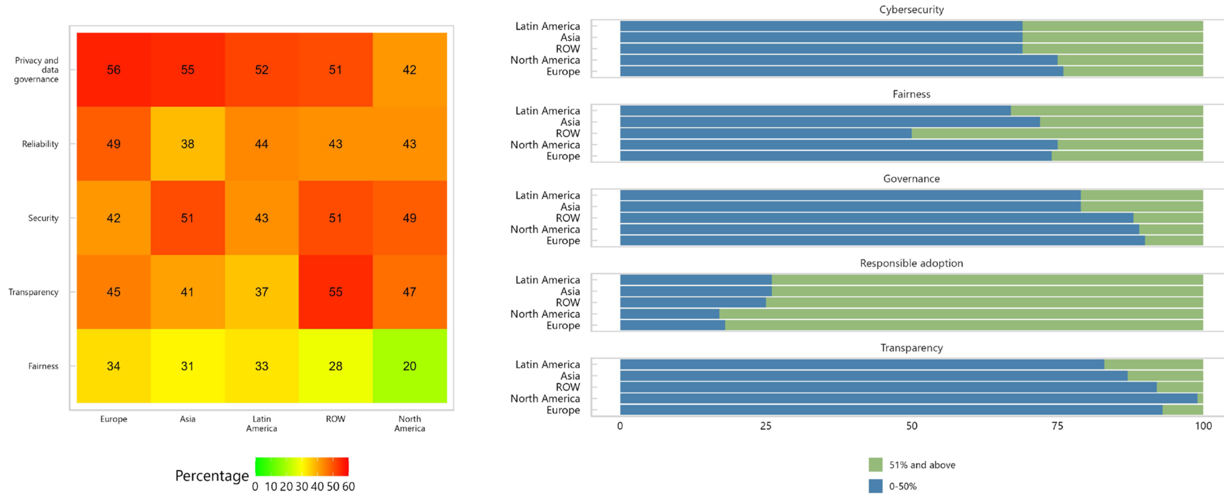
Concerns about AI

Businesses in LAC are actively addressing the risks associated with AI adoption, particularly concerning privacy and transparency, through responsible measures. According to the 2024 AI Index and Global State of Responsible AI reports, privacy emerged as the top concern among businesses in Latin America, closely followed by transparency and security, with reliability and fairness also being significant concerns for 30 to 40 percent of respondents. Interestingly, the region boasts the highest proportion of organizations that have fully implemented all recommended measures for responsible AI adoption. However, it also has a notable share of businesses that have implemented less than half of these measures. Governance and fairness improvements have seen the most extensive adoption efforts across the region. Conversely, LAC exhibits a relatively high percentage of companies that have yet to adopt any measures related to transparency or cybersecurity.

Figure 5.9 Relevant Risks for AI Adoption and Responsible AI Adoption by Region

Relevance of selected AI risks: by regions
(In percent of respondents in each region)

Responsible AI Adoption and Measures Taken
(In percent of respondents)



Sources: Global State of Responsible AI report; AI Index Report, and IMF staff calculations.

Policies to achieve the full potential of AI

How could policies help harness the potential of AI for growth in LAC? Our analyses suggest that policies should focus on enhancing technology diffusion while supporting work force transition. Fostering competition, improving regulatory and supervisory frameworks, and boosting investments in both physical and human capital are crucial steps to facilitate AI diffusion. Additionally, it is imperative to address the skill gap among workers and increase labor market flexibility to mitigate the risks of job displacement. This will help reduce the risk of labor market polarization and foster a smoother transition of workers to more productive sectors in the AI era, ensuring that AI adoption benefits the economy broadly and equitably. This section outlines detailed policy recommendations to achieve these goals, with the sequencing of policies depending on country-specific gaps and implementation capacity in each area

Fostering Competition

Fostering competition is crucial for AI diffusion. Policies should address market failures and facilitate the transition to an AI-driven economy without creating prohibitive entry barriers for new firms or stifling innovation. Governments should focus on lowering these barriers and actively support innovation through grants and subsidies, especially for small and medium-sized enterprises (SMEs) that specialize in AI. AI technologies often exhibit network externalities and winner-take-all dynamics, leading to market concentration. Strengthening antitrust regulations to curb monopolistic behaviors and ensuring open access to datasets are vital for fair competition. Additionally, fostering collaborations between academia, industry, and government can spur the AI development and ensure that its benefits reach a wide segment of the economy, enhancing the competitive landscape and promoting responsible AI adoption across sectors.

Regulatory and Supervisory Frameworks

Rapid technology adoption calls for upgrading regulatory and supervisory frameworks. Given the sensitive nature of data used in AI applications, comprehensive data protection and cybersecurity frameworks are crucial. These should include robust measures such as encryption, access controls, and authentication mechanisms to safeguard against data breaches, unauthorized access, and other security threats. Additionally, enhancing data integration capabilities and setting standards for interoperability are essential to facilitate the seamless transfer of data between AI systems, databases, and other computing resources. Effective data management practices are imperative to ensure the quality, integrity, and accessibility of data. Moreover, health and safety regulations should limit the use of inadequately tested AI technologies in scenarios that might compromise worker safety through surveillance or hiring practices (Acemoglu, Autor, Johnson, 2023).

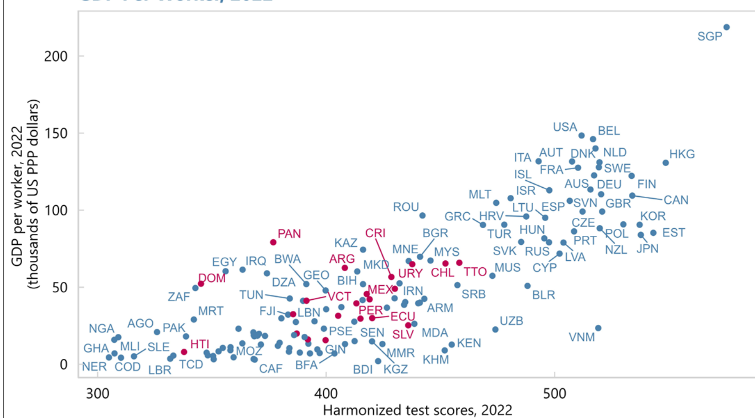
Improving Access to Education and Training

Education and training are vital for AI diffusion. Limited educational opportunities create a skills gap that impedes the shift from low-skill to high-skill jobs, restricting innovation and business creation.[12] Economies with lower educational achievements tend to have lower GDP per capita levels (Figure 6.1). To address this,

[12] For example, Maloney and Caicedo (2022) find that the presence of engineers in the workforce from 1870 to 1914 explains about a quarter of the income variance across the Americas.

targeted strategies to improve educational outcomes in LAC are needed. Despite similar investments in education compared to regions like Europe and North America, LAC countries struggle to enhance educational quality effectively. Two specific education policies to foster AI adoption merit consideration: (i) developing comprehensive AI-focused education programs, and (ii) providing foundational expertise training. Integrating AI and data science into all levels of education will equip workers with the necessary skills for the modern workforce while foundational training enables workers to critically assess AI-generated suggestions. With foundataional training, AI has the potential to elevate worker capabilities to the level of trained professionals (Autor, 2024). This approach could also help informal workers bridge the skills gap, fostering a more inclusive workforce.

Figure 6.1. Harmonized Test Scores and GDP Per Worker, 2022



Excludes Norway, Ireland, Luxembourg and major oil exporters.
Sources: World Bank and IMF staff calculations.

Investing in Digital Infrastructure

Significant investments in reliable, high-speed digital infrastructure are essential for broader and more equitable participation in the digital economy (Box 4). Despite progress in expanding internet coverage, LAC countries still face a substantial gap in digital infrastructure. The IDB estimates that LAC countries need to invest approximately US$70 billion to close the digital infrastructure gap with OECD countries. Significant investments, especially in underserved areas, is needed to achieve broader and more equitable participation in the digital economy. Governments should attract satellite internet providers, capitalize on White Spaces technologies (Box 4), establish public Wi-Fi spots, and introduce tax incentives for investments in high-computing equipment, data storage, and cybersecurity solutions. AI services, often cloud-based, require robust computing infrastructure and secure data storage solutions to operate effectively.

Box 4. Addressing the Digital Divide in Trinidad and Tobago[13]

To facilitate digitalization of its economy, Trinidad and Tobago's authorities prioritize addressing the digital divide. To achieve this goal, the Telecommunications Authority of Trinidad and Tobago (TATT) is creating a robust, reliable, and accessible ICT infrastructure and enhancing digital literacy. Specifically:

- To enhance digital access, the authorities are deploying the TTWiFi (an island-wide public broadband wireless network) establishing Wi-Fi spots in transportation hubs, hospitals, libraries, and schools (with 24 sites already in place). To connect the underserved populations, they are also leveraging innovative technologies (TV White Spaces), attracting satellite service providers, and creating public ICT access centers equipped with broadband-connected computers, printing, and scanning services.

[13] See O. Bespalova (2024), Digitalization in Trinidad and Tobago, in *Trinidad and Tobago: Selected Issues Paper*, IMF Country Report No. 2024/151, Washington. DC.

- To strengthen the digital literacy of its citizens, the government is implementing the Digital Skills Development program "WeLearnTT", cooperating with the Youth Training and Employment Partnership program (YTEPP), acquiring learning licenses for several online learning platforms from Linux and Cisco, and organizing coding camps. Also, the FY2024 Budget is allocating resources to train 10,000 individuals and distribute 2,400 laptops to students and staff across 94 secondary schools.

Reducing Informality in Labor Markets

Complementary policies to reduce labor market informality could promote AI adoption and ensure an inclusive labor market transition. Providing startup support, improving access to finance, and simplifying registration procedures can encourage formalization for young firms. Removing burdensome regulation that increases the costs of operating in the formal sector, such as strict employment protection laws, high minimum wages, complex tax compliance procedures, and high marginal taxes, can ensure that productive firms continue to grow within the formal market. For workers, easing legal and financial barriers, such as occupational licensing, and high payroll taxes, can facilitate the transition to formal employment. Education, training, and active labor market policies such as job search and job reinsertion programs can enhance labor mobility and support transition to formal jobs. Improving social safety nets and youth programs can reduce incentives for informal employment, ensuring efficient allocation of production factors and continued investment in human capital.

Adopting Human-Complementary AI Policies

Policies should guide AI adoption towards enhancing human capabilities using a human-complementary approach to AI (Acemoglu, Autor, and Johnson 2023). Eliminating policy distortions favoring automation over human labor, such as unequal tax treatment of human workers and automated equipment, can level the playing field between humans and machines. Governments should promote research and development in AI technologies that complement human workers, ensuring AI supports rather than supplants jobs. Moreover, addressing the broader societal costs associated with automation is crucial to foster an environment where AI serves as a tool for enhancing human work and benefiting society as a whole.

Conclusion

In conclusion, the persistent lack of income convergence between LAC and the US since 1980 can be largely attributed to stagnant labor productivity growth. This stagnation contrasts sharply with the rapid productivity gains seen in emerging Asia and Europe. The large informal sector, composed of small and unproductive firms, has contributed significantly to this issue, as has the weak productivity growth in the formal sector.

The slow diffusion of technology in the LAC region has exacerbated the productivity gap. Despite the transformative potential of AI, similar to previous IT innovations, the region faces challenges in AI adoption due to weak competition, poor governance, and inadequate human capital, among other factors.

AI offers a unique opportunity to boost productivity and expand the formal economy. However, the adoption of AI could lead to labor market polarization, with some jobs being displaced while others benefit significantly from AI enhancements. The impact on employment will vary across sectors and depend on factors such as market demand and the quality-to-price ratio of goods and services.

To harness the growth potential of AI, LAC countries must focus on enhancing technology diffusion, supporting workforce transitions, and addressing structural barriers. Policies should aim to foster competition, upgrade regulatory frameworks, and invest in digital infrastructure and AI-focused education. Reducing labor market informality and supporting AI adoption that complements human capabilities are also crucial.

Annex 1. Financing Innovation in Latin America and the Caribbean—The Case of Fintech and AI Start-ups

The growing financial technology sector (fintech) in Latin America is a beacon of progress, contributing to productivity improvements by significantly enhancing financial inclusion and boosting competition among financial institutions (Loko and Yang, 2022; Bakker et al., 2023; Yang et al., 2024). This sector is innovating and contributing to a surge in patent registrations. The patenting in fintech and AI start-ups is closely associated with the amount of funding raised. However, the relatively small scale of this sector in comparison to the broader economy restricts its overall impact.

This annex sets out to examine the impact of financing on the innovation outcome of fintech and AI firms, with a focus on LAC countries. Using data from Crunchbase and Patstat, we start by employing a natural language processing-based approach to identify fintech and AI firms. Fixed effects panel regressions are used to explore the correlation between financing and innovation. Causality is established through an instrumental variable approach.

Innovation as the Key to Improving Productivity

Technological innovation plays a crucial role in influencing economic growth (Schumpeter, 1934). It has been a driving force behind the growth of economies and has the potential to transform industries, increase efficiency, lower production costs, and raise living standards. Most notably, innovations often lead to improvements in production processes, automation, and the efficient use of resources. This results in higher productivity, as fewer resources are required to produce the same or greater output. (Aghion and Howitt, 1992).

One of the most widely accepted measures of innovation is the number of patents and other IP registrations (Yang, 2021). Patents document novel inventions and technological advancements, providing a concrete measure of the inventive activities of individuals, firms, and countries. Unlike other forms of innovation indicators, such as R&D expenditure, patents represent tangible evidence of innovation and offer a clear and quantifiable indication of the creative output.

Since patents signify the successful development and protection of new inventions, technologies, and processes, which can translate into productivity gains over time, they can carry significant economic value as well. The presence of patents can enhance the competitiveness and market position of firms by providing them with exclusive rights to commercialize their inventions, thereby generating revenue streams and capturing market share. Therefore, in the current annex, we chose to focus on the patenting activities of fintech and AI firms in the LAC region.

The Patstat database, developed and maintained by the European Patent Office (EPO), is one of the largest and most comprehensive repository of patent data globally, containing bibliographical and legal information on millions of patents from leading industrialized and developing countries. The sample used in this study is extracted from Patstat's bulk data feature, including bibliographic information such as patent titles, abstracts, filing dates, publication dates, patent classifications, and information about inventors, applicants, and assignees. As Figure 3.9 in Box 2 shows, Brazil, Mexico, Argentina, Chile, and Colombia stand out as leading countries in the number of patents filed.

Fintech and AI Start-ups as Engines of Innovation

Startups represent the most vibrant segment of the economy. Among them, Fintech and AI startups, exemplified by companies like OpenAI, are at the forefront of the latest global technological revolution. We are particularly interested in this sector, and rely on the Crunchbase database to evaluate the financing activities of fintech and AI startups. Crunchbase, which provides information on startups, investors, funding rounds, and acquisitions and exits, is the leading platform for company insights into the entrepreneurial ecosystem.

The Crunchbase database includes 3,000,000+ firms, ranging from nascent startups to established Fortune 1000 companies. To identify fintech and AI firms within this extensive pool, we adopted a textual analysis approach (see e.g., Barkema et al., 2020; Gonzales-Garcia and Yang, 2020, 2022; Yang et al., 2023; Lutz et al., 2024), focusing on the firms' self-identified industry. Key terms that are crucial for defining advancements in AI and fintech domains, including machine learning, big data, fintech, peer-to-peer, virtual currency, crowdfunding, payments, insurtech, bitcoin, blockchain, and cybersecurity, are used as the basis for our textual analysis.

The analysis is conducted for countries in LAC from 2010 to 2022. During this period, we identified 1,129 fintech and AI startups operating in LAC, with an average of 5.2 million dollars funding raised per startup. The number of fintech and AI startups documented in the Crunchbase database aligns closely with the economic scale of countries in the LAC region.

How Financing Helps Foster Innovation

In the subsequent set of regressions, we use the following fixed effects panel regression models to establish the correlation between the amount of financing and firms' innovation output.

$$LnPat_{i,j,t+n} = lnFundRaised_{i,j,t} + Controls_{i,t} + \theta_j + \mu_t + \varepsilon_{i,j,t} \quad (1)$$

where FundRaised denotes the amount of funding raised by start-up i in country j in year t, and Pat signifies the number of patents filed and eventually granted. Innovation is a complex process characterized by a significant lag between the acquisition of funds, project planning and execution, and the ultimate innovation output. Hence, we used lagged patent registrations, where n=1, 2, 3, to assess the outcome of firms' inventive activities. Control variables include the rounds of financing and the number of investors. Country- and year-fixed effects are included to account for factors that vary with country or time, and an error term captures unobserved influences.

Table 1 presents our baseline results. We found that a 10% increase in the amount of funds raised is associated with a 1% increase in the number of patents, and the results remain significant across different specifications in columns 1-3, and are robust to using patents applied 1, 2, and 3 years after the financing round. (Table 2)

Table 1. Start-up Financing and Innovation Output

	(1)	(2)	(3)
Variable	LnPat	LnPat	LnPat
LnFundRaised	0.065**	0.118***	0.124***
	(0.037)	(0.031)	(0.026)
Funding Round		-0.004*	-0.003
		(0.002)	(0.002)
Investor Number			0.003
			(0.005)
Constant	0.019***	0.020***	0.014
	(0.001)	(0.002)	(0.012)
Year FE	Y	Y	Y
Country FE	Y	Y	Y
No. of Obs.	7739	7739	7739
R2	0.02	0.02	0.03

Notes: *** p<0.01 ** p<0.05 * p<0.1

Table 2. Start-up Financing and Innovation Output – Robustness Checks

	(1)	(2)	(3)
Variable	LnPat	LnPat	LnPat
LnFundRaised	0.124***	0.010***	0.058*
	(0.026)	(0.035)	(0.031)
Controls	Y	Y	Y
Year FE	Y	Y	Y
Country FE	Y	Y	Y
No. of Obs.	7739	7739	7739
R2	0.03	0.03	0.03

Notes: *** p<0.01 ** p<0.05 * p<0.1

We further investigated the heterogeneities in terms of investment styles. Co-investment, which refers to a financing round with more than one investor, could be more effective in fostering innovation by leveraging diverse expertise, accessing resources, sharing risks, validating ideas, and aligning incentives among investors and start-ups. The results in Table 3 confirmed our hypothesis.

Table 3. Co-investment and Innovation Output

	(1)	(2)
Variable	LnPat	LnPat
LnFundRaised	0.124***	0.087**
	(0.026)	(0.036
LnFundRaised * Investor Number		0.046***
		(0.013)
Controls	Y	Y
Year FE	Y	Y
Country FE	Y	Y
No. of Obs.	7739	7739
R2	0.03	0.03

Notes: *** p<0.01 ** p<0.05 * p<0.1

Financing can occur at different stages of a firm’s lifecycle. Table 4 shows that funding raised at later stages (after seed round) is more favorable for nurturing innovation. Understandably, at later stages start-ups have typically validated their business models, demonstrated market traction, and proven their ability to generate revenue. With a solid foundation in place, additional financing enables start-ups to scale their operations, expand into new markets, and accelerate growth. This increased scale provides start-ups with the resources and bandwidth to invest in innovation which can be manifested in the increasing number of patent filings.

Table 4. Financing Stages and Innovation Output

	(1)	(2)
Variable	LnPat	LnPat
LnFundRaised	0.124***	-0.003
	(0.026)	(0.040)
LnFundRaised * Late Round		0.149**
		(0.062)
Controls	Y	Y
Year FE	Y	Y
Country FE	Y	Y
No. of Obs.	7739	7739
R2	0.03	0.03

Notes: *** p<0.01 ** p<0.05 * p<0.1

We further examined the impacts of different financing instruments. Theoretically, equity financing should be preferable for start-ups since it offers more flexibility than debt so that start-ups can use funds for innovation and growth without incurring immediate interest payment burdens. Equity investors also share the risks and rewards of the business. They have a vested interest in the firm's success and may provide strategic guidance and support. (Hsu et al., 2014)

However, in this study, we found that debt and equity financing instruments do not exhibit significant differences in fostering innovation. (Table 5) Overall, start-ups benefit from a combination of debt and equity financing instruments. Ultimately, the optimal financing strategy for innovation should align with firms' long-term vision, risk tolerance, growth prospects, and access to capital markets.

Table 5. Financing Instruments and Innovation Output

	(1)	(2)
Variable	LnPat	LnPat
LnFundRaised	0.124***	0.070**
	(0.026)	(0.031)
LnFundRaised * Debt Financing		0.202
		(0.127)
Controls	Y	Y
Year FE	Y	Y
Country FE	Y	Y
No. of Obs.	7739	7739
R2	0.03	0.03

Notes: *** p<0.01 ** p<0.05 * p<0.1

More innovative firms could attract greater financing. Investors might consider patents as a significant criterion for their investment decisions. To address potential endogeneity concerns, we employed an instrumental variable approach, exploiting the monetary loosening (or tightening) cycle as the instrumental variable for financing. The results remain largely unchanged compared to the baseline. (Table 6)

Table 6. Financing and Innovation Output Using Instrumental Variable Approach

	First stage	Second stage
Variable	LnFundRaised	LnPat
Loosening cycle	0.306***	
	(0.099)	
Instrumented LnFundRaised		0.025*
		(0.015)
Controls	Y	Y
Country FE	Y	Y
No. of Obs.	7739	7739

Notes: *** p<0.01 ** p<0.05 * p<0.1

Taken together, an increase in financing is associated with significant improvement in innovation output for fintech and AI start-ups in LAC. The results are more pronounced in later financing rounds and in cases involving co-investment. Debt financing, however, is not inferior to equity financing in fostering innovation. The results are robust to alternative specifications and an instrumental variable approach.

Annex 2. Cases of AI adoption in Latin America and Caribbean.

The survey conducted by the MIT Technology Review[14] in 2020, indicated that in 2019, already 79 percent of businesses in Latin America have launched AI initiatives, and estimated that by 2022, AI would be used across 21 to 40 percent of business processes at two-thirds of surveyed organizations. It predicted a significant uptake of AI among large businesses, with the main applications like chat-bots and AI-driven analytics in customer service, sales, marketing, banking, e-commerce, and logistics.

Key applications of AI in **manufacturing** include *predictive maintenance* (by analyzing data from sensors and using machine learning algorithms, manufacturers can predict when machinery needs maintenance and prevent costly breakdowns, reducing downtime and maintenance costs), *enhancing quality control processes* (e.g., machine vision systems are used to inspect and analyze products on assembly lines with high precision, detecting defects and ensuring that products meet quality standards); *optimizing supply chain operations* by forecasting demand, managing inventory, and planning logistics (AI algorithms analyze historical data and current market trends to make accurate predictions and recommendations, reducing waste, enhances delivery times, and lowering costs); *integrating AI in robotics and automation* (robots can perform repetitive tasks, reduce human error, and improve production efficiency; AI enables these robots to adapt to different tasks and improve their performance over time through machine learning); *design and customization of products* (using AI, manufacturers can more efficiently handle customer specifications and personalization requests, creating designs that are both innovative and feasible for production).

For example, Fracttal, a company producing leading software for asset maintenance management - used by manufacturers and logistics companies in Colombia, Chile, Mexico, Central America and the Caribbean - has released AI-powered updates. The new features of Fracttal One include a more modern and intuitive interface, and the integration of a virtual assistant expert called Tony. It is designed to provide an easy-to-use tool for supervising maintenance processes with sustainability, safety, and efficiency. The tool integrates Internet of Things (IoT) devices that monitor assets with intelligent systems capable of detecting possible incidents and applying preventive and predictive maintenance strategies. The Spanish startup, which also counts a large team in Chile, Colombia, Mexico, and Brazil, raised USD $10 million in venture capital funding in November 2023, led by Kayyak Ventures.[15]

A comprehensive study by IDB highlighted the use of digital transformation technologies in manufacturing subsectors like textiles, motor vehicles, paper products, and logistics in Argentina, Brazil, Chile, Colombia, Ecuador, Mexico, and Peru. These technologies aim to boost regional productivity and enhance the global relevance of local industries. For instance, AI-driven predictive maintenance and supply chain optimization are key areas where these countries are implementing digital solutions to improve efficiency and competitiveness[16].

AI being utilized in agriculture across LAC:

[14] See https://www.technologyreview.com/2020/06/08/1002864/the-global-ai-agenda-latin-america/ and https://mittrinsights.s3.amazonaws.com/AIagenda2020/LatAmAIagenda.pdf
[15] See Fracttal announces AI-powered updates to its maintenance software to help Latin American firms - Latin America Reports
[16] See https://www.idbinvest.org/en/publications/digital-transformation-manufacturing-latin-america-and-caribbean

1. *Satellite and Drone Imaging*. In Argentina[17], companies like Satellogic and Auravant use AI with satellite and drone imagery to provide detailed insights into crop health, soil moisture, and even nutrient levels. Farmers use this data to make informed decisions about irrigation, fertilization, and crop rotation, significantly increasing efficiency and yield.
2. *Automated Crop Management Systems*. Brazilian agtech startups such as Solinftec and Strider (acquired by Syngenta) incorporate AI into their digital platforms to optimize the use of resources and manage pests[18]. For example, Solinftec's AI platform analyzes real-time data from various sources to provide actionable insights, helping farmers reduce the use of pesticides and increase productivity.
3. *AI in Coffee Farming*. A Colombian startup, Demetria, has raised $3 million to date and is betting on its sensory digital fingerprint using AI to match a coffee bean's profile to the industry's standard coffee flavor wheel created in 1995.[19]
4. *AI for Weather Prediction and Disaster Management*. In the Caribbean region, which is frequently affected by extreme weather conditions, AI is used to improve weather forecasting and disaster preparedness. Organizations like the Caribbean Institute for Meteorology and Hydrology use AI models to predict hurricanes and droughts, helping farmers and governments plan better and mitigate potential damages.
5. *AI-powered Robotic Harvesting*. In Chile, robotic technologies powered by AI are being used in fruit harvesting. In Chile, AI-powered robots with vision systems can identify and harvest ripe fruits, reducing labor costs and improving efficiency. Autonomous flying robots can operate 24/7, replacing scarce workforce. The data collected can provide precise information on the contents of various bins filled with apples, including quantity, weight, ripeness, and geolocation. The robots are equipped with algorithms to distinguish between fruit, foliage, and other items and can harvest a wide range of fruit sizes. This innovative technology is revolutionizing the fruit harvesting industry, making it faster, cheaper, and more efficient.[20]

These examples illustrate the diverse applications of AI in enhancing agricultural productivity, efficiency, and resilience in LAC. Each of these initiatives not only contributes to local food security but also promotes sustainable agricultural practices.

Several companies in LAC are actively integrating AI and generative AI technologies to drive innovation and efficiency across various sectors.

1. A technology services company *Wizeline* has partnered with Tecnológico de Monterrey to establish the Generative AI Laboratory (G.AI.L) in Mexico. This initiative is focused on bridging the gap between research, education, and real-world AI application, encouraging the development of ethical AI practices and community engagement through workshops, hackathons, and conferences.[21]
2. Argentinian company *Azumo* offers AI development among its services and emphasizes custom software development. It is known for its direct communication and reliable quality of execution, contributing significantly to AI adoption in the region.[22]

[17] See https://news.microsoft.com/source/shortform/new-ai-powered-tools-are-helping-democratize-agriculture-in-argentina/ and https://theyieldlablatam.com/companies/auravant/

[18] See https://www.globalagtechinitiative.com/market-watch/crop-scouting-in-brazil-improves-through-intelligent-pest-monitoring-systems/

[19] See https://www.forbes.com/sites/jenniferhicks/2021/06/12/heres-how-ai-can-determine-the-taste-of-coffee-beans/?sh=2b3c674578ec

[20] https://www.news18.com/viral/ai-powered-robots-lend-a-hand-with-fruit-harvesting-8323279.html

[21] https://www.globenewswire.com/en/news-release/2023/10/12/2759626/0/en/Tec-de-Monterrey-and-Wizeline-present-G-AI-L-the-first-Generative-Artificial-Intelligence-Laboratory-in-Latin-America.html

[22] https://azumo.com/artificial-intelligence

3. Operating out of Chile, *CodeNinja* is engaged in custom software development with a portion of its services dedicated to AI development. The company is recognized for providing exceptional experiences in partnering for technology solutions, which include AI applications[23].

5. Located in Brazil, *Zallpy Digital* specializes in AI consulting and custom software development. It has been praised for its profound AI knowledge and innovative approach, helping businesses to leverage AI technologies effectively.[24]

Business communication software helps automate repetitive tasks such as composing emails, scheduling meetings, and summarizing conversations, and is able to generate generate clear, concise, and grammatically correct content, freeing up employee time to do more strategic work. (e.g., https://www.prezent.ai/, that currently supports English and Japanese, are adding Spanish, in order to increase adoption in LAC).[25]

These companies exemplify the diverse application of AI technologies in the region, from educational initiatives to practical solutions across various industries, highlighting the region's growing commitment to adopting and innovating with AI technologies.

The Case for AI in the Caribbean [26]

The diverse applications of AI across different sectors have potential to drive significant improvements and innovations in the Caribbean region.

- *Healthcare*. AI can predict and monitor non-communicable diseases, assisting in diagnoses with high accuracy, and managing healthcare resources more effectively.
- *Food security and agriculture*. Caribbean countries import 60 percent of consumed food. With AI applications, Caribbean farmers can optimize crop growth by analyzing data on weather patterns, soil conditions, and plant health. For example, FAO's AquaCrop Model can be used in the Caribbean to predict the ideal types and amounts of fertilizer, soil, water, and other variables for the best crop growth. The AI-based smartphone applications allow for better monitoring of crops and growth conditions. For Caribbean farmers with little formal training, this reduces costs and makes monitoring conditions and crops easier, improving food security and reducing reliance on food imports in the region.
- *Energy*. AI can be utilized to optimize oil and gas production processes, forecast energy demand, and integrate renewable energy sources more efficiently into the power grid, and provide recommendations for the optimal use of energy. AI can be especially helpful in the upstream segment of production, which involves locating and extracting crude oil or natural gas. It can reduce costs and boost production – and tax revenue – by using real time data to improve decisions during the drilling and oil lifting processes. Locating new oil reserves, including ones across the Caribbean, can also be facilitated by AI, which would be able to identify prospective drilling sites that are becoming increasingly scarce.
- *Tourism*. AI technologies such as chatbots and personalized travel experiences are being implemented to enhance visitor interactions and improve service delivery in the tourism industry.

[23] https://codeninjaconsulting.com/services/ai-development

[24] https://zallpy.com/en

[25] AI's adoption in Latin America: An interview with Prezent's Antoine Valentone - Latin America Reports

[26] See https://blogs.iadb.org/caribbean-dev-trends/en/9397/; https://www.caribbeanintelligence.com/content/new-technology-and-caribbean; https://www.oecd-ilibrary.org/sites/08955f48-en/index.html?itemId=/content/component/08955f48-en

- *Public Administration*. AI is used in public sector management to improve service delivery and efficiency. Applications include automating routine tasks, enhancing decision-making processes, and improving citizen engagement through more responsive services.
- *Transportation*. AI aids in the optimization of traffic management and public transportation networks, enhancing the efficiency of transportation systems.
- *Public Safety and Security*: AI is employed to enhance public safety measures, including predictive policing and emergency response optimization.
- *Education*. AI can enhance learning experiences, personalize education, and manage educational resources more effectively.
- *Environmental Management*. AI can help to address environmental challenges such as waste management and energy efficiency, aligning with sustainable development goals in the region.

The use of AI in the Caribbean can have numerous benefits, including saving lives, improving food security, and making energy production more efficient. However, there are also potential risks associated with AI, such as job displacement and increased inequality. To alleviate these concerns, appropriate policies should be implemented, such as building in-demand skills, redistributing AI capital gains, and encouraging innovation to create new job opportunities. Additionally, policies should focus on generating AI inputs, such as big data, and building the necessary human capital to operate AI systems. Overall, the adoption of AI technology in a systematic and coordinated manner can offer unique opportunities for the Caribbean region.

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