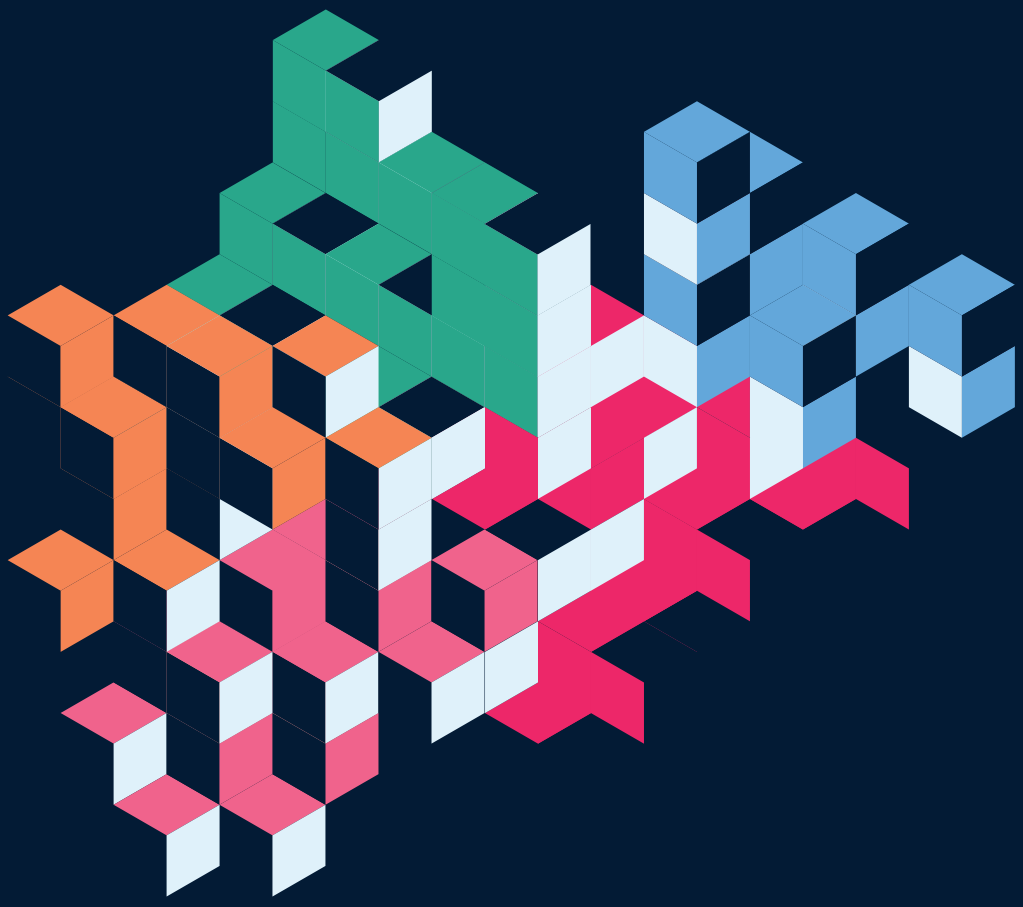
REGIONAL VIEWS
ON THE FUTURE OF WORK



LATIN AMERICA

FUTURE OF WORK IN THE GLOBAL SOUTH

LATIN AMERICA

THE FUTURE OF WORK IN THE GARDEN OF FORKING PATHS

Authors
Ramiro Albrieu
Gonzalo Zunino

CIPPEC

RED SUR
Red Sudamericana de Economía Aplicada

REGIONAL VIEWS ON THE FUTURE OF WORK: THE INFINITE SHAPES OF THE FUTURE

Digitalization, artificial intelligence, and related technologies are undoubtedly changing the way we approach our social and economic lives. By allowing us to produce –both old and new– goods and services in novelty ways, technologies are not just transforming production processes, but the very essence of jobs in the workplace. At the technological frontier, robots and software are carrying out many tasks that used to belong exclusively to humans. Far from that frontier, the developing world struggles to adopt and adapt new technologies while avoiding job displacement and technological anxieties.

Such deep transformations force us to think about what comes next: will robots end up filling the already scarce jobs in the Global South? Will technology exacerbate or help us tackle social gaps? Lots of efforts are directed to capturing elements of how the future of work will look like.

However important these questions are, there is an inherent limitation in trying to predict a future that “is coming". This approach reduces our capacity for collective action and transforms it into a mere response to this "otherness" that is approaching. In reality, however, the shape of the future is continually evolving, as our collective past and present actions result in new reconfigurations and (dis)equilibria. There is room to create the future we want for the developing world: taking ownership of the Global South’s transformational capacity is the first step towards this goal.

Two important factors need to be embraced in the quest of shaping the future of work in the Global South: context and complexity. History proves that countries can take advantage of the window of opportunity open by technological waves. Still, there are no unique formulas for success. Technology does not appear in a vacuum, but within specific cultures,

TECHNOLOGY

SKILLS

DEMOGRAPHY

LABOR INSTITUTIONS

INEQUALITY

institutions, and histories. The combination of these and other dimensions hold specific keys to unlock development processes.

With the principles of context and complexity in mind, between June and August 2021, 80 regional experts participated in the "Dialogues on the future of work in the Global South". This series of events, coordinated by CIPPEC and hosted by the African Economic Research Consortium, the Economic Research Forum, Just Jobs Network, and Red Sur, were a first step towards developing a vision for the future of work from an inter-regional Global South perspective.

In these dialogues, academics and field experts engaged in a double cross-fertilization process: they discussed key questions for variety of relevant themes – including technology, skills, institutions, demographics, and inequality– while approaching them from the regional perspectives of Sub-Saharan Africa, the Middle East and North Africa, Latin America, and Asia.

This document –as well as three companion papers covering other Global South regions- seeks to present key messages and policy recommendations emerging from these discussions. On the one hand, it is intended to take stock of the main dimensions shaping the future of work in the Global South. On the other, it is an open invitation to move from the plane of predictions to that of the imagination and future-building. It can serve as a powerful tool to reframe the discussion by adding Global South perspectives.

CONTENTS

1.INTRODUCTION 6

2. STRUCTURAL FACTORS THAT MATTER TO THE FUTURE OF WORK: THE OUTLOOK FOR LATIN AMERICA 8

2.1 The fourth industrial revolution & Latin America: a low and uneven penetration of new technologies 8

2. 2 Skills for the 21st century: a big challenge for Latin America 14

2.3 Dual labor markets 21

2.4 Growing older: The demographic dividend 26

2.5 Multiple futures. The deep roots of inequality in Latin America 31

3. POLICY PATHWAYS TO BREAK THE STATUS QUO 33

3.1 Ensure macroeconomic stability 34

3.2 Promote technological change 35

3.3 Foster 21st-century skills 36

3.4 Reform labor market institutions 38

3.5 Time to rethink fiscal policy 41

4. REFERENCES 45

5. ABOUT THE AUTHORS 47

6. ABOUT THE FOWIGS 47

7. ABOUT THE PARTNERS 49

1. INTRODUCTION

In 1941 the Argentine poet and writer Jorge Luis Borges wrote a short story called "The Garden of Forking Paths". The plot revolves around an old novel written by an intellectual named Ts'ui Pen and a Japanese spy during World War I, but its central idea is that of the existence of multiple futures, as is explained in the following extract:

"Naturally, my attention was caught by the sentence, "I leave to various future times, but not to all, my garden of forking paths. [...] In all fiction, when a man is faced with alternatives, he chooses one at the expense of the others. In the almost unfathomable Ts'ui Pen, he chooses – simultaneously – all of them. He thus creates various futures, various times which start others that will in their turn branch out and bifurcate in other times..."

Nowadays, the confluence of a diverse set of Information and Communication Technologies – with Artificial Intelligence (AI) as the core, general-purpose technology – is fundamentally changing the way we produce, consume, and work. We are, it has been told, on the verge of a new industrial revolution. In the past, these periods of rapid technological change led to unimaginable improvements in economic and social well-being; in fact, as Robert Nisbet emphasizes, the word "progress" as we understand it today is inseparable from the sequence of technological innovations in recent centuries (let alone "economic growth," an invention of the 20th century).

However, technological innovation has also yielded winners and losers. The categories of "developed" and "developing" countries, or "Global North" and "Global South" are then closely related to forking paths in terms of growth, development, and working conditions across countries and regions. In Latin America, the first industrial revolution gave rise to two of its most salient characteristics that differentiate the region from high-income countries: high inequality and low long-term

growth. The relative GDP per capita of Latin America with respect to the US or Western Europe is lower now than two hundred years ago, and the region remains more unequal than other regions, even those with similar levels of development. Moreover, Latin American societies grew more fragmented over successive industrial revolutions and reconfigurations of the global economy. A minority of firms and workers were endowed with the capabilities to absorb novel ideas and knowledge and became isles of innovation, while many others were trapped in labor markets characterized by the use of old technologies and outdated skills. Latin America is, then, a garden of forking paths.

Will this time be different? Will AI and related technologies break with the Latin American long-term path of low growth and high inequality? Will those left behind join all-time winners and share the benefits of a new industrial revolution? These are hard-to-answer questions owing to at least two reasons. First, the overall outcome will depend on a set of structural factors – ranging from the pattern of technological diffusion to the demographic transition – that have their own complexities. Second, the answers are not set in stone. On the contrary, the actions that firms, workers, and governments are taking now will determine whether the status quo will prevail or not. With these two reasons in mind, Section 2 will provide an outlook of the regional record regarding the structural factors that matter to the future of work. Finally, Section 3 will provide some policy guidelines to create an innovative and inclusive future of work in Latin America.

2. STRUCTURAL FACTORS THAT MATTER TO THE FUTURE OF WORK: THE OUTLOOK FOR LATIN AMERICA

The structural factors that will shape the future of work in Latin America are varied, and each one of them is in turn complex and multivariate. In order to retain these complexities but reach a broad and consistent overview, in April 2021, The Future of Work in the Global South (FoWiGS) initiative, together with Red Sur, organized a series of dialogues on the future of work in Latin America. These dialogues brought together researchers from different areas of expertise: technology, skills, labor market regulation, demographics, and inequality. The following is a summary of the themes that emerged from these rich debates among some 25 specialists and researchers from the region.

2.1 The fourth industrial revolution & Latin America: a low and uneven penetration of new technologies

The world economy is undergoing deep changes in the way it organizes production, consumption, and trade. There is no single technology that accounts for these changes; rather, as The National Academies of Sciences, Engineering highlight in a recent report (NASEM, 2020), it is a confluence of multiple and mutually reinforcing innovations in the area of the Information and Communication Technologies (ICTs). Table 1 summarizes the major technologies in question by area of innovation.

TABLE 1
DECONSTRUCTING THE TECHNOLOGY BEHIND FOURTH INDUSTRIAL REVOLUTION

Core IT Research Areas	Fundamental Research Goals	Significant IT Innovation	Economic, Societal, or Confluence Impact
Networking, Communications	Reliable, scalable, manageable, tethered and untethered communications networks	Local area networks, Internet, wireless, broadband	Pervasive use of the Internet, the Web, and cell phones throughout society and economy; communications networks used to operate cars, airplanes, and ships; e-commerce, telehealth, teleconferencing.
Systems, Architecture	Manage increasingly complex computers, storage devices, and distributed systems and enhance their performance	Smartphones, cloud, personal computing, microprocessors	Over 3 billion smartphones worldwide; cloud services; Web and search technologies; enterprise data sharing
Theory, Programming Languages	More effectively create software; understand the nature of computation and apply that understanding to create more efficient methods	Scalable, dependable, and agile software	Pervasive use of optimization, digital reconstruction, DNA sequencing, cryptocurrencies, and blockchain
Databases, Analytics	Manage, discover, locate, and analyze information	Enterprise software and systems Secure computing	Widespread use of data sharing or data warehouses; precision medicine, electronic health records; precision farming
Security, Privacy	Protect networks and computers from disruption or theft or damage to the data they contain; allow people to control their personal information	Secure computing	Confidential Internet financial transactions
Robotics, CyberPhysical Systems	Create systems incorporating sensors and actuators that operate autonomously or semi-autonomously in cooperation with humans; manage cyber-physical and physical-cyber interdependencies	Automation, robotics, sensors, control systems	Surgical robots, smart medical devices, adaptive cruise control, automated manufacturing and fulfillment centers, smart homes
Artificial Intelligence, Machine Learning, Data Science	Simulation of humanlevel intelligence, including language understanding, vision, learning, and planning	Speech and image recognition, reasoning, prediction, optimization	Medical diagnostics, sports coaching and training, crop management, predictive analytics
Graphics, Simulation	Display of images and movies; realistic modeling and simulation	Video and animation techniques; virtual, augmented, and mixed reality; GPUs	Video games, computer animated films, computer-aided design, advanced training tools
Human-Computer Interaction	Advances in theory, design, and technology to create usable, useful, and compelling computing experiences	Web, social media, mobile interaction tools and gesture interfaces, accessibility, interaction design	Productivity and collaboration tools, mobile apps, recommendation tools, user experience design

Source: Author's elaboration based on NASEM (2020).

In practice, the innovations in Table 1 do not manifest themselves in isolation but come together in a variable way in each specific implementation. Let us take a product from the automotive industry as an example. In the production stage, plant processes include an intensive use of robotics to perform tasks that are hazardous to people's health and cyber-physical systems to connect machines, data and software (known as the Industrial Internet). The design stage is intensive in technologies associated with graphics and virtual reality simulations, for which, in turn, digital architectures must be created and specific theories and programming languages applied. At the time of sales, human-machine interaction technologies are key since commerce is mostly carried out digitally. In sales, technologies to ensure the cybersecurity of buying and selling transactions, and tools to make predictive analytics and decide to whom, how, and when to sell also appear. The product itself includes a set of innovations that in many cases are associated with the user experience, from the generation of information that is concentrated in large data centers where estimates and forecasts are made using artificial intelligence methodologies (whether machine learning, expert systems or symbolic logic) to high-performance digital systems – such as a digital panel with information – for which efficient communication networks, databases and devices or systems operating in that environment are necessary. The nine areas of innovation shown in Table 1 appear in the production of a car, and never in isolation.

What is so special about this new way of doing things? After all, the description we present here is very much like a continuity of what happened with ICTs in the last part of the 20th century. They also have another feature in common: they are General Purpose Technologies (GPTs) and therefore have a strong transformative potential. GPTs share three basic characteristics (see Agrawal et al., 2019 Section I; and Crafts, 2021):

– They are highly malleable with room for improvement. As society applies, understands and processes the technology, potential uses and best practices are detected and processes and products are readapted to standardize their use.

– They are of widespread use. The technology is initially adopted in one sector of the economy, but then begins to appear in other unexpected contexts until it becomes a ubiquitous technology whose use is no longer considered unusual.

– It generates spillover effects that encourage innovation. The technology is invented for a specific purpose, but the gains go far beyond that initial objective since the knowledge associated with the new TPG circulates and spreads throughout the rest of the productive and social fabric, opening up new spaces for product, process and organizational innovations.

At the center of this new transformation is artificial intelligence (AI), defined as an intelligent system that takes human-level knowledge as input and uses that information to automate and multiply tasks that were previously performed by people (Taddy, 2019). Two of the central technological deployments fueled by AI technology that profoundly affect the labor market are: (a) the implementation of AI-powered, data-driven solutions in the production process and (b) a mediating labor supply and labor demand through digital platforms. In both cases, heated debates have emerged in academia, policy circles, and public opinion about the impacts of such developments.

The pandemic accelerated these processes of change. The need to engineer low physical proximity interactions amid high sanitary risks gave rise to a battery of solutions, the most salient and less transitory one being the switch from the “world of atoms” to the “world of bits.” From a business perspective, digital transformation became not only a matter of long-term

growth but of survival. For both consumers and producers, the use of platforms for mediating labor transactions became a key strategy to maintain labor relationships.

How is Latin America doing in terms of the diffusion of these novel technologies? Regarding AI solutions, there is ample evidence of the presence of dynamic firms, particularly in specific sectors such as agriculture and finance (Albrieu et al., 2021). Agriculture, which was considered non-innovative for decades, has undergone an intense process to incorporate new technologies in recent decades, particularly in precision agriculture (that is, a management strategy that employs detailed, site-specific information to precisely manage production inputs, see USDA, 2021). In Argentina and Uruguay, these practices are well known in the business sector. In finance, the transformation came with the increasing use of digital media to carry out all types of banking and credit transactions. Although traditional banking has been deeply involved in this process, a novel fact is that digitalization has also allowed the emergence of a new type of firm named "fintech": fully automated, AI-powered, platform-based credit institutions. Some of them, such as Nubank from Brazil and Konfio from Mexico, are part of the elite group of Latin American unicorns.

However, these cases alone cannot explain the average performance of the region. Instead, they refer to innovative but still small sectors or particular segments of pre-established firms. In Argentina, for example, barely 4% of agricultural companies use precision technologies (Lachman et al., 2020), and something similar occurs in neighboring countries. Moreover, the fintech share in total credit is still minimal (i.e., less than 1%). In the manufacturing sector, the available evidence on the use of 4.0 technologies points to 4% / 5% of the system, while in the United States or Germany, it reaches 10% / 15% (Albrieu et al., 2018; Ferraz et al., 2019; Basco et al., 2020). The lagging firms are characterized by being smaller establishments, not performing R&D activities, operating in the non-tradable sectors of the economy, and not hiring digital services companies.

As to the platform economy, both high-skilled and low-skilled labor in Latin America are being disrupted by these new forms of intermediation. As regards the former, which includes professional, scientific, and technical services, information and communication, finance, and insurance, the expansion in "telemigration" practices (Baldwin, 2020) attracted large multinationals in areas such as software and IT services, business process outsourcing (BPO) and audiovisuals. Furthermore, the existence of an ecosystem of high-skilled workers, fiscal incentives, cultural affinity, and the same time zone makes Latin America attractive for US firms engaging in outsourcing and offshoring strategies (López et al., 2014; Alvarez, 2021). In addition to the attraction of foreign companies, the region has given rise to several successful software and IT-BPO services exporting firms that went global, including Globant from Argentina, TOTVS, and Stefanini from Brazil, Sonda from Chile, Neoris from Mexico, and Genexus from Uruguay.With respect to low-skilled services, the penetration of online platforms for delivery or taxi services has been pervasive. According to the COLLEEM research project, carried out in 14 European Union member countries, 10% of the adult population has used a platform for exchanging labor services.

In the European Union, nearly 10% of the adult population has used an online platform to provide a labor service. In Latin America, data collected by CAF in pre-pandemic times point to similar records. On average, more than 9% of workers surveyed in large cities in the region reported having provided a service through a platform in the past month. In comparison, almost 7% were registered as a provider on a platform without providing any service in the previous month. This makes a total of about 16% of the workforce that can be categorized as active or potential platform workers (CAF, 2020).

In sum, while there is a big opportunity to accelerate growth and create jobs, the penetration of advanced technologies associated with the fourth industrial revolution in Latin America has been low and uneven. While the platform economy has expanded markedly, particularly in low-skilled services, AI-

powered implementations have been confined to a pocket of already dynamic firms. In contrast, the majority of firms are being left behind. As an overall outcome, productivity growth has been low – particularly during the fourth industrial revolution.

FIGURE 2
PRODUCTIVITY GROWTH IN THE GLOBAL SOUTH

Source: Dieppe (2021).

2. 2 Skills for the 21st century: a big challenge for Latin America

The high dose of technological innovation associated with AI and the platform economy, together with the consequent break with the past, suggests that the status quo institutions (which explain the current set of learning systems, social protection policies, and organizational and management practices in companies) are hardly up to the challenge.

This possible asynchrony between rapid technological change and a somewhat slower adaptability of human-made institutions and behaviors is not new; it was called "the cultural lag" at the beginning of the 20th century. The American sociologist William F. Ogburn pioneered the study of social change by focusing on technological innovations as disruptive elements that are then absorbed by society as it alters its system of institutions and behaviors. This adaptation drives technological change, Ogburn said, and its success or failure will determine the fate of its distributive impact.

Some years ago, Google X CEO Eric "Astro" Teller illustrated this tension between strong technological dynamism and inertia in human adaptability in the figure below. He was referring, of course, to the innovations associated with the fourth industrial revolution. The figure shows two curves: one for technological change and another for the society's capacity to adapt and absorb ideas. The two curves have positive slopes: both the rate of technological innovation and the adaptive capacity of society have grown over time. However, and this is key, human adaptability moves slower than the pace of technological innovation.

FIGURE 3

Source: Friedman (2016).

The main variable that explains the relative inertia of human adaptability is the education system. Thus, one of the most pressing challenges to the future of work is the potential mismatch between the stock of skills that workers have and those required to navigate modern or 21st-century labor markets.

In the labor market prior to the fourth industrial revolution people contributed to the mass-scale production of standardized products by performing a set of routine and repetitive tasks, either cognitive or manual (Boix, 2019). And along with the mass production system came the massive education system. In this system, learning a relatively fixed body of knowledge in an encyclopedic way and for a very specific life stage was all that was necessary to enter a firm. Then, once hired, an internal career based on promotions and new skills acquisition began, which would allow people to

navigate labor challenges without major problems until the time of retirement (Sennett, 2007).

The emergence of ICTs rendered the first blow to this scheme. The subsequent arrival of Artificial Intelligence systems was a confirmation that those skills that were so very useful to participate in labor markets were being threatened by new technological solutions. That is why a widespread consensus exists on the need to automate routine and repetitive tasks. The general idea is for workers to stop acting like automatons or robots. When Karel Capek came up with the word "robot" for his 1921 play R.U.R., he thought of it in a very different sense from the way we use it today. He was not proposing machines that could recreate the cognitive capacity of humans; instead, he was trying to show how dehumanized jobs were in the age of the large production factory. A century later, little seems to have changed: when physicist César Hidalgo was asked in 2015 whether machines could think, he retorted, "The key question is whether society is training people who have the ability to think" (in Brockman, 2015).

What does this "ability to think" mean in today's context? The exhaustive list of skills that will be required in the 21st century is yet to be determined. However, it is possible to glimpse the groups of skills that complement the new technologies and the connections that exist between these groups.

A first group of skills that are in high demand in the fourth industrial revolution are associated with the world of bits, what we know as "digital skills". This group comprises very sophisticated skills (such as programming and training machines) with more fundamental ones (for performing simpler tasks, such as communicating messages in digital media). There are several ways to classify digital skills (UNESCO, 2018). The education expert Cristobal Cobo, for example, divides them into those necessary for decoding (understanding the world, filtering the relevant from the irrelevant) and those required for coding (producing goods, knowledge, algorithms); Professor Yoram Eshet-Alkalai is even more comprehensive

when speaking of digital literacy, including creativity and the ability to think in real time, which according to the specialist are key to "surviving" in the digital world. A second group is rightly associated with socioemotional skills. The list here is long: in IADB (2020) the following stand out: Motivation, Self-esteem, Perseverance, Adaptability, Commitment, Empathy, and Tolerance. We should add here another set of executive control skills: flexibility, self-control, meta-cognition. Finally, a third group is associated with cognitive skills. In addition, here we can group skills that are forged at different stages of life: from specific technical skills to basic and foundational ones, such as reading comprehension. We should add here another skill that is fundamental for the future: critical thinking.

In Latin America, learning outcomes in these skills are, as IADB expert Diana Hincapié mentioned in the dialogue, "deficient and unequal". It should be noted that over recent decades there has been a significant improvement in the coverage of the education system, from early childhood to higher education: before the pandemic, practically all children attended elementary school (70% in the early 1970s), and more than 80% attended a secondary institution (less than 20% in 1970). But when we move from schooling outcomes to learning outcomes – and particularly the learning of 21st century skills – the outlook is darker.

Recent advances in neuroscience reveal that the relationship between biology and the environment is bidirectional: biology delimits our interactions with the environment, but the environment also affects biological development. In particular, it is now possible to detect the critical and sensitive periods when external stimuli affect cognitive development with greater accuracy. Gerry Leisman and his collaborators conclude that there are two particularly sensitive periods: early childhood and adolescence (Leisman et al., 2016). Of course, for non-digital natives, the challenge is to unlearn some things and learn others at later stages. Thus, our assessment of learning 21st century skills in Latin America

will focus on three main themes: early childhood education, formal education, and lifelong learning.

Regarding the first, up until a few years ago regional enrollment was low, but the picture has begun to change. According to OECD data, in Colombia, for example, enrollment ratios of children under 3 is close to 45%, even above the average of the countries of that organization (OECD, 2019). For children between 3 and 6 years, there have also been significant improvements, as evidenced by the high coverage in countries such as Brazil, Uruguay, or Peru (UNESCO, 2020). Expenditures on early childhood education are also significant in several countries in the region, as in the case of Chile, where it exceeds 1% of GDP (0.8% is the OECD average).

However, the overall assessment is more challenging. Although coverage has grown, it is characterized by two worrying features. The first is that very little is known about the quality of learning in early childhood education institutions. Governments in Latin America do little to document learning outcomes and to incorporate this information into the public education information system. The scarce available evidence points to the need to reimagine these institutions, which were originally associated with care roles performed by a neighbor (generally, a woman) and must now incorporate children-centered elements of learning with a special focus on socioemotional skills (Hincapie et al., 2020). The second element of concern is associated with (the lack of) education equity. Existing institutions focus on children from well-off families in terms of income and education. In the case of Argentina, for example, Cardini and Guevara (2021) found that while 76% of children aged 5 years or younger in the highest quintile have access to an education institution in the highest quintile, only 10% in the lowest income quintile have said access. Data from UNICEF confirms that, with some exceptions such as Peru or Uruguay, these disparities are a common feature in Latin America – and in Africa as well.

If a good part of the socio-emotional and executive function skills is formed in early childhood, formal education must tackle the foundational skills and technical and cognitive skills, including digital skills. For example, the ability to understand a text should be developed by the age of 10; later on, formal education focuses on learning more complex and more analytical skills.

With respect to foundational skills, the region's performance is also disappointing. According to a new database developed by the World Bank and UNESCO covering some 115 countries, six out of ten children in Latin America cannot read age-appropriate material by age 10. In countries such as the US, Canada, or France, this share drops to 4%/8%. The picture is particularly negative in countries like Honduras, Paraguay, and Panama (see World Bank, 2021).

What about educational achievement in secondary education? The Programme for International Student Assessment (PISA) is a global assessment conducted by the Organisation for Economic Co-operation and Development (OECD) to evaluate the learning outcomes in mathematics, science and reading of 15-year-old students. According to the PISA data from 2018, no country in Latin America ranked in the top 40 places (OECD 2019). In fact, the first country to appear is Chile, ranking 43, followed by Uruguay, 47, and Costa Rica, 48. Of the three subjects under evaluation, all Latin American countries scored below the OECD average. In fact, the average scores for Latin America fell well below the 25th percentile scores for OECD countries. PISA test data also show a high inequality in learning within the countries of the region. In Latin America, upper secondary school completion rates near 80% in the richest quintile, and just over 40% in the poorest quintile. And in terms of learning, an adolescent from the richest quintile is twice as likely to solve age-appropriate problems as one from the poorest quintile (UNESCO, 2021).

Finally, there is the question of reskilling those in the current labor market. How many have 21st century skills? Following

Frey and Osborne, in Albrieu et al. (2018) we have tried to answer this question by measuring the reskilling effort of workers in different countries in the region. This estimate for a set of countries with comparable data (Argentina, Chile, Brazil, Mexico and Peru) reveals that about 32.3 million out of a total of 192 million are prepared in terms of the stock of skills they have, that is, about 18% of the total number of employed people. The remaining 82% would require, under this estimate, investment in human capital to a greater or lesser extent to readjust their skills. The percentage of workers who today have skills complementary to AI and other technologies is low compared to the percentage recorded in the United States, where it reaches 33%. The mismatch is particularly high with regard to digital skills. According to the Coursera global skills report 2021, out of a total of almost 60 countries worldwide, no country in the region is positioned in the top 40. We can highlight some cases, such as Costa Rica, but the large countries, like Argentina, Brazil, and Mexico, rank in the category of "laggards", particularly with regard to the use of new technologies in production processes (Coursera, 2021).

2.3 Dual labor markets

Labor market institutions play an essential role in managing the risks and opportunities generated by the impact of the so-called fourth industrial revolution on the labor market. In this regard, understanding the characteristics and functioning of these institutions in the region is essential to be able to anticipate specific potentialities and challenges in Latin America and the Caribbean.

When we speak of labor market institutions, we refer mainly to the mechanisms of worker representation and wage negotiation; setting minimum wages; the characteristics of employment contracts and dismissal regulations, the

structure of pension and labor protection systems, including unemployment insurance; training, and job retraining systems, but also informal arrangements that occur between workers and employers within the framework of labor relations.

Concerning these characteristics of labor market functioning, the labor markets of Latin America and the Caribbean present specific features that substantially distance them from what is observed in the more developed countries, generating important nuances regarding the potential impact of technological penetration but also regarding the possibilities and incentives for these new technologies to be massively adopted.

Consider first that the labor markets in most countries in the region present a dual-type structure, with a formal sector that enjoys the benefits of social protection and legal regulations and an informal sector that operates outside of all regulations, within the framework of agreements between individuals where workers usually negotiate from a more vulnerable position. The relative importance of these blocks shows relevant heterogeneities between countries, reaching informality rates of around 80% in Bolivia, Guatemala, Honduras, and Nicaragua, while the rate falls to less than 30% in Uruguay and Chile (see CAF, 2020).

This difference in the starting point with respect to developed countries, where formal work is largely dominant, has interesting consequences. In the first place, one of the projected risks in the labor market consists of an increase in "non-standard" forms of employment, often associated with greater work through platforms, which could erode the coverage of social protection systems and the quality of the employment (see for example ILO, 2016).

In the case of emerging countries, in general, and LAC countries, in particular, there is no clear evidence regarding the growth of non-standard forms of employment. The panorama is heterogeneous between countries but with a

certain tendency towards stability in the participation of this type of insertion (Apella and Zunino, 2018).

The risks associated with these non-standard forms of employment are linked to the loss of social benefits as well as to less control over the length of the working day and the loss of spaces for collective bargaining. In terms of gender gaps, the risks are linked to the fact that greater flexibility of non-standard forms of employment are used so that women can increase their labor participation while maintaining or increasing the unequal distribution of unpaid work from home.

In the region, social protection systems reach only a limited fraction of workers. Hence, the risk of a significant increase in informality is more restricted and the opportunities to improve the labor market results are greater. Indeed, in LAC the problem of informality is already installed in a large part of its workforce, basically as a consequence of very low productivity jobs and low governmental control.

In this context, new forms of employment associated with platforms constitute a limited threat. The evidence so far on employment on platforms points to important opportunities. According to Fernández and Benavidez (2020), platforms absorb mostly informal work, so their impact on social contributions is less important than in developed countries and can even operate in the opposite direction. According to data from the ECAF 2019 survey (see CAF, 2020B), platform workers in Latin American cities are more likely to be formal compared to similar workers who operate off platforms. Additionally, also according to Fernández and Benavidez (2020), platforms seem to be more inclusive than formal work since they are an entry point for migrants, youths, and women. Finally, in terms of working conditions, platform workers do better than informal workers but worse than formal workers, so they seem to be inserted somewhere in the middle of our dual markets.

Considering the above points, the new forms of work (particularly independent and offshored work) could offer the opportunity to compete with the world at different ends of the skill spectrum (micro-work versus highly qualified services). In this way, platform work could help to reduce the structural problem associated with low productivity in the informal segment of employment.

On the other hand, platforms provide unique possibilities in terms of traceability of transactions, as they are associated with digital payments. In this sense, many possibilities arise in terms of controlling informality, even in self-employment, where irregular income flows usually imply high inspection costs.

Governments should advance in the use of these data for control purposes not only to avoid an erosion of income from contributions and income tax in case these work modalities are extended, but also as a matter of tax justice that can prevent platform jobs from competing unfairly given their advantageous positions taxwise. This is particularly important in those sectors with high productivity, today mostly formal, that may be attracted to offshoring modalities of work with the aim of avoiding taxes or social contributions.

A second issue to consider is that the starting point characterized by dual markets could affect the incentives for automatization. Evidence reveals that certain labor institutions, such as the minimum wage, impose extra pressure on companies to increase their productivity, which tends to facilitate the process by which lower-productivity firms are left out of the market or are forced to reconvert. This dynamic favors a process of creative destruction at the firm level that accelerates the diffusion of new technologies and fosters productivity at the economy's aggregate level (see, for example, McLaughlin, 2007 and 2009 or Mayneris et al., 2014).

This type of pressure is far weaker in the informal bloc of the region's economies, where institutions such as the minimum wage have an indirect impact. In this group of informal workers, which, as was mentioned, represents an average of approximately 60% of employment in the region, the pressure to increase productivity is lower, which generates fewer incentives to incorporate new automation technologies.

The presence of dual markets could also lead to more profound impacts in terms of well-being in the event of a major job transition towards a new job profile for workers in the labor market. Indeed, even without assuming a relevant technological unemployment process at the aggregate level, workers who are being displaced in the transformation of the labor market may face periods of unemployment and reconversion processes.

The cost of this transition will obviously be lower if the affected workers have social protection policies that allow them to mitigate the fall in income in the event of job loss, as well as access to job retraining programs that will enable them to reintegrate into the job market faster. This last aspect is critical in the case of workers with jobs that have become or are rapidly becoming obsolete given technological change.

In the case of LAC, workers in the informal bloc tend to lack or are poorly covered by social protection instruments that allow them to cope with income shocks. This relative lack of protection was even seen in countries with greater social security coverage during the recent COVID-19 crisis, which severely impacted activity sectors characterized by high informality (see, for example, Caporale et al., 2021), determining in several cases substantial increases in the levels of monetary poverty.

Inadequate social protection coverage is a relevant risk that has a double impact. On the one hand, the effect on the unprotected workers and their families in the short term is explained by the larger risk of severe income and

consumption losses. On the other hand, the lack of coverage impacts the relevant process of human capital formation of children in families without social protection coverage. If economic instability weakens the process of human capital accumulation in children belonging to families where the parents work in low-productivity informal jobs, the strong inequality of opportunities existing in the region is reinforced.

In sum, when discussing the future of employment in the region, we cannot help but consider that the onset of the so-called fourth industrial revolution can be characterized by dual markets that are totally unlike what is observed in developed economies. As was discussed, this particular starting point in the region may have relevant consequences in terms of the magnitude of the added risks in terms of informality and the loss of job quality. The current opportunities for the purposes of productivity increases and reduces tax evasion. The incentives for a generalized process of technological penetration is developed and the individual risks at the worker level is associated with the transition costs. For all these reasons, it is necessary to qualify the global narrative on the future of employment and adapt it to the reality of the region.

2.4 Growing older: The demographic dividend

Together with and interacting with technological change, demographic trends constitute one of the most relevant forces that will determine the future of employment in the region. These trends are vital to understanding the evolution of the labor factor endowment, which allows us to approximate the dynamics of the labor supply that will exist in the region in the coming decades. The relative endowment of labor to capital, in turn, affects the relative prices between both factors, which impact the incentives and economic policy conditions to advance or not in a process of automation or a substitution of labor.

In the case of LAC, we can summarize the demographic trends with two central points: i) a demographic bonus that is still in process but is projected with a relatively short duration compared to developed countries, and ii) substantial heterogeneity between and within countries.

Most of the region will be completing the so-called demographic bonus in the coming decades (see Cotelar, 2011; Saad et al., 2012; Rofman and Apella, 2020). In this context, an absolute increase in the working-age population is projected in the next three decades, which will total around 45 million (Saad et al., 2012), where growth will be concentrated in workers over 40 years. The challenge for the labor market is then to absorb this growth in the workforce in a context of technological change biased towards the substitution of codifiable tasks.

In this average view, there is a high level of heterogeneity between countries, and also within them. Countries in the pre-demographic bonus stage (with the growth of the dependent population driven by children and youths) coexist in the region with countries that are going through the demographic bonus (with a relative increase in the working-age population), and countries that are in the final stage of the demographic dividend (relative growth of the dependent population, but in this case driven by the elderly).

This heterogeneity is also observed within countries where the best positioned socioeconomic groups present birth and mortality rates compatible with an advanced demographic transition scenario. Conversely, the most vulnerable groups are in the pre-bonus situation, with high birth rates and higher mortality rates.

Also observed is an inverse relationship between the demographic stage and the economic performance of the countries. The least advanced countries in the demographic transition are usually in a lower condition of development (Filgueira, 2009). This relationship is also noted within the

different countries where population groups with the lowest incomes present the characteristics of a less advanced demographic transition.

This starting point in terms of the demographic transition significantly conditions the incentives and the political economy to adopt technologies that make the substitution of labor possible. In economies where the labor supply will be reduced in the future, it is clear that there will be less resistance to adopt technologies that allow automating tasks performed today by human labor. On the other hand, the reduction in the labor supply itself generates a lower relative endowment of the labor factor that will make it more expensive compared to capital. If we add to this that the population has sufficient skills to adapt to the type of non-routine jobs that are likely to be carried out by the labor factor, we are in optimal conditions to consider a process of strong technological incorporation with low transition costs.

However, the LAC situation is clearly different. First, as was mentioned, the economies in the region will present a significant growth in the number of workers in the coming decades. Second, the population growth is mainly driven by the most socio-economically vulnerable population groups, which, in turn, usually show a poorer educational performance and, therefore, are less able to adapt to occupations that are intensive in non-routine cognitive tasks. In this context, the political economy and the economic incentives are less aligned with a scenario of generalized technological incorporation.

Additionally, according to Autor and Dorn (2009), one of the possible ways in which transformations in the task profile will be processed within the labor market is through an aging process of tasks. According to this hypothesis, young workers do not have incentives to enter contracting occupations (intensive in routine tasks). On the other hand, older workers have strong incentives to maintain these jobs, especially when they have been working at them for years. The result of these

different incentives according to age groups is known as the relative aging of occupations with decreasing participation in the labor market. This process of "automatic adjustment" of the task profile of jobs may be difficult in a labor market where the growth of the labor force will be concentrated in people between 40 and 65 years, as is projected for Latin America.

Keep in mind that a scenario with little propagation of new technologies in the region's labor markets may reduce the transition costs associated with the process, but it would imply a new missed opportunity to move towards less dual labor markets with higher productivity and income. In other words, maintaining the status quo does not represent the most desirable option in the case of the region.

Regarding the demographic transition, we could then suggest that the fundamental challenge for the economies of the region is to capitalize on the first demographic dividend in order to make good use of the second dividend.

Following Mason and Lee (2005)'s analysis, the effects of the demographic transition on the economic growth process are related to what these authors call the first and second "growth dividends." According to these authors, a demographic window of opportunity (VOD) is generated during the demographic bonus stage, characterized by favorable conditions to increase economic growth. The first growth dividend refers to the fact that the relative participation of the working-age population increases during the VOD. This implies that during the demographic bonus stage, the population directly involved in the production of goods and services increases in relation to the dependent population. Obviously, this first growth dividend disappears and is even reversed when we enter the population aging stage. The second growth dividend generated during the VOD can be attributed to the fact that there is an increase in the proportion of the population that can be considered "net savers" in the demographic bonus stage (their economy's disposable income levels exceed consumer spending). This situation, in which an increase in the saving rate is favored, can be used to increase investment.

Note that most of the region is not taking advantage of the demographic bonus stage adequately. The relatively low female participation rates, the high informality associated with low-productivity jobs, and, in some cases, relatively high structural unemployment rates mean that the region is not able to effectively take advantage of the demographic window of opportunity in terms of a higher per capita product or a significant increase in savings and investment rates.

Evidence shows that the wastage of the bonus could be partly linked to a mismatch between the supply and demand of skills, mainly connected to a low accumulation of soft skills in the region, in addition to the low educational quality that leads to a low accumulation of cognitive skills. In this way, an important part of the workforce is relegated to the option of lower productivity occupations. In this sense, note once again the importance of implementing reforms in educational systems that foster increasing coverage and educational quality, as well as the need for further training programs and job retraining.

In turn, there is less time to try to take advantage of the demographic window of opportunity with respect to what happened in the more developed countries. As an example, while the demographic dividend in European countries took about 60 or 70 years, in Latin America, it is expected to take an average of 30 to 40 years. Although there could be room to extend the demographic bonus considering the gender bonus, this requires proper social protection policies (increases in paternity leave and care policies). However, considering the educational characteristics of women who are out of the market today, they may tend, on average, to develop low-productivity jobs with a moderate impact on the product.

The bonus could also extend with age. Today's adults have better health conditions than a few decades ago, which leaves room for a longer stay in the labor market. However, in the long term, the effect of demography will be dominant and, even considering the above nuances, the demographic window of

opportunity in the region will be shorter than in developed economies.

In short, within a framework of significant heterogeneity, the countries of the region will have to face costs associated with demography (health, pensions), costs related to the preparation and training of skills for the workforce, and possible costs in the coming decades, protection associated with the transition of skills in a context of fiscal constraints. For this, it is essential that the countries achieve a significant increase in productivity and the capacity to save and invest during the demographic window of opportunity. Incorporating new technologies plays a fundamental role in this regard. However, economic incentives may not be aligned appropriately towards a significant investment in replacement technologies for tasks currently developed by human labor.

2.5 Multiple futures. The deep roots of inequality in Latin America

Having analyzed the various dimensions co-creating the future of work, some regularities emerge that are worth highlighting. One of them – perhaps the most important for the region – is the presence of deep inequality and structural heterogeneity: dynamic, innovative companies versus backward companies; workers with modern skills versus workers with 20th-century skills; workers with long-term formal contracts versus informal workers generating their income on a day-to-day basis. These gaps represent alternative ways in which structural inequality manifests itself in Latin American societies. The fact that the region's Gini is higher than that observed in Asia, Europe, or North America is also an outcome of these disparities.

Over recent decades, global discussions on technology and the future of work have recognized that technological change creates winners and losers; therefore, the emergence of

novel technologies leads to more inequality. Differential returns to capital partly explain this dynamic: technological change is accompanied by a fall in the labor share and thus a lower percentage of wage income in national income. The emergence of superstar firms accounts for this phenomenon (Autor et al., 2019). However, the gaps are not limited to the tension between capital and labor: disparities also appear within the distribution of wage income. The hypothesis of wage polarization and "hollowing out" in the (wage) income distribution gathers quite a lot of confirmatory evidence in high-income countries: "middle class" wages have grown below low- and high-class wages. There are two main groups that explain these factors: globalization, with offshoring as the main driver, and technological change (Goos et al., 2014).

Regarding the latter, as we discussed, new technological advances make routine tasks cheaper but increase the demand for employment in non-routine and flexible tasks. Of course, this positively impacts the demand for high-skilled workers, such as those creating the AI systems. It also positively impacts the demand for low-skilled workers that perform simple tasks that machines cannot yet perform (such as detecting movement at a distance). This increased dynamism at both ends of the labor market gives rise to wage polarization.

What is interesting and perhaps even paradoxical is that the region appears to be a strong counter-example in the global debate on the impacts of new technologies on labor markets for at least a few decades (see López Calva and Lustig, 2010, and Messina and Silva, 2018).

The reasons why Latin America did not follow the polarization trend vary. One of the hypotheses that gathers consensus is the expansion in the supply of medium- and high-skilled skills (Gasparini et al., 2011). They claim that although the demand for these skills increased, the supply also showed high dynamism, and therefore salaries in this segment of the labor market moved less than in the low-skilled market. As was

mentioned, schooling increased sharply in the last decades, and this was also true for tertiary education, particularly in countries such as Argentina, Chile, Honduras, and Panamá (Rodriguez-Castellán et al., 2016).

The second hypothesis refers to the sectoral bias in the structure of GDP and exports in the region and its impact on the labor market. Since the turn of the century, the leadership of China and emerging Asia has led to a strong demand for primary products (oil, copper, soybeans, etc.) that benefited the region, mainly South American countries. The key is that a greater dynamism of these sectors implied a shift in the demand for labor towards the low skilled.

A third hypothesis has to do with the speed of technological change. Ceteris paribus, if the diffusion of new technologies is lower in one country than in another, the demand for high-skilled jobs will be lower, as will wage increases. It also gathers confirmatory evidence as we discussed in the technology subsection.

It is very relevant to understand that although inequality did not increase in recent years, Latin America is a region with structurally high levels of inequality. Gasparini and Cruces (2021), in their up-to-date picture of inequality in Latin America, documented pervasive gaps between the Latin American rich and poor in the labor market (labor participation rates, employment rates, informality rates), in education (years of schooling, enrollment rates), and in the use of technology (internet connectivity). Gaps are also huge regarding gender, for example, in participation rates and hours worked. In a recent report, UNDP explains how these economic asymmetries translate into power asymmetries, which in turn create biases in public policies that benefit already-advantaged workers and firms.

From the perspective of the future of work, all this evidence indicates that not one but multiple futures are being created in Latin America. A new garden of forking paths is in the making.

The current set of institutions and policies has a strong bias towards reproducing the status quo.

3. POLICY PATHWAYS TO BREAK THE STATUS QUO

How can we break with this dynamic and bet on a future of work unlike the present and the past? We close the chapter by listing a set of policy axes to consider regarding the future of work in Latin America.

3.1 Ensure macroeconomic stability

The first axis refers to a passive horizontal policy: the search for macroeconomic stability. The public and private sectors cannot bet on the future with a volatile and unstable macroeconomy. The lack of macroeconomic stability represents a complex environment for firms that want to stimulate technological change given that digital transformation is essentially a long-term bet. Recurrent crises and regime changes operate as a "break" in the planning horizon with a consequent shortening of the decision-making horizon. In this context, business behavior will be biased towards less costly and more flexible options, i.e., with lower losses in negative scenarios and quick exits or reversals in cases of sudden changes of context. Thus, in a context that generates a high preference for flexibility, the shortening of the time horizon rewards short-term investment projects over long-term ones. The expected profits of riskier projects are discounted at an excessively high rate. As economist Jorge Katz points out, in these contexts, business behavior becomes defensive and short-sighted (Katz, 2000).

Short-termism goes beyond the behavior of the business world and is observed in several dimensions that make up the

long-term dynamics and constitute challenges for horizontal policies, such as spending on infrastructure or investment in human capital. In these contexts, the financial system also adjusts its behavior. Instead of evaluating the specific return of each project, financing is based on the quality of the guarantee or collateral with which the debt is taken. It looks to the past instead of looking to the future. We will return to these issues later.

3.2 Promote technological change

The second axis concerns the pace of digital transformation. The good news here is that many governments in the region are implementing programs that reflect the importance of this issue for public policy. We list some of them: the Industry 4.0 Plan in Argentina, the National Plan for the Internet of Things in Brazil, the National Plan for Artificial Intelligence in Chile, the National Policy for Digital Transformation and Artificial Intelligence in Colombia, and the Digital Transformation Strategy towards the Costa Rica of the Bicentennial 4.0 2018-2022. However, the strategies are still in the early implementation phase and there is much to learn from the most advanced countries in the field.

What should a plan to accelerate the adoption of new digital technologies contain? First, it is critical that society achieve a greater understanding about the costs and benefits of new technologies. This, in turn, requires that these technologies "leave" the sphere of the hard sciences and be understood and processed by the social sciences and by decision-makers in the public sphere. Following Herbert Simon (1969), it is a matter of advancing in the "science of the artificial" to make the study of these technologies an interdisciplinary subject oriented to improving the explanatory power of the technological solutions implemented.

In the case of Latin America, in view of the above, the policy framework must be ambitious because it is essential to avoid the status quo bias. The block to change recognizes different sources depending on the heterogeneity of the productive regional system so that the development policies to be implemented are inclusive by design.

3.3 Foster 21st-century skills

The third area of policy concerns human capital formation. It is essential to progress in retraining people's skills in the labor market.

If we focus on digital skills, we see that the data available for four countries in the region (Chile, Ecuador, Peru, and Mexico) that are part of the Programme for the International Assessment of Adult Competencies (PIAAC) show significant gaps with the OECD average in terms of the percentage of adults who have high levels of achievement in problem-solving in digital environments. These differences become more intense, in general, at lower educational levels and at older ages (Martínez et al., 2020). Fewer than half of the Latin Americans who participated in this evaluation had used a computer or had sufficient experience to use computers to perform basic professional tasks. At the same time, less than 10% of workers in the region use ICTs for more advanced tasks, such as programming, a percentage made up to a greater extent by individuals with higher educational credentials. While one-third of workers in Latin America use ICTs regularly in their work, in Europe, this percentage rises to more than half (OECD, 2020a).

It is also key for public policy to promote the acquisition of these skills for future workers, so it is necessary to rethink the education system.

The first recommendation in this regard is to achieve a generalization of early childhood education policy. A very low percentage of children under six years in the region attend an educational institution (less than 10% in the case of Argentina, for example). During this vital stage, the foundations of the brain structure are laid, making it a critical period to develop basic cognitive and socio-emotional skills. It is also a critical period for leveling development opportunities between the more and less advantaged socio-economic sectors.

The second recommendation refers to formal education after early childhood. There, it is urgent to improve the quality of basic education in order to incorporate more advanced general skills and knowledge, many of them of a digital nature (see Busso et al., 2017). This requires fostering and improving the conditions of the teaching career, updating curricular designs, investing in infrastructure, and paying particular attention to the secondary level. In that stretch, it is vital to reduce the high levels of dropout (remember that 4 out of 10 students in the region do not complete secondary school). It is also necessary to adapt tertiary and university education to facilitate the transition to the world of work. This implies, of course, strengthening technical and vocational education and training mechanisms, including middle school, and intensifying an interaction between the world of employment and the business world. Also, many countries need greater flexibility and agility in modifying curricula, creating new careers, offering specializations of shorter duration than the traditional alternatives, initiatives that, at the end of the day, aim to ensure that the supply of education does not lag so far behind the speed of technological change and its consequences in terms of the demand for new skills.

Finally, there is the issue of lifelong learning. Dynamic companies of a certain size allow themselves to design in-house mechanisms for retraining skills, but this is not common outside this select group. For this reason, technical and

professional education must be encouraged, adding the fact that these instances must be redesigned to make them more inclusive. In the region, as in much of the emerging world, this type of training does not reach people in vulnerable segments of the labor market: few training institutions can capture low-skilled workers with short-term or temporary contracts, who earn low wages, and who work in small- and medium-sized enterprises. The gap is also significant in terms of gender.

3.4 Reform labor market institutions

Labor institutions will have to adapt to the new forms of employment, probably characterized by delocalization and more irregular incomes, to keep workers who are already in the formal sector and trying to incorporate new workers to the extent that an increase in productivity will be achieved in some groups. Institutions should be present, adapt, and act as enablers of new opportunities.

Adapting labor institutions requires fine-tuning, but it is essential to avoid a narrative of technological anxiety that leads to a pro-deregulation agenda. The goal of preventing the automation of specific jobs from preserving employment can lead to proposals for deregulation and a depression of wages or employment benefits, which in turn can effectively reduce the incentives to automate. It is crucial to avoid high costs in a transition that involves significant changes in the profile of workers' tasks. Still, the response to this new technological impulse can in no way try to reduce the incentives for the adoption of new technologies.

If a far less intensive technological change develops in the region, the challenges associated with technological unemployment and labor polarization mentioned in the literature will probably be less relevant. However, this scenario would represent a new episode of technological acceleration that the region would not be able to capitalize on in order to

accelerate its level of growth, reducing the critical productivity gaps that separate it from the more developed economies.

The region has already gone through previous episodes of technological acceleration at the global level that it failed to capitalize on in increased productivity and per capita product. The main objective now should be to prevent this from happening, generating instruments of well-being and labor reconversion that make it possible to smooth transition costs but aim to create a generalized increase in productivity that begins to leave behind the dual structures of the labor markets that both contribute to the existence of social gaps and inequality of opportunities in the countries of the region.

As was mentioned, labor institutions must play a fundamental role. In the first place, it is important to prevent the growing relocation of employment associated with the use of platforms from worsening working conditions. There are basically two central elements in employment relationships that need to be rethought and reconsidered in regulation: the workplace and working time. A relevant challenge when revisiting these concepts is how to articulate the representation of this type of worker who does not necessarily share a physical space. The representation of the firms themselves is also a challenge since they are still in the process of creating chambers that allow them, for example, to participate in local discussions on sector regulation.

Additionally, offshoring probably requires international agreements; this is to rethink the global governance of labor relations. As an example, the ILO's global commission on the future of work in 2019 proposed creating an international scheme to regulate platform work in the same vein as the regulation of maritime labor, where workers have a framework that is above the national regulations that ensure respect for human rights and basic conditions regardless of where the worker is located.

On the other hand, without artificially making labor costs more expensive, it is necessary for regulation to facilitate the process to creatively destroy firms, putting pressure for investment on new technologies or reconversion on those firms with lower productivity. Proper calibration of minimum wage policies is essential in this regard.

Institutions must also play a relevant role in preventing the number of layoffs in the economy from surpassing the socially optimal one. Layoffs have costly externalities associated with the costs of social protection required in these cases but they are also related to other types of costs, such as the impact on the very significant accumulation of human capital of the children belonging to the affected households. Again, a fine calibration of the regulation is necessary. Clearly, redundancies must be prevented from being excessively costly since this will remove incentives for firms to hire workers. But on the other hand, it is important that regulation help to internalize all the costs associated with layoffs so that they do not represent a free lunch for companies.

Note that the adaptation of regulation requires a much more comprehensive approach than simply adding a regulatory chapter for new forms of employment that appear as a consequence of new technologies. Indeed, there are sectors such as platform work that are currently excluded from governance frameworks, not because they are technology-based but because they are independent jobs, which already existed in analog formats, for example, catalog sales. Therefore, the challenge to adapt to the institutions is more profound than the simple addition of a "chapter of the platform works" to the existing regulation, which already presented important pre-existing weaknesses in the region to the new technological wave of automation/digitization.

Additionally, institutions linked to labor reconversion (and in general active employment policies) also play a fundamental role in smoothing transition costs. Public employment services

are required to alert the demands of the labor market in a timely fashion, identifying feasible reconversion possibilities for those workers who may be displaced by technology. In a labor market, which, as was previously mentioned, will have a growing participation of workers over 40 years, investment in strengthening these types of institutions will be essential.

Finally, in order to smooth possible transition costs, it is also important for the countries of the region to continue advancing in social protection policies and minimum income. As we discussed above, the scarce social security coverage associated with the duality of labor markets means that only a limited fraction of workers has access to unemployment insurance or policies in general that help cushion the income shocks associated with employment loss.

In sum, it is necessary to have strong labor institutions to regulate opportunities and manage the risks associated with technological penetration in labor markets. However, part of the problem facing the region is that strengthening these institutions may require financial resources, which, as will be discussed in the next section, will be particularly limited in the region in the future.

3.5 Time to rethink fiscal policy

Taking into account everything mentioned in the previous sections, it is evident that a relevant economic dimension to consider when analyzing issues related to the future of employment has to do with the challenge in fiscal terms that are associated with potential changes in the labor market.

On the income side, the potential growth of non-standard forms of employment implies a potential erosion of the social contribution bases and potentially other income taxes associated with formal jobs. At the same time, on the spending

side, the growing automation/digitization will require growing educational spending to expand the coverage and quality of education, as well as increase spending on job retraining, which will mitigate the transition to a labor market that is much more intensive in non-routine cognitive tasks. Additionally, on the spending side, the aforementioned demographic trends will begin to put more strain on public finances through the growth of spending on pensions and health.

This combination of higher spending with possibly lower income derived from technological and demographic trends requires an imminent start to design alternative forms of tax collection and reforms in pension systems that make it possible to moderate the trajectory of spending and thus prevent fiscal crises in the future.

Although, as was previously discussed, the arrival of new forms of employment may constitute less of a threat to the contribution bases in Latin America and the Caribbean than in developed countries, due to the strong initial informality associated with the dual labor markets in the region, these same differences at the onset make our region begin from a much more vulnerable fiscal situation.

We could argue that Latin America and the Caribbean have previous comorbidities in terms of fiscal vulnerability, so that any marginal impact may have relevant consequences. These comorbidities include a situation that since the mid-2020s has been characterized by low growth and limited fiscal space and structurally less favorable access to financing, implying a high-interest burden on public budgets that take into account the level of debt compared to developed countries.

This situation has intensified with the pandemic, determining that the public accounts of the region present unusually high results (average -7.5% of GDP in 2020). The pandemic, in turn, exposed the labor market to the most deleterious shock of the century, with a differentiated impact on women and

young people that generated needs for greater spending on social protection. Additionally, the post-pandemic scenario has generated additional requirements in terms of state intervention, for example, tax or spending stimuli to push up the demand, generating greater stress on fiscal balances.

We could argue that these fiscal vulnerability problems are not new to the region and even have important points of contact with the challenges faced by developed countries. However, in LAC, the vulnerabilities are much greater and risk intensifying even further as a consequence of the expected transformations in the world of work.

In this sense, the expected transformations in the world of work may constitute an opportunity for a more balanced tax system between labor and capital. Today, in Latin America and the Caribbean, tax systems are biased towards work. In particular, the financing of social security systems based fundamentally on labor payrolls.

In turn, if the loss of revenue due to the erosion of direct sources were replaced by increases in indirect taxes (for example, VAT), the risk of transformations in the world of work could lead the countries of the region to more regressive public revenue structures, which is particularly worrisome in a region with such high-income inequality levels.

On a global level, as a result of a proposal by Bill Gates, various discussions have been raised regarding the imposition of taxes on robots, an idea that has been incorporated into several recent academic studies (Thuemmel, 2018; Costinot and Werning, 2018; Tsivinski and Werquin 2017, Guerreiro et al., 2020). However, concrete experience with this type of tax is extremely limited.

In turn, this type of proposal has major limitations from a theoretical point of view. The main problem of taxation on robots is the difficulty in defining the tax base. Experience has

shown us that technology is moving very fast, and it would make it very difficult to adapt the tax base in the legislation. In this way, taxing business income to a greater extent seems to be the most viable path.

It also emerges as an item on the agenda, the advance in the design of a joint structure of public revenue instead of the current structure that has an independent structure for financing social security. A joint look at public revenues could generate the conditions to move towards more progressive systems than those currently existing in the region.

Finally, consider that the greater digitization of activities opens up opportunities to improve the efficiency of tax collection. Outside of what is strictly corresponding to the world of work, digitization opens up possibilities to control for evasion, which can help prevent the erosion of public revenue in a context where, as was mentioned above, there will be significant spending demands. Also, the very growth of digital activities constitutes a new potential tax base. Several countries have already created a kind of VAT on digital activities, although the impact of this type of tax is limited for now. However, if the legislation is not adapted, the growth of digital activities can lead to unfair competition and loss of revenue. Lastly, digitization and the use of financial payments in platform activities provides information that facilitates the design of contributions to social security and the collection of income taxes in the case of independent workers.

4. REFERENCES

Albrieu, R., Rapetti, M., Brest López, C., Larroulet, P. and Sorrentino, A. (2018a). Inteligencia artificial y crecimiento económico. Oportunidades y desafíos para Argentina. CIPPEC-Microsoft. Retrieved from https://www.cippec.org/wp-content/uploads/2018/11/ADE-ARG-vf.pdf

Albrieu, R., Basco, A., Brest López, C., De Azevedo, B., Peirano, F., Rapetti, M. and Vienni, G. (2018b). Travesía 4.0: Hacia la transformación industrial argentina. Retrieved from https://publications.iadb.org/publications/spanish/document/Traves%C3%ADa_4.0_hacia_la_transformaci%C3%B3n_industrial_argentina_es_es.pdf en

Albrieu, R., Ballesty, M. and López, A (2021). Transformación digital y desarrollo productivo en América Latina y el Caribe: desafíos, oportunidades y políticas. Mimeo.

Agrawal, A., Gans, J., and Goldfarb, A. (2019). The Economics of Artificial Intelligence: An Agenda. Chicago University Press.

Alvarez, M., Fernandez-Stark, K. and Mulder, N (eds) (2021). Gobernanza y desempeño exportador de los servicios modernos en América Latina y la India. Santiago de Chile: CEPAL.

Basco, A. I., De Azevedo, B., Harraca, M. and Kersner, S. (2020). América Latina en Movimiento: Competencias y Habilidades en la Cuarta Revolución Industrial. Buenos Aires: INTAL-BID. Retrieved from https://publications.iadb.org/publications/ spanish/document/Am%C3%A9rica_Latina_en_movimiento_Competencias_y_ habilidades_en_la_Cuarta_Revoluci%C3%B3n_Industrial_es.pdf

Boix, C. (2019). Democratic Capitalism at the Crossroads: Technological Change and the Future of Politics. Princeton University Press.

Brockman, J. (2015). What to Think About Machines That Think: Today's Leading Thinkers on the Age of Machine Intelligence. Harper Perennial.

Busso, M., Cristia, J. P., Hincapie, D., Messina, J. and Ripani, L (2017). Learning Better: Public Policy for Skills Development. Retrieved from https://publications.iadb.org/en/learning-better-public-policy-skills-development

Cardini A. and Guevara, J. (2021). Mapa de la educación inicial: los primeros años cuentan. Buenos Aires: CIPPEC –UNICEF.

Costinot, A. and Werning, I. (2018). Robots, Trade, and Luddism: A Sufficient Statistic Approach to. Optimal Technology Regulation. NBER Working Paper. National Bureau of Economic Research.

Coursera (2021). Global Skills Report 2021. Retrieved from https://www.coursera.org/skills-reports/global

Crafts, N. (2021). AI as a GPT: An Historical Perspective. Oxford Review of Economic Policy, 37(3), 521-536.

Dieppe, P. (2020). Global Productivity: Trends, Drivers, and Policies. Washington DC: World Bank.

Ferraz, J. (2019). INDUSTRY 2027 Risks and Opportunities for Brazil in the face of disruptive innovations.

Frey, C. and Osborne, M. (2013). The future of employment: How susceptible are jobs to computerization?. Technological Forecasting and Social Change, 114 254-280.

Friedman, T. (2016) Thank You for Being Late: An Optimist's Guide to Thriving in the Age of Accelerations. Ed. Picador.

Goos, M., Manning, A and Salomons, A. (2014). Explaining job polarization: routinebiased technological change and offshoring. American Economic Review, 104 (8) 2509-2526. ISSN 0002-8282

Simon, H. (1969). The Science of the Artificial. MIT Press.

Hincapié, D., Arias Ortiz, E., Paredes, D. (2020). Learning for life: Socio-emotional skills to face the new normal. Washington DC: IDB. Retrieved from https://blogs.iadb.org/educacion/en/learningforlife/

Katz, J. (2000). Estabilización Macroeconómica, Reforma Estructural y Comportamiento Industrial. Alianza Editorial.

NASEM (2020). Information Technology Innovation: Resurgence, Confluence, and Continuing Impact. Disponible en: Information Technology Innovation: Resurgence, Confluence, and Continuing Impact. The National Academies Press.

Sennett, R. (2007). The Culture of the New Capitalism. Connecticut: Yale University Press.

Taddy, M. (2019). The Technological Elements of Artificial Intelligence. In Agrawal, A., Gans, J., and Goldfarb, A. (eds.). The Economics of Artificial Intelligence: An Agenda. Chicago University Press.

5. ABOUT THE AUTHORS

Ramiro Albrieu is the project leader and principal investigator of the Future of Work in the Global South Initiative (FoWiGS). He is a Principal Investigator at CIPPEC's Economic Development Program and a Macroeconomics professor at the University of Buenos Aires. He is an Associate Researcher at the Center for the Study of State and Society (CEDES) and at the Commitment to Equity Institute (CEQ) at Tulane University, as well as a member of the T-20 "Technological Change and the Future of Work" task force A.

Gonzalo Zunino is a director at the Center for Economic Research (CINVE). He is a Doctor in Economics from the Autonomous University of Madrid, and has a Master's Degree in Economic Analysis from the Carlos III University of Madrid and a Bachelor of Economics from the Faculty of Economic Sciences and Administration of the University of the Republic. Before joining CINVE, Gonzalo served as Technical Advisor to the Macroeconomic Advisory Office of the Uruguayan Ministry of Economy and Finance.

6. ABOUT THE FOWIGS INITIATIVE

The Future of Work in the Global South is an initiative supported by the International Development Research Centre (IDRC) and coordinated by the Center for the Implementation of Public Policies Promoting Equity and Growth (CIPPEC). It aims at understanding the implications of technological change on jobs from a Global South perspective bringing data, knowledge, and policy frameworks to build evidence-based narratives on the future of work in developing countries.

7. ABOUT THE PARTNERS

CIPPEC

CIPPEC is an independent non-profit organization that works on building better public policies. We promote policies that would make Argentina more developed, more equal, with the same opportunities for all and solid and efficient public institutions. We want a fair, democratic and inclusive society, where everyone has the possibility to grow.

RED SUR

The South American Network on Applied Economics/RED SUR (Red Sudamericana de Economía Aplicada) is an independent policy-oriented research network formed by fourteen Universities and Research Centers. Red Sur was created in 1998 and since its inception has promoted multi-country research projects with the aim of contributing with decision making processes within governments, regional institutions and development banks. The main research areas of Red Sur are macroeconomics, sustainable development, trade, investment and value chains, innovation and technical change and regional integration.

As part of COVID-19 research response, Red Sur is leading a macroeconomic observatory in South America and working onresearch projects related to taxation and climate change, poverty and inequality, the future of work, sustainable debt management and inclusive recovery strategies.

FUTURE OF WORK IN THE GLOBAL SOUTH

fowigs.net

linkedin.com/company/fowigsnet/

@fowigsnet

fowigs@gmail.com