# TECHNOLOGY AND THE FUTURE OF WORK



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Ramiro Albrieu

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# The Fourth Industrial Revolution: The Datafication of Everything (and Everyone)

The world economy is witnessing massive transformation 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 and Engineering highlights in a recent report, these changes are rooted in a confluence of multiple and mutually reinforcing innovations in the area of Information and Communication Technologies (ICTs).[1]

The first is large-scale communication networks.[2] The internet stands out here, understood as an infrastructure that connects digital devices through a network that provides a unique identification to each one of them. Networks also include those that connect a small group of devices—computers, printers, scanners—using a common protocol (known as LANs, and if it is a secure network, VPNs), and those networks that connect devices used by a single person (PAN networks).

The expansion of these networks was supported by the creation of new architectures and systems. The phenomenal growth in the computing power of microprocessors is central to this expansion, as is the invention of the cell phone and the proliferation of digital cloud services—that is, the application of standardized decision-making processes using data, algorithms, and storage space shared over the internet.[3]

A third family of technologies relates to computational theories and their applications. Algorithms are simply processes or sets of rules that a digital device can follow.[4] In this area, the main modification of the last decade was the proliferation of algorithms that look for regularities and patterns in databases instead of merely following rules specified previously by people. This new type of strategy is known as Machine Learning.[5] In turn, within the machine learning paradigm, one way to represent the functions to be optimized is to approximate the decision-making process to the functioning of a neural network, where each "neuron" solves a simple function that is then combined with the others to generate a more complex function.[6]

A fourth key element is data. According to World Economic Forum estimates, individuals send around 300 billion emails per day, post approximately 500 million tweets, and conduct about 5 billion searches on Google and other search engines. AI systems require data for three purposes: input for algorithm performance, training to generate the algorithm, and feedback for the algorithm to improve its performance with experience. The potential of AI systems for decision making will depend crucially on the features of the databases used. It is therefore not about collecting data, but rather creating it. Doug Laney points out that data required for building AI systems must meet three requirements:

volume (amount of data), variety (heterogeneity of sources) and velocity (stable flow).[7] A new "V" has recently been added to these three: veracity. The quality and representativeness of the various sources of information cannot be taken for granted.

In practice, these innovations are combined with specific objectives: they seek to generate information that existing information does not provide.[8] They are predictive systems, which are faced with an additional constraint: they allow the imagination of possible futures, but only those close to past patterns. The core value of these technologies is that they allow for a better reading of the past (a past that can be very recent if real-time data are available), and that this improvement helps to recognize patterns in the present or in the immediate future. Together these technologies function as general-purpose technologies (GTPs), in the sense that they are highly malleable and have room for improvement; are used widely in different sectors of the economy; and generate spillover effects that encourage innovation.[9]

## Industrial Revolutions: Redefining the World of Work

Few researchers deny that current innovations have fueled a new technological revolution.[10] Technological revolutions matter because they are the primary drivers of permanent improvement in living standards.[11] In the first industrial revolution in the 18th century, the United Kingdom and some regions of continental Europe led technological innovations around steam power and outperformed the rest of the world. The second industrial revolution at the turn of the 19th century occurred during the emergence of the United States and the proliferation of electricity-powered mass production systems. In the 1990s, the Information and Communication Technologies (ICTs) revolution fueled a series of "Asian Miracles" that put China above the United States in terms of purchasing power.[12]

Many of these GPTs redefined the world of work: the Neolithic revolution transformed hunter-gatherers into farmers; the industrial revolution converted some of the self-employed into factory workers.[13] For the subset of GPTs that emerged in the last 200 years, new labor relations were born with the movement of workers from low-productivity jobs to high-productivity jobs, resulting in higher economic growth and unprecedented improvement in living standards.[14]

Countries who escaped low-growth and development traps have created new and better paid jobs by leveraging the advantages of emerging technologies in past industrial revolutions.[15] These countries managed to

develop, adopt, and adapt new technological solutions quickly and widely enough to transform them into relative gains in terms of productivity and living standards.[16] In the current context of a new wave of technological innovation, societies are reorienting their efforts to make the most of the new GPT. As firms reimagine products and processes[17] and workers become increasingly intertwined with digital tools, the world of work is once again entering a redefinition process. Governments are aware of these mutations, and policy frameworks regarding current and future labor markets—covering a variety of issues, ranging from skills to technology and regulation—are being revised to direct the trajectory of change toward a future with higher productivity and better jobs for all.[18]

Implementations of the new GPT that directly affect the labor market can be divided into two major groups. On the one hand, there are those that expand the set of tasks that capital inputs can perform; on the other, there are those that alter the organization of labor markets. The first relates to automation processes occurring in the workplace, the second explains to the proliferation of labor intermediation platforms.[19]

## Automation and the World of Work: Key Findings from Global Research

**Technological change is feeding (wage) income inequality**. Daron Acemoglu and Pascual Restrep demonstrate how automation technologies are disrupting labor markets in two main ways.[20] First, new job opportunities are being created, particularly in the sets of tasks that complement and augment the power of these technologies. These opportunities are present in specific sectors such as software as well as in specific occupations throughout all sectors, such as design and marketing. Second, technological change is threatening jobs that involve tasks that will become obsolete due to the adoption of new technologies, which will affect entire sectors as well as specific occupations throughout the economy. Employment levels are expected to decline for these types of jobs, and relative returns of the skills involved are predicted to decrease.

The main shift here is the "routine task intensity" of the labor market.[21] Routine tasks are those that are procedural, rule-based activities, which computers are now well-suited to perform. Routine tasks are characteristic of many middle-skilled cognitive and manual jobs such as bookkeeping, clerical work, repetitive production, and monitoring jobs. Routine-based technological change[22] increases the demand for labor in work that is creative and human capital-intensive on the one hand, and work that is easy for people but difficult for machines, on the other hand. The effect is to hollow out the middle of the labor market. [23]

**The adverse impacts of technological change on the labor market are transitory in nature**. In the long run, innovation results in higher productivity, higher real wages, and better jobs. In the short run, societies must undergo a costly adjustment process when technological change is biased towards those with a specific set of skills, higher productivity, and a louder voice. The transition takes time and generates various frictions, from widening income inequality to social fragmentation and political backlash. Discussion of these frictions, and the policy frameworks necessary to confront and solve them, is already underway. It is assumed that, after existing curricula are adjusted to add new skills and labor markets are regulated with new policies, a new equilibrium is attained with new technologies in full use and better jobs.

If history is any guide, these adaptations will be successful, which will in turn lead to an increase in employment, real wages, and the quality of jobs, as has been evidenced in previous waves of technological change.[24] Emerging technologies themselves can be redesigned to "increase human productivity, create jobs and shared prosperity, and protect and bolster democratic freedoms," as economist David Acemoglu writes.[25] The World Economic Forum's Future of Jobs Report 2020, for example, states that while automation will destroy some 85 million jobs in the near future, the application of AI and related technologies will create an additional 97 million jobs to the global economy.[26] The International Monetary Fund (IMF) added a note on wages: as real wages follow productivity trends, they will move upwards with the adoption of emerging technologies.[27]

## Through the lens of the Global South: Key arguments in current research

**New technologies and the end of manufacturing-led development.** Manufacturing has long been considered a stepping-stone on the development ladder due to its ability to productively employ workers with limited education. Reallocating workers from agriculture to manufacturing yielded large gains in economy-wide productivity in past economic transitions. In the past, unlike other industries, productivity in manufacturing has converged across countries,[28] making it a potential driver of convergence in living standards, too. Today's high-income countries followed a common pattern of shifting labor from agriculture to industry, then later from industry to services. But AI is automating tasks in both agriculture and manufacturing, and it has become increasingly difficult for Global South countries to create manufacturing jobs on the scale necessary to meet their job creation imperatives. Emerging and poor countries need to find new paths of development.[29]

**The advantage of "backwardness."** One of the key issues latecomers in economic development face is the question of which path to follow: that of their forerunners or a new and different path of development. The "backward advantage" implies that a still-developing country can take advantage of their technology/industry gap with developed countries by implementing a new technology or venturing into an industry that may be new to its own economy but mature in the Global North. In this case, the innovative costs for still-developing countries will be significantly lower

than for developed countries that need to invent or innovate. An emerging view is that latecomers do not simply follow advanced countries' path of technological development but occasionally skip certain stages or create their own path which differs from that of forerunners in what is called "technological leapfrogging."[30]

**Lack of fiscal space**. Technological change necessitates new infrastructure, more basic innovation and a profound reform of learning systems, all of which require funding and capacity. The fiscal accounts of the countries of the Global South are often fragile, however, and the pandemic has resulted in their having accrued very high debts even by historical standards.

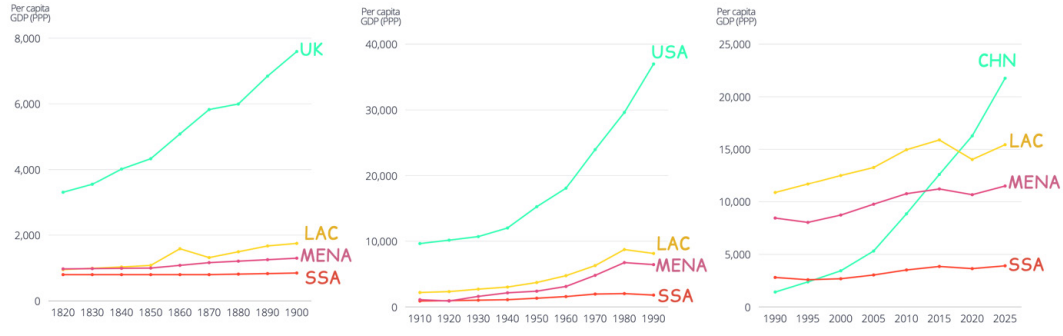
## Issues in the Global South poorly investigated in current research

**Infrastructure gaps and incomplete previous revolutions**. The story of progress from past technological revolutions is mainly a history of the Global North. From a global perspective, the periods of early adoption of disruptive technologies were also phases of large differences in income, productivity, and well-being between countries. Winners and losers emerged at the global level—roughly divided between the Global North and the Global South. The history of the last 300 years is one of divergence in economic growth and well-being between a handful of countries that led the changes and reaped the benefits and a second, more-populated group that lagged behind.

**Figure 1** below depicts two stylized facts about technological change and development over the long run. First, industrial revolutions have, in fact, been real opportunities for accelerating growth and improving living standards, as was the case of the United Kingdom with the steam engine revolution, the United States with the electricity revolution, and China with the ICT revolution. Second, these opportunities are not evenly distributed across countries but are concentrated in earlier adopters of emerging

Figure 1

### Per capita GDP around previous technological revolutions




Source: Maddison database, Accessed April 12, 2021.

technologies. Global South regions, by and large, have been unable to take advantage of previous technological shocks. Critically, this puts them at a disadvantage in terms of reaping the benefits of the current technological revolution underway.

**Low adoption of AI technologies.** According to existing studies,[31] AI technologies have not arrived in the biggest sectors of emerging economies. The Global South has a high percentage of firms that are technologically "behind" as well as firms that are not undertaking concrete action to close their technology gap. The few corporations that have taken the steps to overcome the situation happen to be big, export-oriented, and among the small minority that invest in research and development.

The diffusion of new technologies is still incipient, even in high-income countries. The most authoritative source on this is the 2018 Annual Business Survey (ABS) published by the U.S. Census Bureau. According to data from the survey, about 10 percent of the companies surveyed use technologies associated with the fourth industrial revolution.[32] If the set of technologies considered is limited to those that make intensive use of data and AI implementations, then this figure drops to 7 percent. However, since these are large companies, the exposure of workers to new technologies associated with AI is much higher than 7 percent; in fact, it reaches more than 50 percent of U.S. workers.

Available evidence on adoption patterns and their obstacles in countries in the Global South is scarce. The World Bank is developing a line of research on the subject.[33] Their research so far includes 11 countries: Bangladesh, Brazil (only the state of Ceará), Burkina Faso, Ghana, India (only the states of Tamil Nadu and Uttar Pradesh), Kenya, South Korea, Malawi, Poland, Senegal, and Vietnam. The results allow us to characterize the companies of the Global South as "analog" companies: more than 80 percent use mostly manual processes or manually-operated machines to carry out their main activities.

Another survey for emerging countries that spans a greater geography has been conducted by the United Nations Industrial Development Organization (UNIDO). Between November 2020 and June 2021, UNIDO conducted a firm-level survey in 26 countries in Asia, Africa and Latin America, collecting information from about 3,900 manufacturing firms. The results are similar to those of the World Bank surveys: Less than 2 percent of manufacturing firms in the Global South apply AI-related technologies, and 85 percent perform their functions primarily in analog form.

**Adaptation of new technologies to different contexts**. Given the Global South's past trajectories of technological change, it is imperative that debates around technology and the future of work focus not only on innovation but also on the adaptation of existing technology and, more generally, technologies in use. Adaptation matters because novel technologies are being created mainly by the Global North following its own contexts and challenges; the matter of choices surrounding how and when to use technologies from elsewhere (and how to mix them with locally developed technology) is critical.[34]

**No income polarization**. Studies of the countries of the Global North show that new technologies generate a greater demand for two types of labor: low-skilled and high-skilled, or what Goos and Manning call "lousy" and "lovely" jobs; [35] from this follows the hypothesis that technological change leads to income polarization. However, the evidence available for the countries of the Global South does not confirm this hypothesis; [36] in fact, wage inequality has not increased. Where inequality increased, it has been due to the differential growth of high wages in the context of greater international integration in services markets.

## Regional differences across the South

**Latin American Countries (LAC): structural inequality and the end of manufacturing-led development**. Latin America faces a duality in its future labor markets created by high levels of prevailing structural inequality. There is ample evidence of the presence of dynamic firms, particularly in specific sectors such as agriculture and finance. Agriculture, which was considered non-innovative for decades, has undergone an intensive process to incorporate new technologies in recent decades, particularly in precision agriculture. These are innovative but still small sectors or segments within pre-established firms. The lagging firms are characterized as being smaller establishments, not performing research and development activities, operating in the non-tradable sectors of the economy, and not hiring digital services companies.

**Sub Saharan Africa (SSA): younger countries; advances in cheap, easy to implement technologies**. The need to create more than 700 million jobs in the next three or four decades meets a complex outlook in terms of adaptability to change. While the technology realm has seen a lot of progress in recent years, it has only been in relatively simple, end-user applications. Much remains to be done for the dissemination of complex AI solutions on a large scale, leave alone participation in their creation or adaptation.

**Middle East and North Africa (MENA): lack of innovative risk-taking.** The processes of technological change and structural transformation involve innovations that make obsolete the technologies of the past—thus automating specific tasks and creating new jobs in the most dynamic activities, with more modern technologies and more sophisticated skills. This process of creative destruction is one of the leading forces behind technological innovation and its positive impact on productivity, job creation, and real wages. MENA stands out in relation to other regions in terms of the relative absence of the creative destruction dynamics. The region continues to rely heavily on commodity exports for growth and employment generation, and very little has been achieved in terms of productive diversification.

**Asia: rebalancing growth to be more inclusive**. Asia is the only region that has experienced a long period of high economic growth sustained in large part by the diffusion of the technological innovations mentioned earlier (platforms, artificial intelligence and the "servification" of the economy). Although South and Southeast Asia are still a long way from achieving the

living standards and welfare levels of advanced economies, this dynamic of accelerated growth has generated a sharp increase in within-country inequality as measured by the Gini coefficient. The great challenge ahead for Asia is not the level of growth or the rate of technological innovation, but the direction of change. It is therefore a question of rethinking technological change to make growth more inclusive by design.

## On the Platform Economy: Key Findings from Global Research

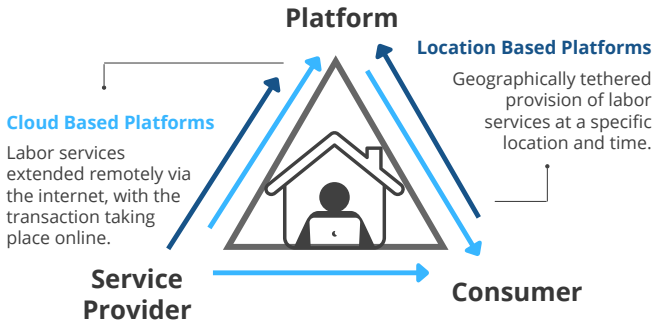
**The platform economy is a new, very powerful business model**. The platform economy is not just a technological disruption, but represents an evolutionary step in two processes that were very important during the ICT revolution. The first has to do with offshoring,[37] that is, firms' decisions to delocalize tasks in the production process from one country to another. The second has to do with the related concept of outsourcing,[38] or firms' decisions to contract out tasks that could have been done internally. The platform-related advances in both offshoring and outsourcing are new in that they have to do with services rather than manufacturing. In particular, offshoring is revolutionizing virtual services[39] and outsourcing is altering physical- or location-based services.[40]

These labor platforms share three characteristics with other platforms: (a) they are largely market-based in the sense that they involve interactions between independent agents; (b) they accumulate new forms of capital—basically intangibles like software, algorithms, or reputation; and (c) they distort the traditional lines between the personal and the professional. Importantly, a distinctive characteristic of labor platforms is that they also blur the lines between dependent and independent employment.

The platform economy increases inequality because only a few suppliers survive in many markets. Digital platforms as a whole benefit by converting fixed costs to variable costs; they do not need to supply any form of direct capital to the production process, as it is provided by the users or providers. Market growth thus does not require investment in fixed capital while the cost of serving an additional user is close to zero. Moreover, once they establish a critical mass of users, platforms can rely on organic growth through the network effects established as a result of additional users being attracted by the existing user base.[41]

**The emergence of digital labor platforms affects the quality of jobs.** In advanced countries, the process of organizing cooperation between capital and labor prior to this revolution could be summarized as what Carles Boix calls "Detroit capitalism."[42] This type of capitalism came

## Digital Labor Platforms

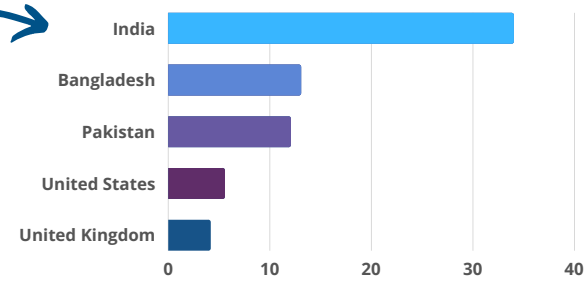



Digital platforms work on a two-sided marketplace model, as a matching intermediary between service providers & service consumers. Their success depends on having a large user base of service providers and consumers.

**Percentage share of online labor supply on cloud based platforms**

South Asia dominates the global supply of labor on digital labor platforms.

Source: ILO (2021). *World Employment and Social Outlook 2021.*




Source: Albrieu, R. (2022). *Technology and the Future of Work (FoW): Artificial Intelligence.* JustJobs Network and Red Sur.

under threat in high-income countries with the proliferation of ICTs in the early 1990s and their impact on firms' offshoring and outsourcing strategies. However, the changes created sometime in the first half of the 2010s by the "platformization" of work relations accelerated this process in the case of digital services and opened up a new market for digitally-intermediated physical services.

The external context of firms is becoming increasingly blurred; it is not easy to detect where the organization ends—with its own rules and hierarchies—and where market transactions begin. Woodcock and Graham explain that "the so-called standard employment relationship is being undermined through fragmented work and increased casualization. Activities that were previously considered to be a formal or standard job can be mediated through platforms to try to bypass rules, standards, and traditions that have protected working standards."[43]

Labor platforms not only blur the traditional employer-employee relationship, but they also alter the distinction between self-employed and employee. This means that labor legislation is likely to face difficulty in providing digital labor platform workers with the social protection they need. The workers' undefined situation generates

much uncertainty about their working conditions, their bargaining power, and social protection in the future.[44] Under these circumstances, it is not clear that platform-mediated jobs will benefit workers.

The emergence of labor platforms has an adverse effect on the effectiveness of public policy.[45] In Detroit capitalism, the advent of the large factory and the spread of long-term jobs allowed governments to implement a wide range of distributive and welfare-enhancing policies. Many of these policies were directly associated with the labor relationship and tasks related to the job, such as the implementation of wage bargaining, the improvement of working conditions, and the setting of minimum wages. Others were more indirectly related and sought to manage risks or possible disturbances to household welfare beyond what happened in the workplace. The new forms of contracting on labor platforms thus similarly eliminate an "entry point" for public policy, which in practice can result in the loss of benefits for workers.

**Platforms are democratizing the labor market**. A contrasting narrative has also emerged, suggesting that the creation and expansion of digital labor platforms has the potential to reduce transaction costs and information asymmetries between the parts involved, which can in turn result in better working conditions for workers. Global value chains are transformed to accommodate this new job method, which has led to a slow but sure "platformization" of firms. New York University professor Arun Sundararajan calls this new organization of work "crowd-based capitalism", in which a new platform-mediated capitalism is highly beneficial to workers because it can eliminate the negative effects of the iron cage while maintaining its benefits.[46]

Entry costs to the platform economy are low. Digital labor platforms allow users, also known as providers, to create an online reputation by managing the projects they work in and the number of hours they can work; this is the main capital needed to participate in the platform economy. Given the flexibility these new types of work can provide workers, digital labor platforms can benefit people who struggle to find jobs in traditional labor markets.[47] These people include women, especially those with children, the disabled, and young people, as well as migrants and refugees who are often discriminated against in developed countries' traditional labor markets. Concurrently, labor on digital platforms can provide a solution to job losses generated by automation and, for those who have not lost their jobs, an additional source of income to supplement household earnings.

## Through the lens of the Global South: Key arguments in current research

**Labor platforms provide opportunities to improve working conditions in large informal sectors of the Global South**. For workers providing physical services through platforms, outsourcing can be more an opportunity than a threat.[48] These countries lack the set of traditional labor institutions that are widespread in high-income countries. Informality in countries such as India or Indonesia is as high as 80 percent according to some estimates.[49] "Non-standard"

forms of employment as defined by the ILO are the standard for employment in many emerging economies. In these countries, platforms can be an opportunity to visibilize these workers thanks to the data recorded about their activities.[50] This visibility, or e-formality, is a first, necessary step to implement policies that would benefit them and improve their working conditions.[51]

Given that informality is the norm and not the exception in developing countries, working on digital labor platforms instead of competing with formal labor like in developed countries can serve as a step upwards from informality. More specifically, considering the large incidence of informality in the Global South, platform work can represent a route to formalization; it can reduce costs and improve monitoring of economic activity through the digitalization of transactions. Thus, labor on digital platforms could serve as an important rung in the formalization ladder. However, it is still not an optimal solution for developing countries for reasons previously explained. Moreover, the degree to which platform work is accessed by those formerly employed in the informal economy is still unclear; for example, research by JustJobs Network in Indonesia found that half of platform workers were formerly employed in the *formal* economy.[52]

**Gaps in digital infrastructure are an obstacle to the diffusion of labor platforms**. The adoption of digital labor platforms remains uneven across the globe, especially considering the digital infrastructure in developing countries, where the internet bandwidth is limited and access to overseas data centers and services is low. According to the ILO, "even developing countries that have a stronghold in IT-enabled and software services, such as India, lag behind in terms of internet bandwidth, connection speed and network readiness."[53] Apart from these challenges, developing countries have inadequate financial infrastructure, human resources and institutional capacities.

**Digital platforms open new markets for virtual services**. Online work platforms are eliminating many geographical barriers previously associated with certain tasks. According to the ILO, "a trend has developed towards outsourcing work, both low-skilled and high-skilled, especially as traditional businesses look to digital labor platforms and digital tools to meet their needs for human resources. These platforms host workers from around the world, enabling businesses to complete their tasks at a faster pace and lower price than if the tasks were performed on site. In many instances, the work is outsourced on these platforms by businesses in the Global North and performed by workers in the Global South."[54]

## Issues in the Global South poorly investigated in current research

**The emergence of platforms for trading high-skilled virtual services represents an opportunity for job-centered development in the Global South**. Although new technologies are transforming agriculture and manufacturing, the employment elasticity of innovations is low in both sectors. The service sectors, on the other hand, have seen structural transformations with three salient features: they are employment-intensive; they allow the modernization of labor

markets; and they are a source of new links with the rest of the world. The telemigration studied by Baldwin is a key example in this regard and is critically supported by the expansion of labor intermediation platforms.[55]

**Local conditions have an impact on the relationship between platforms and job quality**. The Fairwork project objectively assesses working conditions.[56] In FoWiGS, Fairwork assessed four countries in the Global South, adding to others under study in the Initiative. Compared to the United Kingdom, which has a wide range of platforms with a score ranging from eight (very high, e.g., Pedal Me) to zero (e.g., Amazon Flex, Bolt), LAC countries such as Chile and Ecuador have access to platforms with a very low score, the maximum being three. Ghana and Kenya, on the other hand, have platforms with a score of seven, and the former has no company with a score of zero. Among Asian countries, India has the highest score (seven with Flipkart); four platforms are tied with a score of five in Indonesia (GoCar, GoRide, GrbaBike, GrabCar); and Bangladesh is one of the worst performing countries analyzed, where more than half the platforms studied failing to achieve an adequate score.

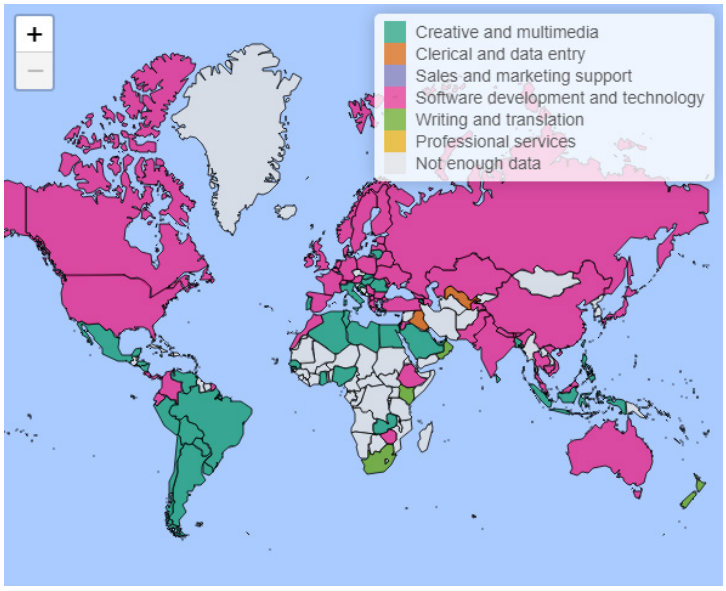
**While there is data on the impact of platform participation on short-term labor income, little is known about the impact on workers' welfare in the medium term**, associated with the full spectrum of shocks to labor income and household welfare. The case studies point to an improvement in compensation for moving out of informal employment and into platform work. However, the outcome may differ significantly when other shocks, including accidents at work or aging, are considered.

## Regional Differences across the South

One of the main sources of information on online work is the Online Labor Index (OLI) created by the Oxford Internet Institute. It tracks all the projects and tasks performed on the five largest English-based platforms, which represent around 70 percent of the total market traffic. **Figure 2** shows the main tasks performed on these platforms. Contrary to the Global North, the Global South has a wide variety of jobs: most of the Latin American and Caribbean and MENA regions focus on creative and multimedia tasks, while Asia focuses on software development and technology. Writing and translation tasks are seen in Africa.

**African countries are the least benefitted by the rise of digital labor platforms.** A large percentage of the continent's population lacks basic internet access and the critical ICT skills to operate on them. According to ICT Africa, based on 2019 data, South Africa is the only country on the continent where over 50 percent of the population uses the internet, and Lesotho and Senegal come in second and third (with 32 and 31 percent, respectively). Larger economies like Nigeria, Ghana and Kenya have lower internet use (30 percent), while Mozambique and Rwanda have the lowest internet penetration (10 and 9 percent, respectively).[57]

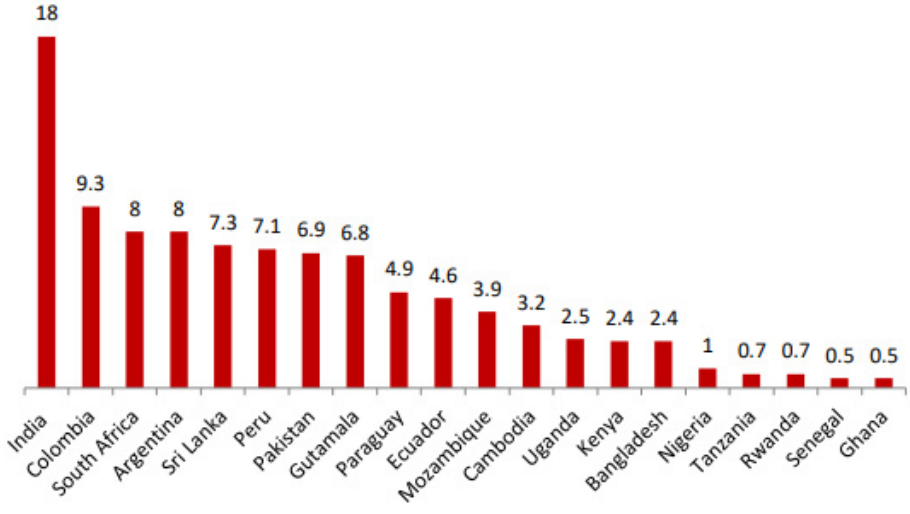
Figure 2




Source: OLI (2022)

Figure 3

## Use of Internet




Source: After Access (2021)

In Sub-Saharan Africa (SSA), Webster and Verachia document a substantial 37 percent growth in the number of digital platforms operating between 2018 and 2019, with South Africa having most (more than 140) and Kenya experiencing the fastest growth rate of 71 percent between 2018 and 2019.[58] Other countries (e.g., Ghana, Nigeria, Uganda, Rwanda, Tanzania, and Zambia) also experienced significant increases in the number of digital platforms. Johnson, Dunn and Van Vuuren report that the gig economy provided income to 4.8 million people across seven African countries in 2018.[59]

Even though Africa has a good advantage given the comparatively lower salaries demanded by the workforce to which developed countries outsource work, African workers are likely to encounter two problems. First, automation could lead to the disappearance of more routine-based tasks, and developed countries would then replace the jobs they originally outsourced and perform them at their locations (onshoring) instead. Second, in this new context of "skills demand," African workers' lower salaries might not be as advantageous as originally believed, given that developed economies would choose to outsource jobs in places where skill levels are higher, e.g. in the MENA and Asia regions.

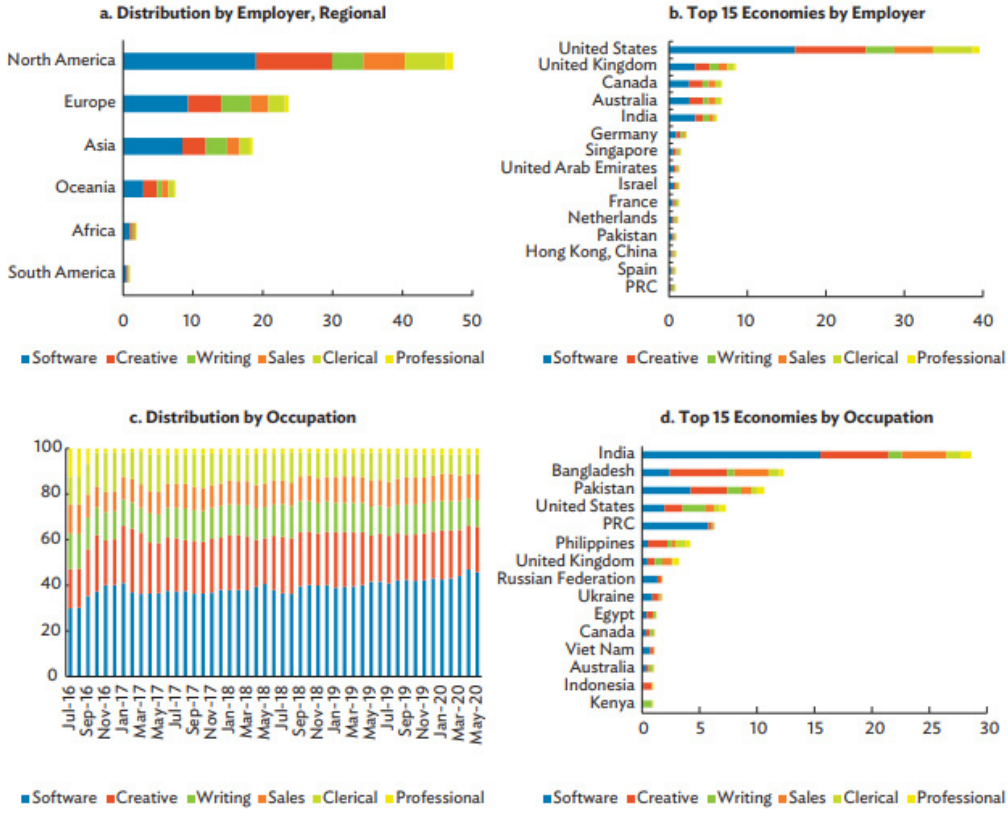
**Work on digital labor platforms in Asia is significant both for the region and globally.** Three Asian countries—India, Bangladesh, and Pakistan—account for 52 percent of the global online workforce. The majority of tasks are related to software and programming, followed by jobs in the creative and multimedia sectors. The distribution of said tasks shows the comparative advantages of each country: software development is larger in countries like India, Pakistan, China, and Vietnam, while workers in Bangladesh, Indonesia and the Philippines perform creative and multimedia tasks.[60] **Figure 4** depicts this in greater detail.

The growth of the gig economy in the region has led to an increase in total workforce participation as well as improvement in productivity and income. However, access to the internet remains a pivotal issue in some parts of the region.

**The MENA region has seen a dramatic increase in digital platforms, focusing on taxi services, delivery, and freelance work, but concentrated in a few countries with limited innovation.** The region's share of global platforms is at seven percent, a figure proportionate to its share of the global population.[61] However, most of these platforms are based in only three countries: the United Arab Emirates, Israel, and Egypt. Furthermore, most platforms are regional versions of global ones; little innovation is taking place within the region itself.

Digital platforms present an enticing opportunity for workers in the MENA region.[62] First, the region has a large unemployed, educated youth population who are comfortable using technology. Second, it is home to a large population of refugees, who could potentially find work through digital platforms. Finally, online platforms also offer opportunities to women who may be unable to find suitable alternatives offline. However, the promise of digital platforms does not correspond with the reality of the situation:

Figure 4




Source: Asian Development Bank (2021)

the main reason educated youth engage on such platforms is not the pull of opportunities online, but because they lack employment opportunities offline. For many, online platforms present the only viable option of employment.

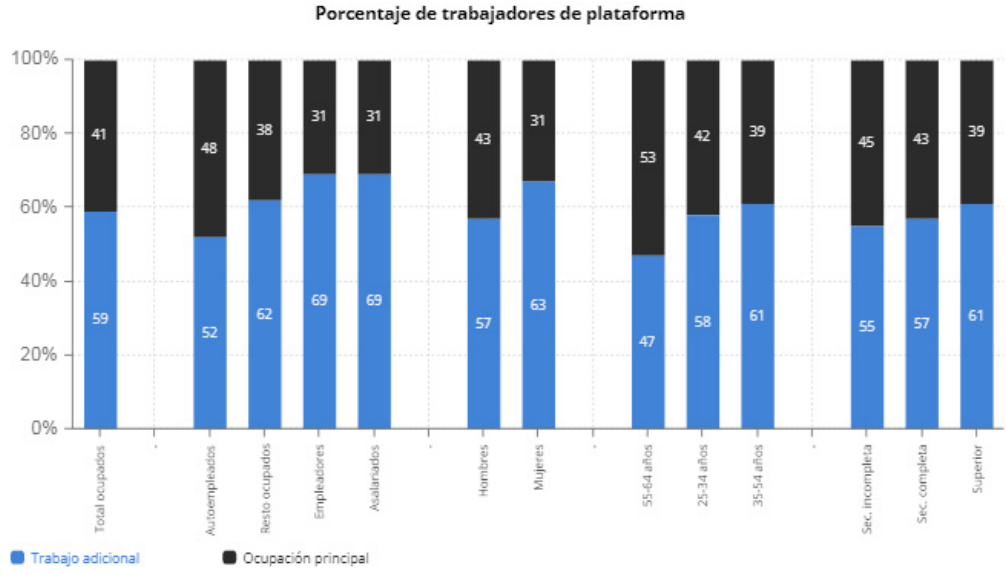
The workforce in MENA countries is better educated in STEM skills. This enables the population to not only use digital labor platforms as customers, but also create and develop them, indicating the many avenues for employment they enjoy. Being in possession of this larger set of skills represents an advantage over other regions, especially considering the fact that developed countries that outsource part of their workforce prefer to employ higher-skilled workers to perform the most qualified tasks.

**In Latin America and the Caribbean, digital labor platforms are less developed than**

**in North America, Europe and even Asia.** However, a good number of these platforms have a presence in the region (e.g., Uber, Cornershop, Glovo, among others).[63] According to the 2019 CAF's survey, around 16 percent of the region's workforce can be categorized as digital labor platform workers, whether potentially or actively (they represent 6.7 and 9.4 percent, respectively). In terms of how they perceive themselves, 60 percent of these workers are self-employed, 27 percent are wage earners, 10 percent are employers, and the remaining 3 percent are family and domestic service workers.[64]

As **Figure 5** shows, 41 percent of LAC's workers employed in digital labor platforms list this activity as their main income source, while the percentage is higher for the self-employed. This type of work is also more common among men, less educated workers and younger individuals.[65] These numbers, however, might have increased after the COVID-19 pandemic and the growing need for businesses to keep working in remote and socially distanced contexts.

Figure 5




Source: CAF (2021)

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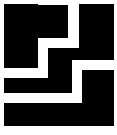

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