

The future of work in the digital economy

Paper prepared for the Employment Working Group under the 2020 Russian presidency of the BRICS

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Abstract

This background paper provides an overview of the opportunities that some transformative technologies present for improving access to labour markets and ensuring decent work. It considers the manner in which new technologies can improve the effectiveness of labour market intermediation services, the role that digital platforms play in facilitating participation in labour markets, and the opportunities these technologies hold for reinforcing efforts of labour administrations to ensure strategic compliance with labour regulations. It further includes consideration of the opportunities that lie ahead to mitigate some of the effects of the COVID-19 pandemic on employment and incomes, and ensuring decent work. The paper concludes with policy options to leverage the opportunities presented by transformative technologies.

Introduction

New forces are transforming the world of work. Alongside demographic and climate change, technological advancements are amongst the most transformative drivers. New digital technologies provide windows of opportunity for emerging economies to catch up in diversification, productivity and complexity, and to leapfrog into advanced technologies and industries. For example, countries with less capacity and fewer resources to expand employment services and to upgrade labour inspection systems may take advantage of digitalization to enhance their systems and services.

Leapfrogging through digitalization, however, requires significant investment in technology, including infrastructure and access, closing the digital divide, and putting in place measures that ensure that vulnerable groups are not left behind. All five BRICS countries have experienced significant growth in internet connections and in the use of internet-enabled devices. Together with growing social media usage, this provides a chance to diversify channels of service delivery even in countries that have low internet penetration.

In addition, technological advancement has given rise to new business models, such as digital labour platforms. While diverse forms of employment offered on these platforms have the potential to provide decent work when appropriately regulated, they are often associated with increased instability and unpredictability in the career paths of workers. The adverse effects of these diverse forms of employment on the size and regularity of earnings throughout one's working life points to the need to address vulnerabilities and inequalities in the labour market through a comprehensive employment policy framework.

The digitalization of employment services improves transparency and reduces friction in the labour market. Leveraging transformative technology can reinforce the efforts of labour inspectorates to ensure compliance with labour regulations; can mitigate the risk of labour inspectorates being outpaced by developments in

the ever-changing world of work; and can enhance inspectorates' abilities to detect, prevent, and remediate decent work deficits. Ultimately, digital technologies have the potential to promote economic growth and boost labour demand.

This background paper provides an overview of the opportunities that some transformative technologies present for improving access to employment and ensuring decent work. It considers the manner in which new technologies can improve the effectiveness of labour market intermediation services (chapter 1), the role that digital platforms play in facilitating labour market participation (chapter 2), and the opportunities these technologies hold for reinforcing efforts of labour administrations to ensure strategic compliance with labour regulations (chapter 3). It further includes consideration of the opportunities that lie ahead to mitigate some of the effects of the COVID-19 pandemic on employment and incomes, and ensuring decent work. The paper concludes with policy options to leverage the opportunities presented by transformative technologies.

I. The impact of digital technology, robotics and AI on labour markets

1. Implications for structural transformation and inclusive development in emerging economies

This section discusses the potential benefits for emerging countries as well as possible negative impacts of the rapid spread of digital technologies for emerging countries.

Opportunities for diversification, structural transformation and leapfrogging

New technologies provide windows of opportunity for emerging economies to catch up in diversification, productivity, and complexity, and to leapfrog into advanced technologies and industries. We know from previous waves of technological change¹ that some, but not all, developing countries could take advantage of such opportunities. ILO research shows that these will be countries that have developed a significant level of social capabilities to innovate (c.f. Nübler, 2014). Such capabilities are embodied in a diverse and sophisticated set of knowledge and skills, as well as in mind-sets, attitudes and institutions that support creativity, openness to change, risk taking, inclusiveness and fairness. In other words, history shows us that economic and technological leapfrogging was preceded by societal learning to build innovation capabilities.

Recently, a number of Asian countries (e.g. China, Malaysia and Thailand) were able to rapidly automate manufacturing by diversifying into robot-intensive tasks and industries, in particular in automotive, electronics, and chemicals and plastics. This innovation led to both economic growth and employment creation. One of the most striking characteristics of R&D in artificial intelligence (AI) is the rapid growth over the past five years. The impressive numbers of patent filings in this period indicate the growing application of AI technologies in commercial products and services. Patent data on AI reveals the huge potential for developing countries to use R&D in AI to learn, build up innovation capabilities and to exploit this knowledge commercially. China follows such a strategy. It filed half of the global AI patents in the field of robotics, and they were largely filed by public universities (Ernst, Merola and Samaan, 2018).

The COVID-19 crisis hit the innovation landscape at a time when innovation was flourishing. Before the pandemic, global intellectual property as well as patent

¹¹ Examples are Germany during the 1850-70s, South Korea during the 1960-80; or China 1980-2000s.

filing activity grew at a rapid pace, setting new records in 2018 and 2019 (Cornell University, INSEAD, and WIPO, 2020). Venture capital was at an all-time high but money to fund innovative ventures is now drying up. While the impacts of the pandemic on the science and innovation systems will take time to unfold, there are positive signs of increased international collaboration in science.

Potential negative impacts for emerging countries

Advanced technologies will also provide challenges to emerging economies. The increasing use of AI and automation in manufacturing – a sector that has acted as the engine of economic and employment growth in the classical pathway of structural transformation – may limit the developmental impact of new technologies if productivity growth is not accompanied by employment growth at a sufficiently high level to absorb those looking for work. In many emerging economies, premature deindustrialization has already started to raise concerns about the impact of advanced technologies (Rodrik, 2016; Dasgupta and Singh, 2006).

Another challenge is that the increased use of robots and AI in advanced economies may reduce the relative cost of production in emerging economies, decreasing the comparative advantage of low-cost labour in those countries and also facilitating reshoring. For example, Dachs, Kinkel and Jager (2017) analyse data from over 2,000 German, Austrian and Swiss firms and conclude that the adoption of new digital technologies is associated with greater propensity to reshore. Although they stress that reshoring remains a rare phenomenon, a recent ILO study (2020a) concludes that the increased use of robotics and other automation technologies in developed countries is indeed associated with reshoring.

A general concern of digital technologies is data privacy. Data privacy norms and regulations will be needed to ensure proper handling of personal data – if data can be legally collected and stored; whether or how data can be shared with third parties; and what constitutes meaningful consent in the collection and use of

personal data. At the international level, the Private Employment Agencies Convention, 1996 (No. 181) establishes in Article 6 that the “processing of personal data of workers by private employment agencies shall be: (a) done in a manner that protects this data and ensures respect for workers’ privacy in accordance with national law and practice; and (b) limited to matters related to the qualifications and professional experience of the workers concerned and any other directly relevant information.” Also in 1996, the ILO developed a Code of Practice concerning the protection of workers’ personal data at a Meeting of Experts on Workers’ Privacy (ILO, 1997). Regulation at the EU level, particularly the General Data Protection Regulation (GDPR) is more far-reaching, as it constrains fully automated decision-making by allowing the affected party to object to how their data are used, to be informed about the use and to demand a human interface (Hendrickx, 2019). Moreover, it monitors cross-border flows of personal data and imposes restrictions when a receiving country does not have a secure data protection framework. There are already examples from the EU of how workers are asserting their data rights as a result of the GDPR². The challenge is to ensure the application of this and other data privacy regulations in the world of work and to extend these protections to all workers across the globe (Berg, 2019).

2. Implications for employment policies

Advances in digital technologies can generate new jobs, increase the productivity of firms and workers and enhance the ability of governments to implement policies. Such benefits will not, however, be automatic and more coherent demand- and supply- side interventions will be required to reap the benefits. This includes a thorough review of tax systems and public expenditure to ensure that

² For example, Uber drivers in London sued to get access to their data under the General Data Protection Regulation (The Economist, 2019).

there is sufficient funding to support innovation, productive employment, adequate social protection and access to lifelong learning.

Digital technologies will lead to the loss and/or transformation of jobs and is likely to have an impact on inequality among different groups of workers. Low-qualified and low-skilled young people, for example, face a greater risk of being displaced by advanced technologies than those with higher qualifications and skills. At the same time, in light of inefficiencies in job-matching mechanisms and discrepancies between jobseekers' skills and those required by employers, many overqualified young people are pushed into occupations typically performed by those with lower levels of education. This places low-skilled young people as well as older workers in need of up- and re-skilling in a particularly vulnerable situation because they face both upward pressure (the risk of automation) and downward pressure (displacement by more highly qualified people) (c.f. ILO, 2020b; Sakamoto and Sung, 2018).

3. Implications for skills policies

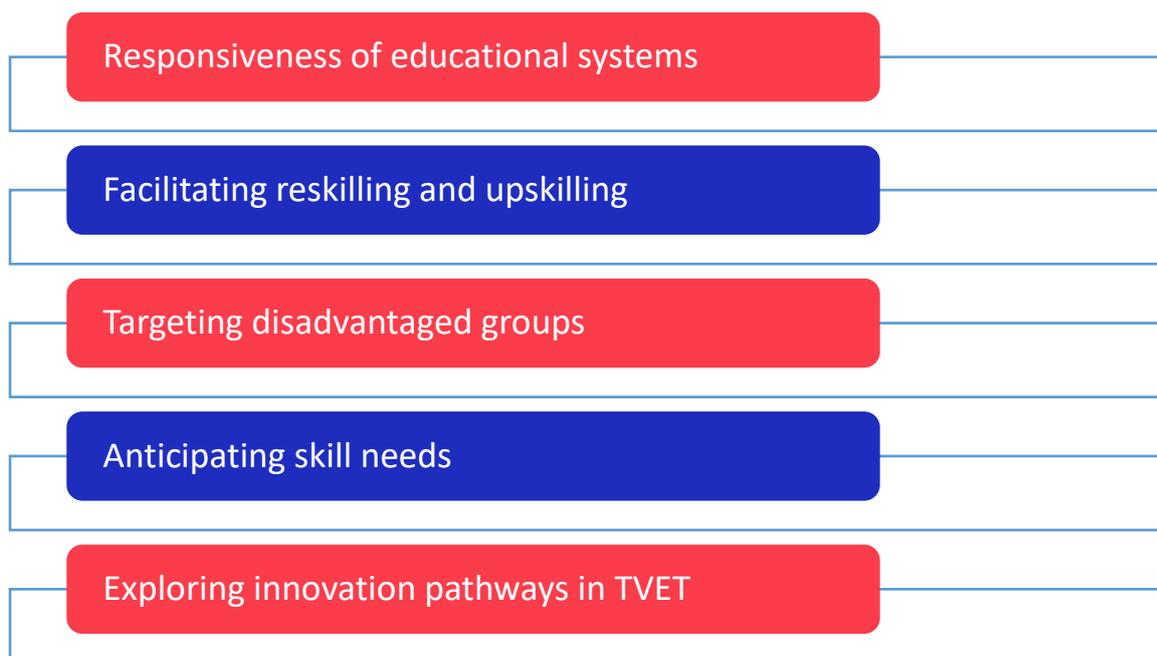
The challenges outlined in the previous sections and, in particular, the increasing number of job-to-job transitions, suggest several implications for skills policies (Figure 1).

Better **responsiveness of educational systems** will enable a swift adaptation to the fast evolving demand for skills and hence prevent both skills shortages and mismatches. Current curricula are not aligned with the technical skills demanded on the labour market. Workers need to acquire new technical skills (including STEM) as well as a mix of transferable digital (e.g. big data analytics, cyber security, social media) and non-technical soft skills, to improve employability across economic sectors and occupations.

Active labour market policies and other measures to support inclusive lifelong learning and flexible learning pathways are needed to facilitate constant **up- and reskilling**. Skills development should in particular target women, rural workers

and older workers. Digitalisation is also affecting the delivery and assessment of learning, with perhaps the most significant impact occurring in the area of skills recognition and certification.

Figure 1. Implications for skills policies



As **anticipating skill needs** is increasingly important, identifying needs for a fast moving target is a challenge. Digital technologies can be harnessed to understand skills demand and supply and to assess the impact of digitalisation on skills demand. New solutions that include big data analytics should be explored and mainstreamed.

The digitisation of TVET necessitates multiple and well-coordinated policies and actions at all levels of government. Such policy coherence at national level is often missing. Much innovation in digital TVET is driven by individual education and training institutions, whereas the innovations occurring in the labour market follow **innovation pathways** that are neither captured nor reflected in TVET curricula or TVET institutions' operations. (c.f. ILO and UNESCO, 2020).

II. Leveraging transformative technologies for decent work

This section discusses the opportunities that some of the transformative technologies present for improving access to labour markets and ensuring decent work.

1. Labour market intermediation

The outbreak of the COVID-19 health emergency and socio-economic crisis has put a severe strain on public employment services as they have endeavoured to maintain services amid containment measures while at the same time support workers and enterprises affected by the pandemic to maintain and find jobs and workers, respectively. The relevance of technology-based services in responding to the effects of changes in the labour market has thus been amplified.

Public employment services (PES) and other labour market intermediaries face a fast changing labour market with changing and increasing demand for value-added services and new ways of clients' interaction with government and other service providers. To remain relevant, employment agencies must adapt their organization and service delivery methods. They must design and deliver services that are client centred and respond to their particular needs and customise delivery channels to different groups of labour market participants. Many public employment services have adopted technology in the delivery of services – a digital first policy has generally taken root in advanced countries with some variations while emerging economies and developing countries are taking advantage of the fast penetration of mobile devices to design innovative services, expand service provision and diversify delivery channels.

Technology is also changing the landscape for job-search methods used by jobseekers and employers. Internet based job-search methods are becoming

more prominent with implications on the relevance or effectiveness of traditional (public) employment services. The BRICS countries have on the whole been responsive to changes in the labour market and have adopted technology in the design and delivery of their services. Nonetheless, significant variations exist in terms of the extent to which services have been technology enabled, geographical and functional coverage.

The impact of digitalization on employment services³

Public employment services can use digital technologies to increase their **efficiency, effectiveness and coverage**. Specifically, they can better diagnose the needs – in particular of groups with specific needs, such as young people, people from ethnic minorities, people with disabilities, migrant workers – and improve targeting and profiling by using biometric and spatial data together with real-time labour market information. Furthermore, they can improve job matching and counselling by complementing face-to-face interviews with online interactions. In addition, they can use new technologies to improve programme monitoring and coordination with other service providers. This should help tackle both employment and labour market participation barriers in an integrated manner. The relatively low cost of ICT-based labour market intermediation implies that developing countries can extend employment services to a far greater number of people than in the past. Increased automation of back-office tasks increases time for more personalised services to clients. This does, however, require progress to be made on increasing the rate of Internet penetration and digital literacy. In recent years, all BRICS countries have launched online job portals.

Digitalization of employment services enables **exploitation of “big data”** with the potential to improve job matching and tailoring of employment services to individual needs, as well as providing more accurate analysis of the labour

³ This section draws extensively on ILO, 2020b.

market at the national and regional level. In many advanced economies, public employment services have set up, or are setting up, systems for collecting big data, especially by linking databases on jobseekers and registered vacancies, and gathering data on job matching, unemployment insurance, training, wages, benefits and compensation for industrial accidents and occupational diseases. In emerging and developing countries, digitalization can help provide information for labour market signalling, given the lack of up-to-date and time series data.

Although **skill development** is generally the responsibility of educational institutions, the role of employment services in promoting employability has become more prominent in recent years. PES offer their own skill development and training programmes. In recent years, PES have increasingly been using off-the-shelf online learning platforms, such as Google for Education, along with massive online open courses and webinars, to train jobseekers. During the COVID-19 pandemic, the use of online training services has been increased across almost all countries.

Online job matching systems allow employers to post vacancies, review CVs and connect directly with jobseekers. Many PES are setting up dedicated websites to **provide employers with advice and information**. Digitalization also **facilitates partnerships** between public employment services and private and third-sector providers of such services.

Role of Digitalization during COVID-19 emergency and crisis

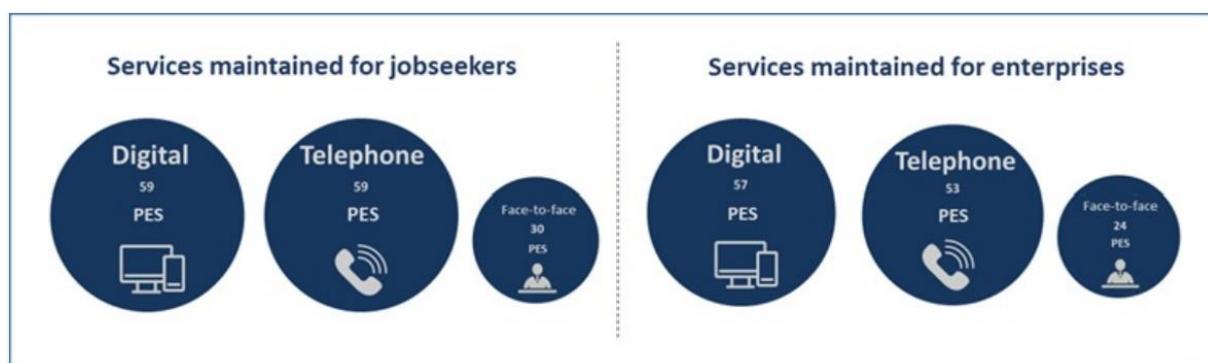
During the COVID-19 pandemic, countries imposed strict containment measures, including lockdowns or lesser restrictions on movement and non-essential economic and social activities. PES were faced with a double challenge of protecting their own staff and their clients, which meant closing frontline offices, reducing staff on site, instituting working from home, etc. On the other hand, PES were faced with soaring demand for their services, particularly in countries where they are responsible for the administration of unemployment benefits and of support for enterprises in economic distress. PES also needed to support

jobseekers who lost their jobs relocate to other sectors that were recruiting, particularly in essential sectors.

Digital technologies became an essential tool in ensuring service continuity and adaptation, scaling up capacity in critical services, including through partnerships, as well as instituting crisis management plans. One clear finding is that PES that had invested in technology for service delivery before the crisis, and those with a clear digital transformation strategy, were better prepared to respond rapidly to COVID-19 challenges.

The overwhelming majority of PES moved their services online. This also holds true for some BRICS countries. India, for instance, had “work from home” jobs posted on a dedicated webpage and extended the use of online job fairs, while South Africa encouraged jobseekers and employers to use the ESSA system.

Figure 2. PES service delivery for jobseekers and enterprises during the COVID-19 crisis by category



Note: 79 PES were surveyed, generating 66 valid responses.

Source: ILO et al., 2020; published in ILO, 2020c.

As shown in Figure 2, most of the PES surveyed by the ILO⁴ indicated maintaining services online or through telephone services for jobseekers (75%) and enterprises (72% and 67% respectively). Only few PES (38% and 30% respectively)

⁴ In April 2020, the ILO implemented a global survey of PES responses to COVID-19 in collaboration with the World Association of Public Employment Services (WAPES), the European Commission, the Inter-American Development Bank and Socioux+.

continued offering face-to-face services, many of them by appointment only. Developing countries were more likely to use face to face or telephone services compared to developed countries.

Digital services were also instrumental for the provision of information and training that took place through live video and other online communication tools supporting free calls and chats. In China, for instance, PES facilitated remote interaction between counsellors and clients via “WeChat Official Accounts”.

Finally, technology has been used to facilitate the recruitment of workers in critical sectors through web-based matching systems, telephone and call centres, online chat conversations or video conferences, etc. In industrialised countries, dedicated web portals were developed to match retrenched workers and employers with vacancies. Specific sites were also created to assist employers in maintaining their employees and/or find workers. Examples include several states in the US, Australia’s Jobs Hub and Luxembourg’s JobSwitch.

Digitalization and employment services in the BRICS⁵

In the last decade, **Brazil** invested in increasing the government's use of web-based technologies and applications for service provision across a vast and complex territory. Public policies associated with digital services include the provision of job-search support, labour intermediation services and the overall modernization of the PES system. The main public provider of labour market services in Brazil is the National Employment System, SINE, (Sistema Nacional de Emprego), which is currently undergoing a reform driven by a more citizen-driven approach and the utilisation of technology and low-cost communication tools for clients and caseworkers. SINE is using digital services to decentralize service

⁵ Further details on the digitalisation in BRICS countries can be found in ILO’s BRICS country briefs on the future of work, prepared for the Brazilian BRICS presidency in 2019: <https://www.ilo.org/global/about-the-ilo/how-the-ilo-works/multilateral-system/brics/2019/lang--en/index.htm>

provision and customize delivery to client's needs, including in regions where face-to-face services are unavailable.

The public employment service of the **Russian Federation** (Rostrud) has accelerated the adoption of technology in the design and delivery of services ranging from labour inspection, employment contracts, promotion of labour mobility across regions as well as intermediation services. "Work in Russia"⁶ is a comprehensive online service covering the various functions that the Federal Service is responsible for, including internal labour migration, labour inspection, labour relations, unemployment protection and labour intermediation through provision of high quality information. Several services are offered on the website, including databases for jobseekers and vacancies, matching, employment of people with disabilities, internships and work practice among others. Moreover, Rostrud runs an open data system for the public to access its analytics portal and database ranging from vacancies and job seeker data, to regional information and user feedback⁷.

In 2015, the Indian government established the National Career Service (NCS), a one-stop solution that provides a wide array of employment and career related services to jobseekers, students, employers, placement agencies, career centres, training institutions, counsellors and local service providers. The digital centralised NCS portal provides a wide range of online services including job search, job matching, rich career content, career counselling, and information on Job Fairs. Through partnerships with both public and private service providers, enhanced functionalities have been added to the portfolio of service, such as the possibility to create Video Profiles, and scanning, saving and accessing authentic documents without paperwork and free of charge (DigiLocker).

China embarked on a comprehensive overhaul of its employment services system following the issuance of the "Guiding Opinions on Promoting All-round

⁶ <https://trudvsem.ru>

⁷ See <https://trudvsem.ru/opendata>.

Public Employment Services” in 2018 which among other things promote equal access to quality services in urban and rural areas and by all groups of labour market participants and enterprises, and improve service delivery and coordination. Technology enabled the creation of an integrated system of employment services, which comprises an information system offering online and mobile services delivered through various channels and devices⁸ as well as physical face-to-face services. Advanced technologies such as facial recognition systems, quick response (QR) codes as well as data collection and analysis software have been developed and are used to complement traditional channels, such as job fairs.

South Africa’s Employment Service South Africa (ESSA) was upgraded in 2012 and an internet based electronic system launched. Services provided by ESSA include online registration of jobseekers’ skills and experience, of vacancies and of learning opportunities, such as internships and apprenticeships. The ESSA system is able to match suitable candidates to opportunities reported by employers and is accessible online.

Developments in the job search channels - the role of internet and PES

While digitalization has created opportunities for public employment services and other traditional service providers to improve the efficiency and effectiveness of service delivery, the resulting significant reduction in job-search costs brought about by internet-based search methods and the emergence of job boards and platforms have led to fears that the traditional employment service providers would be pushed out of the market.

The Boston Consulting Group and Recruit Work Institute has been conducting job search surveys in 13 countries including the BRICS since 2015. In the latest

⁸ Such as kiosks in employment centres and Ministry of Human Resources and Social Security offices, telephone, computers, tablets, wearable devices, cable TV, call centres, email, and SMS among others.

survey available for 2017⁹ respondents were asked to identify the single most effective job search method that helped them find a job. Internet job sites ranked top at 36 per cent followed by referrals (16%) and paper-based methods and social networking sites at 10 per cent each. In the BRICS countries, the trend is similar to the global level, but with somewhat lower rates for the internet job sites and somewhat higher rates for referrals. There are however interesting variations among the countries. Russia has the largest share of people choosing internet job sites as the most effective channels among all countries surveyed at 53 per cent. It is also the country where social network sites are least used as a means of job search (3%) second only to Japan (2%). India has a more balanced distribution with the highest use of paper-based search channel (23%) and a relatively high usage of social media networks (13%). Only one per cent of the respondents thought that PES was an effective channel, but a relatively significant share used private employment agencies (6%). China stands out with the highest approval rates for social media networks at 21 per cent and a relatively smaller use of commercial internet job sites (15%) but relatively high share compared to the countries surveyed of private and public employment agencies at 10 and 6 per cent respectively. South Africa's use of informal channels is the highest among all surveyed countries (27%) while internet job sites come second to Russia at 33 per cent. Like in India, PES is the least effective channel. Brazil's PES is ranked second highest among the BRICS and social media is only second to China at 15 per cent.

However, as the discussion in the previous section showed, PES that have embraced digital technologies as a tool for service delivery are better placed to serve different labour market groups with a more personalised approach.

⁹ USA, Japan, Germany, UK, France, Italy, Canada, Australia, Brazil, Russia, India, China and South Africa with a total sample of 13,000 respondents.

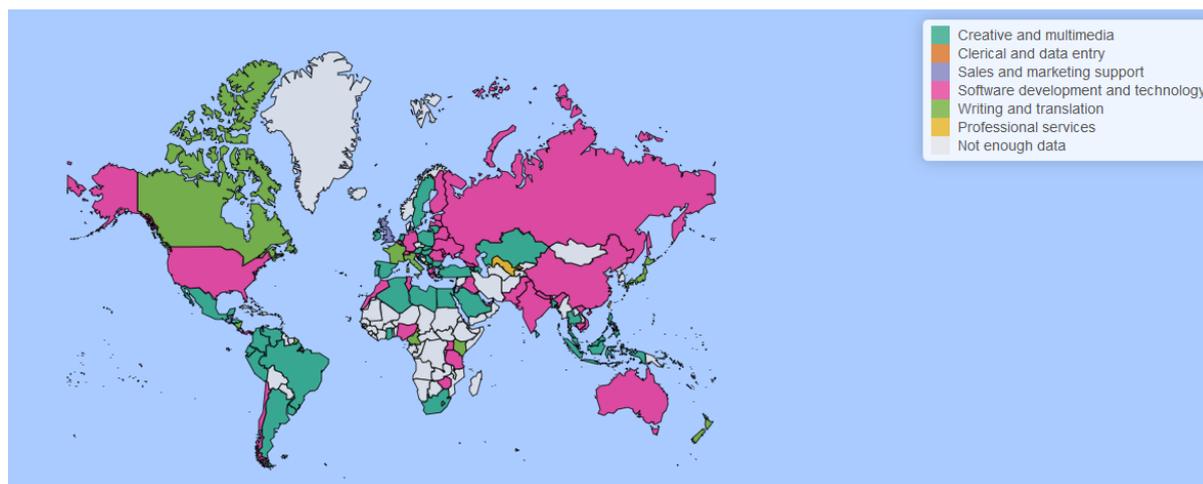
2. The role of digital platforms in facilitating labour market participation

One of the most prominent transformations in the world of work during the past decade is the emergence of digital labour platforms. These platforms comprise an array of different work modalities that have the common feature of having work mediated through a digital platform, either through a website or app. There are on-location platform apps that provide local services such as taxi driving or home repairs, and web-based platforms, allowing workers located in a country different from the client or platform to provide a range of services. Depending on the platform these services can be “micro-tasks”, where workers perform short tasks such as data annotation, data entry, or audio transcription, or “freelancing” platforms. On freelancing platforms, individual workers offer their services as programmers, graphic designers, statisticians, translators, and other professional services. Some freelancing platforms specialize in specific professional domains, match the services of freelancers and clients for a set fee that is usually levied on the workers. Many of these platforms are designed so that workers set up individual profiles, indicate their expertise and their rate, with the final price for their work set via a bargaining process with the clients. On other platforms, the client sets the fee and remuneration of the task.

Digital labour platforms are widespread in all of the BRICs countries (Kässi and Lehdonvirta, 2018). According to data from the Oxford Internet Institute’s Online Labour Index, which tracks work and workers on the five largest English-language online labour platforms, India is home to the highest number of crowdworkers (24%), whereas Russians are the 8th most dominant workers on these five platforms. Within the BRICS, workers from Brazil and South Africa specialize in creative and multimedia work, whereas workers from China, India and the Russian Federation specialize in software development and technology (Figure 3). In addition, there is a strong presence of local and regional platforms within the BRICS. For example, several dozen Russian platforms, link Russian-speaking clients and freelancers across the post-Soviet space. By 2019, at least

one of such platforms counted over 3 million active users, and at least two counted over 1 million users¹⁰. About 70 per cent of online workers of these platforms come from Russia. (Aleksynska, 2020).

Figure 3. Top occupations by country of origin



Source: Online Labour Index

As digital labour platforms can seamlessly connect workers with businesses to perform work, whether locally or across the globe, they can be considered a new form of private labour intermediation, bypassing what was once the domain of private employment agencies. Yet unlike private employment agencies, digital labour platforms are not regulated. For example, most freelancing platforms are set up so that the worker pays to work, with fees typically set on a sliding scale from 20 to 5 per cent depending on the remuneration for the project and the worker's experience on the platform.¹¹ Many platforms also sell "memberships" to workers, who for a set monthly fee, gain greater visibility on the platform and more opportunities to contact potential clients. A recent ILO survey found that 85 per cent had paid a commission to the platform on which they work (Aleksynska, Bastrakova and Kharchenko, 2018). These practices are against the

¹⁰ www.advego.ru: 3.250k; www.etxt.ru: 1.000k, www.fl.ru: +1.600k (September 2019).

¹¹ See for example the case of Upwork. Stephane Kasriel, *Upwork's New Pricing: A Message from the CEO*, Upwork (May 3, 2016), <https://www.upwork.com/blog/2016/05/upwork-pricing/>.

longstanding principle of “free-of-charge” established in international labour standards.¹²

Digital labour platforms provide important income and employment opportunities for a growing number of workers. They enable workers who would normally be excluded from the labour market on account of disability, care responsibilities or illness, to participate. However, concerns remain about the conditions of work. An international regulatory framework could ensure fair conditions on digital labour platforms, avoid the risk of creating a competitive disadvantage on national level, and hence harness their potential for decent work.

3. Transformative technologies for strategic compliance

Labour inspectorates ensure compliance with labour rights and the promotion of safe and healthy working environments. Working with employers, workers and their representative organizations, labour inspectorates secure enforcement of national laws, guide employers and workers on how to improve the application of national law in such areas as working time, wages, occupational safety and health, and social security, and bring to the notice of national authorities gaps and defects in national law. Changes in the world of work such as the growth of diverse forms of employment and the introduction of new technologies, have led to the development of new business models and new work-related hazards, which have outpaced the evolution of the legal authority and enforcement tools available to the labour inspectorate (ILO, 2017a). Leveraging transformative technology can reinforce the efforts of labour inspectorates to ensure compliance with labour regulations; can mitigate the risk of labour inspectorates

¹² The ILO’s Private Employment Agencies Convention, 1997 (No. 181) and the Private Employment Agencies Recommendation (No. 188) regulates the practices of private employment agencies.

being outpaced by developments in the ever-changing world of work; and can enhance inspectorate abilities to detect, prevent, and remediate decent work deficits.

Use of technology in labour inspection

Labour inspectorates around the globe recognize the merits of technology. A 2015 survey by the ILO showed that 92 per cent consider that the sensible adoption of information and communication technologies (ICT) can improve efficiency and effectiveness. Based on their experiences, about half of the respondents reported improvements in knowledge sharing within institutions (55%), improvements in knowledge sharing between institutions (49%), significant improvement in the quality of performance management through the automated reporting of results against set objectives and goals (49%), and an increase in overall productivity of government officials (50%). Further, 73 per cent deemed as very important the use of ICT to meet the increasing demands for public services. Their experiences showed that 85 per cent observed an improvement in access to labour law, 59 per cent reported a significant increase in their reach to the public, and 60 per cent reported improvement in transparency and accountability (Galazka, 2015).

Despite the acknowledged benefits of technology, global adoption rates by labour inspectorates remain low. Labour inspectorates continue to face several challenges in the uptake of technology. The 2015 survey showed that in the area of OSH data collection, only 37 per cent of respondents use technology for recording workplace accidents and 21 per cent for recording occupational diseases. In the area of digitalizing and computerizing administrative and transactional procedures for efficiency gains, the survey showed that only few use technology for calculating wages and working hours (17%), recording complaints about labour law violations (46%), issuing warnings and tickets to establishments (28%), managing follow-up actions (39%), tracing labour cases (23%), documenting visit check lists (33%), and for registering inspection visits (44%) (Galazka, 2015).

There are several merits to increasing the uptake of technology to enhance labour inspectorate capacity. Taking steps towards digitizing and automating administrative procedures can help guarantee due process, better use of existing inspection data, enhancing engagement with employers and workers on how to improve the application of national laws and regulations.

In 2015, the **Russian Federation** approved the launch of an online inspection system for the Federal Service for Labour and Employment (Rostrud). Through the system, workers can make and track progress on online complaints and employers can conduct self-tests of compliance via checklists available on the system. The system also enables workers and employers to contribute to discussions, proposals, and initiatives for improving labour law. Additionally, the system functions as an information portal where users have access to public information on detected violations of labour law and to a database of questions and answers on compliance with existing regulations. The system automates interactions between workers and employers and enables the federal labour inspectorate to improve oversight and coordination amongst different units.¹³

Similarly in **South Africa**, online services and portals of the Department of Employment and Labour provide guidance to workers and employers and digitize filing and reporting requirements. These include the *Online Employment Equity Reporting system*, the *National Minimum Wage portal*, and *uFiling* which is an online system through which employers can register, declare and pay unemployment contributions and workers can apply for benefits (South Africa Department of Employment and Labour, n.d.).

Leveraging transformative technology for labour inspection

Streamlining and digitalization of record-keeping and administrative procedures can be seen as the first step towards the use of predictive analytics to target likely

¹³ Russian Federation. Federal Service for Labor and Employment. 6 June 2016. Order No. 246 on approval of the Regulation on the Electronic Services System.

noncompliant or high-risk enterprises. For now, the use of collaborative, inter-agency data collection and data analytics helps labour inspectorates identify high-risk sectors and enterprises.

China's Twin Networks Management System (TNMS) is an integrated management system to monitor, consolidate and track data collected by the country's labour inspection personnel. The data is sourced by collecting information on establishments on eight metrics and supplemented with data from other departments, such as social security, employment, vocational training, statistics and registration of establishments. The system then automatically classifies companies based on infringement history, potential non-compliance risks and credibility criteria and appoints an inspector for the processing and resolution of specific complaints. It additionally divides establishments into three categories, indicating how many compliance visits are required for a specific company. The integration and analysis of data in this way allows inspectorates to map trends of non-compliance and define areas or sectors of risk in which proactive inspections or specific campaigns are appropriate (ILO, 2017b).

In **Brazil**, the Secretariat of Labour Inspection uses an Integrated System of the Federal Inspection of Work (SFIT) for compiling and cross-referencing inspection data to streamline and better inform future inspection decisions. This includes data on companies or economic activities to be inspected, objectives for inspections, monitoring data on on-going inspections, data from inspection reports, and information on how the inspection work is divided amongst inspectors. The data is also cross-referenced with information from other systems.

In **India**, an information platform called Shram Suvidha has been designed as a single point of contact between employers, workers, and enforcement agencies. The system also automatically classifies inspections into emergency, option, and compliance-based inspections using available data (ILO, 2017b).

SmartLab in **Brazil** is a digital online platform for data analytics and visualization created by the Labour Prosecutors Office on five thematic labour areas, which include the detection of human trafficking and child labour. Using de-identified records of unemployment insurance payments to victims of slave labour and records of successful labour inspections, SmartLab set up a Slave Labour Digital Observatory which presents maps with geo-referenced data on prevalence and incidence to reveal the geographical distribution, hotspots, migratory routes, and demand and supply curves of contemporary slavery in Brazil. The datasets are available publicly and have been cross-referenced with other databases to improve reliability and enable triangulation of data. Spain's anti-fraud tool as well as Chile's non-compliance detection tool are further examples for applying predictive analytics for labour and business inspections.

As demonstrated by the examples above, while labour inspectorates have predominantly focused on procedural digitalization, in recent years, a handful of labour inspectorates have also experimented with transformative technology to enhance compliance outcomes in such areas as working time, wages, occupational safety and health and social security.

For example, **Brazil** launched an e-Social platform designed to merge information, such as tax, labour and social security obligations of employers in real time and employed drones to better visualize regions that are difficult to access, such as haciendas or farms. Moreover, an electronic registry (*Ponto*) was formed, which records and stores the time of entry and exit of workers. This registry facilitates labour inspection since it provides information on the compliance with working time and overtime regulation. (ILO, 2017b).

To secure wage protection and facilitate the digitalization and transparency of record keeping, the Australian Fair Work Ombudsman (FWO) has launched a mobile application known as *Record My Hours*. The application uses geo-fencing to record worker hours based on when they enter their worksite, preventing employers from tampering with hours worked and providing workers with additional proof in the case of disputes (FWO, 2019).

Public authorities in Oman and the UAE have deployed automated wage protection systems for real-time monitoring and oversight over employers, ensuring that vulnerable workers are protected from unscrupulous practices. In both countries, employers use digital web platforms to submit employee and salary information to a portal, which is connected to financial institutions in the country and overseen by their respective labour ministries (UAE, n.d.; Oman, n.d.)

Digital tools can additionally be used to aid regulators and duty holders in identifying indicators of unsafe and unhealthy conditions. Building information modelling (BIM) and computer-aided drafting (CAD) software are widely used in construction to create digital representations of proposed physical environments for improved hazard identification. Today, converting CAD drawings to Virtual Reality (VR) models is another way for regulators and duty holders to identify and avoid potential safety hazards in infrastructure yet to be built and train inspectors and duty holders to identify safety hazards in existing infrastructure.

With the advent of the COVID-19 pandemic, the detection of OSH hazards has become more pertinent. In several countries, technological tools are being used to enable detection and mitigate the impact of COVID-19. Contact tracing apps are an important tool in infectious disease control and several applications have been developed to identify persons who may have been in contact with an infected individual. Sensor-enabled social distancing monitoring tools are another mean being used in fighting the pandemic.

Private sector initiatives using transformative technology offer insight into how compliance with labour law can be improved. Technologies such as collective intelligence tools, blockchain-based supply chain management systems, sensor technology, and web and mobile platforms all hold unique opportunities for reinforcing efforts of public labour administration to ensure strategic compliance with labour regulations. For example, collective intelligence tools can be used to share information amongst workers and increase awareness about grievance redressal mechanisms. An online platform called the *Recruitment Advisor*, developed by the International Trade Union Confederation and the ILO, does this

by enabling workers to review and rate recruitment agencies in Nepal, the Philippines and Indonesia.

To facilitate supply chain traceability, companies such as Sourcemap geographically map and visualize a company's supply chain using crowdsourced data and production data collected digitally using mobile devices and GPS data throughout the steps of their extended supply chains. They help companies monitor transactions across the supply chain to trigger real-time alerts in case of workforce and volume anomalies.

Others such as Bext360 have developed blockchain based "smart contracts" to pay coffee farmers. Deployed on the ground at processing centres, a machine known as the "Bextmachine" analyses coffee cherries using digital cameras and artificial intelligence (AI) technology. The AI software translates the images of the cherries into data. Special software algorithms rate the cherries for size and consistency and estimate the quantity of coffee. This data is used to transparently and instantaneously calculate the price of the coffee and digitally pay the farmer.

To prevent forced labour, child labour and trafficking companies such as Blunumber have used blockchain to build a digital identity system to create profiles for workers who may not trust, or have access to, their national digital identity systems. Blunumber provides workers with a unique B# containing information such as their name, gender, location etc. In order to receive a Bluemark certification, a producer provides verified B#s for all their workers to indicate that their particular product has been produced in compliance with relevant laws regarding forced and child labour.

A prerequisite for leveraging transformative technologies for decent work will be to address data privacy concerns, in particular when collecting data systematically. Personal data should be protected in line with existing national and international standards, which, in turn, need to be kept up to date with technological advancement.

Conclusion and policy options

This paper provides an overview of the opportunities that some transformative technologies present for improving access to labour markets and ensuring decent work. It shows the implications for structural transformation and inclusive development, as well as for employment and skills policies. Although the paper highlights both positive and negative impacts, it focuses on the potential benefits for increasing the efficiency and reach of labour administration. More precisely, it demonstrates that new technologies can improve the effectiveness of labour market intermediation services and reinforce efforts of labour inspection to ensure strategic compliance with labour regulations. In addition, it elaborates on the role that digital platforms play in facilitating participation in labour markets.

BRICS countries are uniquely placed to leverage transformative technologies for decent work. The following policy options could be considered in doing so:

1. **Investing in digital infrastructure:** Acquiring, maintaining and upgrading digital technologies and equipment is not cheap and requires sustainable financing.
2. **Ensuring data privacy:** Data privacy norms and regulations are required to ensure proper handling of personal data – if data can be legally collected and stored; whether or how data can be shared with third parties and what constitutes meaningful consent in the collection and use of personal data.
3. **Targeting vulnerable groups:** When adopting technology, measures should be put in place to help the less digitally literate and those with no access to technology in order not to exacerbate inequalities and ensure universal access to public services. Enhancing digital literacy for all as well as access to technology are preconditions for sharing the gains of technological advancement more equally.

4. **Reducing the skills gap:** Digital innovations will rapidly change the demand for skills. In order to avoid the creation or a widening of skills gaps and to ensure the employability over the work-life, individuals need to have access to lifelong learning systems. At the same time, change is required in technical training and education institutions, with a view to developing the skills workers will need in the digital economy.
5. **Entering innovative partnerships:** Partnerships are vital in designing and enhancing digital services, and in harnessing the benefits of collaboration. With the investment and support of member governments, BRICS could lead collaborative innovation process, bringing together private organizations, public enforcement agencies and workers' and employers' organizations, to ideate and develop technological innovations for labour law compliance and monitoring as well as public employment services that can be scaled and replicated in a variety of different contexts.

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