▶ **World Employment and Social Outlook**

The role of digital labour platforms in transforming the world of work

2021

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The role of digital labour platforms in transforming the world of work

International Labour Office • Geneva

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Please note that the figures on revenue and working hours on pages 66 and 166 have been updated since the digital version of this report was first published on 23 February 2021.

Preface

Technological innovation is transforming every part of our lives. The ability to quickly and cheaply exchange large amounts of data and information has laid the foundations for the rise of the digital economy and digital labour platforms. In both developed and developing countries businesses and consumers have embraced this transformation, as services and goods are delivered in ways that are cheaper and more convenient. Digital labour platforms are now part of our everyday lives.

This transformation extends to the world of work. Digital labour platforms offer new markets for businesses and more income-generating opportunities for workers, including those who were previously outside the labour market. Such platforms are leading to changes not just to the organization of enterprises and work processes but in many cases to the relationship between workers and businesses as well.

It is widely considered that the COVID-19 pandemic has accelerated changes that were already under way, both in society and at work. These include the expanded use of digital platforms and related technological innovations like cloud computing and the use of big data and algorithms. The result has been innovative ways of working, and flexibility for both workers and businesses. The remote working arrangements adopted by many during the past year have brought a rise in e-commerce, e-services and online freelance work. For many who lost their jobs, in both developing and developed countries, digital labour platforms have offered opportunities to earn some income. Many businesses have relied on digital labour platforms to keep operating, reach new markets and reduce costs.

But there are challenges. This new business model allows platforms to organize work without having to invest in capital assets or to hire employees. Instead, they mediate between the workers who perform the tasks and clients, and manage the entire work process with algorithms. Workers on digital labour platforms often struggle to find sufficient well-paid work to earn a decent income, creating a danger of working poverty. Many do not have access to social protection, which is particularly concerning during a pandemic. They are frequently unable to engage in the collective bargaining that would allow them to have these and other issues addressed.

This report is the first major attempt by the ILO to capture the experiences of workers and businesses with digital labour platforms. It is based on surveys and interviews with 12,000 workers in 100 countries, and with 70 businesses, 16 platform companies and 14 platform worker associations operating in multiple sectors and countries.

To address the challenges raised by this new way of working, many governments have taken regulatory steps to tackle issues such as the employment relationship, health and safety standards and inadequate social protection. Private, non-state actors and employers' and workers' organizations have also taken initiatives. However, variations in these regulatory responses have created further challenges. The matter is made more complex because many digital labour platforms operate across multiple borders and jurisdictions. The result is regulatory uncertainty for workers, businesses and governments alike.

Digital labour platforms have the potential to benefit both workers and businesses – and through them, society more generally. But they will only fulfil this positive potential, and help us achieve the Sustainable Development Goals, if the work opportunities they provide are decent. Ensuring that all workers, irrespective of their contractual status, are covered by key labour standards will be critical, as will social dialogue.

A clearer understanding of the operation of digital labour platforms, and a more effective and consistent approach to them, are therefore essential. There is a need for international policy discussions and coordination, which could lead over time to that clearer understanding and a more effective and consistent approach to digital labour platforms worldwide.

Guy Ryder
ILO Director-General

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▶ Abbreviations

AI	artificial intelligence
API	application programming interface
B2B	business to business
B2C	business to consumers
BPO	business process outsourcing
CAIT	Confederation of All India Traders
CEACR	ILO Committee of Experts on the Application of Conventions and Recommendations
FTAs	free trade agreements
GDPR	General Data Protection Regulation
GPS	Global Positioning System
ICT	information and communications technology
IPO	initial public (stock) offering
IT	information technology
MNE	multinational enterprise
NSSO	National Sample Survey Office (India)
OFN	Open Food Network
OLI	Online Labour Index (Oxford)
PCBU	person conducting a business or undertaking
PPE	personal protective equipment
PSTE	persons in special types of employment
RDC	remote desktop computer
SDGs	Sustainable Development Goals
SMEs	small and medium-sized enterprises
TaaS	Talent as a Service
VPN	virtual private network
WEC	World Employment Confederation
WTO	World Trade Organization

Acknowledgements

Executive summary

The digital economy is transforming the world of work. Over the past decade, the expansion in broadband connectivity and cloud computing, along with innovations in information and communications technologies, have enabled economic transactions and the exchange of large amounts of data and information between individuals, businesses and devices. Data is increasingly a key asset driving the digital economy. Related to these transformations is the proliferation of digital platforms in several sectors of the economy. Since March 2020, the COVID-19 pandemic has led to an increase in remote-working arrangements, further reinforcing the growth and impact of the digital economy. While digital platforms provide a range of services and products, this report focuses on digital labour platforms, which mediate work and have rapidly penetrated a number of economic sectors as a result of innovations in digital technologies.

Digital labour platforms are a distinctive part of the digital economy. They allow individuals or business clients to arrange a ride, order food or find a freelancer to develop a website or translate a document, among many other activities and assignments. By connecting businesses and clients to workers, they are transforming labour processes, with major implications for the future of work. Digital labour platforms can be classified into two broad categories: online web-based and location-based platforms. On **online web-based platforms**, tasks or work assignments are performed online or remotely by workers. These tasks may include carrying out translation, legal, financial and patent services, design and software development on freelance and contest-based platforms; solving complex programming or data analytics problems within a designated time on competitive programming platforms; or completing short-term tasks, such as annotating images, moderating content, or transcribing a video on microtask platforms. The tasks on **location-based platforms** are carried out in person in specified physical locations by workers, and include taxi, delivery and home services (such as a plumber or electrician), domestic work and care provision.

The development of digital labour platforms has the potential to provide workers, including women, people with disabilities, young people and migrant workers, with income-generating opportunities. In developing countries in particular, such platforms are regarded as a promising source of work opportunities, leading many governments to invest in digital infrastructure and skills. Businesses are also benefiting, as they can use these platforms to access a global and local workforce to improve efficiency and enhance productivity, and enjoy wider market reach.

The opportunities provided by platforms are accompanied by some challenges. For workers, these relate in particular to regularity of work and income, working conditions, social protection, skills utilization, freedom of association and the right to collective bargaining. Many of these

challenges are quite pronounced for workers in informal and non-standard work arrangements and are increasingly affecting those engaged on digital labour platforms, who are a relatively fast-growing share of the workforce. The consequences of the COVID-19 pandemic are exposing the risks and inequalities for workers, particularly for those engaged on location-based platforms. For traditional businesses, the challenges include unfair competition from platforms, some of which are not subject to conventional taxation and other regulations, including those relating to their workforces. Additional challenges for traditional businesses include the amount of funding required to continuously adapt to digital transformation, especially for small and medium-sized enterprises (SMEs), and the inadequate availability of reliable digital infrastructure, particularly in the global South.

This report seeks to enhance our understanding of how digital labour platforms are transforming the world of work, and the implications of that transformation for employers and workers. It draws on the findings of ILO surveys conducted among some 12,000 workers in 100 countries around the world working on freelance, contest-based, competitive programming and microtask platforms, and in the taxi and delivery sectors. It also draws on interviews conducted with representatives of 70 businesses of different types, 16 platform companies and 14 platform worker associations around the world in multiple sectors.

This work provides a pioneering and comprehensive international overview of the platform business model and business strategies, based on an analysis of the terms of service agreements of 31 major online web-based and location-based platforms, and on the experiences of workers and clients on these platforms. It also explores regulatory gaps with regard to platform governance, and reviews multiple initiatives undertaken by governments and social partners to bridge these gaps. Finally, it suggests ways to leverage the opportunities and overcome the challenges emerging from the rise of digital labour platforms, to ensure sustainable enterprise development and decent work for all, and to advance achievement of the United Nations Sustainable Development Goals.

The past decade has seen a fivefold increase in the number of digital labour platforms, which are concentrated in a few countries.

The number of online web-based and location-based (taxi and delivery) platforms rose from 142 in 2010 to over 777 in 2020. The number of online web-based platforms tripled over this period, while the number of taxi and delivery platforms grew almost tenfold. A large proportion of these platforms are concentrated in just a few locations, including the United States of America (29 per cent), India (8 per cent) and the United Kingdom of Great Britain and Northern Ireland (5 per cent).

Digital labour platforms offer two types of work relationship: workers are either directly hired by a platform or their work is mediated through a platform. In the first case, they are categorized as employees with an employment relationship to their employer, while in the second case they are categorized as self-employed or independent contractors by the platforms. Those working under an employment relationship tend to be responsible for the functioning of the platform and comprise a relatively small fraction of the platform workforce. For instance, the freelance platform PeoplePerHour has about 50 employees, while it mediates work for 2.4 million skilled workers.

Estimating the actual size of the platform-mediated workforce is a challenge owing to non-disclosure of data on the part of the platforms. Surveys by researchers and statistical agencies in Europe and North America between 2015 and 2019 suggest that the proportion of the adult population that has performed platform work ranges between 0.3 and 22 per cent.

On online web-based platforms, labour supply exceeds demand, placing downward pressure on earnings.

Tracking labour supply and demand on major online web-based platforms since 2017, the Online Labour Observatory reveals that there has been an increase in both demand and supply for freelance and microtask work. Since the COVID-19 outbreak, the labour supply on platforms has increased significantly, while the demand for work has decreased and shifted towards tasks related predominantly to software development and technology. The demand for work on the five major online web-based platforms largely originates from developed countries, while the labour supply originates predominantly from developing countries. The evidence indicates that on some digital labour platforms there is excess labour supply, which leads to greater competition among workers for task assignment and puts downward pressure on the price of the tasks to be performed.

The global distributions of investment in digital labour platforms and platform revenues are geographically uneven.

About 96 per cent of the investment in digital labour platforms is concentrated in Asia (US$56 billion), North America (US$46 billion) and Europe (US$12 billion), compared to 4 per cent in Latin America, Africa and the Arab States (US$4 billion). Platforms providing taxi services have received a much larger share of venture capital funds than delivery or online web-based platforms. Among taxi platforms, the distribution of funding is uneven, with 75 per cent of funds concentrated in only two platform companies.

Digital labour platforms globally generated revenue of at least US$52 billion in 2019. About 70 per cent of the revenues generated were concentrated in just two countries, the United States (49 per cent) and China (23 per cent), while the share was much lower in Europe (11 per cent) and other regions (17 per cent). The seven largest technology companies globally had a cumulative revenue of over US$1,010 billion in 2019, and most of these companies invest heavily in digital labour platforms as well.

The business strategies adopted by digital labour platforms comprise four key elements.

Four key elements enable platforms to establish a market base, leverage network effects and expand rapidly, while generating benefits for businesses and workers.

▶ *Revenue strategy*: The revenue strategies of digital labour platforms are based on offering subscription plans and charging various types of fees to platform workers and/or the businesses, clients or customers that use them. Online web-based platforms offer multiple subscription plans and customized services to clients, with free trials to attract subscribers. They also offer workers subscription plans with incremental benefits at extra cost, which tend to be essential for accessing more work. Digital labour platforms often charge a commission fee to workers and businesses; such fees tend to be higher for workers than clients on online web-based platforms. For instance, Upwork generated 62 per cent of its 2019 revenue from various types of fees charged to workers, while 38 per cent was generated through fees charged to clients. On location-based platforms, workers typically pay a commission fee on taxi platforms whereas on delivery platforms it is businesses and customers that generally do so.

▶ *Recruitment and matching of workers with clients*: Digital labour platforms use algorithms for the matching of tasks or clients with workers, which has been transforming a traditional human resource process that typically involved human interaction. While traditional human resource practices base recruitment selection largely on education levels and experience, algorithmic matching is often determined by indicators such as ratings, client or customer reviews, rates of cancellation or acceptance of work, and worker profiles. On online web-based platforms, this matching process may also take into consideration a worker's subscription plans and optional purchased packages. This practice risks excluding some workers from accessing tasks, particularly those from developing countries and those with lower incomes.

▶ *Work processes and performance management*: Algorithmic management of workers is central to the platform business model. Platforms provide a variety of software and hardware tools to facilitate the work process, monitor workers and enable communication between the client and the platform worker. These include monitoring of workers on location-based platforms using the Global Positioning System, and tools that automatically capture screenshots or keyboard strokes on online web-based platforms. Moreover, algorithms assess, evaluate and rate platform worker performance and behaviour using a number of metrics, such as client reviews and customer feedback.

▶ *Rules of platform governance*: Digital labour platforms tend to unilaterally shape the governance architecture within the platform through their terms of service agreements, which have to be accepted by workers, clients and businesses for them to be able to access the platform. Besides requiring the observance of the codes of conduct regarding the use of the platform, these agreements also cover aspects such as acceptance or rejection of work, deactivation of platform accounts and data usage. This form of governance allows platforms to exercise considerable control over platform workers' freedom to work, and can shape how and under what conditions clients or businesses engage with platform workers, through exclusivity clauses, for instance.

Diverse types of businesses, from start-ups to Fortune 500 companies, are increasingly relying on online web-based platforms.

Businesses use online web-based platforms for three broad reasons: to streamline recruitment processes; to reduce costs and improve efficiency; and to access knowledge and seek innovation. The organizational performance of many companies has improved through innovations facilitated by open source platforms, as well as through access to a global pool of workers with diverse skills via digital labour platforms.

SMEs in particular have benefited from location-based platforms.

Many traditional businesses, particularly SMEs, have started using location-based platforms, predominantly in the restaurant and retail sectors. Such businesses are increasingly relying on digital labour platforms as a way to cope with greater competition and the need to expand their customer base, to keep pace with a transforming marketplace and to respond to consumer preferences. Many restaurants are heavily dependent on delivery platforms, particularly since the outbreak of the COVID-19 pandemic, to enhance their visibility among consumers and expand their markets, as well as to improve productivity, efficiency and profitability.

Digital labour platforms have also supported the growth of start-ups and the reorientation of some sectors.

Many digital start-ups have emerged around the world, particularly in the field of artificial intelligence (AI), to meet the demands of automated work processes and analytics. As AI technology is still far from fully automating work, such start-ups rely heavily on digital labour platforms and the human intelligence of platform workers, who are dispersed globally, to complete tasks and train machine-learning algorithms through a "human-in-the-loop" process.

Digital labour platforms have also made it possible for some businesses to reorient their business strategies in certain sectors and access wider markets. The business process outsourcing (BPO) industry, for example, is experiencing a transformation wherein customer demands are now being met through digital means instead of the provision of voice-based services, and the customer journey from beginning to end is managed using digital tools. These include Facebook and WhatsApp messages, web chats or emails, and AI bots for providing real-time feedback.

BPO companies are also trying to sustain their business by relying on work from online web-based platforms, apart from directly working with clients. Many technology companies are outsourcing tasks, such as content review, transcription, annotation and image tagging, to workers in developing countries, often as part of their corporate social responsibility, with a view to providing employment opportunities to young graduates and those from disadvantaged back-grounds, for example. While it is often perceived that such tasks are done by AI, in practice they require human value judgement, which is pro-vided by BPO workers mainly based in developing countries, or "invisible" workers on online web-based platforms.

While businesses can benefit from platforms, challenges abound.

Many businesses that depend on online web-based platforms struggle to strategically manage the various forms of work arrangements and risk losing internal human resource capacity. For businesses that depend on delivery platforms, high commission fees can reduce profits while poor digital infrastructure can have an impact on the smooth running of the business. Traditional businesses, particularly in the retail sector, are facing market disruptions from large e-com-merce platform companies and are confronted with challenges such as competition issues, un-favourable contractual terms, non-transparency on the part of platforms (especially with regard to data, rankings and pricing), weak dispute reso-lution mechanisms and, more broadly, an uneven playing field.

Survey findings indicate that a majority of workers on digital labour platforms are highly educated and male.

The findings from the ILO surveys of workers on online web-based and location-based (taxi and delivery) platforms show that the majority of platform workers are below the age of 35 years and highly educated, in particular in developing countries. While women do find work on digital labour platforms, they represent only four in ten workers on online web-based platforms and one in ten workers on location-based platforms. In some countries, app-based delivery platforms are an important source of work opportunities for migrants.

Gender-based occupational segregation of tasks is common on freelance platforms. Women are more likely than men to perform professional services (such as legal services, translation, writing and editing), and tasks related to business services or sales and marketing. Few women mentioned that they performed tasks related to technology and data analytics.

Worker motivation to work on digital labour platforms varies across the different types of platforms and by gender.

Complementing an existing income and the preference or need to work from home or for job flexibility are the two main motivating factors for platform workers on online web-based plat-forms. On freelance platforms, the preference or need to work from home or for job flexibility is the chief motivator, while on microtask platforms complementing pay from other income sources is the most important factor. In contrast, the main motivating factors for workers on competitive programming platforms are to improve skills and career opportunities. The preference or need to work from home or for job flexibility is particularly important for women in developing and devel-oped countries alike. On location-based platforms, lack of alternative employment opportunities, job flexibility and better pay compared to other avail-able jobs are the key motivating factors.

Work on digital labour platforms is the main source of income for many workers...

On location-based platforms, the overwhelming majority of workers indicated that this was the case. About one third of the workers on online web-based platforms stated that platform work was their main source of income; the propor-tions were higher in developing countries and for women.

... but there are major differences between the earnings of workers on online web-based platforms in developed and developing countries.

Average hourly earnings in a typical week for those engaged on online web-based platforms are US$3.4, while half of the workers on these platforms earn less than US$2.1 per hour. For workers on freelance platforms, average hourly earnings are US$7.6, while on microtask platforms they amount to US$3.3. Workers in developing countries tend to earn less than those in developed countries; on freelance platforms, for instance, they earn 60 per cent less, even after controlling for basic characteristics and types of tasks performed. Earnings on online web-based platforms are influenced by time spent on unpaid tasks (such as looking for work or building up a profile), competition due to excess labour supply, high commission fees, and non-payment due to rejection of work.

Evidence of the existence of a gender pay gap on freelance platforms is mixed. After controlling for basic characteristics, such as education level and work experience, at the global level there is no difference in hourly earnings, while at the country level there is a significant gender pay gap in some cases. A gender pay gap is also found on location-based platforms in some countries.

In developing countries, earnings in the app-based taxi and delivery sectors tend to be higher than in the traditional sectors.

Hourly earnings for app-based taxi drivers and delivery workers vary across the countries analysed in this report, and tend to be higher than in the traditional sectors. In the taxi sector in particular, platforms are able to provide services to customers at low cost, hence expanding the business. In addition, the bonuses and incentives provided to workers have attracted a large number of workers, thereby increasing the labour supply, which can exceed the expected demand and result in intense competition. This situation also has the potential to reduce income-generating opportunities for those in the traditional sectors. In some of the countries surveyed, over 70 per cent of the traditional taxi drivers reported that compared to when they started to work as taxi drivers, the number of trips in a typical day, and daily earnings, had decreased.

Working hours vary across location-based platforms and online web-based platforms...

Workers on online web-based platforms work 27 hours on average in a typical week, including both paid and unpaid work, with about one third of their time, or eight hours, spent on unpaid work. About half of them have other paid jobs, working 28 hours on average per week in these jobs in addition to their platform work, which can make for a long work week. Some workers on online web-based platforms face unpredictable work schedules and unsocial hours, particularly in developing countries, as clients are often based in developed countries. This may have negative implications for their work–life balance.

On location-based platforms, most workers in the taxi and delivery sectors work with high intensity and for long hours, on average 65 hours per week in the taxi sector and 59 hours per week in the delivery sector. On app-based taxi and delivery platforms, a high proportion of respondents (79 and 74 per cent respectively) mentioned that they had some degree of stress due to their work, often related to traffic congestion, insufficient pay, lack of orders or clients, long working hours, the risk of work-related injury and pressure to drive quickly.

... but many workers on both types of platforms would like to do more work.

Many workers on both online web-based and location-based platforms stated that they would like to do more work than they do. They are unable to do so mostly due to the unavailability of enough work or of well-paid tasks. Furthermore, platform design may also restrict workers from certain developing countries from accessing well-paid jobs on online web-based platforms.

The relevance of skills and qualifications acquired through formal education varies on digital labour platforms.

Platforms are redefining the relationship between formal education and access to work, as worker profiles, ratings and reputation are vital for accessing work. Varying degrees of vertical and horizontal skills mismatch can be observed on digital labour platforms. A high proportion of workers on freelance and competitive

programming platforms stated that their skills were a good match with their work, and many were undertaking tasks that were potentially related to their field of study. However, skills mismatch is quite prominent for those engaged on microtask platforms, where a highly educated workforce performs tasks that tend to require few or no specific skills. Similarly, a sizeable proportion of workers on platforms in the taxi and delivery sectors are highly educated.

Working conditions on digital labour platforms are largely regulated by terms of service agreements.

Terms of service agreements are contracts of adhesion and are unilaterally determined by the platforms. They define aspects related to working time, pay, customer service etiquette, applicable law and data ownership, among others. They tend to characterize the contractual relationship between the platform and the platform worker as other than employment, regardless of the actual nature of the relationship. As a result, platform workers cannot access many of the workplace protections and entitlements that apply to employees.

Platform design and algorithmic management are defining the everyday experiences of workers on digital labour platforms.

Platforms use algorithms to match workers with clients or customers, a process in which worker ratings are decisive. The ratings are themselves algorithmically determined, according to a number of metrics, which include acceptance and rejection rates. This in effect limits workers' ability and freedom to reject work. A considerable number of workers surveyed in the app-based taxi and delivery sectors indicated that they were unable to refuse or cancel work on account of the negative impact this would have on their ratings, which could lead to reduced access to work, lost bonuses, financial penalties and even account deactivation.

Rejection of work or low ratings are common on digital labour platforms, although many workers believe that the reasons for such rejections are not always justifiable. Most platform workers are unaware of any formal process for filing a complaint or seeking help in such cases. On freelance platforms, when such a process is known and used by workers the outcomes are favourable to them in many cases. On location-based platforms, where workers sometimes face account deactivation, about half of the appeals against deactivation are successful.

Platform workers are often unable to engage in collective bargaining.

In many jurisdictions, competition law prohibits self-employed workers from engaging in collective bargaining, on the basis that they constitute a cartel. However, the ILO Right to Organise and Collective Bargaining Convention, 1949 (No. 98), and the Freedom of Association and Protection of the Right to Organise Convention, 1948 (No. 87), provide that freedom of association and collective bargaining shall be available to all workers. Some countries, such as Canada, Ireland, Japan and Spain, have introduced exceptions for certain categories of dependent self-employed workers, which allow them to engage in collective bargaining. Another challenge to the collective organization of digital labour platform workers is that they are geographically dispersed. Nevertheless, some workers based in different regions have been able to organize, including through digital means, while on location-based platforms in particular they have also undertaken strike action, initiated litigation and a drive towards unionization. Some workers have also established platform cooperatives.

The majority of workers on digital labour platforms do not have social security coverage.

There are large gaps with regard to health insurance and work-related injury provision, unemployment and disability insurance, and old-age pension or retirement benefits. While access to social protection is limited, workers in the app-based taxi and delivery sectors, particularly women, face various occupational safety and health risks. Not having social security coverage has created significant challenges for all platform workers during the COVID-19 pandemic, especially those on location-based platforms.

A considerable number of workers on digital labour platforms have experienced or witnessed discrimination or harassment.

Discrimination on online web-based platforms is associated with exclusion from work opportunities or low pay, on the basis of nationality and gender, which was mentioned particularly by women respondents and workers residing in developing countries. Workers on location-based platforms also indicated having faced or witnessed discrimination or harassment. App-based taxi drivers reported facing aggressive or rude behaviour, mainly by clients, traditional taxi drivers and police officers, in the course of their work. App-based delivery workers mentioned instances of discrimination based on the grounds of their occupation by customers, restaurants as well as the police.

The COVID-19 pandemic has exposed many of the risks confronting workers on digital labour platforms.

The ILO rapid-assessment survey in four countries captured the implications of the pandemic for workers on location-based platforms. The majority of the workers in both the taxi and delivery sectors indicated declining demand, which had reduced the earnings for nine out of ten taxi drivers and seven out of ten delivery workers. To compensate for the loss of income, some workers reported that they had started to engage in additional work activities, or provided taxi and delivery services outside the platforms through their private contacts; many had also reduced unnecessary expenditure, used savings, deferred payment of bills, or taken a loan.

Some workers on location-based platforms reported working throughout the crisis due to economic necessity, despite feeling anxiety about contracting COVID-19 while at work. Seven out of ten workers indicated not being able to take paid sick leave, or to receive compensation, in the event they were to test positive for the virus, thus risking the health of others in addition to their own health.

Some location-based platforms have undertaken specific measures to mitigate occupational safety and health risks among workers, including the provision of safety training and personal protective equipment (PPE). However, about half the surveyed workers who were provided with PPE stated that the quantity or quality of PPE provided was inadequate. Moreover, eight out of ten workers had incurred additional financial expenditure as they had been obliged to purchase PPE themselves.

Regulatory responses from many countries have started to address some of the issues related to working conditions on digital labour platforms.

Countries have taken various approaches to extending labour protections to platform workers. These include:

▶ *Occupational safety and health*: Laws in Australia and New Zealand have adopted broader statutory language and extended occupational safety and health coverage to all workers. In Brazil, a judicial decision has extended existing safety and health legal standards to platform workers.

▶ *Social security*: Several countries have introduced innovations to extend social security to platform workers. These include requiring that platforms cover the accident insurance costs of self-employed workers (France); extending social security for self-employed workers (many Latin American countries); and providing work injury and death benefits to workers on particular platforms (Indonesia and Malaysia). In response to the COVID-19 pandemic, some countries have extended sickness benefits to all workers (Ireland) and unemployment benefits to uninsured self-employed workers (Finland and the United States).

▶ *Employment relationship*: Employee status remains important, as most labour and social protections are associated with it. Countries have adopted various approaches to the classification of platform workers, often arising from litigation, which fall along a spectrum between very broad and very narrow approaches to employment status. These include: (i) classifying them as employees, often based on the amount of control exercised by the platform; (ii) adopting an intermediate category in order to extend labour protection; (iii) creating a de facto intermediate category to ensure that

they obtain certain benefits; and (iv) classifying them as independent contractors, often based on the degree of their flexibility and autonomy.

▶ *Working time and remuneration*: Some new approaches to labour standards have been specifically adapted to digitally based work. For instance, French law provides that a platform's voluntary social charter should include the "right to disconnect" and methods of enabling self-employed platform workers to obtain a "decent price" for their work.

▶ *Dispute resolution*: Some platforms may restrict dispute resolution to a particular jurisdiction through arbitration clauses, which can be limiting for workers. This has been successfully challenged in some jurisdictions; the Supreme Court of Canada, for example, invalidated a platform's arbitration clause on the ground that it "makes the substantive rights given by the contract unenforceable".

▶ *Access to data and privacy*: Governments are increasingly adopting measures regarding data protection and privacy, including in Brazil, India, Nigeria and the European Union. In France, a recent amendment to the Labour Code gives self-employed platform workers in the transportation industry the right to access data related to their platform activities.

With growing regulatory concerns, platform companies and worker organizations have also been addressing the issues raised.

In Denmark, a collective bargaining agreement between a trade union and a cleaning platform has allowed some platform workers to transition to employee status. Platform companies have also been developing codes of conduct either unilaterally or in collaboration with other platforms to address some of the challenges confronting workers. Six digital labour platforms have signed the World Economic Forum Charter of Principles for Good Platform Work, which covers issues such as safety and well-being, flexibility, fair conditions, social protection, voice and participation, and data management.

Given that digital labour platforms operate across multiple jurisdictions, there is a need for some form of international policy dialogue and coordination.

Governments and non-state actors are in many cases regulating digital labour platforms, but these initiatives vary considerably. Countries face challenges in enforcing regulations, particularly with regard to online web-based platforms, where the platforms, clients and workers are located in different jurisdictions. In this regard, the ILO Maritime Labour Convention, 2006, sets an important precedent as it concerns an industry with multiple parties operating across different jurisdictions. Such an approach could also be considered for digital labour platforms. Another important point of departure is the ILO Tripartite Declaration of Principles concerning Multinational Enterprises and Social Policy, 2017, which provides guidance to multinational enterprises on social policy and inclusive, responsible and sustainable workplace practices.

International policy dialogue and coordination are also vital to ensure regulatory certainty and the applicability of universal labour standards, given the diversity of responses by countries and platform companies. It is important that the ILO fundamental principles and rights at work are implemented for all platform workers, irrespective of their status. In addition, principles rooted in other ILO Conventions, such as those related to fair payment systems, fair termination and access to dispute resolution, should also be extended to platform workers.

A way forward…

A way forward would be to engage in a process of global social dialogue aimed at ensuring that the opportunities arising from digital labour platforms are leveraged, and the challenges addressed, so that digital labour platforms are best positioned to provide decent work opportunities, foster the growth of sustainable enterprises and contribute towards achievement of the Sustainable Development Goals. The ILO's independent Global Commission on the Future of Work recommended

the development of an international governance system that sets certain minimum rights and protections and requires platforms and their clients to respect them. It also called for a "human-in-command" approach to algorithmic management, surveillance and control in order to ensure that "final decisions affecting work are taken by human beings".

The ILO's Centenary Declaration for the Future of Work calls for "policies and measures that ensure appropriate privacy and personal data protection, and respond to challenges and opportunities in the world of work relating to the digital transformation of work, including platform work" in order to promote inclusive and sustainable development, full and productive employment and decent work for all.

These objectives can best be achieved through social dialogue among the relevant stakeholders, most particularly the digital labour platforms, the platform workers, and their representatives and governments. A concerted effort across multiple international forums and organizations will be critical to ensuring that digital labour platforms develop further in a manner that strongly contributes to inclusive and sustainable development. Such a process of regulatory dialogue and coordination should have at its core an effort to ensure that domestic laws implementing the fundamental principles and rights at work as well as other key legal provisions, such as those in respect of occupational safety and health and social security, apply to all workers, including digital labour platform workers. With the right engagement and preparation, this process could lead over time to a clearer understanding and a more effective and consistent approach at the enterprise, national and international levels, with a view to:

▶ ensuring fair competition and creating an enabling environment for sustainable enterprises;

▶ requiring and promoting clear and transparent terms of engagement and contractual arrangements for workers and businesses, including as reflected in labour and consumer laws;

▶ ensuring that workers' employment status is correctly classified and is in accordance with national classification systems;

▶ ensuring transparency in ratings or rankings of workers and businesses using digital platforms such as online web-based, location-based and e-commerce platforms;

▶ ensuring transparency and accountability of algorithms for workers and businesses;

▶ protecting workers' personal and work data, as well as data relating to businesses and their activities on platforms;

▶ working towards ensuring that self-employed platform workers enjoy the right to bargain collectively, for example through greater harmonization of competition law with labour law;

▶ reaffirming that anti-discrimination and occupational safety and health laws apply to digital labour platforms and their workers;

▶ ensuring adequate social security benefits for all workers, including platform workers, by extending and adapting policy and legal frameworks where necessary;

▶ ensuring fair termination processes for platform workers;

▶ ensuring access to independent dispute resolution mechanisms;

▶ ensuring that platform workers are able to access the courts of the jurisdiction in which they are located if they so choose;

▶ providing for wage protection, fair payments and working time standards;

▶ allowing platform workers to move freely between platforms, including by facilitating portability of workers' data, for example regarding ratings; and

▶ aiming at effectively taxing the digital economy, including platforms, clients and workers, as well as their transactions.

1

The digital transformation of industry and the world of work

The rise of digital labour platforms

Platforms rely on two distinct types of workers

Workers directly employed by the platform

99designs	139	1,200,000
Appen	800	1,000,000
HackerRank	200	11,000,000
Meituan	54,580	3,987,000
PeoplePerHour	50	2,400,000
Rappi	1,500	25,000
Uber	26,900	5,000,000

Workers mediated by the platform

5x rise since 2010

Hybrid
Delivery
Taxi
Online web-based

2000 2010 2020

▶ **Exponential growth in the number of platforms**

Concentration of platforms in

USA **29%**

India **8%**

United Kingdom **5%**
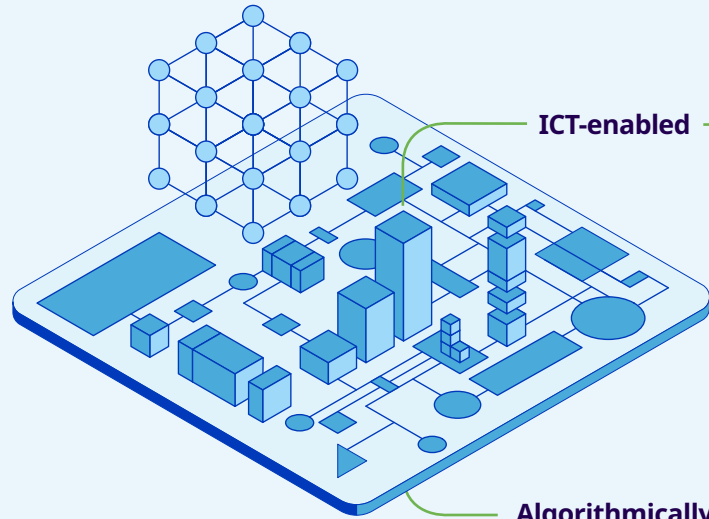
ICT-enabled

Data-driven

Algorithmically managed

US$**119** billion
▶ **Global investment in platforms**

Taxi US$ 62 billion

Delivery US$ 37 billion

Hybrid US$ 17 billion

Online web-based US$ 3 billion

96% invested in Asia, North America and Europe

4% invested in Latin America, Africa and the Arab States

49% United States

11% Europe

23% China

17% Other regions
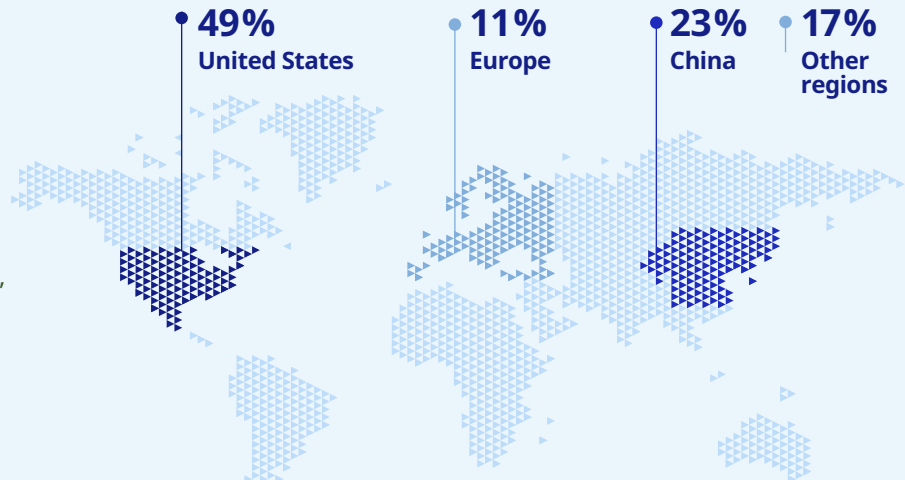
US$**52** billion
▶ **Global revenue generated by platforms**

▶ Introduction

The pace at which technological advances and innovations are taking place is unprecedented. The information and communications technology (ICT) revolution of the early 1990s led to a rapid diffusion and adoption of the internet that transformed a number of economic sectors and reshaped regional, national and international markets. It led to a geographical fragmentation of industry as firms could subcontract, outsource and offshore through global supply chains at a relatively low cost. The expansion of broadband connectivity and the availability of high-speed internet enabled the rapid development of digital infrastructure from the early 2000s. Widespread use of the internet and ICT devices by both businesses and individuals paved the way for web-based economic transactions (on platforms such as Amazon and eBay), and laid the foundation for the digital economy (Castells 2010).

Over the past decade, the availability of cloud infrastructure and computing services has facilitated the growth of digital platforms that have gradually penetrated almost all sectors of the economy. One can identify three broad categories of such platforms: those that provide digital services and products to individual users, such as social media; those that mediate exchange of goods and services, such as e-commerce or business-to-business (B2B) platforms; and those that mediate and facilitate labour exchange between different users, such as businesses, workers and consumers, including digital labour platforms such as Upwork or Uber. These platforms are redefining the means of economic exchange and increasingly shaping the world of work.

This report focuses on two main types of digital labour platforms: *online web-based platforms*, where tasks are performed online and remotely by workers and are allocated to a crowd (on microtask and competitive programming platforms) or to individuals (on freelance and contest-based platforms); and *location-based platforms*, where tasks are performed at a specified physical location by individuals such as taxi drivers and delivery workers (see figure 1.1). These platforms have emerged as a distinctive feature of the digital economy in the way they connect businesses and

◤◤ Digital labour platforms have emerged as a distinctive feature of the digital economy.

clients to workers, and provide new opportunities for both workers and businesses. In addition, technological advances have facilitated new ways of organizing work, thereby transforming work processes and how people work. The COVID-19 pandemic has further reinforced their role in the economy. The expansion of such platforms has occurred alongside the increased relevance of data – particularly big data – that can now be stored and analysed through cloud computing. These developments have been supported by the availability of venture capital funds, which have played a fundamental role in financing the diffusion of digital platforms.

Digital labour platforms offer income-generating opportunities to workers and their flexible work arrangements may be more convenient for certain workers, such as women, persons with disabilities and young people. They also provide opportunities for those marginalized in traditional labour markets, such as refugees and migrant workers. In addition, they provide an avenue for workers to complement their earnings from low-paying or seasonal jobs (Surie and Sharma 2019). Because digital labour platforms are emerging as an important source of income-generating opportunities, many governments in developing countries are investing in digital infrastructure and supporting training programmes developed by the private sector to equip the workforce with digital skills (Graham, Hjorth and Lehdonvirta 2017; Heeks 2017).

Digital labour platforms bring significant benefits to businesses. For instance, online web-based platforms have enabled businesses to access workers and to source talent globally, allowing them to reduce costs and improve productivity (Corporaal and Lehdonvirta 2017). With regard to location-based platforms, businesses are able to benefit from access to a wider market, a broader customer base and labour supply, and improved revenues and productivity. Other forms of digital platforms, such as e-commerce platforms, enable businesses to sell their products to a wider market

(for example, small and medium-sized enterprises (SMEs) selling on Amazon).

Along with these opportunities, several challenges have also emerged for both businesses and workers. Many SMEs face potential competition issues as a result of aggressive pricing by digital labour platforms. For workers, the challenges relate to regularity of work and income, working conditions, social protection and access to their fundamental rights of freedom of association and collective bargaining. As such the digital transformation has the potential to increase informal and non-standard work, which can result in income and job insecurity (OECD 2020a). The COVID-19 pandemic has further revealed the enormous risks in these areas for workers engaged on digital labour platforms (ILO 2020a and 2020b).

This report focuses on the rapid changes that digital labour platforms bring to work, work practices and the business landscape. Digital labour platforms are blurring the previously clear distinction between employees and the self-employed. Global economic competition is further resulting in the growth of atypical work arrangements and a corresponding decline in employment-related and other benefits, as well as a polarization of the workforce (Berg 2019). In addition, innovative digital technologies are changing human resource management practices, as algorithms increasingly replace humans in allocating, evaluating, and administering rewards for work mediated through these platforms. These profound and rapid changes have major implications for workers' well-being and working conditions around the world, especially in middle- and low-income countries. The regulation of digital labour platforms has hence been under discussion in several countries, with debates under way particularly on the role of regulatory frameworks for ensuring decent work on these platforms and fair competition for businesses.

Although digital labour platforms are at a relatively early stage of development, they have been growing rapidly over the past decade. Kuek et al. (2015), on the basis of interviews with representatives of online microtask and freelance platform companies and data disclosed by them, estimated that their global annual market size in 2016 was about US$4.8 billion. The total revenue of one of the biggest online web-based platforms – Upwork – increased from US$164 million in 2016 to US$301 million in 2019 (Upwork 2020). As digital labour platforms continue to rapidly proliferate and increasingly shape the world of work, addressing the challenges arising for workers and businesses will be critical to fully leveraging the income-generating potential of digital labour platforms and meeting the United Nations Sustainable Development Goals (SDGs). In this regard, it is beneficial to explore the core functioning of digital labour platforms' business model and their interactions with other businesses, with a view to gaining a better understanding of the experiences of businesses and workers that engage with these platforms. This report thus reviews the opportunities and challenges that digital labour platforms present to businesses and workers, and the nature of regulations and public policies that might be required to ensure that both workers and businesses are protected and able to sustain and thrive in the process.

Chapter 1 traces the rise of the digital economy and digital platforms, focusing on digital labour platforms in particular. It assesses the impact of such platforms on different economic sectors and labour markets, highlighting the distinctive aspects of digital labour platforms that are transforming the world of work. It gives some estimates of the number of platform companies and the number of workers whose work is mediated through these platforms based on the available literature. It also discusses the roles of data and finance in the rapid rise of these platforms, and the challenges the platforms pose to both businesses and workers.

Chapter 2 discusses the business strategies and key elements of the platform business model of both online web-based and location-based platforms based on an analysis of the terms of service agreements of 31 major platforms and interviews with representatives of 16 online web-based and location-based platforms. The key elements of the platform business model which are discussed include revenue models and pricing strategies, recruitment practices, algorithmic management of work processes and evaluation of workers, and rules of platform governance.

Chapter 3 examines the diffusion of digital labour platforms across various sectors of the economy, and explores how and why businesses use them, based on interviews with representatives of 70 SMEs and large enterprises. Using case studies, it explores the opportunities arising from digital labour platforms for new digital technology start-up companies and business process out-sourcing (BPO) companies. It also analyses the implications of such platforms for traditional enterprises, particularly SMEs in the retail sector.

Chapter 4 explores the opportunities and challenges for workers on digital labour plat-forms, based on surveys conducted with some 12,000 respondents globally. It presents a first major overview of the worker experience on digital labour platforms in multiple sectors and countries, particularly in developing countries. Chapter 5 takes a broad approach to regulation to describe the forms of governance and initiatives undertaken by platforms, governments and social partners to address the emerging challenges. Chapter 6 suggests policies that may be required at the national, international and multilateral levels to ensure decent work for workers and fair competition for enterprises on digital labour plat-forms. Box 1.1 provides definitions of key terms and concepts used in this report.

> ▶ **Box 1.1 Terminology used in the report**
>
> ***Information and communications technology*** (ICT) covers a range of technological aspects and includes internet access, data, cloud computing, software, and hardware, among others. ICT is used in areas ranging from telecommunications, broadcast media and audio-visual processing to finance, medicine, social media, and digital labour platforms. ICT incorporates both the internet-enabled sphere as well as the mobile one powered by wireless networks, although it also includes older technologies, such as landline telephones, radio and broadcast television.
>
> ***Information technology*** (IT) is a subset of ICT and is more specifically the use of computer sys-tems, including all hardware and software, as well as peripheral equipment and infrastructure.
>
> ***Digital economy*** "incorporates all economic activity reliant on, or significantly enhanced by the use of digital inputs, including digital technologies, digital infrastructure, digital services and data. It refers to all producers and consumers, including government, that are utilising these digital inputs in their economic activities" (OECD 2020b, 5).
>
> ***Digital platforms*** are online entities providing digital services and products. These digital services facilitate "interactions between two or more distinct but interdependent sets of users (whether firms or individuals) who interact through the service via the Internet" (OECD 2019a, 21). These interactions can include exchange of labour, goods (e-commerce) or software.
>
> ***Digital labour platforms*** facilitate work using "digital technologies to 'intermediate' between individual suppliers" (platform workers and other businesses) and clients (EU 2020, 1), or directly engage workers to provide labour services. The work undertaken on these platforms is also commonly referred to as "platform work" or "gig work".
>
> ***Algorithmic management*** refers to giving the responsibility of assigning tasks and making deci-sions to an algorithmic system of control, with limited human involvement. The algorithmic management system improves through self-learning algorithms based on data.
>
> ***Worker*** is defined in accordance with the ILO's international labour standards, which include both employees and the self-employed (or independent contractors). Workers on digital labour platforms are also called "gig workers", "crowdworkers" or "platform workers" in the literature. A taxonomy of how these workers are described by different platforms in their terms of service agreements is presented in Appendix 2, table A2.3.
>
> ***Client*** refers to users of digital platforms, whether businesses, firms or consumers.

1.1 The rise of the digital economy

The rise of the digital economy is associated with the development of a number of software technologies, such as artificial intelligence (AI), cloud computing and blockchain, among others. In the past decade, cloud computing, high-speed connectivity and data storage capacities have expanded significantly, enabling economic transactions and the exchange of large amounts of data and information between individuals, businesses and devices. At the same time, innovations by technology companies, such as Google and Apple, along with the availability of software as an open source and as a service, have led to widespread use and adoption of smart mobile phones, computers and servers by both individuals and businesses (Evans and Schmalensee 2016). These platforms are driving innovations and have generated the development of a wide range of applications across many sectors of the economy, which has the potential to bring about industrial transformation. In the process platforms have also provided new entrepreneurial opportunities in the digital realm that are not only enabling the creation of new products, services and processes, but are also transforming erstwhile offline labour processes and business models. The rise of the digital economy can hence be situated at an intersection at which ICTs and their users, both people and businesses, increasingly rely on digital modes of exchange, both socially and economically.

The rise of the digital economy at the country level is contingent upon the availability of digital infrastructure, which remains uneven around the globe. Digital infrastructure in developing countries still lags behind that in developed countries. This is largely because "high costs of additional international bandwidth to access overseas servers and data centres still limit the uptake of cloud services" in many developing countries (UNCTAD 2019, 8). As a result, in 2019 most cloud traffic was generated in North America, followed by Asia and the Pacific and Western Europe, which together accounted for about 90 per cent of that traffic (UNCTAD 2019). The uneven growth of the digital economy perpetuates a digital divide and

risks exacerbating inequalities, particularly between countries. Addressing this divide requires concerted policy action. 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" (UNCTAD 2018, VIII).

Consequently, the growth of platform companies is concentrated in certain parts of the world, while developing countries have emerged predominantly as users of such platforms. Developing countries continue to face challenges, mostly due to the above-mentioned shortcomings in digital infrastructure, as well as inadequate financial infrastructure, human resources and institutional capacities. Examples include insufficient access to capital and unavailability of a technologically skilled labour force, as well as the lack of a favourable regulatory environment for technology entrepreneurship. In this context, it becomes imperative to probe some of the key features that have facilitated the rise of the digital economy, and to better understand the opportunities and challenges it has created for economic processes that are transforming today's world of work.

1.1.1 Key features of the digital economy

An increasingly prominent aspect of the digital economy is its ability to provide access to a variety of solutions "as a service" due to the widespread availability of cloud infrastructure and cloud computing (see box 1.2). The availability of cloud infrastructure services has allowed the digital economy to evolve into a much more diverse environment, and these services are playing a critical role in shaping the global economy. Some of the key features of the digital economy are:

Asset-lightness. The availability of cloud service infrastructure allows firms to reduce costs related to leasing or renting hardware and downloading software and applications, and to manage on-demand

access to applications or storage through a cloud provider (see box 1.2). This makes businesses agile and allows them to focus on core services.

The availability of software application programs and "tools as a service" on platforms reduces duplication costs and improves productivity, as these programs can be used for similar tasks or be customized for new tasks, meaning that programming code does not have to be written from scratch (Boudreau, Jesuthasan and Creelman 2015; Lakhani, Garvin and Lonstein 2012). This reduces developers' costs in terms of time and money and improves their productivity. Over time, with increased use of programming code, the number of applications and tools available to platform users increases. The availability of software application programs and tools as a service also offers an environment for rapid development and improved productivity.

Network effects. The success of a platform depends on its ability to attract a sufficient number of users from all sides of the market (clients and workers). Platforms adopt both pricing and non-pricing strategies – such as providing free access or rewards – to attract users from the different sides of the market. These strategies create more value for users and attract even more users in order to create a critical mass, thereby creating network effects (Evans and Schmalensee 2008). Platforms also attract and retain third-party developers to innovate and add value to the platform by providing them with access to applications and tools at low or zero cost (Boudreau and Jeppesen 2015). In these ways, platforms create network effects.

Datafication. The increase in computing power and the availability of cloud storage have enabled data collection, storage and analysis on a massive scale and at a far more rapid pace than ever before. Data has become integral to platform businesses, as it can be monetized, for example through targeted advertising. Data can be used for myriad purposes, such as predicting consumer behaviour, improving products and services, and managing workers via algorithms.

Mobility. Cloud infrastructure services allow platform businesses to conduct their regional or global operations virtually from any location, irrespective of where their clients, suppliers or consumers are based. It is one of the distinct features of platform businesses that they are able to leverage the intangibles – that is, software, applications and tools – that are at the core of their business (OECD 2014).
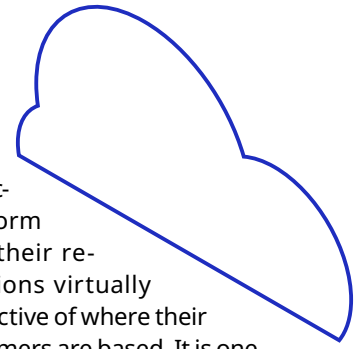
▶ **Box 1.2 Cloud infrastructure and computing services**

There are three main cloud infrastructure and computing services:

Infrastructure as a Service consists of cloud computing infrastructure, such as hardware, virtual machines, servers, cloud storage and networks, that firms can rent or lease. The services are provided by platform companies such as Amazon Web Services (AWS), Microsoft Azure and Google Compute Engine, and are also available on open source platforms such as OpenStack, CloudStack and Nimbus.

Platform as a Service is a cloud computing service that provides components such as operating systems, programming language and development tools, database management and web servers. These services are offered by AWS Elastic Beanstalk, Microsoft Azure, Google App Engine, and other platform companies. They are also available on open source such as Dokku, Flynn and Apache Stratos.

Software as a Service offers users software or applications over the internet through a client interface. This includes various statistical programmes, software packages, Dropbox, Slack, and Google Apps, among others. They are also available on open source such as Apache Hadoop software library.

Source: Adapted from OECD (2014).

1.1.2 The rise of digital platforms

Digital platforms have been able to build on some of the distinct features of the digital economy, and have penetrated diverse sectors of the economy (see section 1.2). In addition, increasing reliance on ICTs, from smartphones to computers, has created multiple opportunities for platform businesses to emerge and thrive. Moreover, the nature and organization of the digital economy has further facilitated the rapid rise of platform businesses. For instance, the availability of cloud infrastructure services at reduced costs, along with the availability of venture capital funding, has reduced entry barriers and enabled the rapid growth of digital platforms over the past decade (Cusumano, Gawer and Yoffie 2019).

Cloud infrastructure has facilitated the growth of digital platforms in many countries and regions, as it makes them asset light. Investment by platforms in traditional capital assets, such as cars, hotels or warehouses, is often minimal; platforms tend to invest instead in digital infrastructure and are overwhelmingly dependent on data, skills, ideas and physical assets provided by their users (both clients and workers). For example, Uber does not heavily invest in cars, but it has been able to expand and scale in 69 countries at an unprecedented pace (within 11 years of its creation) (Uber 2020a). It has 26,900 employees and 5 million drivers, who either own or lease cars, with the majority of them being labelled as self-employed or "driver-partners" (Uber 2020a and 2020b; Appendix 2). Uber orchestrates its services through its app, which is its "linchpin" (algorithmic management), by matching customers with drivers: its key assets are the network of users (drivers and consumers), data and the brand (Teece 2018a, 43).

Furthermore, cloud infrastructure services allow platform businesses to be virtual and mobile as they operate with intangibles, and their users (clients and workers) can be based anywhere in the world.
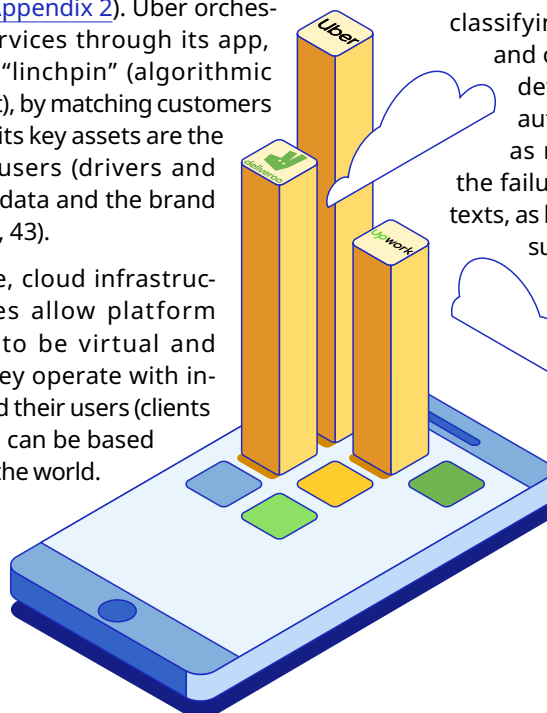
◢◤ Cloud infrastructure has facilitated the growth of digital platforms.

This distinct feature also creates challenges from a regulatory point of view for two reasons. First, it is always possible for users to disguise their location using virtual personal networks (OECD 2014). Second, when users and platform companies are based in different countries the application of labour and tax laws becomes complicated, as such laws differ across jurisdictions (see sections 5.3.9 and 6.3).

Finally, the rise of digital platforms has created entrepreneurial opportunities for digital technology start-ups and third-party developers to innovate and develop new products, tools, application programs and services on platforms (Miric, Boudreau and Jeppesen 2019), which drives further digital transformation (see section 3.3.2).

Digitalization allows datafication through the collection of massive amounts of data. User data has emerged as one of the most valuable assets for platforms, as it provides a basis on which new products can be built and serves to improve efficiency and productivity. Earlier data-processing methods and software were not adequate to handle large amounts of data, and innovative methods were required for processing such data (Sheriff 2018). Some data-processing methods carried out by humans, such as tagging, classifying, categorizing, cleaning, structuring and organizing, remain relevant, as, despite developments in AI, they cannot be fully automated. Digital labour platforms, such as microtask platforms, emerged due to the failure of AI to classify images, sounds and texts, as human intelligence is required to process such data (Irani 2015). For instance, when Amazon was developing its product catalogues with a view to making it easy for buyers to access them through the search function (a process complicated in particular by duplicate product entries), the solution was to create an internal website that enabled

employees to go through catalogue entries and mark any duplicates when they had some time (Silberman 2015).

The availability of this innovative tool (the internal website) through which tasks could be performed in a quick and efficient manner led Amazon to start Amazon Mechanical Turk (AMT) in 2005, whereby a wide variety of simple data-processing tasks could be done by workers from around the globe in a cost-effective manner (Silberman 2015). For instance, data can be processed in two days by engaging 60,000 workers from the crowd on platforms, instead of hiring hundreds of workers to finish the task in few weeks (Irani 2015). Recognizing the power of the platform to complete tasks at such a rapid pace using a global pool of workers led to the rise in microtask platforms. Such platforms have been instrumental in the processing of data needed by many digital and non-digital companies (see sections 1.4 and 3.3.2).

The outsourcing of work through digital labour platforms has resulted in the creation of an invisible workforce tasked with cleaning, processing and organizing vast amounts of data, often in precarious working conditions (see Chapter 4) to meet the needs of a data-driven digital economy. This outsourcing has allowed firms to benefit from the double advantage of reducing costs and at the same time building data archives which can be used for machine learning and training algorithms for future automation (Rani and Singh 2019). Such invisible and – for all intents and purposes – unpaid work is even more prevalent on taxi platforms, where the drivers, apart from transporting people, are in the process also feeding data into the company database to be used in training algorithms, which then automate the management of the company's operations, such as dispatching drivers or surge pricing (Chen and Qiu 2019). The workers are often unaware that they are doing this "data work", and they are not compensated for it.

1.1.3 Open source innovation

One major contributor to the rise of the digital economy has been the availability of open source platforms for software applications (such as Apache Hadoop, GitHub), which can be accessed by both digital and non-digital firms at zero cost. Open source software platforms are used by a number of digital labour platforms, including Uber and Upwork. For example, GitHub, an open source repository of software, application programs and tools, allows users (firms or developers) to access and customize these programs and tools without having to make any substantial investment of time and money. The availability of tools and programs through open source also provides many platforms with an opportunity to diversify across a range of services or sectors, depending on the demands of the users, in a short time span and with low investment.

Open source platforms and software are increasingly being recognized as working tools for innovation. This is partly because open source software is free to acquire and thus offers an alternative to the spread of software that has either a general-purpose or special licence. Platform companies and large firms work with open source platforms instead of competing with them, as this gives them access to a pool of diverse knowledge and capabilities, which in turn speeds up the innovation process at zero cost (see section 3.1.3; Gawer 2014). For instance, Google opened up its Android patents,[1] and Tesla opened up the company's patent portfolio to external developers for free so that they could innovate and develop tools, programs or software.[2] Open source collaboration is also gaining ground among public sector agencies that are opening up their patents to developers for free: the National Aeronautics and Space Administration of the United States of America, for example, has made hundreds of

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1 For more information, see: http://techcrunch.com/2015/07/23/google-offers-to-sell-patents-to-startups-to-boost-its-wider-cross-licensing-initiative.

2 For more information, see: https://www.digitaltrends.com/cars/good-guy-elon-musk-opens-teslas-patents-gives-free-access-technology/. This was later followed by other car manufacturers such as Ford, see: http://www.digitaltrends.com/business/ford-to-open-electric-vehicle-patents-news-pictures/.

patents available to developers.[3] The existence of open source platforms and software has also encouraged these agencies to facilitate innovation and development by offering open access to their intellectual property to external firms or third-party developers through their application programming interface.

1.1.4 Concentration of market power among a few platform companies

Cloud services and computing providers tend to be concentrated among a few large multinational enterprises such as Alibaba, Alphabet (includes Google), Amazon, Apple, Facebook, Microsoft and Tencent. While some of these companies also manufacture products, they are predominantly platform businesses which are able to employ some of the distinct features of the digital economy to create new and extremely efficient ways of facilitating the interaction of large numbers of users, applications and businesses or service providers. They are geographically concentrated in just two countries, China and the United States, and the estimated annual revenue of these seven companies combined for 2019 was about US$1,010 billion (see figure 1.14 in section 1.5). The concentration of wealth among a few platform companies may in some instances allow them not only to coordinate, steer and manage innovation and development, but also to shape infrastructure development in the digital economy. Their dominant position allows them to determine the boundaries governing the digital economy and who should participate in it. They use various mechanisms, such as licensing of their intellectual property rights, and technical frameworks,[4] to provide access to cloud services (Teece 2017; Parker, Van Alstyne and Choudary 2016). They also regulate access to the use of platform infrastructure by determining whether they will be more "open" or "closed" (to attract a select group of participants) (Zhao et al. 2019).

The concentration of power among platform companies raises challenges for countries as they shape their economies, particularly when governments and businesses are seeking to establish secure and decent employment for their workers, a situation which primarily affects developing countries. For example, online microtask platforms such as AMT outsource data-processing, clerical and low-end tasks, which are used for training AI, to workers dispersed around the world. Consequently, while these platforms create opportunities to earn an income, the quality of the work created raises some important considerations. The question of quality of work arises not only in terms of remuneration, regularity of work and social protection, but also in terms of the content of the work, as such tasks can be repetitive, low end and mind-numbing, and they are often performed by highly educated workers (see section 4.1.6). As a large proportion of workers in developing countries continue to work in the informal economy, this development trajectory of the digital economy might push highly educated and skilled workers in these countries to pursue work under precarious or informal working conditions and uncertain work arrangements (World Bank 2020), and therefore requires careful policy considerations.

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3 For more information, see: http://www.nasa.gov/press-release/nasa-offers-licenses-of-patented-technologies-to-start-up-companies.

4 The term "technical framework" refers to defining the boundaries where innovation can take place.

1.2 Digital platforms: Pervading and penetrating different sectors of the economy

Digitalization is permeating different sectors of the economy, thereby improving efficiency and creating new sources of value. Figure 1.1 provides a landscape of digital platforms, showing that almost all major economic sectors are experiencing penetration. The use of digital platforms in the various sectors of the economy is quite diverse. Platforms can be classified into three broad categories: those that offer digital services or products to individual users, such as search engines or social media; those that facilitate and mediate between different users, such as business-to-business (B2B); and digital labour platforms. While most platforms can be allocated to one of these categories, some "hybrid" platforms provide services across multiple categories.

The penetration of digital platforms is having a profound impact on firms and sectors, as they reorganize markets and work arrangements, affecting competition and challenging regulatory models, thereby altering the rules of the game (Kenney and Zysman 2016). This section provides a glimpse into some of these impacts across the various sectors of the economy.

1.2.1 Digital platforms that offer services to individual users

Digital platforms are shaping social and economic exchanges, from social media platforms such as Facebook or TikTok that occupy an increasing role in the socio-economic lives of people around the world, to communication platforms such as Skype, WhatsApp, Viber or Zoom, which are playing a rapidly growing role in maintaining business continuity and remote working during the COVID-19 pandemic and also in people's personal lives.

Some platforms, such as Google and Facebook, also offer search functions and advertising to users, which reduces their search costs.

In addition, social media platforms such as Facebook are disrupting the advertising sector as they draw on the large amounts of data relating to their 2.8 billion users[5] to enable clients to reach audiences across geographical locations (Fumagalli et al. 2018). The availability of cloud infrastructure is also dramatically transforming the news and media industry. Online news and media platforms are competing fiercely with traditional news outlets, with a significant impact on the latter's businesses and workers.

> ## Digitalization is permeating different sectors of the economy.

There are also some platforms that provide video streaming services to individuals and businesses, as well as serve as social media platforms, such as YouTube, which have not only created opportunities for content creators to earn incomes by posting videos, but are also disrupting the advertising industry. For instance, YouTube generated more than US$34 billion in advertising revenue over three years (Alexander 2020). However, on social media platforms such as Facebook, YouTube and TikTok, the labour of users posting content who are often not paid or paid very little is vital for generating network effects and revenues. This report does not examine this type of labour.

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5 As of December 2020, Facebook had 2.8 billion monthly active users. For details, see: https://investor.fb.com/investor-news/press-release-details/2021/Facebook-Reports-Fourth-Quarter-and-Full-Year-2020-Results/default.aspx.

▶ **Figure 1.1 Landscape of digital platforms**

Services provided	Types of digital platforms

Provide services to individual users

- **Social media platforms** — Facebook • TikTok • Twitter
- **Electronic payment platforms** — PayPal • Paystack • Paytm
- **Crowdfunding platforms** — Catarse • Ketto • Kickstarter
- **Other digital services platforms**
  - News, media and entertainment — Apple TV+ • BuzzFeed • Netflix
  - Advertising — Gumtree • Kenhoo • OLX
  - Search, information and reviews — Feedly • Google Search • Yelp
  - Rental goods and assets — Airbnb • Homestay • Makemytrip
  - Communication — Skype • Viber • Zoom
  - Applications marketplace — Apple App Store • Aptoide • Google Play Store

Mediate work

- **Digital labour platforms**
  - Online web-based platforms
    - Freelance and contest-based — 99designs • Kabanchik • Upwork
    - Microtask — AMT • Clickworker • Microworkers
    - Competitive programming — Codeforces • HackerRank • Topcoder
    - Medical consultation — 1Doc3 • DocOnline • MDLive
  - Location-based platforms
    - Taxi — Bolt • Ola • Uber
    - Delivery — Meituan • Rappi • Uber Eats
    - Home services — Doit4u • Task Rabbit • Urban Company
    - Domestic work — Batmaid • BookMyBai • SweepSouth
    - Care services — Care24 • CareLinx • Greymate Care

Facilitate and mediate exchange

- **Business to business (B2B) platforms**
  - Retail and wholesale — Alibaba • Amazon • Mercado Libre
  - Manufacturing marketplace and analytics — AnyFactory • Laserhub • Xometry
  - Agriculture marketplace and analytics — Agri Marketplace • FarmCrowdy • Ninjacart
  - Financial lending and analytics — Ant Group • Avant • Nummo

Mediating work and providing other services

- **Hybrid digital platforms**
  - Services provided include: delivery, taxi, retail, entertainment, electronic payment — Jumia • Gojek • Grab

Digital platforms have facilitated access to a number of products, such as software programs or streamed music, which can be delivered digitally and remotely to consumers and businesses. This has led to a shift from tangible to intangible products, and can potentially lead to unfair competition, as streaming music on Spotify, for example, might not be taxed while an imported CD would be taxed. This can have implications for revenue generated through customs and tariffs, especially for developing countries, as there is currently a moratorium on customs duties regarding electronic transfer of products and services. In this context, there is an ongoing discussion on the World Trade Organization (WTO) digital trade rules: there is no consensus among countries, including developing countries regarding the continuation of the moratorium, with some preferring to end it in order to access revenue that could be used to finance digital infrastructure or other public goods (Rani and Singh 2019; UNCTAD 2018). For instance, countries could use the funds to allocate resources for social protection expenditures which have been squeezed during the COVID-19 crisis, with major implications for the welfare of workers (see section 4.2.5; Behrendt, Nguyen and Rani 2019).

1.2.2 Digital platforms facilitating and mediating exchange between users

The availability of cloud infrastructure has led to a rise in B2B, business-to-consumers (B2C) and digital labour platform business models (see figure 1.1). The rise of such platforms is reshaping the business landscape and changing the boundaries of the firm, while also creating competition and opportunities for traditional businesses.

In the B2B and B2C domain, the online retail sector has seen a prominent rise, which has led to a disruption of the traditional retail sector with a significant impact on both retail stores and the workers they employ. Penetration of platforms into other sectors, such as manufacturing, agriculture and finance, is at a comparatively early stage and the implications of these platforms

for both businesses and workers are not yet as profound as in the retail sector. The past few years have also observed a rise in hybrid platforms which offer both labour and other services such as e-commerce and payments.

Retail platforms. The most successful B2B and B2C models are in the online retail sector. The most successful examples of these models include Alibaba, Amazon and Flipkart. The global retail e-commerce market size in 2019 was valued at US$4.25 trillion (Grand View Research 2020). The e-commerce platforms compete with small retail stores and offer better pricing, as they are able to reduce transaction costs and costs related to renting stores and hiring retail personnel. The decline in retail businesses, exacerbated by the shutdown associated with the COVID-19 pandemic, has the potential to displace thousands of jobs in physical retail stores. A study conducted in Nordic countries shows that e-commerce revenues tripled over the period 2008 to 2018, and there was a 27 per cent increase in revenue in the first quarter of 2020 (Rolandsson 2020).

The rise of these platforms and new digital technologies is also affecting retail employment; in Nordic countries its share in total employment declined between 2009 and 2019 (Rolandsson 2020). It has also created challenges regarding the quality of the new jobs that have been generated, particularly those associated with logistics (such as warehouse and delivery workers for Amazon), where much of the employment growth has been in last-mile delivery and as low-paid jobs in warehouses (MIT 2020). Many of the delivery workers are being classified as independent contractors and as such find themselves outside the scope of employment protection, with irregular and low pay, and no protection in case of accidents at work (De Stefano 2019).

Several retail platforms have enabled SMEs and individual entrepreneurs to access a larger customer base by selling their products through the platforms. For example, 60 per cent of the products sold on Amazon are from third-party sellers (1.7 million SMEs) (Bezos 2020). While enabling access to a larger customer base, retail platforms also tend to charge different types of

fees to third-party sellers for every unit sold. In 2018, it was estimated that third-party sellers paid Amazon US$39.7 billion in fees;[6] its referral fee ranges from 6 per cent (personal computers) to 45 per cent (Amazon device accessories).[7] The high fees charged by the platform have had a major impact on the earnings of these small businesses during the COVID-19 pandemic, many of which had already been struggling due to the slowdown of the economy.

Many platforms have their own range of products, which compete with those from third-party sellers. However, the scale of the data that platforms are able to gather and analyse in making decisions about products to be sold, or their price, or about attracting users or customers, has allowed them to consolidate their position in the market. The pricing decisions based on such data can therefore have a large impact on third-party sellers on the platform as well as traditional retail stores, due to information asymmetry. The competition faced by enterprises, particularly SMEs, from platforms both within and outside the platform marketplace, has started to come under scrutiny (see section 3.4).

Manufacturing platforms. The manufacturing sector is progressively undergoing a digital transformation, whereby the supplier relationship is mediated through digital business platforms such as Laserhub, Tao-factory or Xometry. Some platforms, such as Tao-factory, which operates largely in garment and light industries, connect enterprises with consumers or customers on e-commerce platforms, such as Taobao. Once a buyer on the e-commerce platform places the order, the value chain is set in motion, and the order is manufactured and delivered within seven to nine days (Butollo 2020). Other platforms, such as Laserhub and Xometry, connect suppliers with material processing industries (Butollo and Schneidemesser, forthcoming). The platform networks are based on geographical proximity, and such developments can compete with traditional business and supply chains as they can respond to

individual customer needs in a more flexible and timely manner, and also provide factory-related analytics rapidly for improved efficiency. This might also have implications for working conditions as workers may have to work longer hours to meet the delivery deadlines.

Agriculture platforms. The agricultural sector has seen a rise in the number of farm management software tools and technologies, such as Agricolus, for providing market solutions and improving productivity. Use of the Internet of Things with sensors to collect real-time data and integrated monitoring systems to create optimal conditions for sowing, watering, fertilizing and harvesting is becoming increasingly widespread (Jayne, Yeboah and Henry 2017). These tools, along with big data analytics, help in optimizing agricultural operations through precision farming, or in improving crop yields and environmental management, among other applications. Other digital platforms, such as Agri Marketplace, are connecting farmers with markets. Although the opportunities and challenges arising from the use of these digital tools and platforms in the agricultural sector are not yet well understood, they are considered to have the potential to bring benefits to smallholders, particularly as a result of improved planting and crop rotation and through access to wider markets in the years to come.

Financial platforms. Another sector where significant transformations are taking place is the financial sector, which has become increasingly diverse and is competing with the traditional banking sector. For instance, the entry of companies such as Apple, Alphabet (includes Google) and Ant Group into the financial services sector, and the rise of payment platforms such as PayPal, Paytm, Venmo or TransferWise, are having a notable impact on the traditional banking sector (N.L. Johnson 2020). Many of the large companies in particular are able to leverage their existing relationship with customers and their data and to cross-subsidize their new offerings. Further innovation and expansion in new financial services

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6 For more information, see: https://www.marketplacepulse.com/marketplaces-year-in-review-2019#google.

7 For more information, see: https://sell.amazon.com/pricing.html#referral-fees.

have the potential for financial inclusion of those engaged in the informal economy in developing countries. This trend could result in innovations in traditional banking operations in response to the competition due to digital transformation, and could lead to scaling down of employment.

1.2.3 Digital labour platforms mediating work

Digital labour platforms are the predominant form of platform connecting workers with businesses and clients, and have significant implications for the world of work. It is these platforms that are the main focus of this report. Currently, there are two main types of digital labour platform: *online web-based platforms*, where tasks are performed online and remotely by workers; and *location-based platforms*, where tasks are performed at a specified physical location by individuals (see figure 1.1). Online web-based platforms include microtask, freelance, contest-based, competitive programming and medical consultation platforms, while location-based platforms include those offering taxi, delivery, domestic, care and home services. Much attention has been given in recent years to location-based platforms such as Deliveroo, Giovo and Uber, especially in developed countries. Online web-based platforms are also gaining popularity among businesses. Many freelance and competitive programming platforms, such as Upwork and Topcoder, though less well-known, have been operating for over two decades.

Online web-based labour platforms offer varied services to both individual customers and business clients. For instance, freelance and contest-based platforms enable workers to connect with clients for specific tasks ranging from translation to graphic design, while medical consultation platforms allow individuals to access medical advice from doctors online. Through the use of technology, *location-based platforms* mediate various services, such as taxi and delivery services, which often continue to operate in parallel with traditional labour markets. Other such mediated services include domestic, care and home services, with
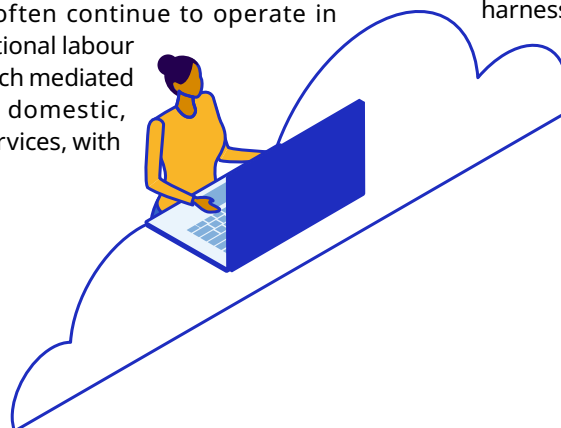
individual workers providing labour services at the homes of individual customers. Digital labour platforms are enabling the reorganization of activities that have conventionally relied on traditional employment relationships into work performed by independent contractors or the self-employed. Work is often performed on an on-demand basis, wherein the logic of the "just-in-time" inventory system is applied to the labour process (Vallas 2018, 49). Compensation is on a piece-rate basis, and workers, who are defined as self-employed, are required to provide their own capital equipment (Stanford 2017; Drahokoupil and Fabo 2016).
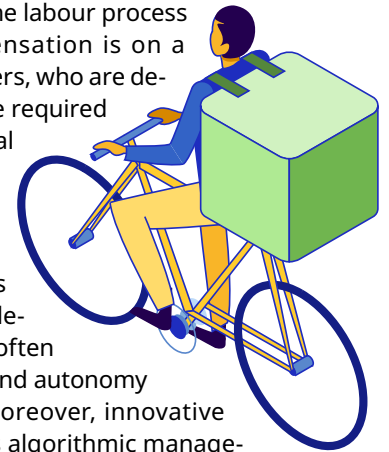
Although platform workers are usually classified as independent contractors, they often do not have the freedom and autonomy to organize their work. Moreover, innovative platform practices such as algorithmic management are used to allocate work and manage, supervise and reward workers (see section 4.3.1). Digital labour platforms have tremendous control over the organization of work and workers' compensation, while "still claiming to be only an intermediary" (Kenney and Zysman 2016, 62). Such outcomes of technological advances represent a return to the past as the workers are engaged as casual labour and paid on a piece-rate basis, which adds to the growing informal or non-standard workforce in developing and developed countries alike. This situation presents new challenges to traditional work arrangements and the standard employment relationship (see section 5.3.10), as well as exacerbating existing challenges, notably the use of non-standard forms of work.

A number of digital labour platforms compete with businesses in traditional sectors, relying on data and competitive pricing. Location-based platforms, such as taxi platforms, have disrupted established transportation business models by harnessing data and algorithms to match passengers with drivers in real time (Clewlow and Mishra 2017). Uber, for example, entered a tightly regulated taxi market in

� ▼ Work is outsourced
on these platforms by
businesses in the global
North, and performed by
workers in the global South.

the United States and challenged traditional taxi drivers by offering low-cost subsidized fares and allowing individuals who were not licensed taxi drivers to offer rides (Horan 2019). Furthermore, Uber's entry into and surge in the market have been funded extensively by venture capital funds despite the losses incurred since Uber's inception (see section 1.5). Similarly, freelance platforms, such as Freelancer or Zhubajie (ZBJ), are competing with traditional employment agencies by matching tasks with workers for businesses at a lower cost and without the need to abide by the protections associated with an employment relationship.
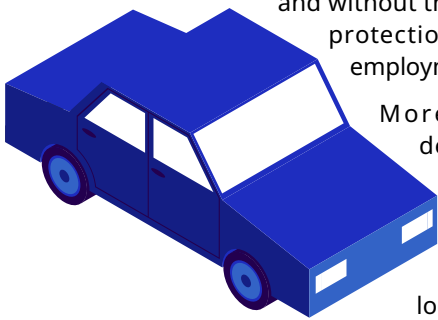
Moreover, a trend has developed towards out-sourcing work, both low-skilled and high-skilled, especially as traditional businesses look to digital labour plat-forms and digital tools to meet their needs for human resources. These platforms host workers from around the world, enabling businesses to complete 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. This is illustrated by data from 200,000 projects collected on a major freelance platform for the period January to December 2019.[8] Figure 1.2 displays whether the demand for work comes from within the country or from abroad, and the size of the bubble shows the inflow of trade (volume of work) in millions of US dollars coming into the country. The data collected shows that the demand for work largely originates from Australia, Canada, Germany, New Zealand, the United Kingdom of Great Britain and Northern Ireland, and the United States. A large proportion of this work is performed by workers in developing countries, particularly in India (US$26 million), which accounts for almost 20 per cent of the total

market, followed by the Philippines (US$16 million) and Ukraine (US$13 million). Overall, the picture of outsourcing work through digital platforms has not changed compared to 2013 (Graham et al. 2017), while the volume of transactions has increased and almost all countries now have a higher share of domestic employers outsourcing tasks on these platforms. Hence, online labour markets are more diffused around the globe.

By engaging with platform workers in locations with lower price and wage levels, businesses can further reduce their costs, while providing employment opportunities. The median hourly wages on the platform, which is the inner circle illustrated in figure 1.2, are clearly higher in de-veloped countries than in developing countries. However, the geographical location where the tasks are completed is related not only to the price level but also to skill requirements, both technical and language, as well as the availability of IT infrastructure. For instance, among de-veloping countries a much larger share of tasks is completed by workers in South Asia and East Asia compared to Central Asia and sub-Saharan Africa. This is despite low wage levels in the latter regions and can be attributed to the availability of the requisite IT and other skills and infrastructure in the former regions. As a result, a number of developing countries are investing in the devel-opment of IT infrastructure in order to be able to benefit from this outsourcing model. In such a context, it is of critical importance to analyse the opportunities and challenges arising from digital labour platforms.

This report focuses on the rise of digital labour plat-forms to gain a more nuanced and comprehensive

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8 In order to map the countries where online work is performed, transaction data for 2019 was obtained from one of the largest online freelance platforms. This platform offers services across a range of occupations. The anonymized transaction data was obtained for the period January to December 2019 using the application programming interface; this is a sample of all projects on the platform, with a total volume of US$135 million.

Figure 1.2 Outsourcing of tasks on a freelance platform across countries, inflow of work and earnings, 2019

Total inflow of remaining countries (in million US$)

Northern, Southern and Western Europe	1.2	(16 countries)
Latin America and the Caribbean	0.7	(23 countries)
Eastern Europe	0.5	(2 countries)
Arab States	0.3	(8 countries)
East Asia	0.3	(5 countries)
South-East Asia and the Pacific	0.1	(8 countries)
Central and Western Asia	0.1	(4 countries)
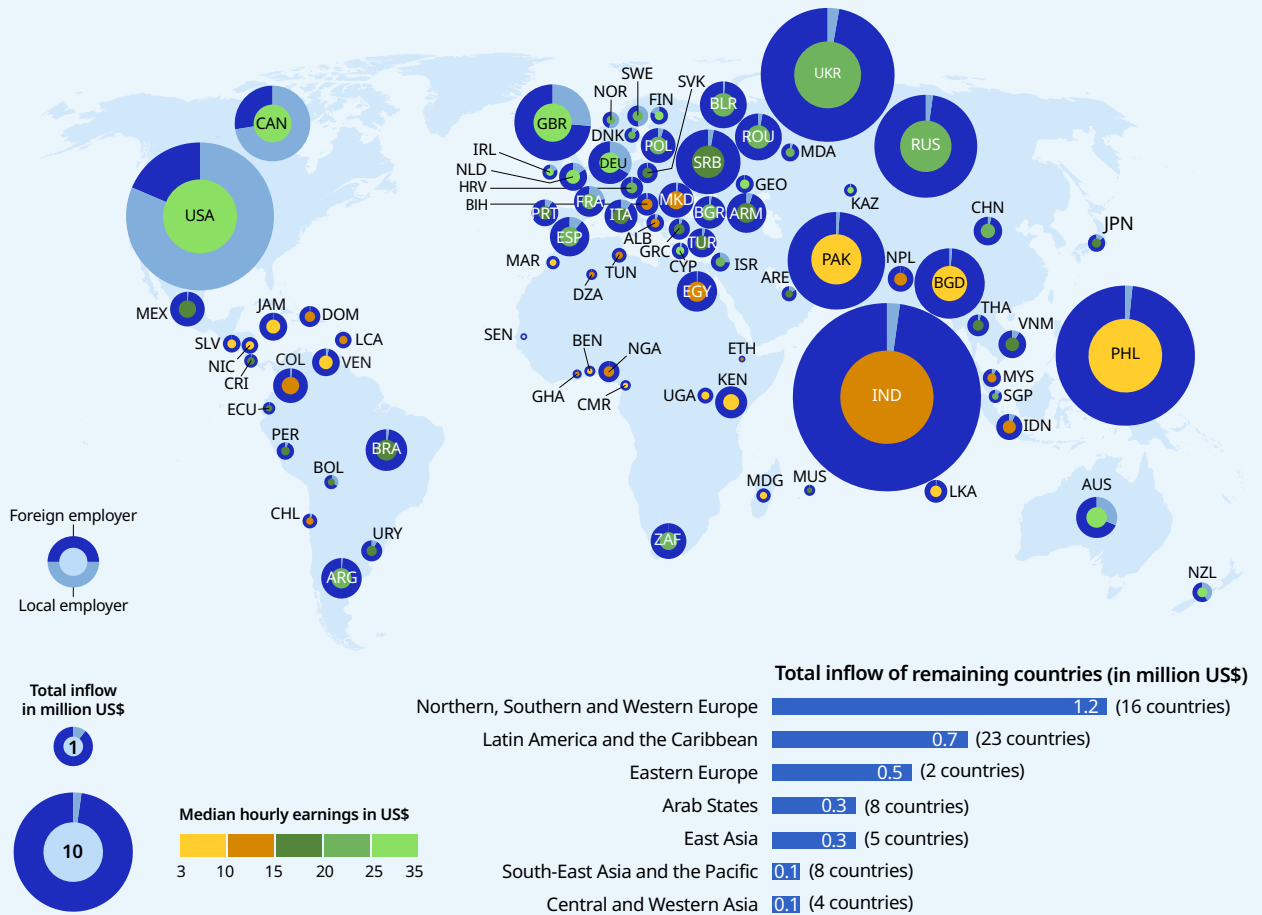
Note: For country codes see Appendix 1.

Source: Data collected by Fabian Braesemann, Oxford Internet Institute, iLabour Project.

understanding of the implications of their rapid growth for both businesses and the workers whose work is mediated through such platforms. The various types of digital labour platforms examined in this report include: freelance, contest-based, competitive programming and microtask platforms, which are among the leading online web-based platforms facilitating labour exchanges between workers and clients (including businesses), covering multiple forms of activities, skills and tasks. Location-based platforms include taxi and delivery services, which not only comprise some of the largest and most well-funded labour platform companies globally, but also mediate work for a large number of workers. Some of these platforms have had a far-reaching social and economic impact in many countries, at times severely disrupting long-standing traditional sectors. The report makes an attempt to understand the nuances of these diverse types of digital labour platform, and the emerging opportunities and challenges for the world of work today.

1.3 Digital labour platforms: Estimates of the number of platforms and workers

The traditional statistical methods used in enterprise and worker surveys do not fully capture these types of digital labour platforms or the number of people whose work is mediated by them and their working conditions. This raises a huge challenge with regard to estimating the number of workers involved and the number of digital platforms in operation as well as the extent of their penetration. This section presents some estimates of and trends in relation to the number of active digital labour platforms, using new online databases, and some estimates of the numbers of workers engaged or mediated through these platforms, using various sources. Finally, based on data from major English-speaking online web-based platforms, certain trends in demand for work and the supply of labour are also presented.

1.3.1 Number of digital labour platforms

The number of digital labour platforms, both online web-based and location-based, has grown rapidly over the past decade. Focusing on online web-based platforms (microtask, freelance and competitive programming) and location-based platforms in the taxi and delivery sector, globally, there were at least 777 active platforms[9] operating in January 2021 (based on data from the Crunchbase database;[10] see figure 1.3). The number of platforms in the delivery sector is the highest (383), followed by online web-based platforms (283), taxi sector (106) and there are five hybrid platforms which provide varied types of services such as taxi, delivery and e-commerce

services. Among the online web-based platforms, the majority are freelance platforms (181), with a lower number of microtask (46), contest-based (37) and competitive programming (19) platforms.

> The number of digital labour platforms has grown rapidly over the past decade.

Online web-based platforms, such as Elance (today Upwork, after its merger with oDesk) (1999) and Topcoder (2001), were pioneers in setting up crowd-based digital labour platforms as a business model. Whereas Elance tried to build a global marketplace to connect freelancers with employers, Topcoder tried to build a "community of programmers" who could re-use basic computer program components and find innovative solutions to software problems, thus saving clients time and money (Lakhani, Garvin and Lonstein 2012, 2). The notion of using "crowdworkers", which gained momentum from the beginning of the 2000s, led to the growth of online web-based platforms. The global recession of 2008–09 fostered the development of online labour platforms across different regions, as businesses came to rely on them for outsourcing various tasks (see figure 1.3).

The global recession of 2008–09 also saw the rise of taxi and delivery platforms as an alternative

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9 This figure would be much higher if all types of digital labour platforms were included, as in figure 1.1.

10 Crunchbase is a database that contains business information about private and public companies and start-ups. It obtains its data in four ways: the venture program, machine learning, an in-house data team, and the Crunchbase community. The venture program allows investors to keep their firm's Crunchbase profile up to date and provides members with free access to company data on Crunchbase and other discounts. Members of the public can submit information to the Crunchbase database. The list of companies and start-ups in the database provides data on their location, funding history, investment activities, acquisition trends and number of employees. It covers platforms from 98 countries around the globe. As it is self-reporting, it is likely that some active platforms, especially from developing countries, are not listed in the database.

▶ **Figure 1.3 Number of active digital labour platforms globally, selected categories**
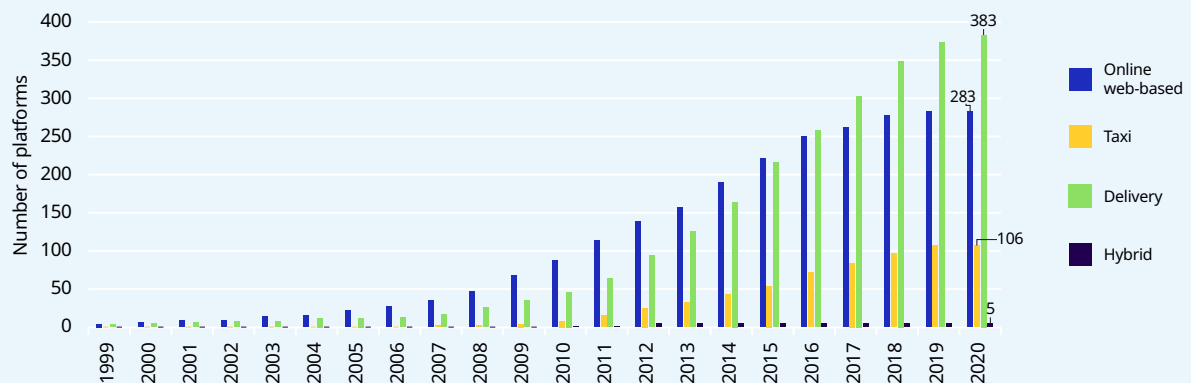
Note: Only currently active platforms are included.

Source: Crunchbase database.

to traditional taxi and delivery services: by using technology, clients could access these services at a competitive price, with the platforms also providing work opportunities. These platforms gained popularity among many different users and grew rapidly between 2012 and 2018 (see figure 1.3). During this period, activities on delivery platforms expanded from food delivery services to grocery, courier services and more. The past five years have seen a growth in hybrid platforms such as Grab and Jumia which offer a wide range of labour and other services, and some of the taxi and delivery platforms are also shifting towards a hybrid model.

1.3.2 Number of workers engaged on digital labour platforms

Digital labour platforms offer two types of work relationships: workers who are directly hired by the platforms (internal employment), and workers whose engagement and work are mediated through the platforms (external employment) (ILO, EU and OECD, forthcoming). Numbers in the latter category are particularly challenging to estimate due to the paucity of data, as most platforms do not disclose the number of active

workers who undertake platform work. Despite the absence of such transparency, an attempt is made here to provide estimates based on surveys conducted by researchers and statistical offices. This section also examines the issue of excess supply of labour on online web-based platforms.

Workers directly hired by digital labour platforms

Data on the number of employees directly hired by digital labour platforms is available for 749 platforms (96 per cent) of the 777 platforms, either from annual reports or databases (Crunchbase and Owler). These employees perform tasks related to the creation, maintenance and overall functioning of the platform, and are hired on a full-time or part-time basis, or on a fixed-term basis (Kenney and Zysman 2018a). Platforms also hire freelancers for the development and maintenance of the platform. For example, Upwork, apart from employing 570 employees globally, also "engaged over 1,200 freelancers to provide services … on a variety of internal projects" in 2019 (Upwork 2019, 4). Information on the engagement of freelancers by platforms is difficult to capture unless platform companies declare it in their annual reports.

▶ **Figure 1.4 Global share of digital labour platforms, by number of employees, January 2021**
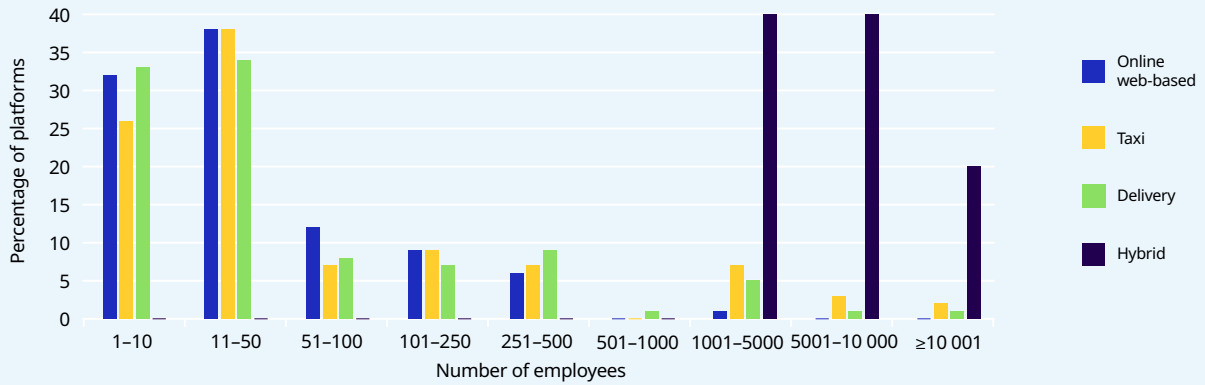
Source: Crunchbase database.

The analysis of the available data shows that in terms of employment, many online web-based and location-based platforms are micro and small enterprises, directly employing either fewer than 10 employees or 11–50 employees (see figure 1.4). Only a few delivery and taxi platforms have more than 1,000 employees. Uber is the largest employer among taxi platforms (26,900 employees; mainly highly skilled professionals such as lawyers, marketing experts, software engineers and other professionals) (Uber 2020a). It also has taxi drivers who are full-time employees (Kenney and Zysman 2018a). In the delivery sector, a number of platforms, including Meituan, Delivery Hero, Swiggy and Ele.me, have more than 10,000 employees. These large entities, apart from hiring employees for managing and running the platforms, also hire delivery workers on a full-time or part-time basis. This strategy allows them to ensure a reliable service as they capture market share, and they change their labour practices once they achieve their objective (see section 2.3.1).
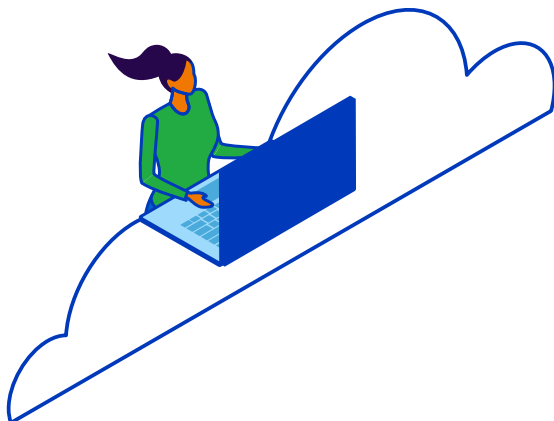
Workers whose engagement and work are mediated through digital labour platforms: Estimates based on surveys

The lack of transparency on the part of platforms in sharing data has led researchers and statistical offices to use surveys to estimate the number of workers whose work is mediated by the platforms. The research shows large variations in the estimates due to definitional and methodological differences. On the definitional differences, surveys have used broad or narrow definitions of the types of platform covered and the reference period in question. In terms of types of platform, the broad definitions used cover digital labour platforms, e-commerce, rental and payment platforms, while narrower definitions are restricted to digital labour platforms (both online web-based and location-based). Concerning the reference period, broad definitions include individuals who have performed tasks or have ever worked or earned money on a platform, or did so during the previous year, while narrow definitions are restricted to whether they have worked on a platform in the previous month or week, or do so on a monthly or weekly basis. On

▶ **Figure 1.5 Estimates of workers engaged on digital platforms based on surveys (percentage of adult population)**

Types of platforms covered

| Digital labour platforms | Digital labour platforms, e-commerce and rental platforms |

Reference period

Ever
14 EU Member States, 2017[1]   9.7
7 European countries, 2016–17[2]   9–22

United States, 2015[13]   22

Last year
Canada, 2015–16[3]   0.3
Switzerland, 2019[4]   0.4
Norway, 2016–17[5]   1
Denmark, 2017[6]   1
Sweden, 2016[7]   2.5
United Kingdom, 2016[8]   4
16 EU Member States, 2018[9]   11

Switzerland, 2019[4]   1.6
Denmark, 2017[6]   2.4
United States, 2016[10]   4.5
Finland, 2017[14]   7

Last month/ monthly
United States, 2016[10]   1.1
14 EU Member States, 2017[1]   7.7
16 EU Member States, 2018[9]   8.6
7 European countries, 2016–17[2]   6–15

Last week/ weekly
United States, 2015[11]   0.5
United States, 2017[12]   1
7 European countries, 2016–17[2]   5–12

[1] Pesole et al. (2018); [2] Huws et al. (2017); [3] Canada, Statcan (2017); [4] Switzerland FSO (2020); [5] Alsos et al. (2017); [6] Ilsøe and Madsen (2017); [7] Sweden SOU (2017); [8] CIPD (2017); [9] Urzì Brancati, Pesole and Fernández Macías (2020); [10] Farrell, Greig and Hamoudi (2018); [11] Katz and Krueger (2016); [12] United States BLS (2018); [13] Burson-Marsteller, Aspen Institute and *Time* (2016); [14] Statistics Finland (SF) (2018).

Source: ILO compilation based on the above sources.

the methodological differences, the surveys follow either an income-based or a job-based approach. An additional definitional difficulty relates to having a clear understanding of the definition of "platform" among the respondents.

Using a very broad definition, estimates indicate that 22 per cent of the working-age population in the United States have offered some kind of good or service using a digital platform, and about one third of them also reported earning at least 40 per cent of their monthly income from platform work (see figure 1.5; see also Appendix 1, table A1.2). However, the estimates in other countries range between 1.6 per cent (Switzerland) and 7 per cent (Finland) if the past year is used as the reference period. Focusing more narrowly on having ever worked or earned income only on digital labour platforms, the estimates vary between 9 and 22 per cent for selected European countries. If the time period is narrowed down to the past year, estimates range between 0.3 per cent (Canada) and 11 per cent (16 European Union (EU) Member

States). When the time period is further narrowed down to the past month, then the estimate of workers engaged on digital labour platforms in these 16 EU Member States declines to 8.6 per cent of the adult population. Narrowing down to the previous week, the estimates show that the proportion of workers who are engaged on digital labour platforms varies between 0.5 per cent in the United States and 12 per cent in selected European countries.

Some surveys have also captured the proportion of the population that uses digital services, covering digital labour, e-commerce and rental platforms in Canada and the United States (see Appendix 1, table A1.2). The findings in the United States show that about 42 per cent of the adult population has purchased or used one of the services (Burson-Marsteller, Aspen Institute and *Time* 2016). The Canadian labour force survey also captured the proportion of the adult population that has used taxi or accommodation services, which amounted to 9.5 per cent (Canada, Statcan 2017).

Workers whose work is mediated through online web-based platforms: Estimates based on data available on platforms

Information on the number of workers registered on various platforms can be found on the websites of the platforms themselves (see table 1.1). Not all registered workers are active and able to access tasks and work on a regular basis, however, which results in an overestimation of those numbers. Workers may also be registered on multiple platforms and thus possibly be counted twice, which makes it difficult to estimate the number of workers who depend on platforms to earn a living.

A recent study has attempted to collect and annotate publicly accessible data on freelance and contest-based platforms (Pesole and Rani, forthcoming). Data was retrieved, whenever technically feasible, from the online interface (website or application) of five freelance and contest-based platforms (see table 1.1). The data obtained relates to September 2020 and shows that Guru has about 1 million registered workers, while on the other four platforms the number ranges between 42,000 and 126,000 workers.

The proportion of active workers on these platforms is measured either by the number of projects completed or by the income earned since their registration on the platform, as a proxy. About one third of registered workers have completed at least one project successfully on these platforms (PeoplePerHour, 99designs and Workana). If the threshold is increased to ten projects, considering workers having earned a reasonable amount of income from the platform, then the share of active workers drops to 10 per cent or less.

On Freelancer and Guru, the number of active workers was captured using incomes earned from these platforms. According to data retrieved on Freelancer, 95,813 workers were registered on the platform, and while a large proportion of them (73 per cent) had earned some income, only 27 per cent had earned more than US$1,000 (see table 1.1). On Guru, meanwhile, out of 1.05 million registered workers, only 0.5 per cent had earned any income and 0.1 per cent had earned more than US$1,000. The large differences in the proportion of active users on various platforms could be partly due to some platforms, for instance Freelancer, charging workers a fee for maintaining their inactive account (see table 2.1), while platforms such

▶ **Table 1.1 Number of registered and active workers on selected digital labour platforms, September 2020**

	Number of registered workers	Active or successful workers		Oversupply of workers (%)
		At least one project/ more than US$1	More than 10 projects/ more than US$100	
PeoplePerHour*	126475	29143 (23%)	10798 (9%)	91.0
99designs*	42781	15794 (37%)	4271 (10%)	90.0
Workana*	95600	26312 (28%)	4820 (5%)	95.0
Freelancer**	95813	69993 (73%)	26195 (27%)	73.0
Guru**	1048575	4862 (0.5%)	1385 (0.1%)	99.9

* Refers to active workers based on completed projects. **Refers to active workers based on income earned.

Note: "Oversupply" is defined as the difference between registered and active workers (more than 10 projects/more than US$100 earned) on the platform. Figures in parentheses are percentages of total registered workers.

Source: Pesole and Rani (forthcoming).

as Guru do not charge membership or basic fees and may allow workers to have accounts even if they are inactive. The different approaches and strategies used by the platforms make it difficult to provide any reliable estimates of workers whose work is mediated through these platforms on the sole basis of information available on registered workers.

Overall, the lack of common definition and methodological approaches, as well as lack of transparency on the part of the platforms are an obstacle to estimating the number of workers whose work is mediated through digital labour platforms. This calls for digital labour platforms to be transparent and disclose the number of active workers whose work is mediated through them.

1.3.3 Trends in labour demand and supply on selected online web-based platforms

Data tracked on the four largest English-language online web-based platforms shows that the number of registered workers on these platforms has been increasing since 2017 (see figure 1.6). This data has been collected by researchers at the Oxford Internet Institute since 2016 and represents at least 70 per cent of the market traffic for work mediated through online web-based platforms and involving workers and requesters from 105 countries (Kässi and Lehdonvirta 2018). The data on *labour supply* captures the number of workers registered on these platforms (though not necessarily active), and *labour demand* captures the number of public projects and tasks that are posted by clients. This data has been used to construct the Online Labour Index (OLI), which measures the use of online labour platforms "over time and across countries and occupations" (Kässi and Lehdonvirta 2018, 241).[11]

There has been an increase in both labour demand and supply for such work on online web-based platforms between 2017 and 2020. The onset of the COVID-19 pandemic and the resultant switch to remote work and teleworking have led to an increase in demand for such work from mid-April to June 2020, unlike previous years. The data shows that supply has been rising faster than demand, including during the COVID-19 crisis (see figure 1.6). This indicates that while it may be easy to register as a worker on a platform, being able to receive work and earn a substantial amount of income can be quite difficult, especially since workers have to compete with one another globally to obtain the tasks posted on platforms. The excess supply of labour on platforms can also be deduced from table 1.1, which shows that more than 90 per cent of the workers on some platforms are unable to find projects to work on or earn an income. This is not specific to freelance and contest-based platforms; it can also be observed on microtask platforms where the number of registered users is far higher than the number of tasks posted, which results in competition for tasks even when the remuneration for performing the tasks is low (Dube et al. 2020).

Some researchers have analysed AMT, a microtask platform, to show that the excess supply of labour and the monopsony among platforms do not encourage businesses to price their tasks at a higher rate and allow them to fix rates convenient to them (Dube et al. 2020; Kingsley, Gray and Suri 2015). In fact, this trend impacts on the distributional gains on these platforms since it has a considerable effect on wages, "with workers paid less than 13 per cent of their productivity" (Dube et al. 2020, 44). Some platforms have recently changed their strategies to address the excess supply of labour by offering membership or subscription plans and charging additional fees so that workers have better opportunities to access tasks on the platform (see section 2.2 for details).

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11 The index is based on tracking all projects and tasks posted on five platforms (Freelancer, Guru, AMT, PeoplePerHour and Upwork). For details about the methodology used to construct the index, see Kässi and Lehdonvirta (2018).

▶ **Figure 1.6 Online global labour supply and demand on major online web-based platforms, 2017–21**
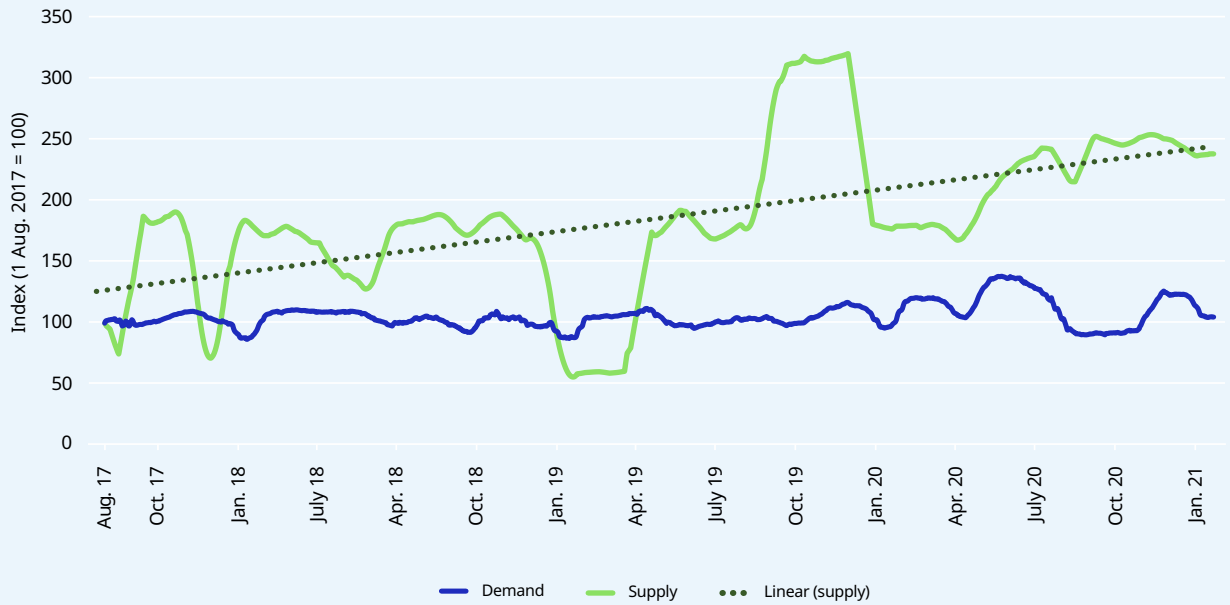
Note: Labour supply is captured from four platforms (Fiverr, Freelancer, Guru and PeoplePerHour). Labour demand is captured from five platforms (Freelancer, Guru, AMT, PeoplePerHour and Upwork). The data is retrieved every 24 hours from each platform.

Source: Online Labour Observatory (iLabour Project, Oxford Internet Institute and ILO).

▶ **Figure 1.7 Global demand for labour across occupational categories on five major online web-based platforms, 2018 and 2020**
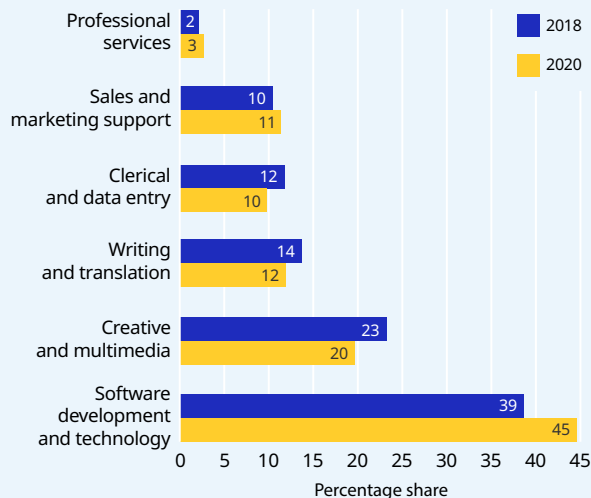
Source: As for figure 1.6.

Demand for and supply of labour across occupations

The tasks performed on these platforms can be classified into the following occupational categories: software development and technology; creative and multimedia; writing and translation; clerical and data entry; sales and marketing support; and professional services. Globally, a large proportion of tasks are completed in the field of software development and technology, whose share increased from 39 per cent to 45 per cent between 2018 and 2020 (see figure 1.7). Professional, and sales and marketing services also gained in importance, whereas occupations such as creative and multimedia, writing and translation, and clerical and data entry declined between 2018 and 2020.

▶ **Figure 1.8 Distribution of global labour supply and demand on major online web-based platforms, by country and occupational category, 2018 and 2020**

(a) Online labour demand
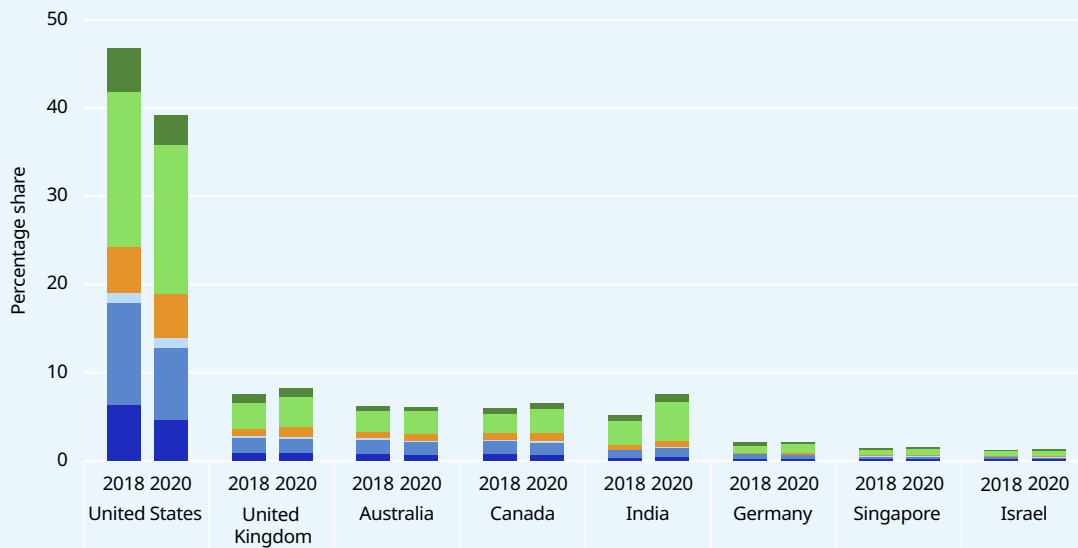
(b) Online labour supply

Legend:
- Clerical and data entry
- Creative and multimedia
- Professional services
- Sales and marketing support
- Software development and technology
- Writing and translation

Source: As for figure 1.6.

The clients who demand such work are largely based in developed countries, with four of the top five countries belonging to this group (see figure 1.8a). Globally, in 2020 about 40 per cent of the demand for such work was from clients based in the United States. Compared to 2018, however, the share of demand from the United States for such work has declined while that from Australia, Canada, Germany, India and the United Kingdom has increased. The share of tasks or projects posted by clients in these countries remains comparatively small. The demand for such work from clients in Europe, excluding the United Kingdom, represents only about 16 per cent of the total. Among the countries in Asia, about 8 per cent of the global demand for such work comes from clients based in India, while the share of other Asian countries is very small (1–2 per cent). The presence of clients from Africa and the Middle East on these platforms is even smaller.

The disaggregation of demand for work by occupation and by country shows that software development and technology are the most sought-after occupations on these platforms across countries (see figure 1.8a). The share of demand in this field has increased worldwide between 2018 and 2020, with higher demand from clients in India compared to other countries. The share of demand for creative and multimedia, clerical and data entry, and writing and translation has declined in most countries, the largest decline being observed in the United States. As these recent trends relate to the period when the global economy is experiencing the effects of the COVID-19 crisis, the decline in the demand for such tasks may be due to the uncertainty caused by the pandemic.

In contrast to the demand for work, the supply of labour on these platforms originates mainly from a number of developing countries, in particular Bangladesh, India, Pakistan, the Philippines and Ukraine, apart from the United Kingdom and the United States (see figure 1.8b). Workers from India are the largest suppliers of global labour; India's share of total supply rose by about 8 percentage points between 2018 and 2020, while it declined in other developing countries, except Ukraine. Meanwhile, the share of the supply of labour

from the United States has declined over the same period, while that from the United Kingdom has increased.

Given the large, highly educated English-speaking workforce in India, it is not surprising that the share of platform work completed by workers from that country is quite substantial. The high global demand for software development and technology has also led to an increase in the supply of labour for these tasks. The rise in the share of total supply coming from India was driven by an increase in the share of labour supply in software-related tasks, which is consistent with the extensive offshoring of IT, BPO and software services to India (see box 1.3 for more details). The other occupational category where the share of labour supply from India increased was that of creative and multimedia services (3 percentage points).

Online web-based platforms often do not provide information on gender, and it is therefore difficult to disaggregate the distribution of workers by sex. To resolve this issue, researchers have used an algorithm that allows them to infer the sex of the worker from first names, country of origin and date of birth (as certain names were quite popular at a certain point in time), using historical data (Blevins and Mullen 2015). Based on this algorithm, a small random sample of workers from the Online Labour Observatory were disaggregated by sex across different occupations for India, Ukraine and the United States (see figure 1.9).

The distribution shows that the participation of women on online web-based platforms is lowest in India (21 per cent), while it is higher in Ukraine (39 per cent) and the United States (41 per cent). The distributions by sex at the country level are very similar to the findings from the online surveys conducted by the ILO (Berg et al. 2018; see section 4.1.2). Across occupations, in all three countries the proportion of women is quite high in writing and translation. A higher share of women in the United States is engaged in clerical and data entry, creative and multimedia, and sales and marketing compared to other countries. In India, the share of women across all occupations is lower than in other countries, even in occupations such as writing and translation, which are female-dominated in the other two countries.

▶ **Figure 1.9 Gender distribution of labour supply on online web-based platforms, by occupation, selected countries, October 2020 to January 2021**

All occupations

Clerical and data entry

Creative and multimedia

Professional services

Sales and marketing

Software and technology

Writing and translation

■ Female   ■ Male
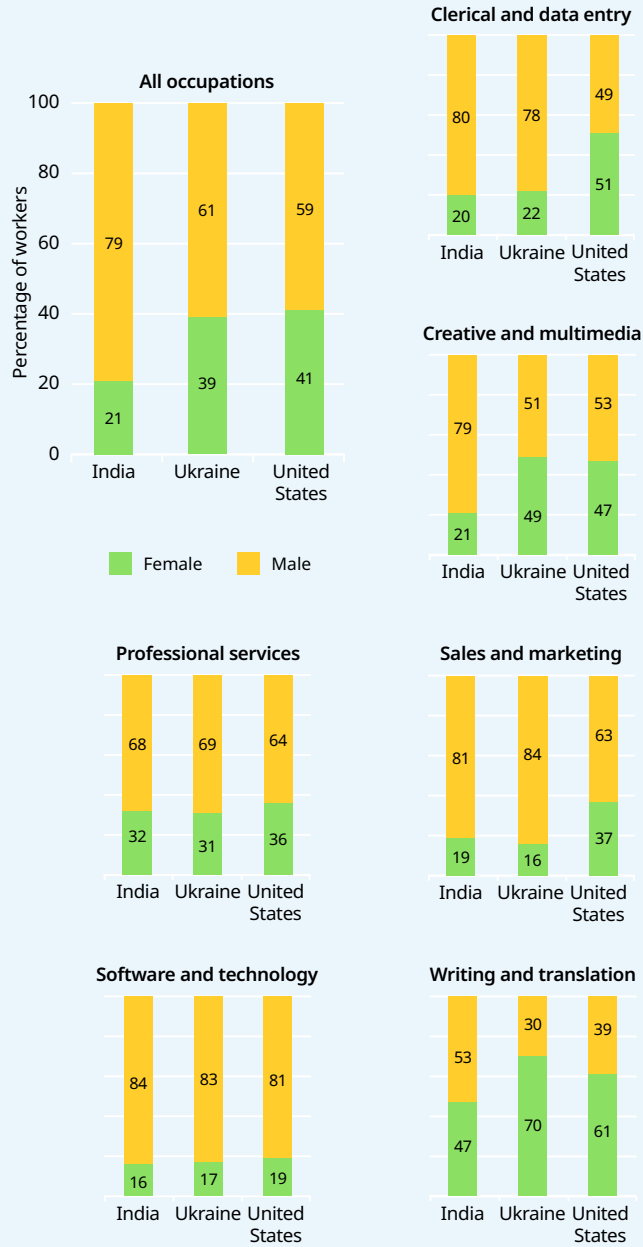
Source: As for figure 1.6.

▶ **Box 1.3 COVID-19 impact on online web-based platforms**

After the widespread outbreak of COVID-19, there was a decline in both the demand for work and the supply of labour in March 2020, after which activity picked up gradually from early April 2020 (see figure 1.6). On the demand side, there was a rise between April and May, after which demand declined gradually and then stagnated until October, when it picked up again. The impact of COVID-19 seems to affect clients and workers differently across countries. To understand these impacts, two countries are analysed: the United States and India. These countries have the largest presence in both posting of tasks and projects (labour demand) and registered workers (labour supply) on platforms.
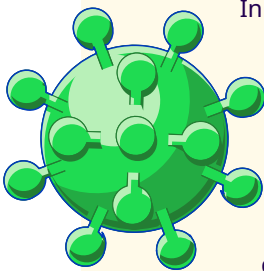
In the United States, the demand for labour declined soon after the outbreak of the pandemic in mid-March (see figure 1.10a), and it picked up in April and continued to rise until May. This decline was observed across all occupational categories until late October. The declining trend could be due to firms or clients being cautious and reducing their expenditures, including by outsourcing non-essential tasks as a result of a fall in their revenues, and postponing expenditures for the future (Stephany et al. 2020). In October 2020 there was an increase in demand across all occupational categories, with the largest increase in tasks related to clerical and data entry and professional services, and the levels were higher than those observed in February 2020.

The labour supply has increased substantially compared to labour demand (see figure 1.10a). There was a steep increase in the number of registered users on these platforms originating from the United States in April and May 2020, particularly in software development and technology, and in creative and multimedia services, followed by a small decline during the next few months. The increase observed in these two categories may have been prompted by the expectation of higher demand for such tasks.

▶ **Figure 1.10 Online labour demand and supply, the United States and India, 2018 and 2020**

(a) United States

••• Demand 2018   ▬▬ Demand 2020   ••• Supply 2018   ▬▬ Supply 2020
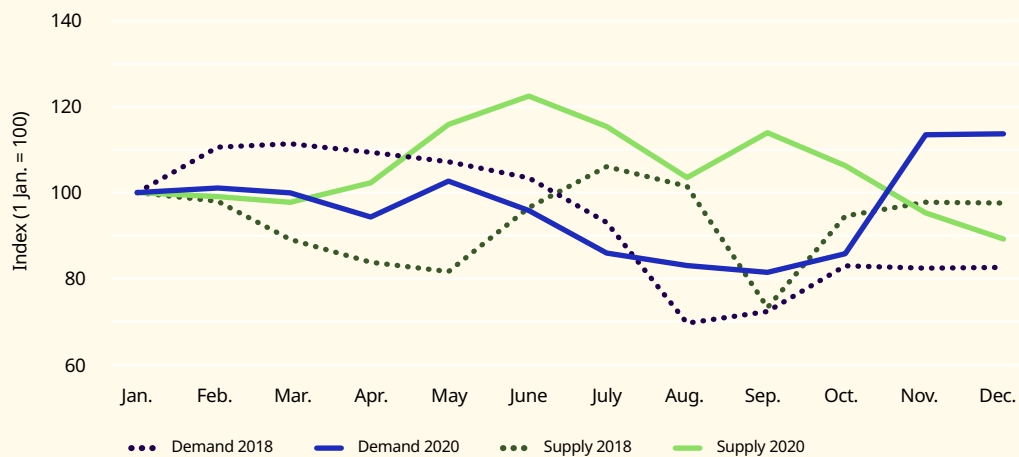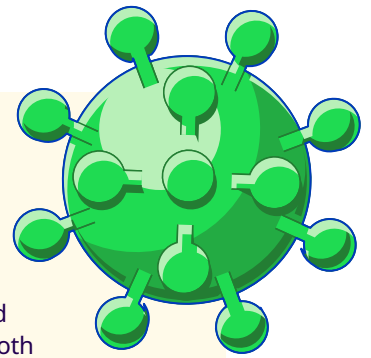
▶ **Box 1.3 (cont'd)**

In India, by contrast, both labour demand and labour supply increased from mid-March 2020 onwards (see figure 1.10b). The increase in demand was largely driven by clerical and data entry, professional services, and software development and technology, and demand was 50 per cent higher than at the beginning of 2020. The increased demand for software development and technology could be due to the need for software solutions that enable a smooth functioning of a remote working environment. The increase in demand for work across other occupations could be attributed to the declining revenues of companies, and it is possible that many firms or clients were considering these platforms as a substitute for on-site work (Stephany et al. 2020).

At the same time, there was also a steep increase in the number of registered workers across all occupations, except for professional services. The general increase in labour supply was unaffected by the seasonal patterns, in contrast to what was observed in the global trends, indicating a steady demand of such work locally and regionally.

▶ **Figure 1.10 (cont'd)**

(b) India

Legend: ●●● Demand 2018   ▬▬ Demand 2020   ●●● Supply 2018   ▬▬ Supply 2020
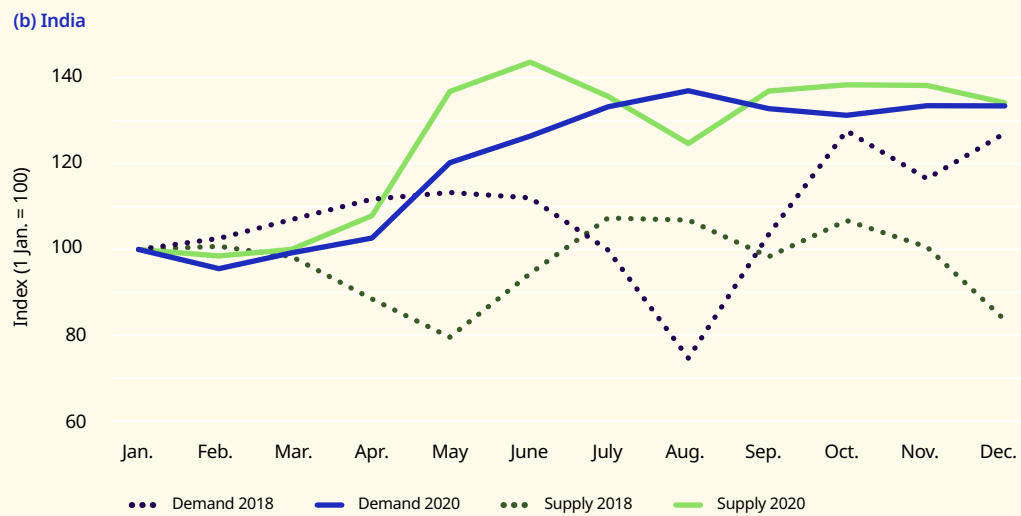
Source: As for figure 1.6.

1.4 The data-driven economy and the rise of machine-learning algorithms

With the growth of digital platforms, data has become a valuable strategic economic resource across various sectors of the economy. The importance of data has been gaining momentum since the beginning of the 2000s, and digitalization has facilitated the collection, processing, storage, use and transfer of data for different purposes (Rani and Singh 2019). The advances in cloud infrastructure such as cloud storage and cloud computing have enabled businesses to not only collect data at a speed and scale that was not possible at the end of the twentieth century, but also to store, structure and analyse data (Sheriff 2018). This section focuses on some of the concerns related to how data is being used, who owns data and how it impacts different users.

Data can be collected from a vast array of sources (websites, internet-based devices such as mobile phones, and so on), and digital platforms have emerged as spaces where data, such as driver and customer data on Uber, or worker or client data on Upwork, can be gathered using trackers and other digital tools. The data collected can be either structured, semi-structured or unstructured. Unstructured data is estimated to account for more than 90 per cent of the data available to organizations globally (Sheriff 2018). This unstructured data contains a bundle of information which, when structured, can be aggregated to analyse important trends and relationships.
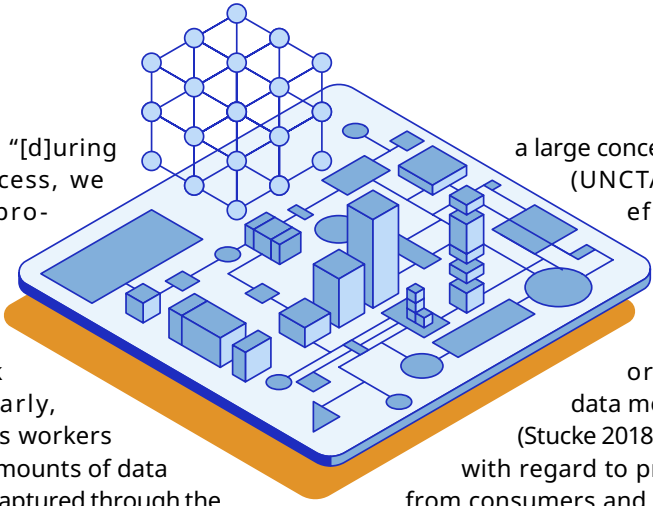
1.4.1 Potential use of data

Structured data, both aggregated and personal, is valuable and can be used by multiple stakeholders such as workers, businesses, communities and governments for various purposes. Data collected at the workplace can potentially be used by companies to plan, to enhance operations, to accelerate decision-making or to maximize performance with a view to improving organizational goals (Sheriff 2018). Such data can also be used to monitor worker performance, which may affect workers negatively (Ball 2010).

While personal data can be sensitive, aggregated data can be used for a number of purposes by multiple stakeholders. The use of structured data can lead to significant changes in the value chain of almost every economic sector, from retail to healthcare, insurance or agriculture, as the economy moves towards access-based services. For instance, data collected by e-commerce platforms on consumer preferences – their consumption patterns and tastes, and so on – provides rich insights that can serve businesses in making economic decisions about product listing, designs, prices, inventory and logistics (Rani and Singh 2019). Such insights can also be sold to other companies for advertising purposes or used for developing new products and services, which in turn can help platforms generate considerable revenue. This not only gives them a competitive edge over traditional businesses (such as small retail stores) but could also lead to unfair competition where companies such as Amazon or Google use the data they collect to promote their own products and services in search listings (see section 3.4).

> ◢◤ With the growth of digital platforms, data has become a valuable strategic economic resource.

On digital labour platforms, the vast amounts of data gathered from users are used for business purposes, including to improve work organization, to match users, for machine learning and training algorithms, and to improve automated decision-making processes (Choudary 2018; see also Chapter 2). For instance, Upwork's annual report

for 2019 states: "[d]uring the search process, we leverage our proprietary data to help freelancers and clients efficiently connect" (Upwork 2019, 6). Similarly, on taxi platforms workers generate large amounts of data which are partly captured through the navigation technologies (GPS) that these platforms invariably deploy. The data is then used by the platforms' matching and pricing algorithms for various purposes, including to propose to the driver the best route to reach a given destination (Choudary 2018).

Although most of the data generated on digital labour platforms is used by the platforms themselves for internal business purposes, if such data is shared locally and globally, and used judiciously, it can benefit society as a whole. Aggregated data in the fields of health, agriculture or environment, among others, could also be useful for policymakers to progress towards achieving the SDGs (UN 2019). Similarly, real-time traffic information collected through app companies such as DiDi, Ola or Uber could be used to relieve traffic congestion and redirect traffic, especially in developing countries where there are challenges in relation to infrastructure (Rani and Singh 2019).

1.4.2 Issues related to user rights over data

Although there has been considerable emphasis on data as a new form of capital that can be leveraged and monetized to create revenue (Sadowski 2016), issues around its value and user rights have only recently gained attention. While it can be used to serve individual, economic and societal interests, the data collected tends to be owned by a few companies or digital platforms that have a large concentration of market power (UNCTAD 2019). The network effects, along with data lock-in and aggregation (more data leads to exponential increase in its value), allow companies or platforms to become data monopolies ("data-opolies") (Stucke 2018), thereby raising concerns with regard to privacy, transfer of wealth from consumers and workers to companies or platforms, and disruption to markets.

The accumulation of data among a few players can lead to excessive market power and competition issues. For instance, Uber[12] (including Uber Eats) have acquired a number of their competitors, such as Careem, Cornershop and Postmates, and one of the assets shared or acquired as part of these transactions, is data. This often allows platforms to amass an extensive amount of data, which is also observed in other sectors such as delivery, e-commerce and social media and gives them a competitive advantage over other players in the market (Cusumano, Gawer and Yoffie 2019).

Although data is generated by users (workers, businesses or consumers) on digital labour platforms, in practice it is considered to be the property of platforms. As a result, in recent years, various initiatives have been put forward to address this misappropriation of data and ensure more equitable forms of user rights over data. For example, data protection frameworks such as the EU's General Data Protection Regulation (GDPR), provide data subjects (including workers on digital labour platforms) with a range of rights over their data that allow them to exercise considerable control over it (rights of access, rectification, portability and more) (see section 5.3.8). Such rights could empower workers (including those on platforms) and ensure greater transparency, so as to enable them to effectively engage in collective bargaining with platforms to improve their working conditions (Rani and Singh 2019).

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12 Uber's privacy policy states that Uber may share "personal data with others in connection with, or during negotiations of, any merger, sale of company assets, consolidation or restructuring, financing, or acquisition of all or a portion of our business by or into another company".

Moreover, the accumulation of data by platforms has led some to consider whether data could be treated as "labour" instead of "capital". This notion would allow data to be perceived and treated as the property of those who generate it and not as an end product of consumption that is collected by the company or platform. Workers could then collectively organize as a "data labour union" and bargain for fees for their data (Arrieta-Ibarra et al. 2018).

While there is much to be gained by treating data as labour, practical questions arise about how to assess its value and what criteria ought to determine data fees. A related question is whether such fees will constitute one-off payments or be charged on a recurring basis. Moreover, monetizing data might even be counterproductive, because in the digital economy "the marginal value of any one person's data contribution is very low", since aggregated or grouped data has more value than individual personal data (P.J. Singh 2020, 8).

As data is generated by different users and is useful for economic decision-making and societal development, it could be a primarily common or public asset, that is, there could be collective user rights over community data (P.J. Singh 2020; Rani and Singh 2019). A framework regulating collective user rights over data could require platforms and companies to share community data and be subject to a licence for using it (P.J. Singh 2020; see box 1.4). This type of user right would allow countries to exercise legal and regulatory power over platforms and companies to ensure fairness vis-à-vis all economic actors, including platform workers. It could also help traditional companies to compete on a more level playing field and strengthen national digital industries. This could potentially lead to the development of appropriate public data infrastructures, especially in developing countries, which would in turn contribute to empowering platform workers and improving their lives, and to meeting the SDGs (Rani and Singh 2019).

> ▶ **Box 1.4 Collective user rights over community data**
>
> What does the concept of collective user rights over community data mean? It represents the idea that communities should have economic rights over the data they generate. In the case of workers, such rights could take the form of a collective stake in the company, for instance, in the form of co-determination rights in the business. In the context of "data as labour" and the monetization of data more generally, economic rights to data can be complicated when employment relationships are taken into consideration, as any remuneration of data could be considered to be already included in the remuneration, as part of the overall work. Therefore, workers' data needs to be distinguished from their labour. In addition, data should be viewed as having a permanent value, as it can be used in multiple contexts. In light of this, collective economic rights over community data cannot and should not translate into a monetary sum; rather, the data should amount to a collective stake in the resulting products or services of a company, or, at the very least, the resulting products or services should not be used in a way that is harmful to platform workers.
>
> In India, the Committee of Experts on Non-Personal Data Governance Framework has adopted a similar approach whereby "the rights over community Non-Personal Data collected in India should vest with the trustee of that community, with the community being the beneficial owner, and such data should be utilized in the best interest of that community" (2020, 23). The rationale behind this approach has been to maximize welfare, as India has a large consumer market, and the entry of data monopolies might lead to imbalances in the bargaining power of the various stakeholders, with just a few companies having access to large data sets that are accumulated in a predominantly unregulated environment, and with consequences for citizens, workers, businesses including start-ups, SMEs and the Government.
>
> **Source:** P.J. Singh (2020); India, Ministry of Electronics & Information Technology (2020).

The excessive power and control over data by a few companies needs to be counterbalanced by policies preventing anticompetitive behaviour and misuse of data; in other words, effective competition and antitrust policies must be developed to prevent such firms from abusing their dominance by leveraging the data they accumulate. Given the asymmetries of economic power within the digital economy, for developing countries to benefit from the digital revolution they must build their digital infrastructure (broadband, cloud computing and data infrastructure) and digital policies in order to "ensure equitable distribution of gains arising from data which are generated within national boundaries" (UNCTAD 2018, VII).

1.4.3 The rise of machine-learning algorithms

The availability of data on a massive and unprecedented scale, coupled with enhanced computing capacities, has led to major breakthroughs in AI technologies. These are already being used extensively in a number of fields, such as search and product recommendation engines, speech recognition, fraud detection, image understanding, robotics and natural language processing. AI also facilitates new human resource practices, such as management by algorithms, which are not restricted to digital labour platforms but are also increasingly used in traditional sectors such as retail warehouses or white-collar occupations to assess worker productivity and their capacity to perform certain tasks (Akhtar, Moore and Upchurch 2018).

Digital labour platforms continuously use the vast amount of data collected for improving their machine-learning algorithms in order to match workers with clients or customers, allocate tasks, set prices, monitor and evaluate tasks, and award payments and rankings. The algorithms are designed to measure workers' speed and attentiveness in completing the assigned task, apart from taking into consideration their ratings and

Digital labour platforms continuously use the vast amount of data collected for improving their machine-learning algorithms.

reputation (De Stefano 2019; see section 2.4). If platform workers do not perform well or if the quality of their work falls short of the standards set by the algorithm, this can result in their not receiving any tasks or at times even being dismissed (deactivation of their account) from the respective platform (see sections 2.5 and 4.3.2).

Furthermore, the use of algorithms may in some cases exacerbate or amplify pre-existing biases or create new ones. The algorithms are coded by human programmers based on a set of norms and instructions; if bias is fed into the system, it can result in discriminatory practices. In addition, it is important to note that the algorithms are only as good as the data that is fed into them; if there are gaps or errors in the data then the algorithms might automate existing patterns of discrimination (UN 2019). The use of AI-enabled algorithms can hence disrupt many existing regulatory approaches, leading to potential gaps in terms of liability, consumer protection and the protection of fundamental rights (see Chapters 5 and 6).

Alongside the increasing use of machine-learning algorithms in both the digital and non-digital sphere, there is as yet no transparency with regard to the source code[13] of algorithms, which is not at all accessible to the platform workers. If a worker's task is rejected or their account deactivated, or if they receive a low rating by the algorithm, they are often unable to find out the reason(s) for said actions or sanction nor how they can improve their performance. Accessing the underlying source code of an algorithm is the only way to inspect whether such an algorithm is producing anticompetitive or discriminatory outcomes. However, it is difficult to access the source code of an algorithm,

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13 Source code refers to "a collection of computer instructions which are processed and executed, and whose human-readable version (called source code) is usually protected by copyright and often kept confidential to protect proprietary information" (UNCTAD 2018, 91).

as it is protected by trade secrecy laws and by intellectual property rules at the WTO level (Smith 2017).[14] There have been instances, however, where access to the source code has been granted; for example, the US District Court for the Northern District of California granted access to Uber's source code to Waymo's[15] counsel and an expert to ascertain whether there had been a case of trade secret misappropriation.[16] Uber committed to not using any of Waymo's intellectual property (whether hardware or software) in its self-driving technology and paid Waymo 0.34 per cent of its equity as part of the settlement.[17]

To ensure fairness for workers and businesses on digital platforms, both labour and e-commerce, it is crucial for governments to have access to the source codes of the algorithms in appropriate circumstances and under appropriate conditions. For instance, without accessing Google's, Amazon's or Uber's source code, it is impossible to inspect whether a company's ranking or pricing algorithm produces anticompetitive outcomes, or whether its rating algorithms lead to account deactivation that amounts to unfair dismissal. In this regard, the proposals on e-commerce rules agreed by WTO member countries at the WTO level that prohibit the transfer of or access to source code could pose a major threat to ensuring decent work and fair competition on digital platforms (Smith 2017).[18]

These restrictions could further deepen global North–South inequalities by aggravating the dependence of developing countries on software monopolies which are usually concentrated in developed countries, and by depriving them of the opportunity to adapt software to their own reality and use it for local development (Neeraj 2017).

The rise of data as capital and an asset, and its relevance to AI, has also led venture capitalists and private investors to invest in digital platforms (see section 1.5) and digital technology start-ups (see section 3.3.3). For instance, the recommendation engine of Netflix reportedly saves US$1 billion every year for the company as it reduces the subscriber monthly churn and is able to recommend based on previous choices (Gomez-Uribe and Hunt 2015). The potential of machine-learning algorithms to raise such revenues has also led venture capitalists to invest in AI start-ups, which raised a record US$26.6 billion in 2019 (compared to US$16.8 billion in 2017) (K. Johnson 2020). Given the rise of business models supported by data and AI, and the potential for enhanced profitability, venture capital investments are further supporting the growth of digital platforms, which are seen as fundamental to taking forward such a profound data-based transformation in the economy.

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14 See Article 39 of the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights: https://www.wto.org/english/docs_e/legal_e/27-trips.pdf.

15 Waymo is an autonomous driving technology development company, subsidiary of Alphabet (includes Google).

16 For more information, see: https://cdn.arstechnica.net/wp-content/uploads/2017/05/Uber.Waymo_.Order_.pdf.

17 For more information, see: https://www.wired.com/story/uber-waymo-lawsuit-settlement/.

18 See, for example, the following WTO documents: JOB/GC/94; JOB/GC/100; INF/ECOM/22.

1.5 Financing the rise of digital labour platforms

Venture capital has played a key role in the rise of digital platforms (including digital labour platforms) over the past decade. The stock market value of the major technology companies or "superstar firms", and of digital labour platforms, has also continued to rise. These companies attract investment even though some of them continue to have operating losses (Kenney and Zysman 2019). This section looks at the rise of venture capital investment in digital labour platforms, and their concentration in particular sectors and geographical regions. It also considers the concentration of market power in the hands of a few platform companies and digital labour platforms, and their implications for businesses and platform workers.

The rise of venture capital investment in digital platforms is rooted in the belief that start-ups offer large capital gains, given that many sectors and industries can be disrupted with the advances in ICT, ranging from smartphones and big data to machine learning and the Internet of Things (Kenney and Zysman 2019). Globally, venture capital investments in digital start-ups have grown sixfold between 2010 (US$52 billion) and 2019 (US$295 billion) (Rowley 2020; Florida and Hathaway 2018). A significant proportion of these investments were made in companies based in the United States (US$136.5 billion), followed by companies in China (US$36.5 billion for January to mid-November 2019, which was a major drop from US$93.4 billion in 2018), Europe (US$36 billion) and India (US$14.5 billion) (PitchBook 2020; Teare and Kunthara 2020; Kunthara 2019; M. Singh 2019). In comparison, investments in Latin America (US$4.6 billion) and Africa (US$1.3 billion) were relatively low (Azevedo 2020; WeeTracker 2020).

Data on funding or investment and revenue of digital platforms is not easily available, particularly for platform companies that are yet to release an Initial Public Offering (IPO). In this regard, research on the flow of investment in and revenue of digital labour platforms has been limited, and fraught with data limitations. This report takes recourse to databases such as Crunchbase and Owler to extract available information on these aspects, while also drawing on the annual reports or filings by platform companies to the Securities and Exchange Commission of the United States where information is available. For funding, the report uses data only from Crunchbase, and this data is available for only 47 per cent (367 platforms) of the 777 digital labour platforms listed on the Crunchbase database. These platforms have together received a total funding of US$119 billion (as of 30 January 2021). There are substantial differences in investment between platforms offering taxi or delivery services and those providing online web-based services. The highest investments are in taxi service platforms, with 61 platforms having received US$62 billion between 2007 and 2020. This is followed by delivery platforms where US$37 billion has been invested in 164 platforms, while investments in online web-based platforms are the lowest, at about US$3 billion for 142 platforms (see figure 1.11). Five hybrid platforms were identified which provide a range of services from payment to taxi or delivery services and e-commerce; these platforms have received US$17 billion between 2010 and 2020.

Based on the funding information available on platform companies, the distribution of funding is considerably skewed among taxi platforms, with 75 per cent concentrated in just two companies (Uber and DiDi), while the remaining 25 per cent went to 59 companies. The distribution of funding is slightly less skewed for delivery platforms, with the top five platforms (DoorDash, Delivery Hero, Ele.me, Lalamove and Instacart) accounting for 49 per cent. In the case of online web-based platforms, about 33 per cent of funding is concentrated among the top three platforms (ZBJ, Scale AI and Upwork).

▶ **Figure 1.11 Total investments from venture capital and other investors, by platform category, 1998–2020**

Note: Number of platforms and period for which data on total funding was available: online web-based: 142 (1998–2020); taxi: 61 (2007–20); delivery: 164 (1999–2020); and hybrid: 5 (2010–20).

Source: Crunchbase database.

other major platform companies such as Alphabet (includes Google) and DiDi, and other investors like SoftBank (one of Uber's largest shareholders) (Uber 2020a, 12). The rapid growth in revenues and the valuation of Uber is explained by these venture capital investments, which have served to heavily subsidize consumers and drivers through various incentives, and what some have argued to allow for "artificial market power to subvert normal market dynamics" (Horan 2019). This situation has led to a disruption of the traditional taxi industry in that it has allowed platforms, irrespective of their revenues, both to establish their market power and to gain a dominant market position.

⬗⬗ **The access to venture capital funding has allowed many platforms to operate at a loss for long periods of time.**

The concentration of funding on just few companies by many venture capitalists, who are betting on these platforms to dominate the market, is based on the high rate of return from their network effects or "winner-take-all" effects (Kenney and Zysman 2018b, 6). The access to venture capital funding has also allowed many platforms to operate at a loss for particularly long periods of time, which has exacerbated their disruptive effects on the traditional sectors. For instance, both Uber (US$25.2 billion in 28 rounds) and Grab (US$10.1 billion in 31 rounds and an additional US$2 billion in 2021) have continued to receive funding despite incurring substantial losses. Grab, which is valued at US$14 billion, continues to remain private (as of 2019), while hoping to make profits so that it can go public (Soon and Choudhury 2019). By contrast, Uber, which has incurred "significant losses since its inception" and has an accumulated deficit of US$16.4 billion, was able to go public in 2019 when it was valued at US$82.4 billion (Uber 2020a, 12; de la Merced and Conger 2019). Despite its continuous losses, the company is able to attract investment from

Given the availability of venture capital funding, many platform companies tend to remain private for long periods of time, as opposed to making an IPO; this situation has led to the growth of so-called unicorns, which are privately held start-up companies valued at over US$1 billion (Kenney and Zysman 2018b). These companies can continue to function for long periods even when incurring losses by raising private funds and avoiding the scrutiny of public markets or traditional investors (Kenney and Zysman 2019; Schleifer 2019). The trend of large valuations despite unprofitability is not unique to companies that are not publicly traded; it is estimated that 64 per cent of platform companies valued at more than US$1 billion that have completed a venture capital-backed IPO since 2010 were unprofitable (Clark 2019). While several platforms are profitable, the fact that many continue to operate and receive funding from venture capitalists despite losses over long periods raises questions about both their economic and social impact as well as the welfare-generating aspects of this innovative business model (Kenney and Zysman 2019).

▶ **Figure 1.12 Total funding from venture capital and other investors, selected categories of digital labour platforms, by region, 1998–2020 (US$ million)**
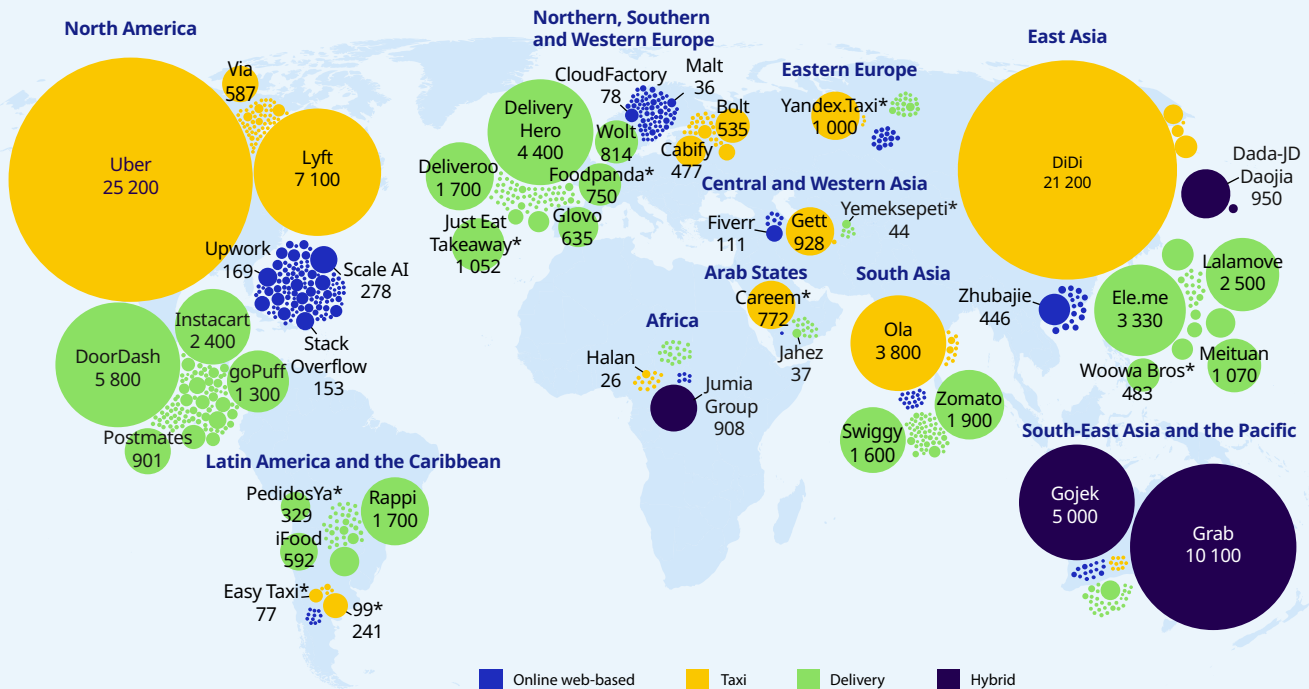
* Platform has been acquired or merged, see Appendix 1.

Note: Number of platforms and period for which data on total funding was available: online web-based: 142 (1998–2020); taxi: 61 (2007–20); delivery: 164 (1999–2020); and hybrid: 5 (2010–20).

Source: Crunchbase database.

1.5.1 Geography of digital labour platforms: funding and revenue

The global distribution of investment in digital labour platforms is quite skewed, with the triad composed of Asia (US$57 billion), North America (US$46 billion) and Europe (US$12 billion) benefiting from 96 per cent of investments compared to 4 per cent going to Latin America, Africa and the Arab States, indicating a digital divide. Although some important players are emerging in these regions, such as Gett and Fiverr (Israel), Jumia Group (Nigeria) and Rappi (Colombia), the most well-funded platforms in the taxi (Uber and DiDi) and delivery (DoorDash, Delivery Hero and Ele.me)

sectors, as well as online web-based platforms (Upwork and ZBJ), are located in the United States, China or Europe. In terms of funding, taxi platforms have received a significantly larger share of venture capital financing than online web-based platforms (see figure 1.12). Uber's total funding (US$25.2 billion) is *nine times* greater than that of all the online web-based platforms analysed put together (US$2.6 billion for 142 online web-based platforms).

▟▛ The global distribution of investment in digital labour platforms is quite skewed.

▶ **Figure 1.13 Estimated annual revenue of digital labour platforms, selected categories, by region, 2019 (US$ million)**

North America
Uber 10 745
Lyft 3 616
Upwork 301
Applause* 136
Toptal 300
Instacart 2 900
Uber Eats 2 510
Grubhub 1 312
Postmates 640
DoorDash 885

Latin America and the Caribbean
Cornershop 200
PedidosYa* 250
iFood 208
Rappi 220
99* 7
Easy Taxi* 10

Northern, Southern and Western Europe
Just Eat Takeaway* 1 700
Deliveroo 624
Wolt 345
Cabify 104
Glovo 300
Delivery Hero 1 502
Bolt 115
Roamler 22
CloudFactory 20

Eastern Europe
Yandex. Taxi* 501
Dáme Jídlo* 32
Codeforces 20

Central and Western Asia
Fiverr 107
Gett 1 000
Yemeksepeti* 231

Arab States
Careem* 119
Talabat* 67

Africa
GoDropping 4
Jumia Group 180

South Asia
Zomato* 394
Swiggy 183
PickMe 88
Ola 365
Playment 13

East Asia
Ele.me 157
Woowa Bros* 270
Meituan 8 532
Lalamove 100
DiDi 401
Quhuo Tech 2 055
CrowdWorks 84
Dada-JD Daojia 438

South-East Asia and the Pacific
Gojek 1 300
Grab 2 300
GoCatch 7
Menulog* 51
Appen 409

Online web-based   Taxi   Delivery   Hybrid

* Platform has been acquired or merged, see Appendix 1.

Note: Number of platforms for which data on revenue was available: online web-based: 106; taxi: 31; delivery: 101; and hybrid: 5.

Source: Owler database, annual reports and filings by platform companies to the Securities and Exchange Commission of the United States.

With regard to revenue, this report relies on data collected from the Owler database, annual reports and filings by platform companies to the Securities and Exchange Commission of the United States. The data on revenue is available for only about 31 per cent (243) of the platform companies. The revenue generated through digital platforms is further evidence of the geographical concentration of wealth, as about 70 per cent of global revenues are concentrated in just two countries, the United States (49 per cent) and China (23 per cent).[19] About 11 per cent of global revenue is concentrated in Europe, while all the other regions together account for 17 per cent of the revenue. Uber, located in the United States, has the highest revenue (US$10.7 billion) among taxi platforms, while Meituan, located in China, has the highest revenue (US$8.3 billion) among delivery platforms (see figure 1.13).

Among online web-based platforms, Appen, Upwork, Toptal and Fiverr, which are based in Australia, Israel and the United States, respectively, generate the highest revenues. The revenue generated by online web-based platforms is smaller than that of location-based platforms.

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19 It is possible that if the information on revenues was available for a larger number of platforms, then the concentration of revenue might be less skewed.

For example, in 2019, Uber generated a revenue of US$10.7 billion, which is about 36 times that generated by Upwork (US$301 million). Uber received funding of US$25.2 billion, compared to US$169 million received by Upwork, which is about 150 times more. Furthermore, the valuation of Uber at the IPO was US$82.4 billion, while that of Upwork was US$1.5 billion (de la Merced and Conger 2019; Belvedere 2018). The key element in this difference could be that the taxi sector allows these companies to gather vast amounts of data on users (workers, clients and customers), which has intrinsic commercial value as it is linked to specific localities and infrastructure, and it also allows these companies to expand their services. This, in addition to using such data to train algorithms for pricing, allocating tasks, or for predicting and mitigating traffic congestion (Chen and Qiu 2019), could be potential reasons for such a high valuation.

While digital labour platforms are disrupting both traditional business models and employment relationships, they are small compared to the platform companies that are dominating the global digital economy. The estimated market value of the digital economy was US$7 trillion in 2017, based on the top 242 companies. However, seven "super platforms" based in China and the United States represented 69 per cent of the total market value of the digital economy (KPMG 2018, 9). The seven largest technology companies (Amazon, Apple, Alphabet (includes Google), Microsoft, Alibaba, Facebook and Tencent) based in the United States or China had a cumulative revenue of US$1,010 billion in 2019 (see figure 1.14).

In comparison to these major technology companies, the largest digital labour platforms (both location-based and online web-based) are small in terms of revenue generation (see figure 1.14). Amazon and Apple generated over US$280 billion and US$260 billion in revenue in 2019 respectively, while some of the largest location-based and online-web based platforms such as Uber, Meituan, Instacart, Appen, and Upwork generated a combined revenue of only about US$31.2 billion in 2019. Moreover, some of the major technology

▶ **Figure 1.14 Estimated annual revenue of large platforms and selected digital labour platforms, 2019 (US$ million)**
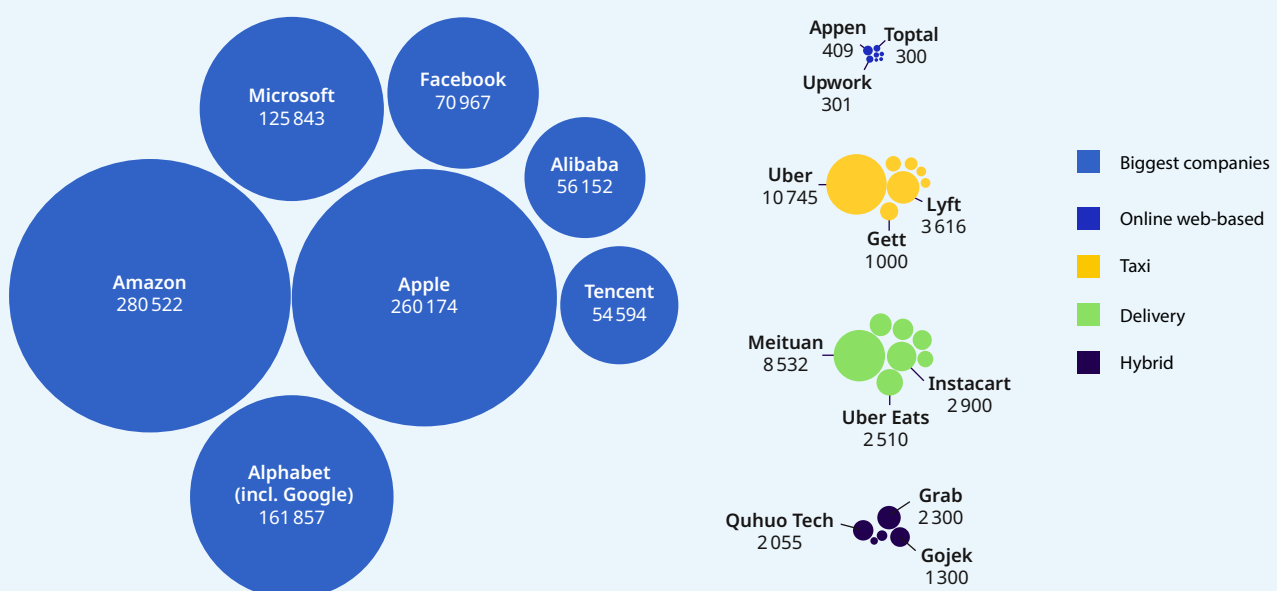
Note: For each of the digital labour platform categories only the seven companies with the highest revenue are included. For the taxi sector, these are Uber, Lyft, Gett, Careem, Yandex.Taxi, DiDi and Ola; for the delivery sector Meituan, Instacart, Uber Eats, Just Eat Takeway, Delivery Hero, GrubHub and DoorDash; for online web-based platforms Appen, Upwork, Toptal, Fiverr, Applause, Guru and Justanswer; and the hybrid platforms Grab, Quhuo Tech, Gojek, Dada-JD Daojia and Jumia Group.

Sources: Owler database, annual reports and filings by platform companies to the Securities and Exchange Commission of the United States.

companies are also investing in digital labour platforms. Google Ventures (now Alphabet) invested in Uber in 2013 and owned a 5.2 per cent stake in the company in 2019 (Levy 2019); Facebook, Alphabet (includes Google) and Tencent have invested in Gojek (Gupta 2020); and Apple, Alibaba, Booking, Softbank and Tencent have invested in DiDi (Chen and Qiu 2019).

The rise of such large technology companies has also resulted in a concentration of market power, as these companies are diversifying and offering an increasing range of services, often through acquisitions or mergers with other platforms. Amazon is a case in point as it offers a wide range of services including online retail, delivery, cloud computing, a crowdsourcing marketplace, and entertainment. The greater market concentration could help companies achieve monopoly power, and could lead to potential issues related to pricing, as well as having an impact on influencing regulation and even innovation.

Such concentration of market power among a few companies is increasingly the case for digital labour platforms, where easy access to venture capital financing enables these companies to reach new markets and enhance their competitiveness. For instance, DiDi in China merged with Kuaidi in 2015 and acquired Uber China in 2016 (Chen and Qiu 2019), triggering an antitrust investigation by the Chinese government in 2018.[20] Globally, it acquired the company 99 in Brazil, and is developing strategic partnerships with platform companies in a number of countries in Asia, Africa, Latin America, the Middle East and Europe (Chen and Qiu 2019).

The rise of large technology companies has resulted in a concentration of market power.

Similar trends can be observed among other companies, such as Gojek and Grab in South-East Asia or Jumia in Africa, which are expanding into more countries and diversifying into a wide range of services: online retail, travel marketplace, transportation and logistics, food and grocery delivery, home and maintenance, entertainment, and payment, among others. While investments have been rising and new investors are increasingly playing an enabling role in financing the digital platforms, the current model of venture capital investment that focuses on a few companies despite their large losses raises concerns with regard to the sustainability of this model, and particularly to the over-valuation of companies.

The competitive advantage and market power exercised by these companies is not necessarily based on inherent competitive advantage, as they are often loss-making and propped up by venture capital funds rather than profits in the short to medium term. This distorts competition, challenges the traditional understanding of monopoly or oligopoly power, and blurs the boundaries of the organization, not just in the sense of employment relationship but also in terms of finance, which is obviously fundamental for the survival of a company. The dominance of such companies might also lead to sustainability issues for traditional companies, smaller businesses and third-party sellers (see section 3.4).

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20 For more information on antitrust investigation, see: http://www.xinhuanet.com/english/2018-11/16/c_137611764.htm.

▶ Conclusion

This chapter has shown that with the ICT revolution and the pervasive spread of the internet, the world of work is experiencing many fundamental transformations. There is clear evidence of the diffusion and penetration of digital platforms into various sectors of the economy. The availability of cloud computing and technological innovations has enabled the development of a distinct form of business model which has created opportunities and challenges for both workers and businesses.

Digital labour platforms in particular, as mediators of work, have grown at a rapid pace, changing the way in which work is organized. They are impacting several economic sectors, so that businesses need to adapt both to the changes being introduced by digital technologies and to new forms of competition arising from these platforms.

The growth of digital labour platforms has indeed created additional income-generating opportunities for workers around the world but has also given rise to a number of challenges which need to be addressed. Although estimates regarding the number of workers whose work is mediated through such platforms continue to face data-related and methodological challenges, in instances where data is available there are clear signs that labour supply is exceeding demand.

The rise of the digital economy and the proliferation of digital labour platforms are occurring alongside the increased relevance of user data, which is largely owned, controlled and managed by platform companies. This data is being used for machine learning, developing new products, enhancing efficiency and productivity, and shaping pricing structures and the organization of work; while the users, and in particular platform workers, often have no economic rights over such data.

At the same time, the rise of the digital economy more broadly, and of digital labour platforms more specifically, has been financed through venture capital funding, which has allowed companies to expand rapidly and compete with traditional sectors despite often being unprofitable. This financing model has also enabled large platform companies to acquire global market dominance even though they are based in only a handful of countries. This could further widen the digital divide and increase economic inequality, and also pose challenges for companies based in developing countries to compete in the global digital economy.

Furthermore, the challenges related to the rise of the digital economy could complicate efforts by governments of developing countries to adopt appropriate regulations to ensure fair competition for businesses and adequate protections for workers. Engaging with and addressing such challenges will be decisive in leveraging the potential opportunities emerging from the digital economy and labour platforms to promote decent work and advance progress towards achieving the Sustainable Development Goals.

2

The business model and strategies of digital labour platforms

The business model of digital labour platforms

Online
web-based
platforms

Freelance

Contest-based

Microtask

Competitive programming

▶ Introduction

The current evolution of the digital economy is transforming business and society, and is also leading to the "platformization" of traditional business practices. The availability of digital tools and cloud infrastructure has enabled the development of innovative business models, such as digital labour platforms, of which there are two broad types: online web-based and location-based platforms. Online web-based platforms offer the flexibility of undertaking work from any location, at any time. While some of the tasks available on these platforms are new, such as image and data annotation, labelling and data processing, a number of others, such as translation, transcription and software development, were previously performed and continue to be performed in the traditional labour market. The distinguishing features of such platforms are that technology enables work to be outsourced globally across borders and that work can be performed remotely from any location.

On location-based platforms, work is performed in a specified physical location, with taxi and delivery services being among the most prevalent examples of such platforms. Like the activities on online web-based platforms mentioned above, taxi and delivery services are not inherently new and continue to be conducted in traditional labour markets. What is new in the digital economy is that these services are mediated through a digital application. Platform-based taxi and delivery services have created employment opportunities owing to changing consumer preferences, and workers in these sectors are increasingly relying on app-based services for their incomes, particularly in developing countries.

Three distinct features can be identified in the digital labour platform business model. First, the introduction of algorithmic management of work processes and performance (Moore and Joyce 2020; Griesbach et al. 2019; Lee et al. 2015). Allocation and evaluation of work performance are based on metrics and ratings integrated into an algorithmically determined performance management system, while work is monitored using digital tools. This mode of management is a fundamental departure from traditional human resource management practices and may have implications for the future of work. For instance, on taxi platforms "algorithmic management allows a few human managers in each city to oversee hundreds or thousands of drivers on a global scale" (Lee et al. 2015, 1603).

Second, the organization of work, which allows platform companies to provide services without having to invest in capital equipment or bear the operational costs (Stanford 2017). For instance, on online web-based and location-based platforms, capital equipment such as computers or vehicles is provided by the workers, who also bear the costs related to fuel, maintenance, purchase of licences, or internet charges.

The third feature is the creation of a highly segmented dual labour market, which consists of two categories: a small core workforce directly employed by the platform (internal employment) and a large outsourced workforce whose work is mediated through the platform (external employment) (ILO, EU and OECD, forthcoming; Rahman and Thelen 2019). Workers in the first category have an employment relationship, while those in the latter are typically categorized as "self-employed" or "independent contractors" by the platform and are without an employment relationship but often have to pay various types of fees for accessing tasks (Webster 2020). This model allows digital labour platform companies to raise revenue and provide services by shifting the risks and costs related to capital equipment and operations to workers.

This chapter explores some of the features of the digital labour platform business model, including algorithmic management of work, the revenue model and business strategies. It also reviews the rules of governance, which are unilaterally set by the platforms, and are hence market-driven to some degree. The analysis for this chapter draws on the terms of service agreements of 31 online web-based and location-based platforms, their online websites, and semi-structured interviews conducted by the ILO with 16 digital labour platform companies (both online web-based and location-based platforms) based in different countries (see Appendix 2).

The chapter comprises five sections. The various types of platforms that are analysed in this chapter and the report as a whole are described in section 2.1. Section 2.2 discusses the revenue model and the pricing strategies that platforms use to appeal to workers and clients. Section 2.3 describes the recruitment practices on digital labour platforms, and the algorithmic matching of clients and platform workers. The management of work processes and evaluation of work on platforms are explored in section 2.4. Section 2.5 reviews the rules of governance on platforms and client–worker engagement, as well as the collection and use of data.

▶ 2.1 Types of digital labour platforms

As discussed in Chapter 1, digital labour platforms provide a variety of services, drawing on diverse skill sets of workers, and operate in two broad categories, *online web-based platforms* and *location-based platforms*. They can be further distinguished based on the type of tasks performed, their duration and complexity. This report reviews four types of online web-based platforms and two types of location-based platforms (see figure 2.1).

2.1.1 Online web-based platforms

Online web-based platforms are gaining in popularity among businesses as they enable them not only to outsource tasks to a global workforce at reduced cost but also to complete assignments at a faster pace than is possible in the traditional outsourcing model (see section 3.1.2). Among online web-based platforms, this report focuses on freelance and contest-based, competitive programming and microtask platforms, which are some of the leading platforms facilitating labour exchange between workers and clients.

▶ *Freelance platforms* function like a marketplace, enabling clients to have work performed in fields such as translation, financial services, legal services, patent services, design and data analytics. They match clients with workers for a specific task, based on a proprietary database that consists of indicators such as ratings and reviews, and facilitate the client–worker relationship in all its dimensions. The nature of services provided differs across these platforms, from a wide range of activities[1] and skills (e.g. Freelancer, PeoplePerHour and Upwork) to service offerings of specialized or targeted skills sets[2] (Toptal). This business strategy allows workers with multiple skills to access various tasks on the same platform, and businesses to access a wide range of skilled workers at a single place. There are other types of freelance platforms as well, where the platform matches the freelancer directly with the client or business for specific services, rather than through a marketplace. For instance, some translation platforms maintain a "network" of freelance translators, who are assigned translation tasks by the platform when a client puts in a request. Such platforms do not have an open marketplace visible to all the users and are not analysed this report.

▶ *Contest-based platforms* specialize in organizing competitive design contests within their pool of talent to provide creative or artistic services and products, such as graphic design, to clients (e.g. 99designs, Designhill and Hatchwise).

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1 Activities range from computer programming and analytics to design, translation, and legal and accounting services.

2 Toptal advertises service offerings through its exclusive community of developers, designers, finance experts, and project and product managers.
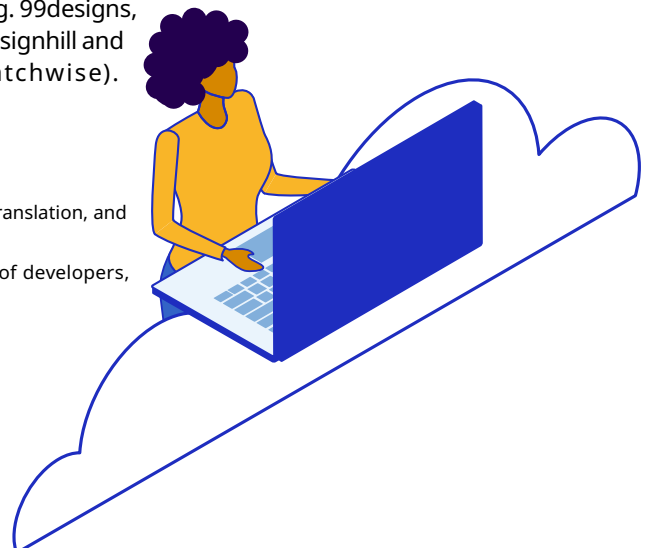
⚑⚑ Digital labour platforms provide a variety of services, drawing on diverse skill sets of workers.

The services[3] offered are similar across platforms, which compete through their pricing strategy and by attracting a pool of the "best" or outstanding designers through various subscription and other plans.

▶ *Competitive programming platforms* are spaces where a community of software developers and programmers can compete to provide business and research solutions related to artificial intelligence, data analytics, software development and other technical fields, within a designated time, with the winner(s) chosen by the clients. These platforms provide wide-ranging services to companies, from software solutions and data analytics (Kaggle and Topcoder) to recruitment services for hiring programmers, developers or data scientists (HackerEarth and HackerRank), among others, through their community of targeted talent. Some of these platforms, such as CodeChef and Kaggle, also link up with academic institutions and offer online practice sessions and contests for students and young software professionals to hone their programming skills.

▶ *Microtask platforms* specialize in tasks of short duration, such as transcribing a short video, checking data entries, adding keywords to classify a product for artificial intelligence and machine learning purposes, or tasks related to accessing content (such as visiting websites to increase traffic) or checking for sensitive content. Platforms such as Amazon Mechanical Turk (AMT), Appen, Clickworker and Microworkers provide a range of services[4] to clients and support them in unbundling tasks into smaller segments and dispersing them to the crowd, then rebundling and delivering them back to the clients. Some of these platforms also provide clients with access to their application programming interface (API), which allows clients to directly crowdsource the tasks on the platform. In addition, there are other types of microtask platforms that have emerged, such as Scale AI or Mighty AI, that provide data and image annotation services; they crowdsource the tasks to their "crowd", which is maintained by the platform on a website that is only accessible to the workers, and is different from the website which is meant for marketing purposes and for the clients. Such platforms are not part of the analysis in this chapter but are discussed in section 3.3.2.

2.1.2 Location-based platforms

The activity of location-based platforms centres on taxi and delivery services, which have been the subject of discussion and scrutiny in recent years because of the way in which platform companies are mediating the work opportunities of a growing number of workers, with potential implications for the future of work. Digital labour platforms in these two sectors have grown rapidly with the help of venture capital funding (see section 1.5).

▶ *Taxi platforms* such as Bolt, Careem, Grab, Gojek, Little, Ola and Uber facilitate ride-hailing services by connecting customers seeking a ride with workers offering their services through the platform. Customers are updated at every step, provided with an approximate waiting time, an estimated fare and ride duration, and have the ability to track their driver and their ride in real time through their mobile application.

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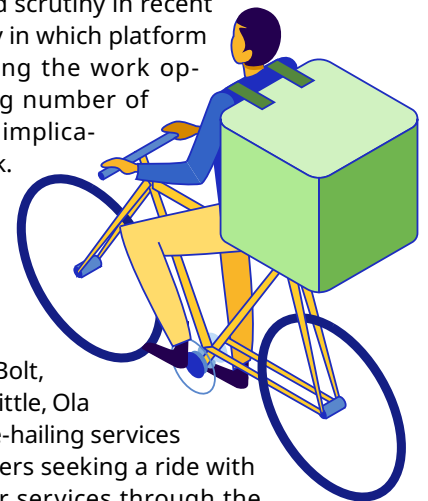
3 Including logo and identity design, web and app design, business and advertising, clothing, arts and illustration, packaging, book and magazine design, among others.

4 Including data cleaning, categorization, tagging, sentiment analysis, creating and moderating content, video and audio transcription, among others.

▶ **Figure 2.1 Types of digital labour platforms**
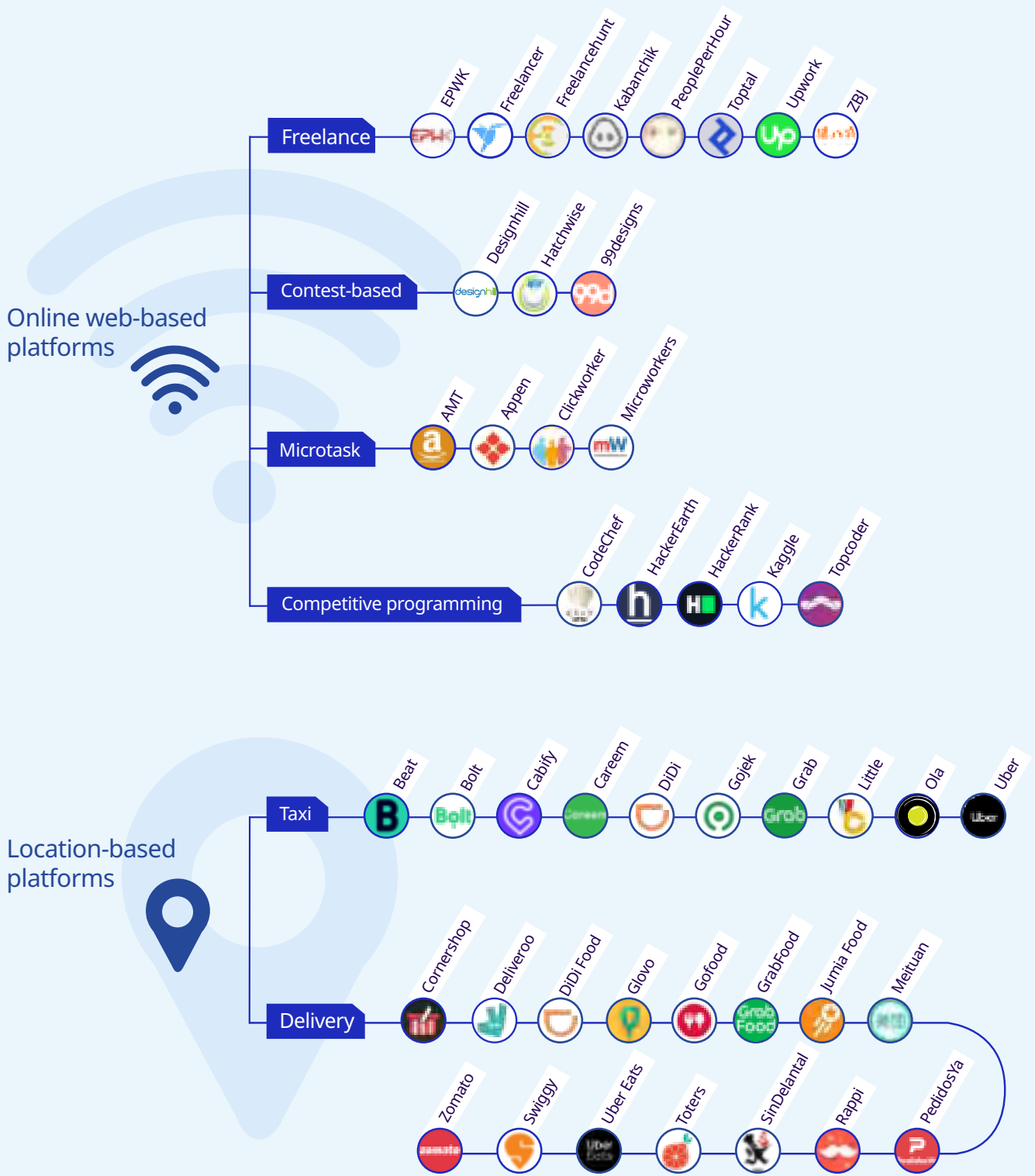
Source: ILO elaboration.

▶ *Delivery platforms* such as Deliveroo, Glovo, Jumia Food, Rappi, Swiggy and Zomato facilitate transactions between customers, workers, and business clients (such as restaurants, supermarkets and pharmacies). They provide customers with a range of products at a competitive price without the customers having to leave their physical location, and business clients with a wider customer network (see section 3.2). A different type of delivery platform is also emerging, which has its own grocery warehouse or ghost kitchens (also called virtual or cloud kitchens), which can only be accessed by consumers through the app (Lee 2020). This model draws on the principles of retail e-commerce platforms, such as Amazon, where a bricks-and-mortar store is absent. It enables delivery platforms to reduce costs and expand their businesses while also delivering food and groceries, and has been growing during the COVID-19 pandemic. Some of these ghost kitchens also link up with delivery platforms and provide food delivery services.

While a wide range of tasks are mediated through online web-based and location-based platforms, it is possible to identify some common elements or practices in the business model across these different types of platforms. These include price-setting and remuneration-setting mechanisms, charging of commission fees to workers and clients, matching of workers with clients, allocation and evaluation of work through algorithms, monitoring of work using different digital tools, use of rating systems and engagement with the workforce through the platforms' terms of service
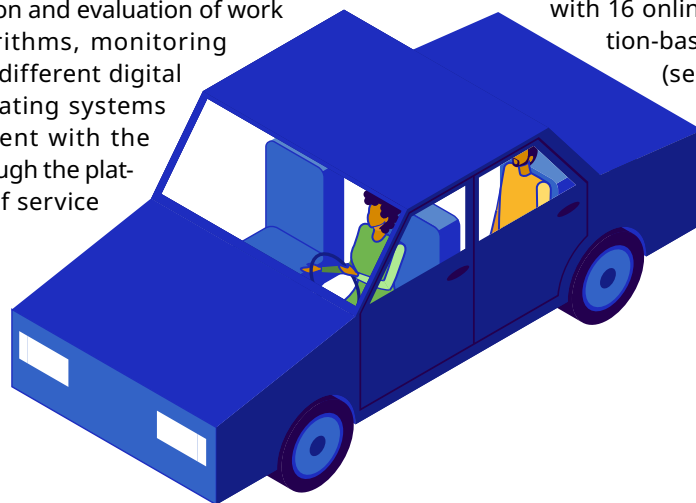
agreements (see also Aleksynska 2021; Moore and Joyce 2020). These different elements play an important role in shaping working conditions on digital labour platforms.

This chapter reviews the business strategies of 31 selected platforms that were covered by the ILO worker surveys (see Chapter 4); it also includes some other prominent platforms in order to better understand the functioning of the digital labour platform business model (see figure 2.1). Some of the digital labour platforms were established at the turn of the century, while others have emerged in the past decade, and are emulating the existing platform business model.

Platform business strategies are based on some of the key elements described below, and some of the location-based platforms also adapt their strategies to their national or legal contexts (Aleksynska 2021). The business strategies adopted by the platforms reviewed in this chapter can be encapsulated in four interlinked key elements: revenue model (commission fees and subscription plans); recruitment and matching of workers with clients; work processes and performance management; and rules of platform governance (see figure 2.2). The analysis of these four elements is based on the terms of service agreements of the respective platforms and on information from their websites (see Appendix 2B), as well as on interviews conducted with 16 online web-based and location-based platform companies (see Appendix 2A for the list of platforms). The different elements are discussed in turn in the next four sections.

▶ **Figure 2.2 The platform business model: Business strategies**

Work processes and performance management

▶ Tools for communication
▶ Monitoring of work
▶ Performance management
▶ Ratings, feedback and reviews
▶ Intermediate payments

Recruitment and matching of workers

▶ Providing access to accounts on platforms
▶ Matching algorithm
▶ Work assignment
▶ Determination of price for the task
▶ Refund policies

Revenue model

▶ Commission fees
▶ Subscription/membership plans
▶ Monetary subsidies
▶ Bonus schemes
▶ Priced features and other fees

Rules of platform governance

▶ Exclusivity clauses
▶ Acceptance/rejection of work
▶ Deactivation of accounts
▶ Dispute resolution
▶ Data collection and usage

Network effects

Algorithmic management

Source: ILO, based on the concepts outlined in Moazed and Johnson (2016).

2.2 Revenue model

A key element in the success of a platform is whether it can attract a sufficient number of users (clients or customers and workers) and create network effects. The pricing strategy of a platform is an important instrument for leveraging network effects and also limiting multi-homing,[5] as this can have an impact on its potential revenues and profits (Cusumano, Gawer and Yoffie 2019; Rochet and Tirole 2003). As part of their pricing strategies, platforms sometimes incentivize one side of the platform through subsidies, which can motivate the other side to join (asymmetric); alternatively, they sometimes provide incentives to both sides (symmetric) to attract users. For instance, on taxi platforms both the customers (low cost of rides) and taxi drivers (bonuses or other financial incentives besides per-ride compensation) are

subsidized (Cusumano, Gawer and Yoffie 2019; Horan 2019). Platforms become potentially attractive to clients only when the available number of workers actively participating on them reaches a certain limit, or critical mass (Liu et al. 2019). The pricing on digital labour platforms is thus dependent on the available pool of workers on the supply side and the number of clients on the demand side.

◤◤ The pricing strategy of a platform is an important instrument for leveraging network effects.

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5 Multi-homing refers to users signing up on multiple platforms. For instance, when a delivery worker signs up on two or more platforms such as Cornershop, Rappi and Uber Eats to access work, then the worker is said to be multi-homing.

The pricing strategy adopted by platforms to appeal to clients or customers and workers includes setting the price for the task, charging different types of fees, and providing subscription plans. The different fees charged and the subscription plans offered across the various platforms are presented in tables 2.1 and 2.2 for online web-based platforms, and tables 2.3 and 2.5 for location-based platforms.

2.2.1 Freelance and contest-based platforms

The price setting on freelance platforms varies depending on the projects or tasks. Workers usually display their hourly rates in their profiles, and the rates are then negotiated with the client. On some platforms, such as Freelancer, PeoplePerHour and Upwork, the price can be determined on an hourly basis or fixed price based on the tasks involved. On contest-based platforms, such as 99designs, Designhill and Hatchwise, the price that clients pay for a particular contest is set by the platform through its subscription plans. The price varies depending on the contest category (for example, labelling, logo, app design) and the subscription plan chosen. The 99designs platform allows clients to set the price for both one-to-one projects and contests, but for the latter it specifies that their price has to be above a minimum threshold corresponding to the price of the least expensive subscription plan.

Freelance and contest-based platforms charge commission fees to the platform worker, while the client is often subsidized and either pays a lower fee for its account to be processed or no fee at all. Some exceptions exist, such as Toptal, which does not seem to charge workers commission fees.

Platforms compete with each other mainly through their pricing strategies, which, as a result, change constantly. For instance, Upwork made significant changes to its pricing model in May 2016: from charging workers a flat rate of a 10 per cent commission fee it moved to a tiered structure (5 to 20 per cent) based on the amount earned with a particular client (see table 2.1). The pricing model for business clients was also changed to stimulate more business by charging less to clients to whom

⧨⧨ The commission fee charged by freelance and contest-based platforms to workers is higher than that charged to clients.

it provided a large volume of services (Cusumano, Gawer and Yoffie 2019; Pofeldt 2016). Furthermore, in 2019 it made some more changes to its pricing model by introducing new paid memberships for clients and new "connects" pricing for workers to bid for projects (Upwork 2019). In 2020, more changes were introduced to the "connects" system: this allowed workers, including new workers, to have free "connects", and additional "connects" to be allocated to workers depending on their subscription plans. Similarly, in China, to expand its market share and attract new workers, the platform Zhubajie (ZBJ) moved from a "pure commission model", whereby it charged a 20 per cent commission between 2005 and 2012, to removing all service charges for projects, except for design competitions and piece-rate projects, in 2015. The platform was able to adopt the strategy of subsidizing workers and clients thanks to the availability of large venture capital funds (2.6 billion Chinese yuan or US$402 million) (Chen, forthcoming).

The commission fee charged by freelance and contest-based platforms to workers is higher than that charged to clients on most platforms being analysed; it is a percentage of the negotiated price for the task or service and varies between 20 and 35 per cent. This leaves workers with between 80 and 65 per cent of their negotiated price as earnings and has implications for their income security (see section 4.2.2). Some freelance platforms, such as Upwork and PeoplePerHour, reduce the worker's commission fee to 5.0 or 3.5 per cent if the worker provides regular services to the same client and has earnings in excess of US$10,000 or US$7,000, respectively. This in effect locks workers into the platform, requiring them to build up their reputation and work relationship with the client in order to obtain repeated contracts and reduce their commission fees. This practice is also adopted by some contest-based platforms, for example 99designs.

▶ **Table 2.1 Revenue model of selected online web-based platforms, January 2021**

	Clients					Workers			
	Commission fee	Maintenance fee	Transaction fee	Deposit	Additional fee[5]	Commission fee	Maintenance fee	Transaction fee	Additional fee[5]
Freelance platforms									
Upwork	–	–	3%[1]	–	–	500: 20% 501–10000: 10% > 10000: 5%	–	$0–30	$0.15–12
PeoplePerHour	£0–0.6 + 10%	$9.95[2]	2.5%[3]	–	$15	350: 20% 351–7000: 7.5% >7000: 3.5%	$9.95[2]	$0–29.99 or 2.5%[3]	$8.95–29.95
Freelancer	$3 or 3%	$10[2]	$0–0.30 + 2.3%; $15	–	$5–35; 50% of contest prize	0–20%	$10[2]	$0–25	0.75% of bid amount $0.50–50
Toptal	–	–	–	$500	–	–	–	–	–
Contest–based platforms									
Designhill	5%	–	5%[1]	–	–	25–35%	–	✓	–
Hatchwise	–	–	–	–	$39	–	–	✓	–
99designs	5%	–	–	–	–	5–15%; 20% of the first $500 earned[4]	–	✓	–
Microtask platforms									
AMT	20–40%	–	–	–	–	–	–	2.9–3.9%	–
Clickworker	20–40%	–	–	–	–	–	–	–	–
Appen	20%	–	–	–	–	–	–	–	–
Microworkers	7.5%	$5[2]	–	–	–	–	$5[2]	3–7.50%	–

[1] Payment processing fee.   [2] For inactive accounts.   [3] Currency conversion fee.   [4] Client introduction fee.   [5] Additional fee for clients includes fees for prioritizing or highlighting their projects or tasks; and for workers includes fees for making their profiles more visible, and also for purchasing connects or credits to bid for projects.

Source: ILO compilation based on respective platform websites, terms of service agreements, field surveys and interviews.

The practice of charging commission fees is prevalent among online freelance platforms that operate globally as well as those that operate regionally, such as Kabanchik and FreelanceHunt in Ukraine and 680 and ZBJ in China. Some platforms in China (such as 680), however, also require workers to make a security deposit for software projects of about 30 to 50 per cent of the project reward to the platform until the completion of work (Chen, forthcoming). This practice is unique for workers and puts an additional burden on workers to raise the amount in order to access

specific work on these platforms. The practice of requiring a security deposit is targeted towards the clients in other cases, and is much more prevalent on platforms established in the United States or Europe which often provide escrow services (such as PeoplePerHour and Upwork). This ensures that the worker does not bear the risk of financial loss if the client disappears, or if an order is cancelled, or if the fees are not paid or only partially paid, which could also threaten the smooth functioning of the platform (Shevchuk and Strebkov 2017). The escrow services also work to the client's advantage as they ensure that if the client is not satisfied with the services, then no payment is due.

The revenue model of freelance and contest-based platforms is based on different types of fees and subscription plans that are charged to workers and clients. To improve their intermediation services and to manage the workforce on the platforms, some freelance and contest-based platforms offer workers the option of buying a "subscription plan" or of bidding for projects that are posted by the clients. Platforms such as Freelancer offer various subscription plans that are priced from US$0.99 to US$69.95 per month, providing the workers with various benefits and services, which include giving their profile greater visibility, providing access to a certain number of bids per month, and being able to follow employers, among others. Design platforms such as Designhill also provide annual subscriptions ranging from US$100 to US$200 (see table 2.2). Upwork and PeoplePerHour have introduced "connects" or "proposal credits" that workers have to purchase to be able to bid for projects. Platforms also offer workers a range of other services such as "highlighting" or "featuring" their projects or proposals, for a fee, to enhance their visibility so that they stand out when clients search for workers on the platform. These fees are in addition to the commission fees that workers pay to the platform, which vary across the different platforms.

Workers are often encouraged to subscribe to paid services, as the algorithms used for the matching process are set up in such a way that workers who have subscription plans or have purchased "connects" or paid an additional fee are more likely to get projects and tasks. This strategy helps the platforms to improve their intermediation service and attract clients, while transferring the costs of the matching process to the workers. In this system, since the workers depend on the platforms for their income, they often have little choice but to incur costs to increase their chances of finding work. This system could potentially present an obstacle for some workers from the global South, as they might not be able to access certain tasks for lack of adequate financial means; this could, consequently, negatively affect their earnings (see sections 4.2.1 and 4.2.2).

The clients, on the other hand, on some freelance platforms are invited to try the platform services free of cost initially, before they choose a "subscription plan" (see table 2.2). On the basis of the plan chosen, they are offered various support services and benefits. In addition to the subscription plans, freelance platforms offer large clients customized pricing and services based on their demand and budget. Toptal's revenue model is based only on customized pricing and the platform offers clients the option to hire workers on an hourly, part-time or full-time basis with a minimum requirement of services for 80 hours,[6] at prices ranging from US$60 per hour (developers) to more than US$8000 per week (finance experts) depending on the skills requirements.[7] The client is required to deposit an initial amount of US$500 as security. The platform offers a "no-risk" trial of three experts for a position, and if the client is not satisfied, they are guaranteed to have their deposit back. This allows Toptal not only to ensure clients' satisfaction but also to establish a good reputation for the services it provides in the multi-sided market.

Contest-based design platforms offer two kinds of subscription plans to clients. Designhill and 99designs offer guaranteed contests, which are non-refundable. If no winner is selected the prize

6 This information is based on an ILO interview with a "Supervisor" at Toptal.

7 This information was obtained from the frequently asked questions (FAQs) section of the Toptal website, August 2020.

▛▛ The fees charged to workers significantly contribute to platform revenue.

amount is equitably distributed among the participating designers. For other contests there is a 100 per cent "money-back guarantee", which enables the platforms to attract clients. These platforms offer clients varying pricing plans for each contest and the platforms often compete with one another on the pricing of the plans and services offered, as in traditional markets. Among such offerings are access to top designers, access to a greater number of contest entries, and prioritized support.

The fees charged to workers significantly contribute to platform revenue, particularly among freelance platforms. For instance, about 90 per cent of Upwork's revenue for 2019 came from the "marketplace", and it earned 62 per cent of its US$300 million revenue from different types of fees charged to workers, compared to 38 per cent from the clients (Upwork 2019, 107). This is despite the fact that Upwork provides "payroll services" via a third party, and customized services for 30 per cent of Fortune 500 companies (Upwork 2019). The practice of charging fees to workers may be contrary to international labour standards,[8] which prohibit agencies, employers and intermediaries from charging fees (see box 2.1; see also Chapter 5 for further discussion). Despite the practice of charging fees to raise revenues, most of the platforms have a history of making net losses, which brings into question the sustainability of the business model. Upwork, for instance, had an "accumulated deficit of US$172 million" as of December 2019, and the platform is uncertain about achieving or sustaining profitability (Upwork 2019, 11).

▶ **Box 2.1 Private employment agencies**

Temporary agency work as practised in recent decades is a regulated form of work. It involves a triangular employment relationship wherein a worker is employed by an employment agency that matches them with an employer. The ILO Private Employment Agencies Convention, 1997 (No. 181), defines a private employment agency as a natural or legal person engaged in "matching offers of and applications for employment" and/or "employing workers with a view to making them available to a third party which assigns their tasks and supervises the execution of these tasks" (Art. 1).

The World Employment Confederation (WEC), a global representative of private employment services, welcomes the "online talent platform technology" and embraces platforms, emphasizing the value that these bring to jobseekers. It asserts, however, that in order to ensure a level playing field platforms must comply with global standards for private employment services, mainly "the ban to charge recruitment fees to workers" and the "compliant and confidential use of personal data" (WEC 2020, 2). This is in accordance with ILO Convention No. 181, which provides that agencies "shall not charge directly or indirectly, in whole or in part, any fees or costs to workers" (Art. 7). The Convention also regulates the processing of workers' personal data to ensure that their privacy is protected and respected.

The WEC maintains that platform work is in essence a new way of organizing work, and that given its diverse nature it cannot be adequately regulated by a one-size-fits-all regulation. Rather, platform work calls for the redesign of existing labour market institutions to accommodate a more dynamic world of work, together with a minimum floor of rights which includes respect for the ILO Fundamental Principles and Rights at Work and which promotes, among others, portability and transferability of benefits across jobs and sectors, as well as access to training and lifelong learning (WEC 2020).

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8 The ILO Protection of Wages Convention, 1949 (No. 95), and the Private Employment Agencies Convention, 1997 (No. 181).

▶ Table 2.2 Subscription plans for online web-based platforms, January 2021

	Clients			Workers		
	Free trials	**Subscription plan**	**Customized service contract**	**Free trials**	**Subscription plan**	**Customized service contract**
Freelance platforms						
Upwork	✓	$49.99/ month	✓	–	$14.99/ month	–
PeoplePerHour	–	Based on points system	✓	–	–	–
Freelancer	✓	✓	✓	✓	$0.99–69.95/ month	–
Toptal	✓	–	✓	–	–	–
Content–based platforms[1]						
99designs	–	$299–1299	–	–	–	–
Designhill	–	$249–999	✓	–	$100–200[2]	–
Hatchwise	–	$89–399	–	–	–	–
Competitive programming platforms[3]						
Topcoder	–	–	✓	–	–	–
HackerRank	✓	$249–599	✓	–	–	–
HackerEarth	✓	$119–279	✓	–	–	–
Kaggle	✓	✓	✓	–	–	–
CodeChef	–	–	✓	–	–	–
Microtask platforms						
AMT	–	–	✓	–	–	–
Clickworker	–	–	✓	–	–	–
Appen	–	–	✓	–	–	–
Microworkers	–	–	✓	–	–	–

[1] Subscription plans for a logo design contest; plans vary across different contest types.   [2] Designhill offers its designers annual designer membership subscription plans.   [3] Subscription plans for recruitment purposes. These charges are monthly, to be billed annually.

Source: ILO compilation based on platform websites and terms of service agreements.

2.2.2 Competitive programming platforms

On competitive programming platforms, the prices for subscription plans and for competitions are fixed by the platforms themselves. The revenue model of these platforms is largely based on charging clients and includes two types of revenue streams (see table 2.2). First, platforms provide clients with recruitment services to which they can subscribe through various plans proposing a range of services and benefits. Second, they charge fees to clients wherein they provide customized services and develop a range of projects, from prototypes to the development of new algorithms, based on specific client requirements. Both recruitment and customized services are provided by means of competitions or "hackathons" in which the platform community of developers, programmers or data scientists takes part. The Topcoder platform also offers "Talent as a Service" (TaaS) programmes to clients and recommends workers from the Topcoder community of programmers to meet specific skills requirements.

Competitive programming platforms do not charge fees to developers and programmers; they build communities of programmers and developers who can provide top-quality services while at the same time honing their skills. Workers on these platforms are rewarded through monetary prizes and non-monetary benefits (Boudreau and Hagiu 2009), which include the opportunity to participate in regular contests and competitions, access to software libraries, rankings and skills ratings, peer reviews, and for highly rated or ranked programmers, sharing of their profiles with companies for hiring purposes.

2.2.3 Microtask platforms

On microtask platforms the prices are usually determined unilaterally, either by the platform or by the client. On AMT, for instance, clients determine the price for tasks and decide whether to accept the completed task and pay workers, while Clickworker specifies on its platform that for participants from Germany, the price should be equivalent to the German minimum wage. Appen and Microworkers have a basic formula to estimate the cost of a job, taking into consideration any specifications indicated by the client and all related costs.

> ◤◤ On microtask platforms the prices are usually determined unilaterally, either by the platform or by the client.

Workers on microtask platforms are not charged a commission fee; instead, clients are charged a fee that is determined in relation to the amount paid to the platform workers. The commission fee is typically assessed and charged at the time of payment for the work performed, and varies between 7.5 and 40 per cent.[9] Some platforms, such as AMT and Microworkers, offer additional services to their clients if they want to target specific groups of workers based on age, sex, experience or nationality, for which the platforms charge an additional fee in terms of either a percentage of the task or a fixed amount per assignment (ranging from US$0.05 to US$1.00 on AMT).[10] Microtask platforms also offer custom-tailored services based on client requirements.

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9 Based on information provided by the platforms covered by the microtask survey.

10 This information is based on surveys conducted on these two platforms in 2017.

2.2.4 Taxi platforms

The ride fare on taxi platforms is determined by the platform using algorithms that are based on factors such as distance, time taken to reach the destination, fuel cost, type of vehicle and financial capacity of the customers to spend in a particular geographical area of the city.[11] During periods of high demand, platforms also use surge pricing algorithms that allow them to determine the ride fare based on demand and supply.

The revenue model of taxi platforms is based on charging commission fees to the taxi driver. The commission fee, which is a percentage of the ride fare, varies within and between platform companies. For instance, the commission fee charged by Uber is 25 per cent in most countries under consideration (see table 2.3; section 4.2.2 provides additional details), but in some countries where there is intense competition, a lower fee is charged (20 per cent in India; 5 per cent in Kenya). Companies also vary the commission fee based on the income earned by the drivers[12] and raise revenues through their surge pricing algorithms (Lee et al. 2015).

Taxi platforms also try to motivate and retain workers and clients or customers through gamification and rewards. Gamification for taxi drivers, which takes the form of offering incentives or bonuses to stimulate their engagement, was reported by three quarters of app-based taxi drivers (see section 4.2.2). The strategy adopted to attract taxi drivers differs across countries depending on local demand, cultural context and the presence of business competitors. For example, Uber's offerings of bonuses and incentives vary considerably between countries (see table 2.4). Among Uber drivers who reported being offered bonuses and incentives, in most countries a high proportion indicated being rewarded for completing a certain number of rides. Another way in which platforms incentivize drivers is by offering them bonuses during specific times (peak demand), or for working asocial hours, a practice that is quite popular among all taxi platforms. A significant proportion of Uber drivers in Chile, Lebanon and Ukraine reported receiving similar offers.

Such bonus schemes usually depend on the number of rides accomplished in a day or a week; the drivers are incentivized to meet targets, which can result in working long hours to earn the extra money promised (Surie and Koduganti 2016; see section 4.2.3). Over time, however, the targets are increased and the rewards reduced, which also affects the incomes of the taxi drivers. The pricing mechanisms followed by taxi platforms can also lead to extensive litigation (see box 2.2). Moreover, drivers often find it hard to meet the final target, as the algorithm often does not assign enough rides when drivers are getting close to their target (Rosenblat and Stark 2016). This situation could also be due to oversupply of workers competing for rides on these platforms (van Doorn 2017). To encourage clients or customers to use their platforms, the companies provide rewards or coupons or subsidize the costs of rides, keeping them low compared to traditional taxis or other companies.

Many taxi platforms are able to provide subsidies, bonuses and other incentives because of funding made available by venture capital and other funds (see section 1.5). This strategy allows these platforms to have network effects, enter new markets (countries) and expand their customer base there. Uber, which is a dominant player in the taxi sector, has raised US$25.2 billion from 28 funding rounds of venture capital (to January 2021),[13] expanded its services in 69 countries and had an accumulated deficit of US$16.4 billion in December 2019 (Uber 2020a). Uber is able to sustain its business and market share largely as a result of the availability of funds from venture capital, which allow it to subsidize both sides of the market and also to penetrate a number of new markets (Cusumano, Gawer and Yoffie 2019; Horan 2019). The investors are betting on a winner-takes-all outcome, wherein Uber would emerge as a market leader and then reduce the subsidies or even increase the commission fees charged to the drivers, or raise the price of the rides (Cusumano, Gawer and Yoffie 2019). Along with the rise in digital labour platforms, an alternative platform structure, the "platform co-operative", which is collectively owned and funded (see box 2.3), is increasingly gaining ground.

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11 These indicators are based on ILO interviews with taxi platform companies.

12 Based on ILO interviews with taxi platform companies.

13 Based on information collected from Crunchbase database.

▶ **Table 2.3 Revenue model of selected taxi platforms in selected countries, 2019–20**

	Clients		Workers		
	Maintenance fee	Transaction fee	Commission fee	Maintenance fee	Transaction fee
Uber					
Chile	✓	✓	25% (18–35)	✓	✓
Ghana	✓	✓	25% (15–25)	✓	✓
India	✓	✓	20% (15–44)	✓	✓
Kenya	✓	✓	5% (5–25)	✓	✓
Lebanon	✓	✓	25%	✓	✓
Mexico	✓	✓	25% (10–37)	✓	✓
Ukraine	✓	✓	25% (10–35)	✓	✓
Careem					
Lebanon	✓	✓	20% (15–25)	✓	✓
Morocco	✓	✓	25% (10–40)	✓	✓
Bolt					
Ghana	✓	✓	20% (10–25)	✓	✓
Kenya	✓	✓	20%	✓	✓
Ukraine	✓	✓	15% (10–40)	✓	✓
Ola (India)	✓	✓	20% (15–40)	✓	✓
Little (Kenya)	✓	✓	5% (5–20)	✓	✓
Grab (Indonesia)	✓	✓	20% (5–40)	✓	✓
Gojek (Indonesia)	✓	✓	20% (10–33)	✓	✓

Notes: The data on commission fees for taxi platforms is based on the ILO selected country surveys of taxi drivers (see Appendix 4A). The figures shown are the commission fees (2019–20) that were mentioned most often by respondents per country and platform. Figures in parentheses are the range of commission rates mentioned by taxi drivers.

Source: ILO compilation based on respective platform websites, terms of service agreements, field surveys and interviews.

▶ **Table 2.4 Criteria for receiving bonuses or incentives on Uber, selected countries (percentage of respondents)**

	New drivers	Working asocial hours (night or holiday)	Reaching or exceeding an hourly threshold	Reaching or exceeding a certain number of rides	Working during high-demand hours
Chile	1	25	28	74	28
Ghana	4	4	27	92	3
India	0	0	8	98	12
Kenya	11	27	33	78	0
Lebanon	3	41	8	58	65
Mexico	0	4	11	88	38
Ukraine	4	20	33	85	42

Note: Figures refer to workers who reported being offered bonuses or incentives by Uber.

Source: ILO selected country surveys of app-based taxi drivers (2019–20).

▶ **Box 2.2 Pricing by taxi platforms and potential for litigation: The case of Ola and Uber in India**

Litigation in India illustrates the complexity and uncertainty of applying competition law to platform work. Uber entered the Indian market in 2013, by which time another local platform company, Ola, already had a three-year head start. MERU (a radio taxi company) alleged that both Ola and Uber subsidized the cost of rides to attract customers,[1] and to compete with traditional taxi drivers and taxi companies.

Both Ola and Uber aggressively recruited drivers by providing them with financing to purchase or lease vehicles, and various other incentives (Surie 2018). Uber gave incentives of 2,000 rupees (US$31.2) for completing 12 rides per day in early 2016 to drivers in New Delhi; although by December 2016 it had changed its incentive model to offering such incentives just once a week for completing 40 to 50 rides, and also increased the commission rate from 20 to 25 per cent (Dhillon 2018). Similarly, an Ola driver noted that he was earning as much as 75,000 rupees (US$1028.7) to 100,000 rupees (US$1371.6) a month working 12–13 hours a day in 2016, but by 2017 the amount had dropped to 40,000–45,000 rupees (US$548.6–617.2) a month working 15–16 hours a day, due to the changes in the trip incentive model (Ayyar 2017).

Furthermore, platform drivers were also incentivized to recommend other drivers and were paid a one-off sum per successful referral, which varied across the cities. They were also offered free insurance, free registration for vehicles, cash discounts and lucky draws for domestic appliances. The measures helped Uber to create network effects in the Indian market and to challenge its competitor Ola and the traditional taxi sector. The latter has since then dwindled in numbers in many Indian cities. In response, Ola introduced the minimum guarantee scheme to attract workers and assured them of a minimum amount after meeting a particular target.[2]

MERU filed a series of complaints before the Competition Commission of India[3] alleging that Ola and Uber were engaging in practices contrary to Sections 3 (anti-competitive agreements) and 4 (abuse of dominant position) of the Competition Act 2002. On the one hand, the Competition Commission decided in Ola and Uber's favour and found that given the nature of competition within the radio taxi markets of Chennai, Hyderabad, Kolkata and Mumbai, *prima facie* dominance of Uber and Ola individually could not be made out (para. 41), and with regard to Section 3 the allegation did not hold merit (para. 37). On the other hand, MERU successfully appealed to the Competition Appellate Tribunal on an earlier case of 2015 that it had lost,[4] with regard to alleged predatory pricing and the Tribunal reversed the Commission's decision and ordered an investigation into MERU's allegations.[5] Uber subsequently filed an appeal before the Supreme Court of India against the Tribunal's reversal, which was rejected by the court in September 2019.[6] The experience in India is not necessarily reflective of other jurisdictions, where both the relevant competition legislation and the business practice might differ substantially.

[1] From Case No. 96 of 2015: Rates for Uber Black: November 2013, 20 rupees/km; June 2014, 18 rupees/km; November 2014, 18 rupees/km; February 2015, 12 rupees/km. While the traditional taxi rates were 23 rupees/km in November 2013.   [2] Information based on ILO interviews with workers.   [3] Competition Commission of India, *Meru Travel Solutions Pvt. Ltd. and ANI Technologies Pvt. Ltd. and Uber India Systems Pvt. Ltd*. & Ors. Case No. 25–28 of 2017.   [4] Competition Commission of India, *Meru Travel Solutions Pvt. Ltd. and Uber India Systems Pvt.Ltd.* & Ors. Case No. 81 and No. 96 of 2015.   [5] Competition Appellate Tribunal, *Meru Travels Solutions Pvt. Ltd. v Competition Commission of India* & Ors., Appeal No. 31 of 2016.   [6] Supreme Court of India, *Uber India Systems Pvt. Ltd. v Competition Commission of India* & Ors., Civil Appeal No. 641 of 2017.

▶ **Box 2.3 Platform cooperatives**

Platform cooperatives are collectively owned and have been gaining in popularity over the past decade. Platform cooperatives are designed and owned by their members, who usually pay a small contribution from their earnings towards the maintenance and development of the platform.[1] Given that work on these platforms is co-determined and decisions are taken based on participatory democratic processes, platform cooperatives are likely to be more transparent and accountable to their members than digital labour platforms in which many functions are algorithmically managed.

There are currently various platform cooperatives operating in a number of sectors, from taxi (such as Green Taxi Cooperative and ATX co-op Taxi, in the United States and Eva in Canada) and delivery (such as Coopcycle[2]) services to house-cleaning (such as Up&Go, New York City) and e-commerce (such as Fairmondo, Germany). Their vision is to create a genuine "sharing" economy, committed to fair labour practices. For instance, Eva is a cooperative that allows driver members, rider members and worker members to be part of the cooperative. The drivers earn about 15 per cent more than on other available taxi platforms in the region.[3] The cooperative structure of many of the platforms has also allowed their members to self-organize efficiently during the COVID-19 pandemic by equitably distributing tasks among themselves.

[1] This contribution tends to be much lower than the commission charged by the digital labour platforms studied in this report.   [2] Coopcycle is a network of bike delivery cooperatives that operates in Belgium, Denmark, France, Poland, Spain, the United Kingdom and the United States.   [3] For more details, see: https://eva.coop/#/driver; http://cities-ess.org/topics/eva-coop/?lang=en.

2.2.5 Delivery platforms

On delivery platforms, the delivery fare for the workers is determined by the platform using algorithms that are based on a number of factors, such as demand and distance, among others, and it is only once the delivery workers have accepted the delivery that the fares are made available to them.

Delivery platforms charge restaurants, shops and supermarkets a commission fee and charge customers a delivery fee. The commission fee charged to restaurants or supermarkets ranges between 12 and 35 per cent depending on the platform and country (see table 2.5). Delivery platforms also charge customers delivery fees: for instance, Cornershop, Jumia Food and Uber Eats charge a minimum delivery fee to the customer, while on other platforms delivery fees vary based on factors such as distance (Deliveroo and Glovo) or a percentage of the purchase price (Jumia Food and PedidosYa). As reported by many restaurants, platforms also charge business clients higher commission fees if they offer their products through multiple platforms. Delivery platforms often state in the exclusivity clauses of contracts that they will charge lower commission fees for clients working exclusively with them.

Some of the delivery platforms also provide discounts to customers as a strategy to expand their business in the specific region or area. For instance, Toters in Lebanon gave a 50 per cent discount to customers for their purchase from certain restaurants and shops, and these costs were borne either by the platform or at times jointly with the restaurants or shops. In the event of cancellation, customers are often charged a cancellation fee that comprises the price of the products ordered and the delivery fee, if a delivery worker has already been assigned the task. Some platforms also offer premium memberships to customers, whereby the delivery fee is waived if the orders exceed a certain amount.

▶ Table 2.5 Revenue model of selected delivery platforms in selected countries, 2019–20

| | Clients (restaurants, shops and supermarkets) | | Customers |
	Commission fee (%)	Commission fee per order (US$)	Delivery fee per order (US$)
Chile			
Rappi	19–28	1.95–5.47	1.40–5.61
Uber Eats	15–33	1.68–2.67	1.68–3.09
PedidosYa	25–28	1.25–4.91	1.25–5.61
Cornershop	15	5.47–6.87	5.47–6.87
India			
Swiggy	22–24	–	–
Zomato	12–25	–	–
Lebanon			
Toters	20–25	–	–
Zomato	10–20	–	–
Kenya			
Uber Eats	15–25	–	–
Jumia Food	16–20	–	1.37
Glovo	15–20	–	–
Ukraine			
Glovo	28–35	–	–
Mexico			
Uber Eats	26–35	–	–
DiDi Food	20–30	–	–
SinDelantal	22–30	–	–

Source: ILO compilation based on respective platform websites, terms of service agreements, field surveys and interviews with restaurants, shops or supermarkets in the respective country.

2.3 Recruitment and matching of workers with clients

Digital labour platforms are transforming human resource practices and the employment relationship, which has major implications for the future of work. This section discusses recruitment practices, matching of workers with clients and assignment of tasks.

2.3.1 Work relationships on platforms

There are two types of work relationship on digital labour platforms: workers are either directly hired by the platforms (internal employment) or their work is mediated through the platforms (external employment). Figure 2.3a shows the number of employees directly hired by online web-based platforms, which varies between 50 (PeoplePerHour) and 800 (Appen). In contrast, about 2.4 million skilled workers were registered globally on PeoplePerHour as of January 2021.

The number of employees hired directly by location-based platforms is far higher than on online web-based platforms (see figure 2.3b). On location-based taxi platforms, this number varies between roughly 1,200 (Careem) and 26,900 (Uber), although this represents only a fraction of the approximately 5 million

There are two types of work relationship on digital labour platforms: internal employment or external employment.

drivers in 69 countries around the world for whom Uber mediates work (Uber 2020b). A number of delivery platforms also have a higher number of directly hired workers (more than 5,000) than other types of platforms; Meituan, for example, has 54,580 full-time employees. This is largely because many of these companies hire delivery workers as employees to establish a market base. Once their objectives are achieved, however, some of them change their labour practices and hire workers on a part-time or a piece-rate basis. For example, Delivery Hero (Germany), PedidosYa (Argentina) and Swiggy (India) initially hired workers on a full-time basis, but once they had established their market position, they terminated many of the full-time contracts and hired

workers on a per-task basis, and have been progressively reducing the number of workers directly employed. In the case of Meituan (China), the platform has been hiring workers through third-party staffing agencies (Sun, Chen and Rani, forthcoming). Among the platforms surveyed, the number of employees directly hired (internal employment) by platforms is a mere fraction of the number of workers whose work is mediated (external employment).

> The number of employees directly hired (internal employment) by platforms is a mere fraction of the number of workers whose work is mediated.

▶ **Figure 2.3 Number of employees directly hired by digital labour platforms, 2019–20**

(a) Online web-based platforms
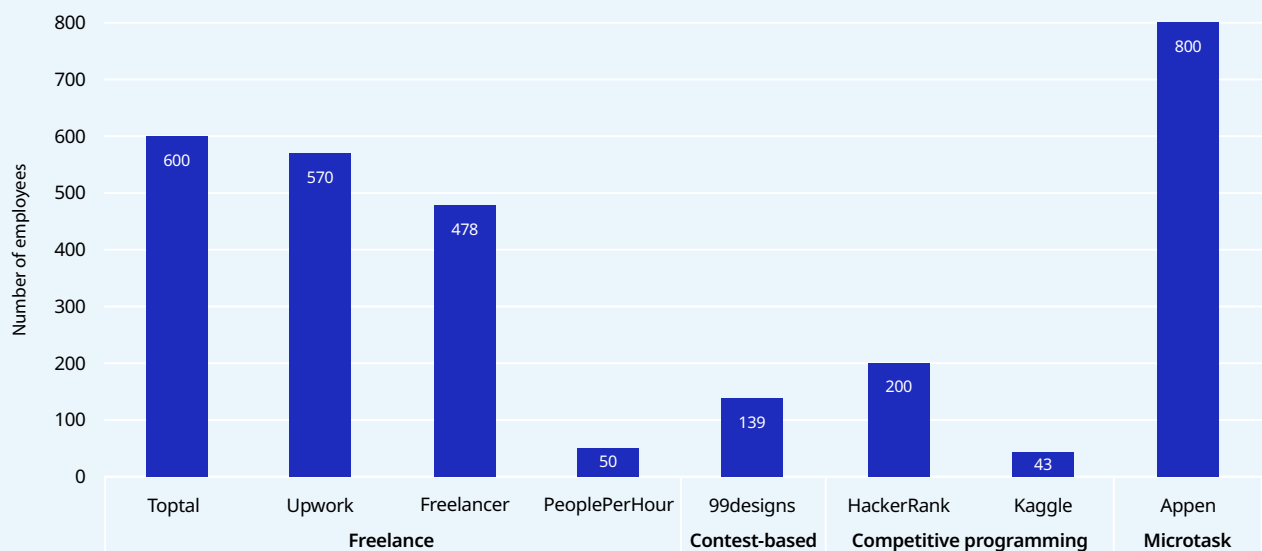
(b) Taxi and delivery platforms
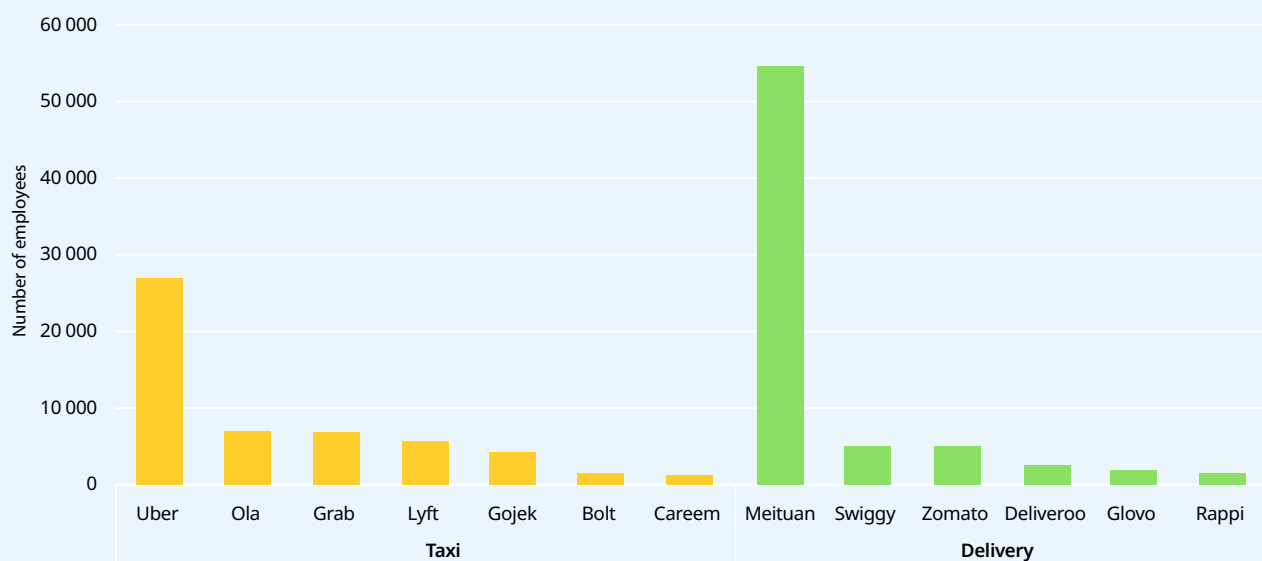
Sources: Owler database, annual reports, filings by platform companies to the Securities and Exchange Commission of the United States and platform websites.

Workers directly hired by platforms have an employment relationship, while those whose work is mediated by platforms are typically considered by the platforms as "self-employed", "independent contractors", "third party service providers", "designers", "freelancers" and so on, and consequently do not have an employment relationship (see Appendix 2B for the different terms used by platforms for workers). These platforms justify their approach to their relationship with their workers on the basis that workers have the flexibility to choose their own work schedules (see Chapter 5 for more details). Furthermore, some platforms, such as AMT, Clickworker and Upwork, even specify that users of the platforms will not be offered employment related benefits such as sick leave, health insurance or retirement benefits.

Platform companies are able to devolve their responsibility for providing the requisite employment or social protection benefits to their workers and to save on labour costs. This also provides platforms with greater employment flexibility than traditional employment agencies, which rely on dependent employees (Schwellnus et al. 2019). Some industry executives have estimated that classifying platform workers as employees instead of independent contractors would cost platform companies 20 to 30 per cent more (Scheiber 2018). Uber mentions in its annual report that if drivers were to be classified as employees then it would have to "fundamentally change" its business model, which would "have an adverse effect on [its] business and financial condition" (Uber 2020a, 13). Similar consequences are also mentioned by online web-based platforms such as Upwork (Upwork 2019, 15). However, some companies such as Alto in the United States have come up with an alternative model and hire drivers as employees providing, for example, health benefits,

competitive wages based on hours worked, and paid time off.[14]

Related to the ongoing discussion on misclassification of platform workers, some location-based platforms offer insurance coverage for accidents and hospitalization at no extra cost to workers. Deliveroo's insurance policy, for instance, covers riders from the moment they are online and for one hour after going offline, and provides supporting income when they are unable to work following injury. In France, notably, Deliveroo riders also benefit from paid sick leave – €30 per day for 15 days – provided they have completed at least 30 rides in the previous eight weeks. In-ride insurance and social protection benefits are offered to varying degrees by Uber depending on the country,[15] and in India all taxi platforms are obligated to provide health and life insurance to taxi drivers. Some of the delivery platforms (such as Swiggy) also provide medical and accident insurance coverage to workers and their family members.

With the spread of the COVID-19 pandemic, some delivery platforms are looking to improve working conditions and protections for those whose work they mediate. For instance, the CEO of JustEatTakeaway, one of the largest delivery platforms globally, recently emphasized: "We're a large multinational company with quite a lot of money and we want to insure our people [...] We want to be certain they do have benefits, that we do pay taxes on those workers" (Josephs 2020). Good practices are also followed by some other delivery platform companies. These include BOX8, which has been providing food and grocery delivery in Indian cities since 2012, and which offers full-time contracts to its employees, and provides social protection benefits and incentives for upskilling.[16]

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14 For more details, see: https://www.ridealto.com/driver-application.

15 Uber provides a range of protections, including accident, injury, illness, and paternity benefits for drivers and delivery workers in partnership with AXA in European markets and in partnership with Chubb in Australia and South Africa. For more details, see: https://www.uber.com/en-GB/blog/supporting-drivers-with-partner-protection-from-axa/; https://www.uber.com/za/en/drive/insurance/; https://www.uber.com/en-AU/newsroom/partnersupportaustralia/.

16 For more details, see: https://www.taciturban.net.in/companies/box8/.

2.3.2 Basic requirements for opening an account on platforms

Online web-based platforms adopt various strategies to build their talent pool, so as to attract clients. For this purpose, they verify the skill levels of workers before a platform account can be opened. At one end of the spectrum are *freelance platforms*, which conduct rigorous screening processes that can last from one to three weeks (e.g. Toptal), or have online skill tests[17] (e.g. Upwork) or a designer curation team that reviews applications by potential workers (e.g. 99designs). At the other end of the spectrum are *competitive programming* and *microtask platforms*, which anyone can join without their skills being vetted. Some platforms stipulate in their terms of agreements that they do not permit registration of people from countries that are subject to sanctions. Many platforms also reserve the power in their terms of service agreements to refuse registration of a "user" at their own discretion.

On *location-based platforms*, registration or onboarding is fairly straightforward, though in order to actually access and complete tasks on the platforms, workers have to meet certain additional requirements. In most cases, taxi drivers and delivery workers are required to provide themselves with the necessary equipment, such as a smartphone, vehicle (car, scooter or bicycle) and thermal backpack (in the case of delivery platforms). In some countries, taxi platforms lease cars to drivers. Platforms usually require formal identification, such as a driving licence, social security or identity card, and vehicle-related information, such as vehicle registration and insurance. In some cases vetting (such as criminal or other background checks) is imposed by regulations and can lead to more rigorous onboarding processes. For example, after incidents of sexual assault of passengers in India and China, Uber and DiDi introduced background checks (Uber 2020c; Yuan 2018).

2.3.3 Algorithmic matching of clients and workers

Platforms are introducing a paradigm shift in the conventional human resource process of how clients (demand) and workers (supply) are matched. Instead of assigning workers and tasks through human interaction, some platforms use fully automated matching processes for assignment of work. Workers are automatically matched to client requirements and assigned a task on the basis of a number of platform-specific indicators. These include a combination of worker ratings, worker profiles (such as expertise level and skills), client reviews, availability, time zones and hourly rates, among other factors. An analysis of 117 freelance and contest-based platforms shows that ratings (50 per cent) and client reviews (60 per cent) are the two major factors used in assigning tasks to workers (see figure 2.4). Other factors taken into consideration include worker profiles (46 per cent), project history or portfolio (27 per cent) and the rate proposed by the worker (21 per cent).

◢◢ Some platforms use fully automated matching processes for assignment of work.

Some *freelance platforms* rely exclusively on algorithmic matching (based on targeted indicators) of clients with workers (e.g. Freelancer, PeoplePerHour), while others use a mix of algorithmic matching and human interaction to assign the task to the worker (e.g. Toptal, Upwork).[18] On these latter platforms, algorithmic matching provides the client with a shortlist of the top three to five workers who could perform the task. The client is then assigned a design specialist or

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17 Upwork has recently discontinued its online skill tests.

18 This information is based on ILO interviews with the platform companies.

▶ **Figure 2.4 Indicators used to determine client–worker matching on freelance and contest-based platforms**
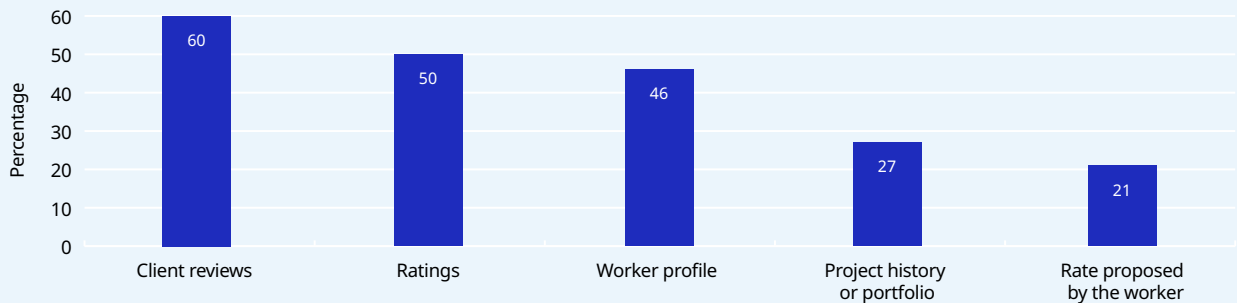
Note: Information was available and considered for analysis for 117 freelance and contest-based platforms.

Source: ILO estimates based on online labour platforms listed on Crunchbase database and the platform websites.

supervisor to discuss the task requirements and the specific skills needed, and is provided with chat and video-conference tools for scheduling interviews with one or two workers from the shortlist. This enables the client and the worker to finalize the contract agreement and to negotiate the price, working schedule and deadline.

While ratings and client reviews are an important part of the matching process, platforms also allow workers to bid on specific tasks through the payment of a fee which gives them more visibility (see section 2.2). These practices carry the risk of excluding some workers with better worker ratings who have not paid the fee or those with low purchasing power from participating in a fair matching process (see section 4.2.1). On **contest-based platforms**, the clients, based on the subscription plan for which they have opted, often set the price and the requirements of the project, and workers can then submit their portfolio and proposals within a limited time. The contests are either open to all designers or are restricted to top-level designers based on such factors as ratings, client reviews, work histories and repeated assignments with clients, and the client's requirements. Some platforms, such as 99designs, also restrict the number of contests that designers can enter on the platform per month, based on their skill level.

> ⯀⯀ Platforms also allow workers to bid on specific tasks through the payment of a fee.

Most challenges or hackathons on **competitive programming platforms** are open to the community of developers, coders and programmers, except some to which the platforms invite only highly rated or ranked programmers. Eligibility to perform the various tasks on **microtask platforms** is determined by worker ratings, which are algorithmically determined. In addition, on some platforms clients can specify further criteria for including or excluding workers, such as nationality, gender or age (see section 2.2.3). Tasks are then automatically made available to eligible workers on a first-come, first-served basis.

Task assignment on both **taxi** and **delivery platforms** is generated by algorithms and based on worker ratings, which are calculated through indicators such as ratings by clients, cancellation rate and acceptance rate. Workers are often given a limited timeframe (usually a few seconds) to decide whether to accept or reject a ride or delivery. In

addition, taxi platforms use "surge pricing" based on demand, which can strongly influence drivers to make themselves available in areas where there is a peak in demand (Duggan et al. 2020; Rosenblat and Stark 2016). Some of these practices are inconsistent with the platforms' assertions that workers are free to set their own working schedules and accept or reject work, because acceptance or rejection of work assignments can have significant implications for workers' ratings and thus the amount of work they will be assigned in future (see section 4.3.1).

Platforms also incentivize workers to build their profiles by using online training tools to enhance their skills, profiles and thereby opportunities. This is most common on *freelance platforms*, which offer workers online training and tests free of charge to help them improve their chances of obtaining tasks. PeoplePerHour, for example, has an "academy" where workers can take courses, gain skills, access training programmes and earn a PeoplePerHour academy diploma, which can then be displayed on their profile. These training tools and skills help workers, particularly new entrants, to access work or improve earnings. Upwork and Kaggle allow workers to take tests at no cost and then provide feedback, so that they can assess their own abilities and learning needs.

2.4 Work processes and performance management

The use of digital tools and algorithmic management are radically transforming work processes and performance management on digital labour platforms. Platforms provide a variety of tools to organize the work processes and communication between the client and the worker, so as to ensure that the worker follows the job instructions carefully.

2.4.1 Work processes and communication

Workers are often required to install software and hardware tools, to deliver work within a prescribed period of time and to be available at a specified time (see section 4.3.1), as laid down in platforms' terms of service agreements. These tools also allow clients to track the progress of their projects and monitor worker performance (see box 2.4). These practices are prevalent among *freelance platforms* and the degree of monitoring using digital tools often resembles that found in traditional employment relationships (Rogers 2018). Furthermore, in order to optimize the client experience, some platforms also refund clients if the work is not up to their expectations or if the delivery is not executed according to the terms agreed. Both Upwork and PeoplePerHour provide clients with an escrow account, to which a specified amount is transferred when the contract is approved, and from which the payment is released to the worker's account only once the client is satisfied with the completed work. Some platforms such as Designhill allow clients to request unlimited revisions of work by designers at no extra cost. *Competitive programming platforms* provide contestants with software tools and have clear codes of conduct for those who participate in challenges and competitions.

In contrast to freelance and competitive programming platforms, on *microtask platforms* there is no communication between the client or platform and the workers. The entire work process of allocation, evaluation and remuneration for a task is algorithmically managed. Workers on these platforms are prohibited from using any automated methods to perform tasks. For example, AMT specifies that automated methods must not be used as a substitute for human intelligence and independent judgement. Some of these platforms also prohibit workers from subcontracting their work. Microtask platforms do not use any work-monitoring tools but they allow clients to check how much attention a worker is paying to a task by adding test questions. If a worker gives too many incorrect responses, he/she loses access

to that task and forgoes payment for it. Another common strategy consists in allowing clients to determine the time limit (minutes or seconds) within which the task should be completed, which allows them to exercise some control over the worker.

Platforms often provide strict guidelines on the nature of the content that can be shared through official platform communication channels, a practice which is most common among freelance and competitive programming platforms. The guidelines analysed for this report also prohibit any

communication, agreement, transfer of assets, sharing of contact details, transaction or payment between users (clients and workers) from taking place outside the platform (see Appendix 2B). This allows the platforms to maintain their position as intermediaries and prevents workers from accessing clients through other means (see section 4.2.1).

Taxi and ***delivery platforms*** define various aspects of the work process, such as behaviour and customer service etiquette, instructions for handling

▶ **Box 2.4 Monitoring work processes on digital labour platforms**

Upwork provides workers on an hourly contract with a "work diary" which, once enabled, records the number of hours worked and the number of keystrokes made, and takes random screenshots (six times an hour) while they work on a project (see figure 2.5). The client can access this information to monitor the worker's activity and progress.

For fixed-price tasks, Upwork and Freelancer suggest that clients organize projects by milestones, whereby payment is contingent on achieving the agreed milestone and clients have access to ongoing status reports. As workers have to report to clients and enter data recording their work activity on a regular basis, the flexibility, autonomy and control they exercise over their work is constrained.

▶ **Figure 2.5 Upwork work diary**

Overview	This Week	Last Week		Since Start
Work Diary	**4:30 hrs**	**32:00 hrs**	Dispute	**167:00 hrs**
Contract History	$225.00	$1,600.00		$8,350.00

Time tracking

Last Worked 1 hour ago
Memo: Forums check
Active Window: Work Diary - Google Chrome

🔍 **View Work Diary**

Activities
Track how much time ▮▮▮▮ spends towards your projects, products or customers

Add or Remove | **Manage All**

Payments History
View Profite

Source: Upwork work diary, from https://www.youtube.com/watch?v=qAXbzLUcjic.

Online web-based platforms often prohibit any communication, sharing of contact details, transaction or payment between users (clients and workers) from taking place outside the platform.

deliveries and determination of working time. Most platforms provide guidelines on non-discrimination, anti-harassment, use of safety equipment such as helmets and vests, and the importance of abiding by traffic laws and regulations. Drivers on some platforms are instructed to take the least costly route and refrain from making unauthorized stops. Workers on these platforms are tracked through the Global Positioning System (GPS), often in real time, by both the platform company and the customers, and data is collected on the number of rides and deliveries accepted or rejected, on earnings, and on driving metrics such as speed. This data is then used for training the platform's machine-learning algorithms, which can influence worker ratings, access to work, fare-setting for rides or surge pricing (see section 4.3.1).

2.4.2 Algorithmic performance management

The use of algorithms to evaluate performance is yet another way of digitalizing human resource management, replacing human supervision and redefining working relationships. Work is evaluated based on a number of metrics such as ratings, client reviews and evaluations, which allow workers to build a reputation on these platforms. There is little transparency about how worker ratings determined by the algorithms are calculated.

On most platforms, such ratings determine the nature and amount of the work assigned and thereby the level of earnings to which the worker is entitled. On all digital labour platforms, any delay in or non-completion of work negatively affects ratings. A lower rating can result in reduced work opportunities or even deactivation of a worker's account. Ratings, which serve to quantify a client's satisfaction with a designated service, are also becoming a significant managerial practice for organizations in service industries beyond digital labour platforms (Wu et al. 2019).

The use of algorithms to evaluate performance is yet another way of digitalizing human resource management.

All platforms use algorithms to calculate ratings, but the indicators that are considered for the calculations differ across platforms. On *freelance platforms*, to take two examples, Upwork has a ratings system which includes a "job success score"[19] and client feedback, while on Freelancer ratings are based on the number of reviews received from previous clients, the workers' earnings scores, their success rate in completing jobs within the agreed deadline and within the price or budget, and whether they have been hired repeatedly by the same client, among other factors. The variations in the metrics adopted by the platforms and their relative weight in the algorithms used to evaluate workers make the portability of ratings across platforms difficult, which in turn dissuades workers from moving across platforms, owing

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19 The platform specifies that the job success score is calculated as the difference between successful and negative contract outcomes, divided by total outcomes. However, an ILO interview with a manager from Upwork revealed that the job success score is actually calculated using more complicated metrics.

to the high costs in terms of time and monetary resources required to build their reputation and ratings again from scratch: workers are thus in effect locked into a specific platform, instead of being able to multi-home on several platforms (see section 4.2.1).

Performance is evaluated on many *competitive programming platforms* using the Elo rating system, which calculates a worker's expected rank in a contest; if the actual rank is better than the expected rank then the rating will increase, otherwise it will decrease. On these platforms, the ratings are also dependent on the performance of other participants in the competition and the number of competitions in which the worker has participated, among other factors.

Workers on *microtask platforms* are evaluated according to their ability to consistently submit high-quality results and maintain a high approval rate, which in turn determines the kind of work to which they have access. Once tasks are completed by workers, they are evaluated by an algorithm, which in turn accepts or rejects the tasks and makes the payment or not to the worker. Rejection of work has a considerable impact on workers' ratings, and on some platforms, such as AMT, workers might not receive tasks if their ratings are below a particular threshold (95 per cent in the case of AMT). AMT provides a "Masters" qualification to some workers who have completed at least 1,000 tasks and who maintain a high approval rating, which gives them access to varied work opportunities.[20] However, there is no transparency with regard to the set of parameters or criteria used for defining the "Masters" qualification (Kingsley, Gray and Suri 2015).

Taxi platforms evaluate worker performance using customer feedback and ratings, which are based on service quality and drivers' acceptance and cancellation of rides,[21] among other factors (such as speeding or damaging the vehicle). These are taken into consideration for calculating a consolidated rating. Workers on *delivery platforms* are evaluated through feedback provided by other platform users (clients and business partners), and factors such as cancellation rates, participation during peak periods, seniority, number of deliveries and speed of delivery.

The algorithmic assignment, evaluation and management of tasks have major implications for workers, who may not have access to a fair dispute resolution mechanism to contest or appeal what they consider unfair rejection of work or poor ratings (see section 2.5).

2.5 Digital labour platforms' rules of governance and workers' freedom to work

Digital labour platforms are adapting business practices to a digital environment. These practices are laid down in the terms of service agreements, which are unilaterally determined by each platform and govern how users (both workers and clients) interact with the platform and among themselves. They include exclusivity clauses, and cover acceptance or rejection of work, deactivation, dispute resolution, and data collection and usage. These practices pose new challenges to workers' freedom to work as well as to the ability of enterprises, particularly small and medium-sized enterprises, to operate freely, and are examined below.

Exclusivity clauses

Some platforms impose an exclusivity clause of 24 months whereby, if a worker and a client meet on the platform, both are required to use the platform as their sole work channel for 24 months (e.g. Upwork and 99designs). If either of the two

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20 For more details, see: https://www.mturkcrowd.com/threads/masters-qualification-info-everything-you-need-to-know.1453/.

21 The cancellation rate represents the percentage of journeys cancelled after accepting a request.

The terms of service agreements are unilaterally determined by the platforms.

parties chooses to opt out within that period, they are required to pay a percentage of the estimated earnings over the following 12 months. In the case of Upwork, this payment is 12 per cent of the anticipated earnings, calculated by multiplying the worker's hourly rate by 2,080; in the case of 99designs, the payment is either 15 per cent of the anticipated earnings or a payment of US$2,500. Some delivery platforms also dissuade business clients from using multiple platforms by specifying in the exclusivity clauses of their contracts that commission charges will be lower for clients working exclusively with them.

Acceptance or rejection of work

Platforms often define the situations in which work can be accepted or rejected. On *microtask platforms*, clients only pay for completed work that they have approved, so that workers are not paid if their work does not meet the client's, or in some cases the platform's, standards. Both *taxi* and *delivery platforms* often provide workers with the freedom to accept work at their own discretion. A closer look at the business model of such platforms shows, however, that such freedom is unattainable in practice, as non-acceptance of work and rejection of work have implications for worker ratings and future work assignments (see section 4.3.1).

Deactivation

Platforms reserve the right to put on hold or deactivate worker accounts at their own discretion, and in particular when a worker is considered to have breached the terms of service. Such terms often include prohibitions on payments and communications outside the platform, prohibitions on the use of subcontractors or automated methods, and prohibitions on having multiple accounts on a platform. Deactivation can also occur when workers have low ratings or have failed to verify their identity or to keep up with a platform's

standards. Workers are often not notified that their accounts will be deactivated and they realize that their accounts have been deactivated only when they log in, thus adversely affecting their access to work.

On some *contest-based platforms*, accounts can be deactivated if designers do not meet the platform's quality standards or if the work is not original. On *competitive programming platforms*, accounts are often deactivated for plagiarism. For instance, on Topcoder, if a developer is found to be cheating the platform initiates an investigation to decide on his/her continued access. On *microtask platforms*, accounts can be terminated if workers' ratings fall below a certain threshold, if they are found guilty of using automated methods, plagiarizing or infringing intellectual property rights, or failing to reply to attention questions correctly.

Location-based platforms can terminate accounts, particularly if workers breach the relevant terms of service. Other reasons for deactivation include low ratings, poor performance, prolonged periods of inactivity, and breaches of codes of conduct, which often include anti-discrimination and harassment clauses.

Dispute resolution

Terms of service agreements usually contain entire sections dedicated to dispute resolution, in which the governing law and jurisdiction are clearly specified. Such sections tend to be lengthier in the case of online web-based platforms, given that their dispute resolution procedures usually take the form of arbitration proceedings, the conditions of which are defined in detail by the platforms. In addition, online web-based platforms often include different dispute resolution policies depending on the issue in question.

Some freelance platforms, such as PeoplePerHour and Upwork, provide dispute resolution services; these often have a cost and are provided to workers based in the country where the platforms are registered, and therefore do not provide much support or assurance to workers based elsewhere. On most *microtask platforms*, workers have little to gain in practice by resorting to dispute resolution when clients do not pay for work, as the pay per task is often so meagre that the worker cannot afford to waste time fighting for such pay. Moreover, clients are typically not required to give a reason for non-payment (Berg et al. 2018). On *taxi* and *delivery platforms*, workers are frequently subject to the jurisdiction of the courts of the place where the services are being provided, although there are some exceptions. For example, in the cases of Bolt and Glovo the disputes are referred to specific courts in Estonia and Spain, respectively. Similarly, disputes in the case of Uber are subject to arbitration proceedings in the Netherlands, except for those concerning India and the United States (see Appendix 2B and Chapter 5 for a discussion on dispute resolution mechanisms).

Data collection and usage

All of the *online web-based* and *location-based platforms* under analysis engage in extensive data collection. Personal information on users (workers and clients/customers) is collected either directly or indirectly. Indirect data collection takes place through cookies, web beacons, or embedded scripts, or through third parties such as Google Analytics, social networking services or business partners. For example, on taxi platforms, this covers data related to the worker's location, which is tracked using GPS, as well as ratings, acceleration and braking data, communications between users and even data stored on users' personal devices, such as address book information or names of applications installed.

Data collection allows online web-based and location-based platforms to monitor what is

Data collection allows platforms to monitor what is happening in real time.

happening in real time and to improve algorithmic management and automated decision-making for matching and other purposes. This real-time intelligence is a valuable competitive advantage for digital labour platforms with regard to pricing and matching decisions. It also enables them to increase the effectiveness of targeted advertising (Cusumano, Gawer and Yoffie 2019) and to attract users to the platform. For example, Careem has developed an AI platform called Yoda which predicts what the demand in a certain place will be in two weeks' time and where drivers will be needed. This helps reduce waiting times and secure more fares for drivers.[22]

The privacy policies of platforms generally stipulate that they use the data collected to communicate with, notify, support and verify users, to provide and improve or personalize their services, and to ensure security and compliance with legal obligations. However, some of the platforms analysed, such as Uber and Deliveroo, specifically mention that they engage in automated decision-making. Uber uses data for automated decision-making to enable dynamic pricing, to match drivers with passengers, to determine ratings and to deactivate users with low ratings, while Deliveroo uses data to confirm payments to riders and to detect fraudulent transactions. Among online web-based platforms, Freelancer and Upwork use data for automated decision-making to match users to jobs and to determine workers' rankings. Meanwhile, Topcoder's privacy policy states that the platform does not rely on automated decision-making. Data collection strengthens platforms' screening and monitoring powers, which can have significant implications for workers' access to platforms and to work.

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22 For more details, see: https://blog.careem.com/en/careems-destination-prediction-service/.

▶ Conclusion

This chapter has shown how digital labour platforms have used some of the key features of the digital economy to develop a distinct business model. In-depth analysis of the business model across various online web-based and location-based platforms reveals that there are a number of common elements among the different types of platforms. A combination of interdependent elements, such as pricing, recruitment, matching, work organization and rules of platform governance, are shaping the ways in which these platforms compete among themselves, while transforming the world of work.

Some aspects of these elements have implications for the future of work. By mediating work, platforms are matching clients and customers with a range of workers who have different skill levels and who perform various types of tasks, from high-skilled work such as software programming to low-skilled work such as delivering food or carrying out microtasks. In doing so, platforms have developed a revenue model that in some cases places a financial burden on workers, through the commission fees or subscription plans and other fees required if they are to access work. These fees can at times be volatile and reduce workers' earnings, particularly in a context of excess labour supply. In other cases, fees may also be borne by businesses, such as restaurants or shops on delivery platforms, which has an impact on their revenue.

Moreover, the digital labour platform business model relies heavily on workers whose work is mediated through the platforms and are categorized as "self-employed" or "independent contractors", rather than employees. This is one of the fundamental shifts of this business model and as such has serious implications for the future of work.

A distinct feature of digital labour platforms is algorithmic management, which is fundamentally shaping work processes and performance management on the platforms. The algorithmic matching of workers with tasks, clients or customers often factors in characteristics such as ratings, client or customer reviews, cancellation or acceptance rates, and skill levels. At the same time, particularly on some online web-based platforms, some of these factors can be sidestepped through the payment of additional fees, thereby creating barriers to accessing work for those workers who may lack adequate financial means to pay such fees, notably in developing countries.

In addition, monitoring tools and software that trace keyboard inputs or capture screenshots at random intervals on many online web-based platforms can curtail workers' freedom and autonomy. Similarly, on taxi platforms, GPS monitoring, and acceptance and cancellation rates can lead to low ratings, which in turn affect access to work and in some cases can lead to deactivation of the worker's account. Furthermore, the governance of platforms through terms of service agreements, which are unilaterally determined, enables platforms to exercise considerable control over workers' freedom to work, and in some instances also restricts clients' or businesses' ability to engage with workers, such as through exclusivity clauses.

A nuanced engagement with such elements of the digital labour platform business model underlines the fact that it is important to move beyond the discourse of flexibility, as often publicized by many platforms. It is critical to further explore these issues and to build a deeper understanding of the impact of such a business model on both traditional businesses and workers. These aspects are discussed in the following chapters.

3

The diffusion of digital labour platforms in the economy

How and why are businesses using them?

Opportunities and challenges for businesses

Why do businesses use online web-based platforms?

- Recruitment
- Innovation
- Cost reduction and efficiency

Why do businesses and consumers use location-based platforms?

Delivery sector

- Improved visibility
- Enhanced productivity
- Increased demand
- Expansion of customer base

Taxi sector

- Safety
- Convenience
- Competitive price

Challenges faced by traditional businesses

- Increased competition
- High commission charges
- Lack of transparency in ratings
- Lack of digital infrastructure

Opportunities for business process outsourcing companies and start-ups

- Transformation and expansion of BPO companies
- Proliferation of AI start-ups

▶ Introduction

The spread of information and communications technologies (ICTs) in the 1990s led to the de-verticalization of large businesses and allowed businesses of varying sizes to relocate their services and production processes to different regions of the world. This process brought about a change in work organization, as businesses started working more and more with sub-contractors, subsidiaries and business process outsourcing (BPO) companies (Rani and Furrer, forthcoming). It also spurred the emergence of networked organizations, linking outsourcing, franchising and temporary agency work, which has led to fragmentation of work and blurring of organizational boundaries (Grimshaw et al. 2017).

The current wave of technological advances, such as cloud computing, has opened up a new means of outsourcing work, namely online web-based digital labour platforms, which enable businesses to access workers with a wide range of skills and expertise from around the globe. Platform work is indeed the latest manifestation of outsourcing services enabling businesses to adjust their workforce, in addition to adopting non-standard work arrangements (short-term, fixed-term, temporary and hourly contracts, among others) for core and non-core tasks within an organization in order to meet its demands (Hyman 2018; ILO 2016; Weil 2014). Digital labour platforms create unprecedented possibilities for outsourcing services to workers globally, in the case of online web-based platforms (Wood et al. 2019a; Santos and Eisenhardt 2005), and for accessing labour available in local markets, in the case of location-based platforms.

Digital labour platforms are not only fissuring the workplace but are also reorganizing work activities; they can therefore be considered as being new players in the temporary staffing industry (van Doorn 2017). While casualization or gig work is not new, the use of technology to manage a contingent workforce and offer their services to businesses, customers or individuals is a new phenomenon. These platforms use search algorithms to match workers with businesses, allowing companies to find talent more rapidly than ever before, thereby reducing search costs. In addition, digital tools have enabled remote collaboration and facilitated algorithmic management of work processes (Moore and Joyce 2020). Platforms have thus introduced new work arrangements, often challenging the traditional business models. Many of these platforms have clients ranging from start-up companies to some of the Fortune 500 companies and multinational corporations (Wood et al. 2019a; Corporaal and Lehdonvirta 2017). In its Global Human Capital Trends report, Deloitte (2018) observed that a diverse "workforce ecosystem" is gradually replacing the employment relationship. Such an ecosystem includes a diversified portfolio comprising workers, talent networks, service providers and gig workers, offering employers a combination of flexibility, capability and a different economic model of sourcing talent.

This chapter examines the diffusion of digital labour platforms in the different sectors of the economy, exploring how and why businesses use online web-based and location-based digital labour platforms and how these platforms are challenging and transforming the established practices of traditional businesses. The analysis is based on semi-structured interviews conducted by the ILO with representatives of different types of businesses (70 enterprises), which include information technology (IT) companies, digital technology start-up companies, business clients who use delivery and taxi platforms, and BPO companies that provide digital services (see Appendix 3). The interviews provide insights into the businesses' use of these platforms, and their experience in doing so.

The chapter is divided into four sections. Sections 3.1 and 3.2 explore how and why certain businesses use digital labour platforms, and the benefits and challenges involved. Section 3.3 considers the opportunities presented by digital platforms, focusing on BPO companies to understand how they adapt to the digital economy. It also examines the new digital technology start-up companies that have proliferated in order to understand their motivations and the services they offer to businesses and digital platforms, illustrating some insights through case studies. Section 3.4 discusses some of the implications of digital platforms for traditional businesses, with a focus on the retail sector.

▶ 3.1 Businesses using online web-based platforms

Businesses are finding innovative ways of outsourcing work through alternative work arrangements involving the use of independent contractors, freelancers, gig workers and crowd-workers. New talent networks or digital labour platforms such as InnoCentive, Toptal, Upwork and 99designs are increasingly being used as a means of outsourcing work. It is estimated that "these types of talent networks now manage over US$2 billion in outsourced activity, employing hundreds of millions of people in every geography of the world" (Deloitte 2019, 23). These platforms are considered to be very important for an organization's competitive advantage in the future, according to a survey of 700 business leaders in the United States (Fuller et al. 2020). This section explores the purposes for which businesses are using online web-based digital labour platforms. The literature on this subject is still limited, though growing, and the analysis is supplemented with interviews conducted for this report with IT, platform and digital technology start-up companies. Based on the analysis, three broad purposes can be identified as to why online web-based platforms are being used by businesses: for recruitment purposes; for reducing costs and improving efficiency; and for accessing knowledge for innovation.

3.1.1 Recruitment

Digital transformation has brought about an unprecedented change in recruitment practices around the globe. Companies are increasingly changing their human resource practices (Deloitte 2017) and using artificial intelligence (AI) and automation to assess and interview candidates. Online web-based platforms, such as freelance and competitive programming platforms, are also gaining in popularity for recruiting workers in two ways.

First, online web-based platforms are a growing means of hiring workers with specific skills, as they algorithmically match workers to the vacancies and tasks of business entities and offer them customized services. The matching services are provided by both freelance and competitive programming platforms. Freelance platforms, such as Toptal, exclusively specialize in matching workers from their talent community to businesses; the workers can be contracted on an hourly, part-time or full-time basis. These platforms provide companies with a choice of workers with whom they can engage before the decision to hire or not is taken. Similarly, Upwork offers "Payroll" service, a premium service offered through third-party providers to hire workers under an employment relationship. It also collaborates with large tech companies such as Microsoft and offers them these services so that they can have better access to a skilled workforce. Such matching services are also provided by competitive programming platforms, such as HackerRank, HackerEarth, Kaggle and Topcoder. These platforms offer "talent as a service" to businesses, and based on their needs recommend workers with specific technical skills from their respective communities of programmers, developers and data scientists (see Chapter 2).

Second, competitive programming platforms, such as HackerRank, HackerEarth and Kaggle, help companies to organize the recruitment process. As discussed in Chapter 2, these platforms offer different types of subscription plans or customized services to businesses for recruitment services in the fields of data science, AI and other technological domains. The recruitment services provided include screening and short-listing workers with specific skills and competencies, who can then be interviewed by the companies. This speeds up the screening process, thereby making recruitment more efficient for businesses and at the same time reducing the efforts and costs of hiring. To assess workers' technical skills, these platforms organize hackathons, competitions and other challenges, which are often algorithmically programmed and conducted either online with the participation of developers from around the world, or in specific locations, such as university campuses. The services provided by platforms such as HackerRank reduce the time lags for businesses in generating

a shortlist of qualified candidates for a job, apart from assisting in removing bias in the selection process (Grooms 2017). In addition, such platforms assist businesses to hire talented individuals who demonstrate advanced design thinking and capabilities and can provide solutions across a range of sectors. A number of companies such as Adobe, Altimetrik, and others use these recruitment services offered by competitive programming platforms (Babu 2015).

The demand for such services by companies has been growing over the past decade. For instance, HackerEarth has more than 750 corporate customers worldwide across various sectors of the economy, such as Amazon, L&T Infotech, Wipro and UBS, which use their platform for recruitment (Bhalla 2017; Babu 2015). These platforms thus seem to be altering traditional recruitment practices in some companies.
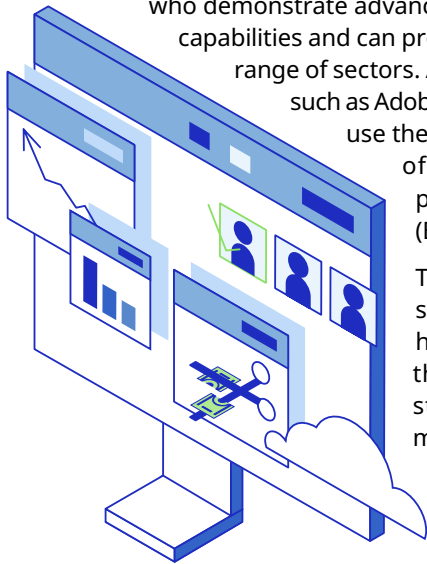
3.1.2 Cost reduction and efficiency

Digital labour platforms provide businesses with an internet-mediated marketplace. Businesses set up the tasks and requirements and the platforms match these to a global pool of workers who can complete the tasks within the specified time. This process ostensibly helps businesses to adopt an extremely agile and lean structure for their core tasks. In principle, rather than hiring additional staff or subcontracting through established firms, organizations can more easily outsource a diverse range of activities to a geographically dispersed crowd, in various sectors such as financial services, legal services, patent services, logistics and healthcare. These platforms are increasingly used by large businesses and small and medium-sized enterprises (SMEs), as well as early-stage start-ups.

⟩⟩ Online web-based platforms are a growing means of hiring workers with specific skills.

A survey conducted by Deloitte in 2019 showed that businesses outsourced work for multiple activities such as IT (33 per cent), operations (25 per cent) and marketing (15 per cent), as well as research and development (R&D) (15 per cent) (Deloitte 2019). It was also observed that "most organizations look at alternative work arrangements as a transactional solution, not as a strategically important source of talent" (Deloitte 2019, 23). Researchers at the Oxford Internet Institute conducted a survey of nine Fortune 500 companies and asked about their motivation for using digital labour platforms compared to traditional staffing agencies (Corporaal and Lehdonvirta 2017). The findings show that these companies outsource work to workers on digital labour platforms to address staffing needs related to content marketing, translation, administrative support and customer service, design, IT and data, for the following reasons:

▶ easier and faster access to a specialized, global and flexible labour force;

▶ low cost of hiring workers, and reducing overhead costs by some 25 to 30 per cent;

▶ quicker outsourcing of work (2–4 days) compared to traditional employment agencies (6–8 weeks);

▶ shorter time schedules as tasks are completed faster;

▶ greater flexibility achieved by outsourcing short and small tasks;

▶ reduced administrative procedures and contractual arrangements as the work can be easily contracted out; and

▶ access to highly qualified professionals and expertise, providing new opportunities for knowledge creation and delivery of quality work.

▟▛ Digital labour platforms help companies to reduce costs and shorten time schedules.

Another study by Harvard Business School and Boston Consulting Group surveyed 700 businesses in the United States to understand the usage of digital labour platforms such as InnoCentive, Freelancer, Toptal and Upwork. The survey revealed that some 30 per cent of the companies used these platforms extensively while for another 30 per cent the usage was moderate. Accessing workers through these platforms also helped about 40 per cent of the companies to boost productivity and increase innovation (Fuller et al. 2020).

The CEO of a major microtask platform mentioned in an ILO interview that large businesses were their biggest clients and the source of about 80 per cent of their revenues. One such client processes 100 million lines of data every year through the platform, for annotating, classifying and categorizing to make them machine-readable and train machine-learning algorithms. This work is integrated through an application programme interface, which allows the clients to outsource work directly to crowdworkers on the platform. Apart from training machine algorithms, the data also provides insights into consumption patterns and can be useful to companies when making business decisions and for targeted marketing. Studies in the automotive industry show that companies use these platforms for data and image processing, which support the development of AI for autonomous and connected vehicles, enhanced speech interfaces and virtual assistants for drivers, as well as for training algorithms on the basis of various traffic scenarios and geographical mapping without the need for human supervision (Tubaro and Cassili 2019; Schmidt 2019).

The strategy of using a crowd to be cost-effective is quite widespread across a variety of industries, including the automotive, chemical, financial, research and technology industries (Tauchert,

Buxmann and Lambinus 2020; Boudreau, Jesuthasan and Creelman 2015). This is also the case among some big technology companies. For example, "Apple has turned to large numbers of users and developers distributed around the world to propel its growth by creating apps and podcasts that enhance its products" (Boudreau and Lakhani 2013, 62). Lakhani, Garvin and Lonstein (2012, 8) also show that clients are able to substantially reduce the cost of building their company website by using competitive programming platforms (for instance US$35,000 was paid) instead of paying "$350,000 to a large IT consulting firm, or $200,000 to a small IT consulting firm, or $80,000 to individual contractors". Similarly, a software development project that took six months to complete through a platform would have taken twice as long had it been undertaken within the company (Corporaal and Lehdonvirta, 2017). According to Fuller et al. (2020, 7), companies are moving beyond experimentation and using platforms on an ad hoc basis with the aim of "developing an integrated strategy … that uses … platforms not just to tap the best talent … but also to get the most out of the latent capabilities of their full-time employees".

As their reliance on digital labour platforms grows, businesses also face challenges in strategically managing the workforce engaged under multiple work arrangements (Deloitte 2018). A majority of business respondents (54 per cent) in a 2019 survey conducted by Deloitte underscored that "they either managed alternative workers inconsistently or had few or no processes for managing them at all" and that this was largely because they used these workers to "fill slots" (Deloitte 2019, 23 and 24). Yet, despite the challenges they present to businesses, about 30 per cent and 17 per cent of the business respondents perceive that gig workers and crowdworkers improve organizational performance respectively (Deloitte 2019). During the COVID-19 pandemic, with rising demand, platforms were offering more value-added services to companies and they are "gearing up to play a more significant role in closing the skills gap" in the future (Fuller et al. 2020, 8).

3.1.3 Access to knowledge for innovation

Digital platforms, such as open source and competitive programming platforms, facilitate and provide opportunities for innovation that are beneficial to both businesses and workers. The rise of the internet and the rapid expansion of ICTs have made it easier for businesses to access knowledge through multiple means. Over the past two decades, two strategies in particular have been gaining prominence among businesses in terms of innovation, ideas and expanding their knowledge boundaries: first, collaboration and co-creation on open source platforms; and, second, collaboration with competitive programming platforms that organize open competitions or challenges for innovation and development. This section focuses on open source and competitive programming platforms to explore how they potentially help businesses' efforts to innovate and develop.

Open source platforms

Open source platforms are growing in popularity because their underlying software is not proprietary and can consequently be accessed, modified or even developed by anyone. Large IT, financial and retail companies use such platforms for purposes of development and innovation, instead of pursuing in-house development or outsourcing to other IT companies (Thakker, Schireson and Nguyen-Huu 2017). Most of the digital labour platforms analysed in this report, including Bolt, Ola, Rappi, Swiggy, Topcoder and Upwork, use the two most common open source web servers – Apache and Nginx.[1] They also use open source tools and software to develop their technologies.
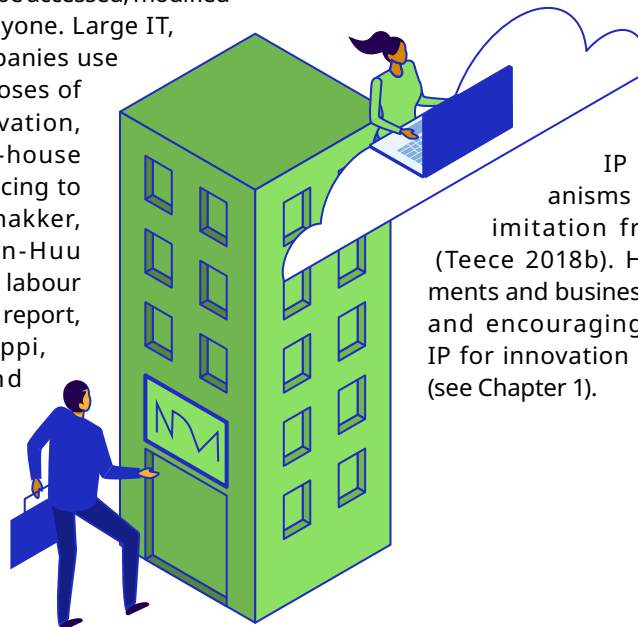
▟▟ **Open source and competitive programming platforms facilitate and provide opportunities for innovation.**

Many leading IT companies collaborate closely with open source platforms on innovation, research and development, seeking solutions to specific problems. Microsoft collaborates with the Apache Software Foundation (an open source volunteer community of developers) and makes products and innovations available through such platforms. Collaboration and engagement of businesses with open source platforms is not necessarily cost-related; it enables them to improve their public relations and gain legitimacy, and to learn from and align with the latest innovations in their field (Lerner and Tirole 2005; see box 3.1).

There are also challenges associated with engaging in open source platforms for businesses, as they have to make a decision about the extent to which they would like to share the intellectual property (IP) in exchange for the benefits of innovation (Henkel, Schöberl and Alexy 2014). This is largely due to ineffective IP protection mechanisms and the threat of imitation from competitors (Teece 2018b). However, governments and businesses are facilitating and encouraging open access to IP for innovation and development (see Chapter 1).

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1 This information is based on an analysis of platform websites using a website profiling tool (Builtwith).

▶ **Box 3.1 Apache Software Foundation**

The Apache Software Foundation (ASF) is an open source volunteer community of developers that was set up in 1999. It has over 350 open source projects such as Hadoop, Spark, Cassandra, CloudStack and Flink. A high proportion of websites on the internet today and most of the digital labour platforms discussed in this report are powered by the Apache HTTP Web Server, which led to the ASF's formation in 1999. The software developed through open source projects in the Foundation is distributed under the Apache licence and is a free and open source software, which can be further developed and innovated by software programmers or coders. It is a business-friendly licence and allows entrepreneurs to leverage and create all types of businesses around it.

Businesses can post questions and computational problems and access services from the online community of experts willing to provide solutions at zero cost. A large number of volunteers (developers and programmers) put in time and effort to work at the ASF, while others are paid by their employers to contribute. They find the experience rewarding as they are able to acquire new skills working with their peers in the community, and they can establish relationships with experts in the domain with whom they can interact in the future. In addition, "programming in these communities requires a high degree of motivation, as programmers and developers have to invest a lot of time before they can see concrete results and most programmers are interested in the art of creating it [the code] rather than the money" (ILO interview with a representative of the ASF).

Many major technological companies regularly send their in-house programmers and developers to the ASF to work on complex problems with the community. This helps workers not only to acquire complex programming skills in a short time and at almost zero cost, but also to come up with innovative ideas for their business activities. It also provides them with an opportunity to enhance their reputation, achieve recognition in their company and develop their career. About half the developers on Apache projects are paid by technological companies such as Facebook, Google, IBM and Microsoft. Some of these companies also have dedicated open source departments responsible for building their relationship with the Foundation.

Apache does not charge anyone for using the platform and it costs the ASF approximately US$5,000 to provide infrastructure support for each project. With more than 350 projects and initiatives, the infrastructure support alone costs them US$1.75 million. The Foundation is funded through sponsorship or the donation of funds from some of the big technology companies to support infrastructure services and conferences. The companies benefit from being associated with the ASF brand as this makes it easier for them to attract customers, and they gain enormously from the knowledge and expertise of the open source communities. Some companies also share their software as open source under the Apache Foundation umbrella, which allows for the development of the software through the community and is beneficial to all users in the ecosystem. For instance, Cassandra, an SQL (Structured Query Language) database, was originally donated by Facebook to the Foundation and attracted developers from other companies such as DataStax, Google and Microsoft, who further developed it by contributing additional features or enhancing its services.

Sources: ILO interview, 2019; Apache Software Foundation website and documentary feature.

Innovating by using competitive programming platforms

Businesses also access knowledge for innovation and build new capabilities by using competitive programming platforms that provide solutions by organizing challenges or competitions[2] (see box 3.2). These platforms provide businesses with access to their community of programmers, developers and coders in various technology domains. There is growing reliance on these digital labour platforms for innovation because they attract a community of programmers to solve a wide variety of problems related to AI, machine learning, data science, security and so on, based on the innovation needs of businesses, in return for prize money (as stated by representatives of companies in ILO interviews). For example, Netflix's filtering algorithm for predicting user matchings for films was initially based on a user rating on a scale from 1 to 5; to improve the accuracy of the rating predictions, an open competition was organized (Gomez-Uribe and Hunt 2015).

Communities of programmers, coders and developers on competitive programming platforms potentially help companies access creative ideas and diverse solutions in a way that was previously not possible (Lakhani, Garvin and Lonstein 2012; Terwiesch and Xu 2008). ILO company interviews revealed that the real value of these platforms lies in the quality and speed with which solutions are provided, which would be difficult to achieve solely with internal resources. This process also provides flexibility and easy access to highly skilled talent around the globe. Competitive programming platforms such as Topcoder have leveraged the crowdsourcing model to find solutions to some of the world's most complex and sophisticated problems (improvements in cancer treatment, faster DNA sequencing and improved energy pipeline security, among others) by pairing their community of IT talent with businesses (see also Lakhani et al. 2013; see box 3.2).

▶ **Box 3.2 Using the Topcoder community for technological solutions**

Topcoder, a competitive programming platform, offers companies access to talented digital workers from around the globe who can provide a range of potential solutions to their projects at a low cost and in a short period. For instance, the Topcoder community was invited to help an ambitious crowd-sourcing healthcare initiative focused on cancer, for a prize of US$55,000 over ten weeks. The initiative focused on tumour delineation in lung cancer, which claims over 150,000 lives annually in the United States alone, and the "challenge" was to produce an AI solution to treat a critical lung tumour. Topcoder joined forces with Harvard Medical School and the Dana-Farber Cancer Institute to create and test automatic delineation algorithms to help improve treatments of cancerous tumours in patients' lungs.

Over the ten-week, three-phase crowd innovation challenge, 564 contestants from 62 countries registered and 34 contestants submitted 45 algorithms, resulting in multiple AI solutions capable of targeting lung tumours with an accuracy equal to that of an expert radiation oncologist, but more rapidly.

Sources: ILO interview, 2019; see also https:// www.topcoder.com/case-studies/harvard-tumor-hunt/; https://jamanetwork.com/ journals/jamaoncology/fullarticle/2730638.

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2 The idea of introducing competition for innovations or solutions is not new and can be traced back to "the Longitude competition in 1714, when the British government announced an open call (with monetary prizes), for developing a method to measure a ship's longitude precisely" (Mao et al. 2017, 59). While internet-based innovation competition can be traced to 2001 with the InnoCentive platform, which tried to attract a crowd for drug development, a number of other platforms later emerged for software development and data analytics (Mao et al. 2017).

▶ **Box 3.3 Wipro's new strategy to develop human resource capabilities and innovate using digital labour platforms**

Wipro Limited (hereafter Wipro), founded in 1982, is today one of the leading Indian companies providing high-quality IT-enabled services globally. Since the early 2000s it has been offering a range of services to clients, including data analytics, AI and cloud computing. The shift from traditional IT services to integrated services in specific industries meant that Wipro had to build and/or acquire a completely new skill set, especially in business strategy and design skills. To this end, Wipro introduced a strategy based on four key components:

(i) Aligning business strategy with talent strategy

Wipro radically shifted its approach to recruitment. Instead of hiring workers with "I-shaped" profiles (involving in-depth knowledge and expertise in a particular technology, such as Java) or "T-shaped" or "pie-shaped" profiles (in-depth knowledge and expertise that can be applied to different industries), Wipro hires workers with "X-shaped" profiles (software and design expertise, along with detailed knowledge of business strategy and implementation). Wipro managers also rotate workers every two years among different industry lines to increase their exposure to various industries, as well as to transfer knowledge among industry clients while continuously learning new skills.

(ii) Leveraging in-depth technology expertise to yield innovative client solutions

Wipro explored a variety of crowdsourcing initiatives to meet this strategic goal. In 2016 it acquired Topcoder, a platform marketplace bringing together 1.5 million developers, designers and data scientists. In 2017, with the help of Topcoder, Wipro developed an internal crowd-sourcing platform – TopGear – to bridge the technology skills gap and create a project-deployable workforce. This demonstrates how structured, internal crowdsourcing efforts can increase individual and organizational adaptability. The platform acts as an opportunity for both teams and individuals to:

- ▶ support employees in learning and applying skills to a range of projects;
- ▶ encourage flexibility and value-driven outcomes by giving individuals more agency;
- ▶ provide a channel for employees to reap benefits that go beyond work;
- ▶ develop their design, coding, testing and data science tools and expertise by crowd-sourcing tasks or projects to internal talent;
- ▶ provide multiple innovative solutions to their clients by posting complex problems on the platform as a "challenge" for prize money; and
- ▶ access platform workers for specific projects for a short time span, enabling flexible resourcing.

The TopGear team supported an internal project team in a large-scale workforce transform-ation that involved everyone from manual testers to automation engineers. Their development and implementation of a learning plan upskilled 80 per cent of the account team, resulting in a 20 per cent increase in annual productivity for the department concerned. Building on the success of TopGear, Wipro launched the new Hybrid Crowd Platform, aiming to make func-tional enhancements to create a flexible workforce for the future and to revolutionize talent resourcing internally and for its enterprise clients.

Hybrid Crowd provides a way for all businesses (in addition to Wipro itself) to connect their internal talent teams with the more than 1.5 million members of Topcoder's global community.

> **Box 3.3 (cont'd)**
>
> Integrating these talent pools, the platform enables enterprises to supplement their teams, on demand, with experts from the crowd. Through Hybrid Crowd, organizations can engage three different types of crowds: private, certified and public. According to K.R. Sanjiv, Chief Technological Officer of Wipro Limited:
>
> > Hybrid Crowd platform is the cornerstone of Wipro's ongoing digital transformation and it enables the team to provide an even broader spectrum of digital services and meet just-in-time requirements. It also gives our digital transformation experts [Wipro employees] increased opportunities to learn new skills, earn, and gain recognition by competing in crowdsourcing competitions.
>
> ### (iii) Encouraging collaboration and innovation
>
> Wipro organizes internal and external hackathons and ideathons on company premises and on the Topcoder platform to develop skills and expertise among Wipro's employees, and to find innovative solutions. Employees can compete either individually or in teams for the challenges posted by clients. Multiple winners are awarded prize money and their achievements are widely publicized within the company. The contest model allows employees to evaluate their skills against their peers, but the open, informal nature of the gamified training encourages communication and support. Senior managers claim that this strategy boosts commitment among employees and has a positive impact on their performance and productivity.
>
> ### (iv) Aligning and collaborating with key stakeholders in the platform ecosystem
>
> Wipro also invests in an ecosystem of start-ups and in collaboration with Microsoft accelerators taps into innovations. It establishes long-term partnerships with clients to identify solutions in emerging technologies, such as blockchain or AI, in their respective industries, and collaborates with open source software communities such as GitHub, SourceForge and others.
>
> **Source:** ILO interviews, 2019 and 2020.

Traditional IT outsourcing firms are facing increased competition from competitive programming platforms, with companies turning to platform communities to solve their problems and outsource their work. To overcome this challenge, traditional companies are starting to build or buy emerging or well-established platforms that can provide the skills and technology that they lack (Cusumano, Gawer and Yoffie 2019). For instance, the IT outsourcing firm Wipro acquired the Topcoder platform in 2016, and with it the skills and expertise to provide technical services in a range of sectors, resulting in a change in Wipro's strategy and delivery model (see box 3.3). Similarly, Google acquired Kaggle, a data-science platform, in 2017, enabling it to use Kaggle's community of data scientists to analyse data at the speed required to be competitive in the AI space.[3] These developments raise critical questions about future career opportunities for highly skilled IT workers if companies of such calibre are increasingly using and relying on digital labour platforms, a trend observed during the COVID-19 pandemic (see Chapter 1). There is also a broader question with regard to building capabilities within companies and whether this practice is sustainable in the long term if firms are increasingly going to leverage expertise through crowdsourcing.

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3 See https://techcrunch.com/2017/03/08/google-confirms-its-acquisition-of-data-science-community-kaggle/.

3.2 Businesses using location-based platforms

Location-based platforms, such as taxi and delivery platforms, have created easy access to services for individual consumers (see box 3.4) and are being increasingly used in many countries by SMEs, restaurants and individual entrepreneurs. The growing reliance on such platforms stems from competition, the need to expand the customer base and to cope with a transforming marketplace as well as consumer preferences. Some traditional businesses that have started using delivery platforms include those in the restaurant and retail sectors. This section examines the opportunities and challenges that restaurants and small businesses encounter with location-based platforms. The analysis and conclusions in this section are based on semi-structured interviews conducted by the ILO with representatives of 47 businesses and their clients in selected developing countries (Ghana, Indonesia, Kenya, Lebanon, Morocco and Ukraine) between October 2019 and March 2020 (see Appendix 3, table A3.1 for details).

The growing reliance on location-based platforms stems from competition.

Restaurants

The restaurant business in particular has witnessed enhanced consumer demand for deliveries through platforms that customers often consider easy and convenient to use. ILO interviews with 27 restaurant owners in six countries (see Appendix 3, table A3.1) reveal that their markets have expanded and that they are able to reach new customers thanks to increased visibility through app-based delivery platforms. In addition, the ease of ordering through the platforms has led to increased demand from offices during the week and households during weekends or during poor weather conditions.

The motive for using apps is to sell products, to increase the customer base as well as to increase demand – *Restaurant using app-based delivery services (Morocco)*

When it is raining, the demand for delivery increases because people do not want to come to the restaurant and they prefer to order through the delivery apps. This is true even during weekends – *Restaurant using app-based delivery services (Kenya)*

Many restaurants use multiple platforms to provide services to customers, for three main reasons. First, each platform has its own customer database, which allows restaurants to reach more customers. Second, having a presence on multiple platforms helps retain customers who often switch across apps to get the best deals. Third, doing so helps smaller restaurants to compete with bigger restaurants or chains and to benefit from various kinds of promotions and advertisements offered by the platforms.

The motivation behind joining multiple platforms is to get more visibility, so that we do not lose customers to coffee chains who have a presence on these apps – *Restaurant using app-based delivery services (Lebanon)*

By using multiple platforms we are able to target as many people as possible because each platform has its own customer base – *Restaurant using app-based delivery services (Kenya)*

The constant advertising of our food items through platforms leads to high demand – *Restaurant using app-based delivery services (Morocco)*

Delivery platforms are also helping restaurants to improve their productivity through multiple means. First, platform companies offer restaurants web analytics and monitoring tools that help them track their customers' preferences; this in turn allows for greater insight into the best ways to develop their business strategies and pricing structures. Second, platforms provide periodic

reviews and training on digital integration, as well as advice on business strategy and advertising. Third, digital tools for tracking orders, preparing products for dispatch and managing accounts and payments also help increase restaurants' productivity. Finally, the rating systems on platforms create an incentive for restaurants to increase the speed of delivery and improve their packaging, which not only enhances their competitiveness but also improves their ranking and gives them greater visibility among customers.

We are making sure that all our staff are aware and are trained and have the knowledge on how to do the packaging at a rapid speed, so that the orders are ready for the delivery worker to pick up. The quality and the quantity are important for rating – *Restaurant using app-based delivery services (Kenya)*

The platform company provides recommendations through email about how to increase profitability – *Restaurant using app-based delivery services (Ukraine)*

Several restaurants reported that the increase in demand for deliveries led to a greater workload, especially for kitchen staff. Some restaurants hired temporary or short-term workers to meet the increasing demand.

We have a list of temporary workers, we call them from time to time, especially on weekends. We pay them according to the hours worked – *Restaurant using app-based delivery services (Morocco)*

We used to have permanent employees who delivered products, but now we use the platforms and have fired those employees – *Restaurant using app-based delivery services (Ukraine)*

While app-based platforms have prompted a rise in demand for food from restaurants, they have also led to greater reliance on the digital economy, which in turn requires a well-functioning digital infrastructure. Many restaurants reported that unstable internet connectivity had an impact on their business, particularly relating to dispatching orders. Restaurants also faced challenges with regard to delays on the part of delivery workers, leading to cancellations, and some complained of poor service on the part of platform companies, which provoked complaints from customers. In addition, platforms charge a commission fee of about 15 to 25 per cent, which affects the restaurants' profit margins and sustainability. Some restaurants also mentioned that they were penalized with high commission fees if they used multiple platforms.

The current deal with Toters is 25 per cent commission for each order. We think this is extremely high. We recently tried to negotiate a better deal with Toters but did not succeed, so we decided to work with other companies until we have developed our own application as an exit strategy – *Restaurant using app-based delivery services (Lebanon)*

Poor internet infrastructure is the main issue in Lebanon, which often leads to interruptions – *Restaurant using app-based delivery services (Lebanon)*

Small retail businesses

The ILO interviews with representatives of 16 small retail businesses and independent sellers in Ghana, Indonesia and Kenya show that small businesses are increasingly using social media platforms such as Twitter, Facebook and Instagram, as well as e-commerce platforms, to sell their products. Some of them have no physical stores and operate exclusively from home. All the small retail businesses surveyed are increasingly relying on delivery platforms to deliver goods to customers who place orders online, and they are able to sell products from anywhere and to a wider customer base, resulting in higher incomes. Delivery services have also enabled independent sellers to focus on the production and management of goods rather than on deliveries.

> **The delivery platforms have helped us to increase orders compared to the previous months, which has led to an increase in revenue and profits** – *Small retail business on an e-commerce platform using app-based delivery services (Kenya)*

> **Delivery platforms help to deliver the products on time and reduce the delivery workload, which is a relief. So, I monitor my social media feeds regularly and as soon as I get an order, I call the delivery guys and inform them about the pick-up and delivery time** – *Independent seller using app-based delivery services (Ghana)*

Small retail businesses using e-commerce platforms are also able to access data about their orders and sales using web analytics, which allows them to respond to changing demand. To deliver the goods or products to customers, small retail businesses often use multiple delivery platforms, take advantage of various promotions and offers, and have preferences for platforms based on the services offered.

> **We are able to compare how many orders were delivered, which helps to analyse and monitor the sales** – *Small retail business on an e-commerce platform using app-based delivery services (Kenya)*

However, small retail businesses and independent sellers also face challenges similar to those of restaurants with regard to unstable internet access, delays in receiving orders from delivery workers, and the capacity to adapt to an online business model. Businesses that use e-commerce platforms also face the challenge of changes in commission fees without any notice, which affects their revenue. For independent sellers, delays by delivery workers also have serious implications for customer relationships as they are often reliant on a smaller customer base.

> **The delivery worker is delayed by two hours, then the customer is frustrated and gets angry with me** – *Independent seller using app-based delivery services (Ghana)*

▶ **Box 3.4 Customers' motivation for using app-based taxi and delivery services**

The rise of location-based platforms provides individuals with more choices to access services than are available through traditional means. To understand the motivations of customers using these platforms, the ILO conducted in-person interviews with a small sample of 33 customers in Chile, Ghana, Kenya and India between October 2019 and March 2020. The option of accessing taxi services or ordering a product through a digital app or at the click of a button has added to the popularity of these platforms among customers. For most of them, convenience, ease of use, low prices, transparency and reliability were some of the reasons for using app-based services.

The main motivation for the customers to use app-based taxi services was the lower price compared to traditional taxi services, as well as various offers and discounts. They also pointed out that they feel safe as GPS enables them to track the driver and to share their location with family and friends. In addition, in some countries, app-based taxi services are available in certain locations where it is often difficult to find traditional taxis. Customers of delivery services emphasized that delivery apps provide them with a variety of products to choose from and help them save transportation costs and time.

> **Convenience, comfort, privacy, security, flexibility and also knowing that there will be no need for any negotiation** – *Customer of app-based taxi services (Ghana)*

> **I don't have to wait on the road or street and can book the taxi anywhere. I can buy all the products in one click instead of going to the shop and it saves my time** – *Customer of app-based taxi and delivery services (India)*

Many customers also use multiple platforms simultaneously for taxi and delivery services as this enables them to choose the cheapest and most convenient option. For instance, on taxi platforms, customers can compare offers across multiple apps to find the best deal in terms of fare, driver rating and location. Delivery platforms enable customers to compare the price of a product across different apps and to choose the product offered at the most favourable terms and the shortest delivery time. All customers emphasized the importance of ratings, as this feature allows them to provide feedback about the quality of services and to see other customers' opinions about products and services.

> **I can say that sometimes it helps you get a better price for delivery to the same location because you can check both apps and get to know which one is cheaper** – *Customer of app-based taxi services (Ghana)*

> **Ratings provide a better perspective based on others' experiences and help me assess safety issues** – *Customer of app-based taxi services (India)*

Alongside the benefits of app-based taxi and delivery services, some challenges were also identified by customers, the main ones being internet connectivity and technical glitches on platforms. Other concerns in the taxi sector included the rise in app-based taxi fares, instances of disagreement with app-based taxi drivers, cancellations or rudeness on the part of the drivers, lack of transparency of waiting charges, and surge pricing. In the delivery sector, the challenges included mix-up of food and other items, delays in orders, cancellations and instances of extra charges, as well as excessive advertisements on the platforms and a platform design that promotes more consumption.

> **The delivery apps make the interface more interesting and more appealing so that even if you are not willing to buy anything, by just clicking and swiping, you may end up buying something that you didn't even think you needed** – *Customer of app-based delivery services (Ghana)*

> **Prices, especially for app-based taxi services, have increased a lot** – *Customer of app-based taxi services (India)*

Some customers said that taxi and delivery platforms provide job opportunities, especially for migrant workers, and raised concerns over working conditions and insurance for app-based taxi drivers and delivery workers.

Source: ILO interviews.

Corporate clients (taxi services)

The ILO interviews with four corporate clients in Kenya reveal that they tend to use app-based services as they are considered to be convenient, readily available and reliable. Safety features available in taxi apps (for example an SOS button and driver tracking) and the ease and convenience of making payments via a digital tool were among other important factors reported by the clients for preferring app-based taxi services.

> **We normally sensitize our staff to use specific taxi platforms when they meet with a client, as it is more reliable** – *Corporate client of app-based taxi services (Kenya)*

> **You can track the driver, wherever you are and one can feel safe** – *Corporate client of app-based taxi services (Kenya)*

App-based taxi platforms compete with one another to attract corporate clients. For instance, Maramoja specifically targets corporate clients, offering them far lower prices than other platform companies, while Bolt proposes services at a rate similar to that charged to individual customers. However, corporate clients also face challenges relating mainly to customer service, non-transparency in cancellation charges and poor internet connection. The period when the interviews were conducted was also marked by strikes called by app-based taxi drivers. This was reported as one of the key challenges by the clients in Kenya, as their business was affected by the temporary halt of platform-facilitated taxi services.

> **When app-based taxi drivers were on strike, there were no services available. This was quite different when compared to contracting with a taxi company** – *Corporate client of app-based taxi services (Kenya)*

3.3 Opportunities from digital platforms for BPO companies and digital technology start-ups

Digital platforms create opportunities for innovation and entrepreneurship for start-up companies, BPO companies, software developers and programmers, among others. Low IT infrastructure costs and access to open source platforms have reduced the costs of setting up a business, and provide an opportunity to experiment with innovative ideas. This section focuses on two trends: the transformations in BPO companies in response to the needs of organizations in the digital era; and the growth of digital technology start-ups that provide new technological products and AI-enabled services.
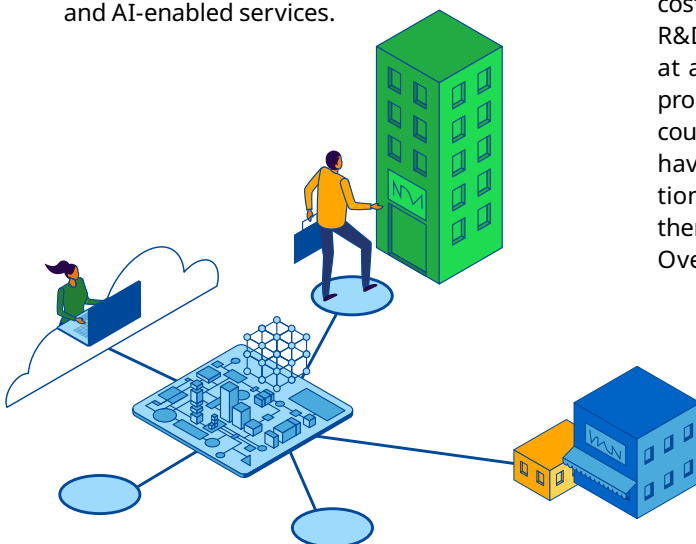
3.3.1 Transformations in BPO companies

The rapid advances in, and adoption of ICTs since the 1990s have led to the outsourcing or relocation of services to developing countries, creating new markets and employment opportunities for IT-enabled services, call centres and for BPO companies (Rani and Furrer, forthcoming; Parthasarathy 2010). This has helped large companies to reduce their operating costs – by accessing labour pools for software and R&D services and for customer support centres at a relatively low cost – and to enhance their productivity (Graf and Mudambi 2005). Developing countries, such as Brazil, India and the Philippines, have integrated ICT development into their national development policies, which has allowed them to dominate the BPO market (Parayil 2005). Over the past decade, some African countries,

including Ghana, Kenya and South Africa, have also become a viable location for BPO companies due to their cost competitiveness (Anwar and Graham 2019).

The rise of the digital economy and the proliferation of digital platforms are leading some traditional BPO companies to adopt new strategies in order to adapt to and sustain their businesses in the digital economy and to provide the services needed by large companies. Based on semi-structured in-depth interviews with managers or representatives of 11 companies[4] in two countries (India and Kenya) between April 2019 and January 2020, this section focuses on these strategies.

All the BPO companies that participated in the ILO survey are SMEs, which have adopted various strategies to adapt to the changing needs of their clients. The BPO companies in Kenya are largely reliant on work outsourced from large international companies. Since 2014, they have been transitioning from voice-based services to digital services. The nature of the tasks however, such as handling clients and customer complaints, has remained the same. The digital channels that the BPO companies have started using to provide these services include various social media channels, email and AI bots.[5] In addition, digital tools such as web analytics have allowed them to track the entire journey of the customer from start to endpoint, enabling them to engage with customers, cater to their specific needs and provide the required services.

Anwar and Graham (2019, 214) made a similar observation in their survey of seven BPO companies in Johannesburg, South Africa, where they found that most of the BPO companies were making a digital transition by providing customer services through "multiple digital channels such as voice calls, automated interactive voice responses, webchat and WhatsApp". In one of the companies they surveyed, the number of voice calls decreased by more than 50 per cent between 2012 and 2016, with voice calls being replaced by non-voice digital channels.

◢◤◢◤ BPO companies are adopting new strategies in order to adapt to and sustain their businesses in the digital economy.

The interviews with Kenyan companies show that digital tools and technologies have enabled them to provide what they consider to be improved, on-demand customer-friendly services, as well as technical support and management of social media. BPO companies such as HN, IN and CCI provide clients in the insurance, banking, telecom and retail sectors in the domestic and international markets with a range of services, including market research, customer care, tracking of consumer preferences, digital marketing, pricing strategies and communications strategies, using various digital channels. These services help their client companies improve customer experience and operational efficiency, so that they can remain competitive in the digital business environment.

With the use of AI across a range of sectors, from automobiles to social media and e-commerce, data labelling and content moderation have become a key requirement for many companies. A number of "big tech" companies, such as Facebook, Google and Microsoft, have also started outsourcing content review and moderation, data annotation, image tagging, object labelling and other tasks to BPO companies. The company interviews revealed that these tasks are being outsourced by the "big tech" companies as part of their corporate social responsibility programmes. The objective of outsourcing is to have a social impact in developing countries by providing employment opportunities to young graduates or school-leavers, and to support people from disadvantaged backgrounds. This strategy has also led to the growth of new

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4 The names of the BPO companies cited have been changed to preserve their anonymity.

5 A bot is a simple automated tool or a computer program that can complete an action using artificial intelligence or natural language processing.

BPO companies and call centres, which perform these tasks in a number of developing countries, including India and Kenya. Some of the data labelling companies, such as Infolks and iMerit in India, which operate in smaller towns, do so to create employment opportunities among underprivileged communities, while creating annotation tools (Murali 2019).

Some new BPO companies, such as FS and CO, India, stated in the ILO interviews that content moderation not only provides a business opportunity but also allows them to perform a very important task for society as they "act as a firewall or gatekeeper or a watchdog for the internet". Both these companies also provide services such as flagging counterfeit products and fraudulent practices in advertisements and product reviews; safeguarding copyright material and ensuring that there is no copyright violation on e-commerce websites; and identifying fraud profiles and scammers on dating websites, among others, for large international and local companies. Interviews with workers and the CEO of FS revealed that about 90 per cent of the workers who perform content moderation and other tasks are graduates or postgraduates with engineering and computer science skills. Some of the companies offering IT-enabled services, such as Accenture, Genpact and Cognizant, have also diversified and entered into the content moderation business, hiring university graduates to perform these tasks (Mendonca and Christopher 2018).

Due to labour cost competitiveness in Kenya, many large companies have also established their own subsidiaries. For instance, SS, an international company that is one of the largest outsourcers of varied tasks (such as data entry, annotation and transcription) to small BPO firms and crowdworkers in Kenya, set up its own delivery centre in Nairobi. While such subsidiary companies create local

employment opportunities by hiring women and young people from poor households with basic computer and numerical skills and English literacy, they have also destabilized many small BPO companies, which now face a reduction in outsourced work.

Some companies, such as AT, which rely on large companies for outsourcing tasks, have struggled to operate in the market due to this decline in outsourced work. To sustain its business, in addition to working directly with its clients, AT has established good relations with an online web-based platform, which outsources work to them. This strategy by small BPO companies of accessing work through online web-based platforms such as eLance, oDesk (now Upwork) and Guru was also observed during the period 2010–14 (Foster et al. 2018). However, they found that small companies were struggling to survive on the basis of such work alone as the tasks were of short duration and low value, and such companies had to turn towards domestic markets to sustain their business.

Labour cost competitiveness has also led to the emergence of new types of companies, such as CF, which has set up its delivery centres in India and Nepal and uses both local and crowdsourced labour through its platform to provide services to large companies in Europe and the United States. The main service provided by the CF delivery centres relates to image annotation and data labelling of still video shots of road signs, traffic lights and pedestrians, to train autonomous vehicles to recognize these objects and navigate real-life situations with little human supervision. They also provide services such as transcription, categorization, tagging and content moderation. The company uses a hybrid workforce of online workers and locals, which enables it to train the local workforce in these tasks, and
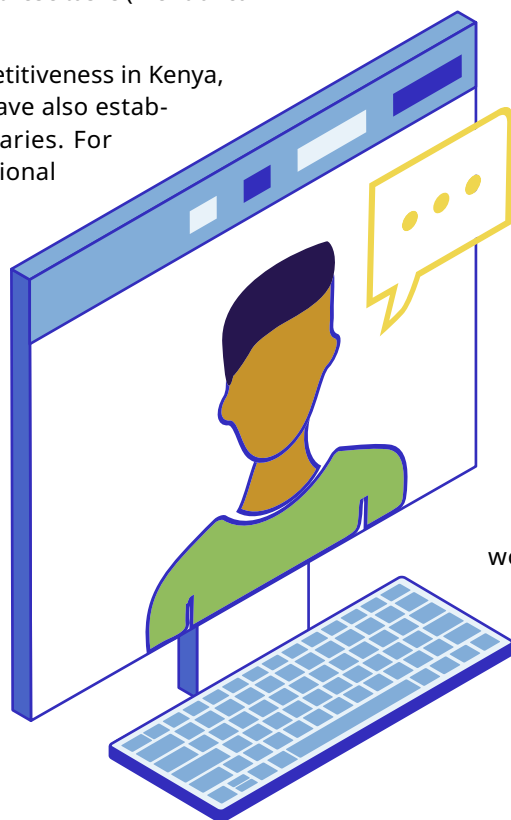
repetition of tasks allows them to ensure quality, precision and efficiency, while at the same time maintaining competitiveness in the market.

Tasks such as data labelling and content moderation have not had much traction among traditional BPO companies in Kenya. Some of these firms, including HN, IN and CCI, stopped performing them after a year or so as they considered them to be low-end and low-value tasks. Furthermore, this work did not offer any opportunity for upward mobility in terms of either skills upgrading or learning for the company and at the same time profit margins were low and difficult to sustain in the long run.

3.3.2 Emergence of digital technology start-ups

The digital economy and the expansion of digital platforms have led to the emergence of new players: digital technology start-ups that provide new tools, products and services that enhance efficiency and functioning of the digital ecosystem. Moreover, the heightened expectation around automating specific tasks (Nedelkoska and Quintini 2018; Frey and Osborne 2017; Arntz, Gregory and Zierahn 2016) has created new demand and opportunities for AI-enabled services. In 2020, the global start-up economy generated US$3 trillion in value and provided many entrepreneurial opportunities; although only 14 per cent of the start-up founders were female (Startup Genome 2020).

This section examines the motivations behind the rise of digital technology start-ups and how the products or services they provide benefit companies, including digital labour platforms. The analysis is based on semi-structured interviews conducted with ten digital technology start-ups based in San Francisco (United States), Bengaluru (India), Cherkasy (Ukraine) and Warsaw (Poland) between July 2019 and March 2020 (see Appendix 3).

Two types of digital technology start-ups can be distinguished, based on the responses to the ILO interviews: those that create technological products and services, and those that provide AI

Advances in AI and natural language processing have made it possible for start-up companies to advertise and sell their services to businesses as AI-enabled.

applications and AI-enabled services. The growth of these start-ups has been driven by three factors:

▶ Ease of entry, with low investment in physical assets compared to traditional start-ups and availability of IT infrastructure at a low cost. The availability of open source platforms and software allows for experimentation with new ideas and innovations to improve efficiency or productivity.

▶ Advances in AI and natural language processing, which have made it possible for start-up companies to advertise and sell their services to businesses as AI-enabled, with the resultant lowering of costs through the replacement of workers with AI.

▶ Availability of venture capital and accelerator funds to start-ups, which has played a crucial role by providing opportunities to entrepreneurs in developed and developing countries alike.

Creation of products and services

Most start-up companies try to find niche areas where they can provide innovative services to platforms or traditional companies that improve their productivity. Developments in AI and, specifically, advances in data analytics and tracking techniques, have had major implications for pricing and marketing strategies, customer service management and risk assessment; hence the growth of start-ups that provide products and services, including web analytics and tracking, to traditional companies as well as to digital labour platforms.

Companies such as Crazyegg and Rytangle provide digital platforms or traditional companies with real-time data about the users accessing their platforms. Most digital platforms and traditional companies today have web analytics and tracking tools installed to track customer behaviour, which helps target their customers and improve their pricing and marketing strategies.

Companies like Cloudinary offer advanced software application solutions for digital platforms or traditional companies that allow for image and video processing, management of image and storage facility. Start-ups such as NoticeBoard have developed communication applications that help to improve communications between large fleets of ground staff or delivery workers – 1,000 or more workers requiring supervision and management – and their managers. E-commerce platforms and trucking companies in various regions have been using these applications to track and manage their workers. A number of other start-up companies provide customized software applications to traditional companies and digital labour platforms according to their requirements, often using open source tools and applications.

Provision of AI applications

The past decade has witnessed the growth of AI start-ups due to the availability of vast financial resources from governments, the private sector and venture capitalists (Nitzberg, Seppälä and Zysman 2019). These start-ups offer a range of AI applications to companies, either fully automated or human-powered. Most such start-ups have two profiles: one for clients, with a website and a company name, exclusively focused on providing services using AI; and another for crowdworkers, with a website and company name offering work opportunities and the chance to earn an income (Schmidt 2019; ILO interviews with AI start-ups). Many of these companies have emerged in fields such as virtual assistance (secretarial tasks), legal services, microtasks (image and data annotation) and others which use crowdworkers to provide the services (see box 3.5). An investment review of 2,800 AI start-ups across Europe in 2019 found that about 40 per cent of them did not have anything to do with AI (Ram 2019).

▶ **Box 3.5 Proliferation of AI start-ups**

Venture capitalists and other investors have been interested in investing in the automation of wide-ranging tasks, from secretarial to legal services, causing many start-ups to market themselves as AI companies in order to access such funding (Schmidt 2017; ILO interviews with AI start-ups). For example, Scale AI, Playment and Mighty AI explicitly market themselves as AI companies seeking to appeal to the automotive industry in preparing for and designing the next generation of driverless cars (Schmidt 2019).

Similarly, there has been a proliferation of start-ups that provide companies with virtual assistant services, such as appointment scheduling, note taking at meetings, or AI-managed mail. Some of the leading start-up companies in terms of venture capital investment in these areas include x.ai (US$44.3 million) and Clara Labs (US$11.4 million) (information based on Crunchbase database).

Legal services, considered to be one of the largest markets in the world, have also seen a phenomenal rise in start-ups (Toews 2019). Most legal start-ups, such as LawGeex, Klarity, Clearlaw or LexCheck, market themselves as providing automated AI legal services, including contract drafting, review and negotiation, thereby reducing the tedium of certain aspects of legal work. Furthermore, they emphasize that AI can automatically absorb written documents, "analyse them in full using natural language processing (NLP) technology, and determine which portions of the contract are acceptable and which are problematic" (Toews 2019).
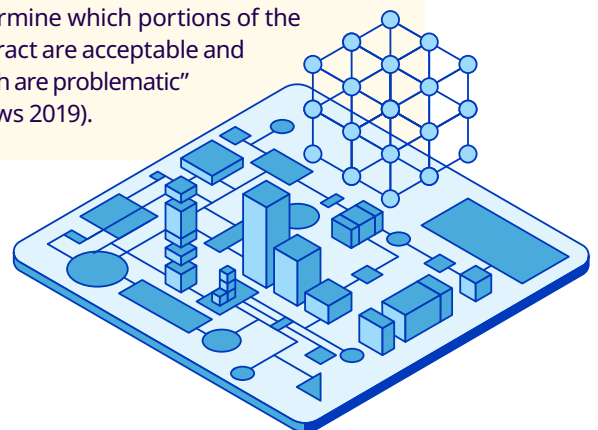
The AI start-ups interviewed by the ILO are human-powered. However, AI start-ups often do not mention to their clients that their tasks are completed by a globally dispersed human workforce through digital labour platforms. Tubaro, Casilli and Coville (2020, 7) argue that the reason why most AI start-ups are not automating these tasks is that "machine learning is expensive, as it requires powerful hardware, the brainpower of highly qualified computer scientists, and top-quality data", while it is easier and cheaper to "fragment the work into microtasks and sub-contract them to low-paid workers through platforms". Most AI start-ups differentiate themselves from crowdsourcing platforms, such as AMT, Clickworker or CrowdFlower (now Appen), and market their crowd workforce as qualified or trained workers, or as experts in the field (Schmidt 2019; ILO interviews with start-ups; see box 3.6). Many of these AI-enabled services and the development of AI are in fact subsidized by crowdworkers, as they are needed initially to train the AI models to correctly infer patterns that can be automated over time. As a result, many of them are inadvertently helping large established companies to become "data-opolies" and control the market (Stucke 2018, 275).

Currently, these systems are designed to operate as human-in-the-loop, with a worker reviewing the AI analysis and making the final decisions (Armour and Sako 2020). Advances in AI and machine learning are ostensibly not eliminating humans from the performance of tasks, but are transforming their role and "integrating humans and computers more tightly" (Tubaro, Casilli and Coville 2020, 6). Furthermore, the AI applications available today are suited for limited usage; a general AI that can perform cognitive tasks as workers do remains far beyond the reach of current technology. A Massachusetts Institute of Technology taskforce, which looked at the implications of AI on jobs in a number of sectors, such as insurance, healthcare, autonomous vehicles and manufacturing, found that much of the AI systems that are deployed today can solve a limited set of specific problems, based on large amounts of data and by extracting patterns. However, "the ability to adapt

� Start-ups offer a range of AI applications to companies, either fully automated or human-powered.

to entirely novel situations is still an enormous challenge for AI and robotics" and AI applications are in their infancy in a number of sectors (MIT 2020, 34). Even within the narrow applications of AI that are used for hiring practices, obtaining a bank loan or face recognition, AI is revealing limitations; AI decisions risk being discriminatory as they can exhibit historical biases and their logic cannot be explained (Bodie et al. 2016).

Therefore, while one would have expected that tasks such as automating a virtual assistant would be relatively easy given the purported advances in technology, the fact that AI still operates with human-in-the-loop assistance shows that natural language processing is still in the development phase (see box 3.6). Though natural language processing capabilities are advancing, there is still a long way to go before the entire workflow process of a particular task is powered by AI end to end and AI completely replaces workers. Thus, while a business might adopt "virtual assistant" technology, persuaded that AI is processing its requests and thereby replacing its workforce, in practice the tasks are outsourced to crowdworkers through digital labour platforms. An ILO survey of about 300 online home-based workers in the Philippines found that about 14 per cent of the respondents were working as "virtual assistants" for clients based in Australia, Canada, the Philippines and the United States (ILO 2021; King-Dejardin, forthcoming). There might be some jobs lost or generated due to AI, but most importantly AI is leading to a shift in the nature of the employment relationship, as tasks are performed by invisible workers on digital labour platforms, raising questions about the quality of jobs.

▶ **Box 3.6 "Jordan", the automated virtual assistant: A case study**

Jordan.inc,[1] founded in San Francisco, United States, in 2014, aims to provide business clients with an automated service for the scheduling of meetings. The company raised US$120,000 as seed capital and a further US$11 million from venture capital funds. It provides virtual assistant services and sells monthly subscription packages ranging from US$99 to US$399. By 2019, Jordan.inc had around 350 clients and a workforce of 18 in its San Francisco office (technical and engineering staff who develop the AI), together with some 200 workers around the world who perform microtasks through digital labour platforms.

The product, sold as "Jordan", is a virtual assistant that coordinates and schedules meetings. Instead of sending multiple emails back and forth, a client can simply copy Jordan into all emails that refer to meeting requests, and Jordan then schedules the meetings and enters them into the business calendar in less than 45 minutes. The company claims that it is continuously improving Jordan with the help of smart and self-motivated "Jordan Remote Assistants". Clients have praised Jordan for its efficiency and accuracy, which the company attributes to the combination of precise machine intelligence and the judgement of an expert team of workers. But what does this mean in practice?

The challenge of automating the "virtual" assistant

The challenge of automating a meeting schedule is that it requires the ability to understand the often idiosyncratic requirements of clients expressed in an email. For humans, this is a function of our natural language processing intelligence, but for AI this requires an additional large-scale input of data about customer preferences and behaviour for the AI to be trained to recognize patterns and make the correct decisions.

For example, a virtual assistant such as Jordan is not yet able to understand or process email content such as, "Hey, I can do a call next week". According to AI developers at Jordan.inc, the wording of this message makes it difficult for AI to understand that: (i) the sender is requesting a meeting; (ii) the type of meeting request is a call; and (iii) the meeting is to be scheduled next week.

It appears that human expertise is still required for a simple message such as this, so that the information can be decomposed into a structure that AI can process.

Implementation strategy for building and perfecting AI

Jordan.inc implemented its strategy to develop and automate the virtual assistant service in two phases:

  (i) Phase 1: Exclusively human-driven

The goal of the first phase was to build a client base so that technicians could collect data and develop AI for organizing meeting schedules. Initially, the company founders manually connected different calendars, messaged people and scheduled the meetings. They learned that the key qualities of a virtual assistant are good communication skills, intuition and a pleasant communication style. They then hired workers from Upwork, one of the largest online web-based freelance platform, and trained them to schedule meetings manually. As the client base expanded, Jordan.inc designed its own digital labour platform called "Workplace Jordan Remote Assistant" (JRA) instead of hiring workers through Upwork.

▶ **Box 3.6 (cont'd)**

(ii) Phase 2: Hybrid (human–machine interaction)

In the second, "hybrid" phase, AI developers at Jordan.inc attempted to automate the workflow process and build algorithms so that over time it would become cheaper to schedule tasks by reducing reliance on the growing JRA platform workforce. This phase involved a combination of human–machine interactions (a human-in-the-loop system), whereby workers on the JRA platform would extract parameters relevant for scheduling the meeting – availability of the participant, location, date and time – from emails, and on this basis train the AI, then check whether the parameters were being correctly used by the AI, and correct the decisions taken by the AI if necessary, thereby improving its future performance.

Final outcome

In 2020, Jordan.inc continued to combine the virtual assistant service with the human-in-the-loop system, despite its original ambition of developing a fully automated service. At this stage, human–machine interaction is integrated throughout the entire workflow and human judgement remains critical for reviewing final decisions. Administrative scheduling tasks have thus been only partially replaced by AI. In fact, work has been dispersed in the form of thousands of microtasks around the world to an invisible online crowd of workers. The JRA platform workers are based in around ten different countries, including the Philippines and the United States.

On the company website, Jordan.inc now explicitly mentions that scheduling workflows are efficient and accurate because they combine machine learning and expert human support. The development of a virtual assistant that can deliver 90 per cent precision through AI language processing alone would not be sufficient to attract and sustain a viable client base. The CEO of Jordan.inc has admitted that "AI has a long way to go before it can completely replace humans".

[1] This case is based on an interview with representatives of a start-up company whose name has been changed to Jordan.inc (and the product to Jordan) to preserve anonymity.
Source: ILO interview, 2020.

Current AI advances in certain fields are demonstrating medium-term implications for work, workers and businesses through algorithmic matching, rating and pricing on e-commerce, business-to-business and digital labour platforms. In addition, AI seems to have radically altered marketing and sales activities in the consumer goods, retail and banking sectors through the use of data analytics and tracking tools that produce vast amounts of customer transaction and attribute data (Chui et al. 2018). This data is used in taking marketing decisions such as "pricing, promotions, product recommendations, enhanced customer engagement" (Davenport et al. 2020, 27). AI applications can be deployed by digital platforms to analyse such data and deliver personalized recommendations to customers in real time. For instance, Amazon is said to change the price of its listed products every 10 minutes, which is more often than any retail shop can ever do (Mehta, Detroja and Agashe 2018). This is made possible due to the availability of large amounts of data that are collected on their consumers using various analytical tools on the platform. The implications of such developments in AI for traditional businesses and workers are discussed in section 3.4 and Chapter 4, respectively.

▶ 3.4 Impact of digital platforms on traditional businesses

The rise of digital platforms is resulting in competition between platforms and traditional businesses, with some platforms establishing a dominant position in the market, such as Amazon in the online retail sector or Uber in the taxi sector. These developments are presenting traditional enterprises, particularly SMEs, with opportunities and challenges. This section examines the implications of the rise of digital platforms for traditional businesses, with a focus on the retail sector.

There has been increasing consolidation in the digital economy, with about 5 per cent of platform companies (21 companies) making 20 per cent of the total net income among companies on Standard & Poor's 500 Index in 2019 (Moazed 2019; UNCTAD 2019). Consolidation is also occurring at the country and regional levels. For instance, in India, two platforms (Amazon and Flipkart) controlled about 63 per cent of the market share in online retail in 2018 (S&P Global Market Intelligence 2019). Similarly, in the European Union (EU), where there were over 10,000 platform start-ups in 2018, these accounted for only 2 per cent of the total value of all platforms, while the seven largest platforms accounted for 69 per cent of the estimated value of the digital economy (European Commission 2019; KPMG 2018). The consolidation is due to some of the major platforms acquiring both smaller platforms and traditional businesses. For example, Amazon and Alibaba, the two biggest e-commerce platforms, have acquired businesses in a range of sectors, from entertainment and finance to news and fresh food. In 2018, the US-based retail chain Walmart acquired Flipkart, one of the largest online retail platforms based in India, for an unprecedented US$16 billion, in a move to take on Amazon in the online retail market (*Economic Times* 2018). Economies of scale, network effects and data collection enable platforms to achieve a dominant market position. The degree of market power concentration can be discouraging not only for traditional businesses, but also for new platform entrants.

At the same time, certain dynamics within e-commerce markets have raised concerns regarding "anticompetitive collusive and unilateral conduct by economic operators" (OECD 2019b, 5). Amazon, for instance, has been criticized for its competition practices and their implications, particularly for SMEs, and is facing antitrust claims in a court in the United States (Bloomberg Law 2020). Large technology companies, such as Amazon, Apple, Facebook and Google, are increasingly being investigated by competition authorities around the world (see also Stucke 2018).[6] The Confederation of All India Traders, an organization representing small businesses in India, has been alleging, including through street protests, that unfair competition practised by Amazon is a threat to small businesses in the country (Sonnemaker 2020).

While some large traditional businesses may be able to acquire platforms to improve their competitiveness, most SMEs are unlikely to have adequate resources for such undertakings. Many SMEs therefore use digital platforms, such as Alibaba, Amazon or Flipkart, to gain access to a wider customer base and to build and sustain their business. However, traditional businesses, particularly SMEs, encounter a number of challenges in conducting their activities through digital platforms (Crémer, de Montjoye and Schweitzer 2019; OECD 2019b; UNCTAD 2019; Duch-Brown 2017a; Martens 2016). Some of these challenges are described below.

The contractual terms between platforms and business users, many of which are SMEs, are unilaterally determined by the platforms and are generally complex and unclear (European

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6 See, for instance, for Amazon: https://ec.europa.eu/commission/presscorner/detail/pl/ip_19_4291; for Apple: https://ec.europa.eu/commission/presscorner/detail/en/ip_20_1073; for Facebook: https://www.nytimes.com/2020/12/09/technology/facebook-antitrust-monopoly.html; and for Google: https://www.bbc.com/news/business-54619148.

Commission 2016a and 2018). For instance, the criteria for blocking a user's account are not clearly defined, which can have severe implications for the continuation of their business operations (European Commission 2016a). Contracts are unilaterally determined, the commission fees charged by platforms to business users can vary considerably, and platforms can increase rates arbitrarily without any negotiation (this was particularly observed for location-based platforms).[7] During the first months of the COVID-19 pandemic, when many restaurants were largely dependent on delivery platforms to continue their business operations, the commission fees charged ranged between 15 and 35 per cent in the United States, while discounts were being offered to consumers (Cagle 2020).

Another factor shaping competition between platforms and traditional businesses is the classification of platform services. Digital labour platforms often avoid sector-specific regulations, such as those governing the taxi sector, by insisting that they are merely technology companies providing intermediation services. In the EU, a number of businesses have emphasized "that there is a problem stemming from the fact that entire sectors that are subject to sector-specific rules now in fact compete with online platforms in these same sectors, yet those online platforms are not subjected to the same regulations" (European Commission 2016b, 17). These rules cover areas such as consumer protection, social security, labour market regulation, and taxation of and technical standards relating to goods and services markets (Martens 2016). Nevertheless, judicial decisions such as that by the Court of Justice of the EU, which held that Uber's services must be classified as services in the field of transport,[8] can help create a level playing field with the traditional taxi sector.

> ◥◢ There has been increasing consolidation in the digital economy, with about 5 per cent of platform companies (21 companies) making 20 per cent of the total net income.

Competition between platforms and traditional businesses is also increasingly shaped by data. This is especially so when platforms rely on data they collect from their business users to promote their own goods and services in the marketplace. Google, for example, was fined in 2017 by the European Commission for abusing its dominant position as a search engine by prominently placing its comparison shopping service "Google Shopping" in its search results.[9] More recently, the European Commission has launched an investigation into Amazon based on preliminary findings that the platform is using the data of sellers trading on the platform to directly compete with them.[10]

Furthermore, competition issues can occur not only when platforms promote their own goods and services over those of competitors, but also when they favour certain business users on the platform. In India, a number of antitrust cases have been filed by associations of businesses against retail platforms like Amazon and Flipkart, alleging preferential seller treatment through anti-competitive practices such as deep discounting (Kalra 2020).[11] This alleged preferential treatment

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7 Based on ILO interviews with restaurant owners.

8 Case C-434/15 Asociación Profesional Elite Taxi v Uber Systems Spain, SL [2017], available at: http://curia.europa.eu/juris/liste.jsf?num=C-434/15.

9 European Commission, Antitrust Case 39740 – Google Search (Shopping). For a summary of the decision, see the press release: https://ec.europa.eu/commission/presscorner/detail/en/IP_17_1784.

10 For more details, see: https://ec.europa.eu/commission/presscorner/detail/en/ip_20_2077; see also https://ec.europa.eu/commission/presscorner/detail/en/IP_19_4291.

11 See, for example: Competition Commission of India, Case No. 09 of 2020, Case No.40 of 2019 and Case No. 20 of 2018.

becomes even more problematic considering that the decision to promote one business user over another is often based on algorithmic ranking which is non-transparent (European Commission 2017a). It is estimated that in the EU, the aggregated financial impact of the uncertainty derived from opaque practices on online platforms is between €2 billion and €19.5 billion per year (Duch-Brown 2017b). As a result, there have been a number of alternative platform initiatives, such as open source community platforms or platform cooperatives, that have tried to bring about more transparency by building fairer distribution systems (see box 3.7).

Opaque practices on e-commerce platforms are also observed in algorithmic pricing. More specifically, data collected on these platforms allows them to analyse the demand for goods and services, and to adapt prices accordingly via algorithms. Furthermore, data collection allows platforms to target the preferences of consumers and businesses, including through rebates, incentives and loyalty programmes. Many SMEs, however, lack such data or the financial means to be able to compete with platforms and their pricing systems. As a result, access to data, combined with their pricing strategies, offers platforms a competitive advantage over traditional businesses (Mehta, Detroja and Agashe 2018). This potentially threatens the sustainability of traditional businesses, and in turn the income stability of the workers engaged in these enterprises. Such pricing strategies are not specific to the retail sector but are also quite widespread in the taxi sector, which raises important questions from a competition law perspective (Fountoukakos, Pretorius and Geary 2018).

The competition and business operations on some platforms are also shaped by exclusivity agreements (Competition Commission of India 2020) that can also lead to anticompetitive practices. In 2019, Google was fined by the European Commission for abusing its dominant position in the market for online search advertising intermediation by including exclusivity clauses in its agreements with third-party websites that prevented other online advertising brokers from placing their search adverts on these websites.[12]

Another challenge for many business users relates to copyright or intellectual property right infringements enabled through digital platforms, which have implications for their profits and reputation. However, regulatory frameworks are unclear about the responsibility of digital platforms in instances where the intellectual property rights of business users are infringed. In a recent case before the Competition Commission of India, a business alleged, among other issues, that counterfeit products with its branding were appearing on Amazon at "unfair and discriminatory prices", to which the Commission replied that the issue, though of concern, was not one of antitrust.[13]

The rise of digital labour platforms also poses challenges that have not yet been adequately addressed for both domestic and international taxation regimes. Challenges in relation to taxation have also arisen with regard to data, especially given the fundamental role of data in the creation of value (OECD 2014). Traditional, formal enterprises have more clearly defined obligations regarding taxation and may end up paying higher taxes than many platforms, which therefore have a competitive advantage. On this issue, the European Commission announced in 2020 that it will move forward with a digital tax should the negotiations at OECD level not produce immediate and satisfactory results.[14]

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12 European Commission, Antitrust Case 40411 – Google Search (AdSense). For a summary of the decision, see the press release: https://ec.europa.eu/commission/presscorner/detail/en/IP_19_1770.

13 For more details, see: Competition Commission of India, Case No. 09 of 2020, Paras 8 and 28 https://www.medianama.com/wp-content/uploads/CCI-Amazon.pdf.

14 For more details, see: https://www.politico.eu/article/gentiloni-eu-ready-to-launch-new-digital-tax-if-us-stalls-global-talks/.

> ▶ **Box 3.7 Open source community platforms in the retail sector**
>
> The Open Food Network (OFN), a global open source software platform operating in the retail sector, is a virtual space in which farmers, wholesalers and communities can set up their own online stores and collaborate in selling their produce. It operates in a number of developing and developed countries, including Australia, Belgium, Brazil, Canada, Colombia, Costa Rica, France, India, Norway, South Africa, the United Kingdom and the United States. The aim is to create fairer and more transparent food supply chains, and to move towards regenerative forms of agriculture so as to build resilient natural systems.
>
> The OFN platform offers subscription packages to shops or business users; for example, on the United Kingdom OFN platform, shops are offered four subscription packages depending on their size and scaling needs. These are: Basic (£1 minimum donation per month), Starter (2.4 per cent of monthly sales (including VAT)), Scale (£60 per month plus 0.6 per cent of monthly sales (including VAT)) and Enterprise (custom pricing). Depending on the plan, shops can benefit from additional digital tools and assistance, yet they all get full voting rights irrespective of the plan selected.
>
> **Sources:** https://www.openfoodnetwork.org/find-your-local-open-food-network/; https://about. openfoodnetwork.org.uk/pricing-and-plans/.

Finally, a key challenge that many businesses face relates to dispute resolution. The need to ensure fair dispute resolution with platforms has been invoked by business users in the EU, especially with regard to sudden delisting of accounts (European Commission 2017b). For business users such as SMEs, fast and easy redress mechanisms are not only crucial to ensuring fairness and safeguarding their fundamental right to do business in equitable circumstances, but also to ensuring business continuity when they are confronted with unjustified delisting or freezing of assets (European Commission 2017c). All these challenges are increasingly being subject to thorough consideration in a number of countries and Chapters 5 and 6 discuss some of the measures that have been taken.

▶ Conclusion

This chapter has shown that a wide variety of businesses are increasingly using digital labour platforms, both online web-based and location-based, in their efforts to achieve greater efficiency and expand their customer base, among other factors. Several benefits for businesses in using online web-based platforms have emerged: the platforms allow them to streamline recruitment processes and to better match talent with needs, to reduce costs and to enhance their access to knowledge and innovate faster. Having access to a large global pool of workers with diverse skill sets accessible through online web-based platforms can be seen to be contributing towards improved organizational performance for many firms. For several of these businesses, SMEs in particular, the use of location-based delivery platforms has opened up opportunities to expand their markets as well as increase productivity and profitability, while taxi platforms have enhanced the convenience and accessibility of transportation for many businesses and consumers.

Furthermore, the rise of digital platforms has created opportunities for entrepreneurship and innovation for BPO companies and digital start-ups. BPO companies have been able to transition from providing voice-based to digital services in order to cater to the demands of their clients. Many digital start-ups have also sprung up to meet the demands of automated and AI-enabled services, for example in analytics and tracking. However, as AI technology is far from mature and a completely autonomous AI remains a distant prospect, many such start-ups draw on human intelligence to undertake tasks and support machine learning by engaging a globally dispersed workforce that is available every day and round the clock (24/7) on digital labour platforms at a relatively low cost. At the same time, digital platforms in sectors such as retail have also benefited many businesses, especially SMEs, which can increasingly sell products globally through e-commerce platforms.

While the proliferation of platforms and their use by businesses have provided opportunities, a multitude of challenges have also emerged. BPO companies face competition from large companies and the prevalence of low-end and low-value tasks reduces their margins, particularly in the case of SMEs. For businesses that are dependent on delivery platforms, poor digital infrastructure as well as platform glitches or delays caused by the delivery couriers can have a significant impact on the smooth running of the business, while high commission fees can reduce profits. Traditional businesses, particularly in the retail sector, are facing market disruptions from large e-commerce platform companies. While some businesses have resorted to joining platforms to reach a wider customer base, they face challenges in terms of unfair competition, unfavourable contractual terms, non-transparency on the part of the platforms (with regard to data and pricing), weak dispute resolution mechanisms, and, more broadly, an uneven playing field. Many of these issues are also increasingly receiving regulatory attention, particularly from competition authorities in many countries.

Despite such challenges, digital platforms have become pervasive in today's society and economy, especially since the outbreak of the COVID-19 pandemic. Given the increasing reliance of businesses on digital labour platforms and the fact that these platforms are gradually shaping the world of work, it becomes all the more relevant and urgent to better understand the implications of these developments for the worker experience in the digital economy. In this regard, the next chapter captures the diverse experience of workers on both online web-based and location-based digital labour platforms.
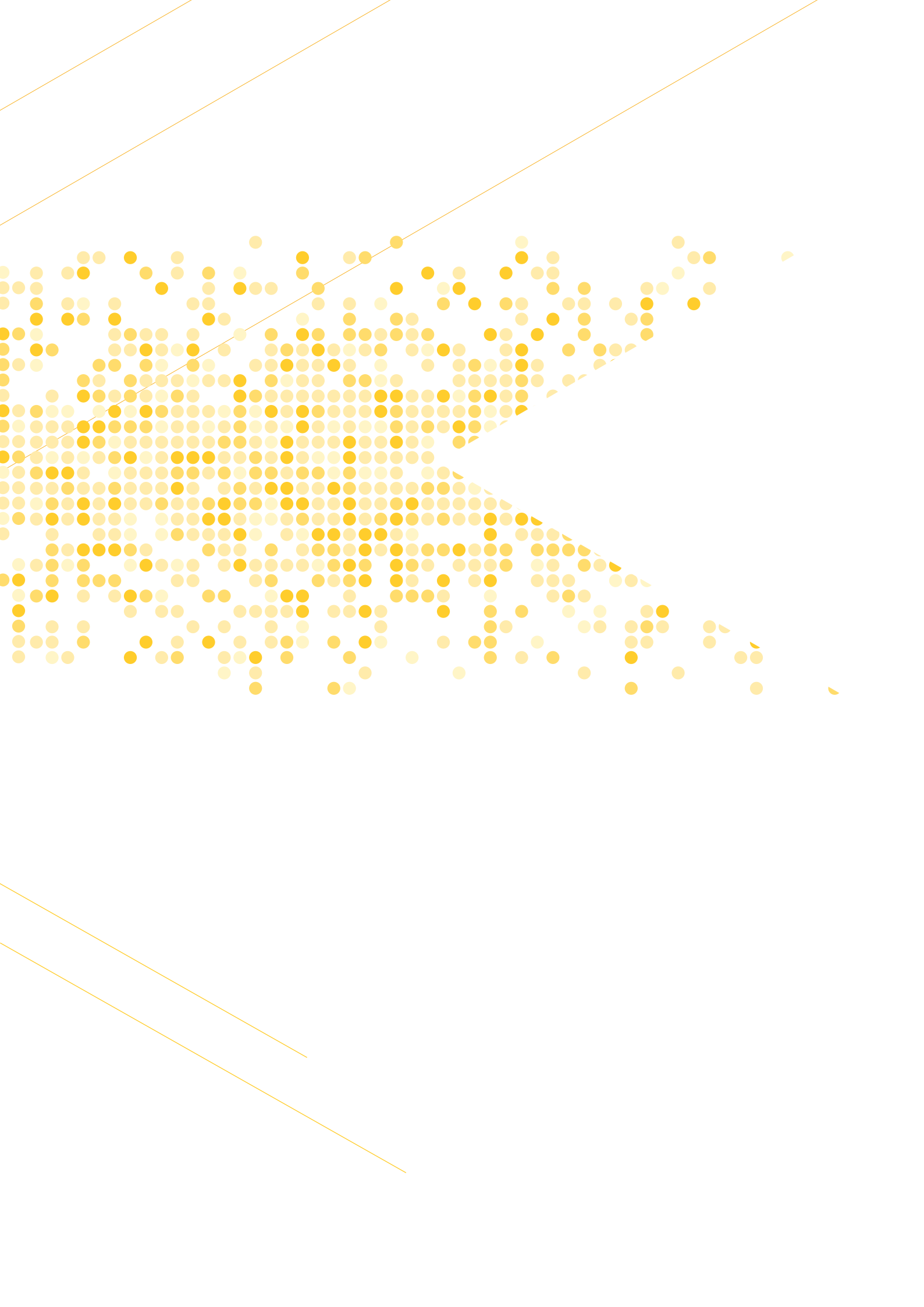
4

Digital labour platforms and the redefinition of work

Opportunities and challenges for workers

Design of a platform
The worker experience

▶ Accessing and performing work

69% ➔ **70%** of them have taken a loan
of app-based taxi drivers own their vehicle

65 hours
is the average working week of an app-based taxi driver

Resources required

Access to the platform

Terms of service agreements

Workers' ratings are decisive for accessing work
Freelance platforms
82%
Taxi
72%
Delivery
65%

Demonstrate capability

Commission fees
Online web-based
3.5% to **20%**
Taxi
5% to **25%**

Costs incurred

Working time
1/3 of every hour is unpaid on online web-based platforms

Algorithmic matching process

Autonomy and control

Workers on freelance platforms
47% are monitored by their clients for hours worked...
46% are required to take screenshots of their work...
43% are required to be available during a specific time...
▶ On a regular basis

Quality assurance of work

Workers whose account was deactivated
Taxi **19%**   Delivery **15%**

▶ After finishing work

Dispute resolution mechanism

Lack of awareness of a dispute resolution mechanism
Freelance platforms **52%**
Taxi **42%**
Delivery **32%**

Workers whose work was rejected
Microtask platforms **86%**
Freelance platforms **35%**

Non-payment

Payment

Hourly earnings (US$)
Microtask **3.3**
Delivery **0.9** to **3.5**
Freelance **7.6**
Taxi **1.1** to **8.2**
0   10
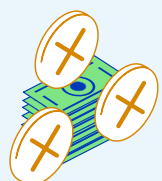
Social protection (access to pension)
Online web-based **20%**   Taxi **18%**   Delivery **17%**

> ▼▼ The online world is complicated and full of opportunities and hopes, and of course is also full of various traps and pitfalls.
>
> ▶ Male respondent on freelance platform EPWK (China)

▶ Introduction

The previous chapters have presented the emergence of digital labour platforms, their business model, and how they are changing the organization of work. Platforms are increasingly redefining, through the use of technology, how economic relationships are established between workers and clients or customers, many of whom are geographically dispersed around the world.

Simultaneously, digital labour platforms are creating opportunities for work and gaining popularity globally among policymakers and governments as a means of boosting economic development, along with enhanced information and communications technology (ICT) penetration in many countries (AfDB et al. 2018; Roy, Balamurugan and Gujar 2013; Narula et al. 2011). Moreover, digital labour platforms are attracting workers across multiple sectors and countries as they provide flexibility in work schedules, the option to undertake work from any place and at any time, and the ability to choose the tasks to be performed (Berg et al. 2018; AfDB et al. 2018).

Despite the opportunities emerging through digital labour platforms, concerns are being raised about the worker experience on such platforms, particularly with regard to working conditions – from limited access to work and social protection to low earnings and income volatility (Rani and Furrer, forthcoming; Federal Reserve Board 2019; Berg et al. 2018; Farrell and Greig 2016; United Kingdom, Department for Business, Energy and Industrial Strategy 2018a). Ensuring decent work opportunities for all calls for a better understanding of the platform worker experience, and of worker motivations, opportunities and challenges across multiple sectors, countries and contexts.

This chapter presents findings from ILO surveys conducted among workers engaged on online web-based and location-based platforms. It documents worker experience on online web-based platforms such as microtask, freelance or contest-based and competitive programming platforms through surveys conducted at the global level, and at the country level in China and Ukraine. Through extensive field-based surveys it also presents new insights into the situation of workers in taxi and delivery services in developing countries, which so far has remained inadequately explored. By drawing on the findings of surveys conducted among some 12,000 respondents, the chapter provides a first major comprehensive picture of the worker experience on digital labour platforms in multiple sectors and countries.

The chapter begins by providing the basic demographic characteristics of the platform workers surveyed and their motivations for undertaking platform work in section 4.1. Section 4.2 explores the heterogeneity of worker experience in navigating complex platform designs to obtain work, perform tasks and receive income, thereby bringing to the fore the opportunities and challenges encountered with regard to access to work, earnings, working time, social protection, and occupational safety and health. Section 4.3 focuses on how digital labour platforms use algorithms to manage and evaluate workers and how that practice is impacting the extent of autonomy and control that workers can exercise over their work. Section 4.4 investigates the worker experience with regard to skills acquisition and development, and skills mismatch as digital labour platforms increasingly redefine the relationship between formal education and tasks performed. Section 4.5 discusses the role of platform design in shaping the worker experience in the context of non-discrimination issues.

4.1 Basic demographic characteristics of platform workers

The ILO conducted several surveys across countries and sectors between 2017 and 2020 (see table 4.1). In the global surveys conducted on microtask (2017), freelance and competitive programming platforms (2019–20), about 2,900 respondents from 100 countries took part. In addition, two country-specific surveys of workers on online web-based platforms were conducted in China (1,107 respondents) and Ukraine (761 respondents) in 2019. In this chapter, the term "online work" includes the combined data from the global and country-specific surveys to provide a broad overview of the worker experience on online web-based platforms. When referring to "developed" or "developing" countries with regard to these platforms, for methodological reasons (see Appendix 4A) only the global surveys are taken into account; the country-specific surveys are excluded.

Surveys were also conducted among workers on location-based platforms during 2019 and 2020 with a focus on the app-based taxi sector in nine countries, and the app-based delivery sector in 11 countries, comprising about 5,000 respondents spanning the Arab States, Africa, Asia and the Pacific, Eastern Europe, and Latin America and the Caribbean. This was complemented by a survey of over 2,200 respondents in traditional taxi (nine countries) and delivery (four countries) sectors.

All the surveys contained both quantitative and qualitative questions, including open-ended text questions aiming to obtain insights into the experience of workers engaged in these sectors (see Appendix 4A). Given the lack of official statistical information on the numbers and characteristics of platform workers (see section 1.3), including those using online web-based and location-based platforms, there was no sampling base from which a random sample could be drawn. The statistics presented in this chapter therefore reflect the findings of the ILO surveys, and are not necessarily representative of a global or country-level population.

▶ **Table 4.1 Number of respondents, by survey**

Online web-based platforms		Main platforms covered	Number of respondents
Global surveys	Freelance and contest-based	Freelancer, Upwork	449
	Competitive programming	CodeChef, Codeforces, HackerRank, Iceberg, Topcoder	62
	Microtask	AMT, Clickworker, CrowdFlower (now Appen), Microworkers, Prolific	2350
Country-specific surveys	China	680, EPWK, ZBJ, k68	1107
	Ukraine	Advego, Freelance, Freelancehunt, Freelancer, Kabanchik, Upwork	761
Location-based sectors		**Countries surveyed**	**Number of respondents**
Taxi	App-based	Chile, Ghana, India, Indonesia, Kenya, Lebanon, Mexico, Morocco, Ukraine	2077
	Traditional	Chile, Ghana, India, Indonesia, Kenya, Lebanon, Mexico, Morocco, Ukraine	1864
Delivery	App-based	Argentina, Chile, China, Ghana, India, Indonesia, Kenya, Lebanon, Mexico, Morocco, Ukraine	2965
	Traditional	Chile, India, Kenya, Lebanon	347

Sources: ILO global surveys of crowdworkers (2017) and workers on freelance and competitive programming platforms (2019–20); ILO surveys of platform workers in China (2019) and Ukraine (2019); and ILO selected country surveys of taxi drivers and delivery workers (2019–20).

4.1.1 Age distribution of platform workers

Across the sectors surveyed, the majority of workers engaged on online web-based and location-based platforms are below 35 years of age. The average age of workers on **online web-based platforms** is about 31 years and is higher among workers from developed countries (35 years) than in developing countries (30 years). Workers engaged in competitive programming tend to be the youngest (22 years) (see figure 4.1.), indicating that many are using these platforms to hone their skills. In the **taxi and delivery sectors**, app-based taxi drivers (36 years) and delivery workers (29 years) tend to be younger than those engaged in traditional settings (taxi drivers: 44 years; delivery workers: 31 years).

4.1.2 Participation of male and female workers on platforms

About four in ten workers on **online web-based platforms** are women, while in developing countries only about two in ten are women (see figure 4.2). These figures underline the fact that, in a similar way to the offline labour market, the online labour market poses challenges for women in accessing work. Among competitive programmers, only 1 out of 62 respondents was female, which reflects the occupational segregation in the IT sector (see also Aleksynska, Bastrakova and Kharchenko 2018; Shevchuk and Strebkov, forthcoming).

The **app-based taxi and delivery sectors** are largely male-dominated. Women comprise fewer than 10 per cent of workers in these sectors, and this proportion is even lower in the traditional sectors (below 5 per cent), as shown in figure 4.2. The share of women is considerably higher in some countries, for instance in Indonesia in the app-based taxi sector (13 per cent), where female-only
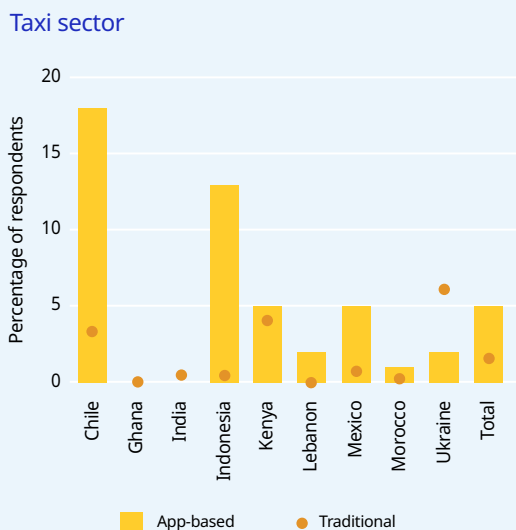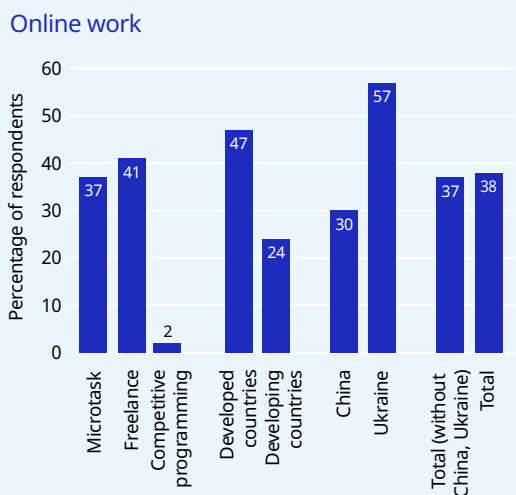
▶ **Figure 4.1 Age distribution, by occupation**
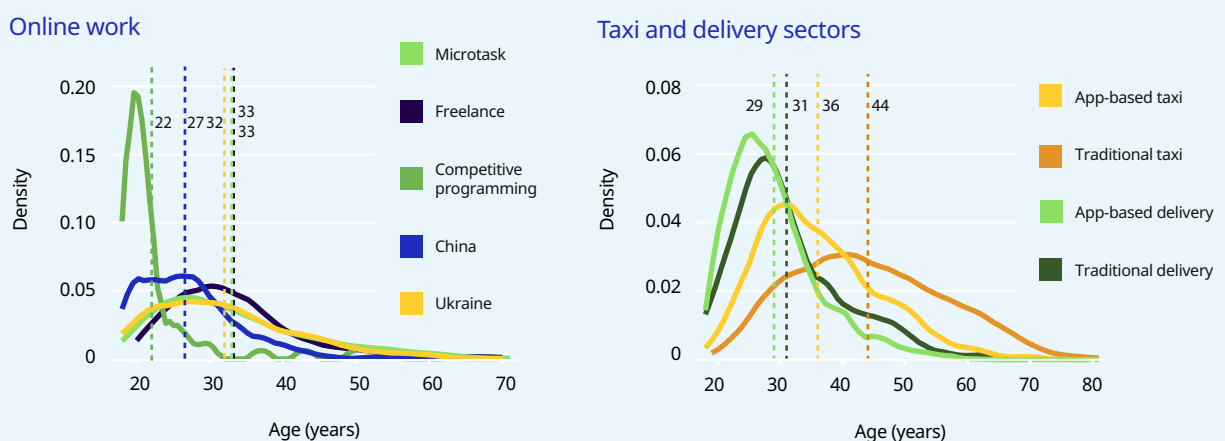
Note: Vertical dashed lines indicate mean values.

Sources: As for table 4.1.

▶ **Figure 4.2 Share of female respondents, by occupation and country**

Online work

Taxi sector

Delivery sector

Sources: As for table 4.1.

taxis are preferred by some female clients to mitigate risks of violence and harassment (*Straits Times* 2015). In Kenya, where only 5 per cent of app-based taxi drivers are women, some platforms are undertaking special measures to encourage their greater participation, such as priority access to vehicle financing (Taxify). A platform with female-only taxis has also emerged (An-Nisa Taxi) (Osman 2019).

4.1.3 Participation of workers from rural and urban areas

This section focuses on workers on online web-based platforms, not on taxi or delivery services as the surveys for the latter were conducted in urban areas only. There is limited penetration of **online web-based platforms** in rural areas, particularly in developing countries. The vast majority of respondents (84 per cent) on such platforms reside in urban or suburban areas. The share of those performing online work who live in rural areas or small towns is higher in developed countries (23 per cent) than in developing countries (16 per cent). With increased ICT connectivity and its spread to rural areas, there is income-generating potential for online work in these areas, whereby skilled workers would be able to access jobs in the global labour market (Kalleberg and Dunn 2016).

> **I live in an area where there are few opportunities for this type of work. My only other option to work in this field would be to move to a big city, pay high rent and reduce the time I spend with my family and friends –** *Female respondent on freelance platform Upwork (Ireland)*

## 4.1.4 Participation of migrants on platforms

> **I signed up to Upwork after emigrating. I used it to get started in a new country as a freelancer. I got work online very quickly and it provided me with an income to get started** – *Female respondent on freelance platform Upwork (Canada)*

Online web-based platforms offer some opportunities to migrant workers[1] in accessing work, particularly in developed countries. The ILO surveys reveal that of those engaged on freelance platforms, 17 per cent are migrant workers. Their share is higher in developed countries (38 per cent) than in developing countries (7 per cent), and is higher among women (39 per cent) than men (36 per cent) in developed countries, while it is similar across the sexes in developing countries. This could be indicative of the intersectional barriers (such as those based on gender, migrant status, indigenous or tribal identity, among others) to accessing offline work faced particularly by many migrant women (King-Dejardin 2019).

In some countries, many migrant workers engage in the **app-based delivery sector**. The proportion of migrant workers is higher in this sector (15 per cent) than in the app-based taxi sector (1 per cent), and similar differences exist in the traditional delivery and taxi sectors. However, there are considerable variations across countries (see figure 4.3). Argentina and Chile, for instance, each with a high proportion of migrant workers in the app-based delivery sector (over 70 per cent), have seen a large influx of Venezuelan refugees and migrants into their national labour markets, who face uncertain employment prospects even though many have high education levels (ILO 2020c): in Argentina and Chile, 43 and 47 per cent respectively of migrant respondents had attained a university degree. Working in the app-based delivery sector emerges as an option for many due to the lack of other available jobs corresponding to their education, low entry barriers and ease of access to this sector, as well as discrimination in accessing jobs elsewhere.

> **In the period immediately before I started working as a courier, I was a salaried employee. I quit because I suffered discrimination and exploitation against Venezuelans** – *Male respondent on app-based delivery platform Uber Eats (Chile)*

▶ **Figure 4.3 Share of migrant respondents in the taxi and delivery sectors**
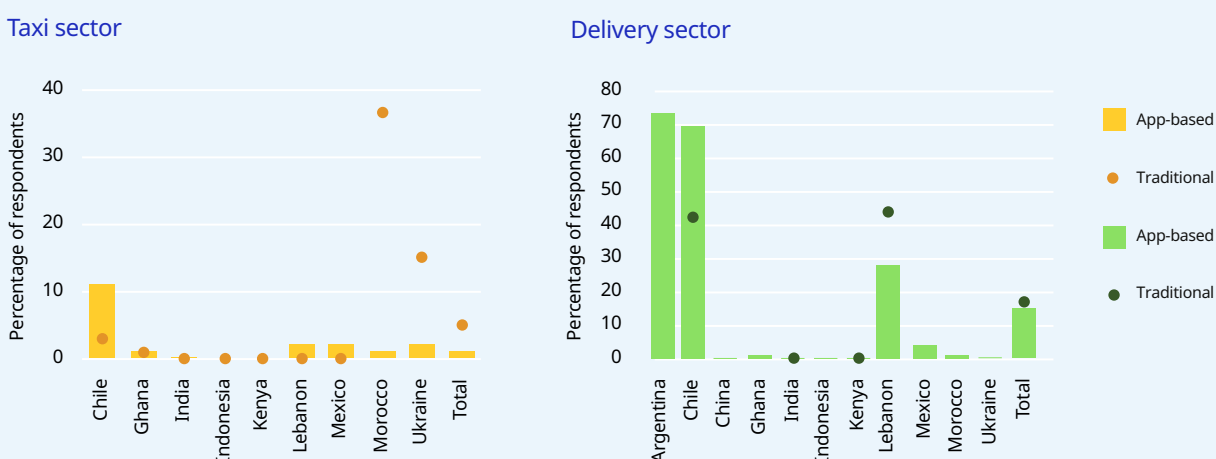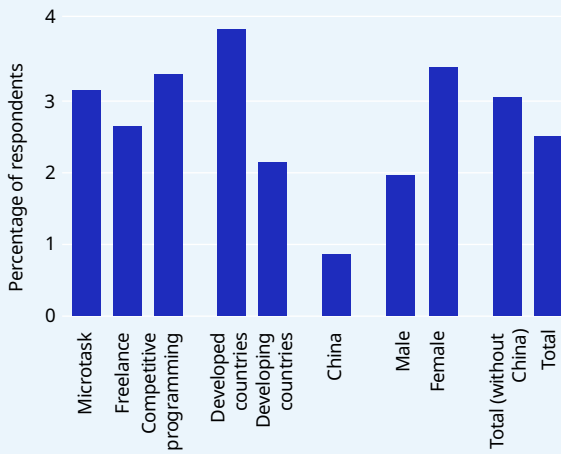

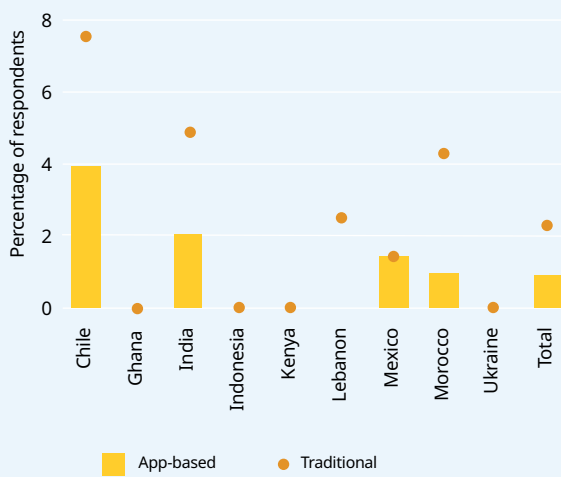**Source:** ILO selected country surveys of taxi drivers and delivery workers (2019–20).

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1 In this chapter, "migrants" refers to workers born in a country that is different from where they were residing at the time of the survey.

▶ **Figure 4.4 Share of respondents who consider their health to be poor or very poor, by occupation and country**
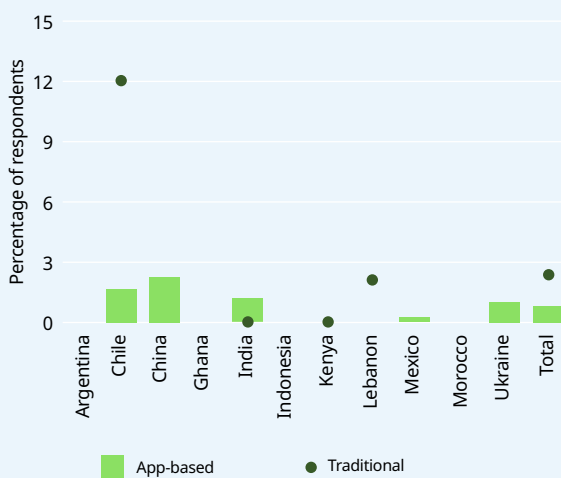
Online work

Taxi sector

App-based   ● Traditional

Delivery sector

App-based   ● Traditional

Sources: ILO global surveys of crowdworkers (2017) and workers on freelance and competitive programming platforms (2019–20); ILO survey of platform workers in China (2019); and ILO selected country surveys of taxi drivers and delivery workers (2019–20).

4.1.5 Health status of workers on platforms

I use a wheelchair and experience severe chronic pain as a result of a congenital orthopaedic condition. My days often depend upon my pain. Freelancing gives me the flexibility to set my own schedule and work where and when I need to. I can work in 10-minute bursts if that is what I need to do. And I often do that *– Female respondent on freelance platform Upwork (United States)*

I became a driver because my health is not good enough to work somewhere else *– Male respondent on app-based taxi platform DiDi (Mexico)*

Some people in poor health or with disabilities are able to find work on online web-based and location-based platforms. About 2 per cent of respondents on ***online web-based platforms*** reported poor or very poor health status, with no major differences by sex (see figure 4.4.). Online work can also provide opportunities for persons with disabilities, given the additional barriers they encounter in labour markets (Fundación ONCE and the ILO Global Business and Disability Network 2019). In particular, some respondents in poor health or with disabilities identified the possibility to work from home as being beneficial in finding and carrying out work. The proportion of respondents reporting poor or very poor health in the ***app-based taxi and delivery sectors*** varied across countries. In the app-based taxi sector it ranged between 0 and 4 per cent, while in the traditional sector it was slightly higher. The proportion of delivery workers with poor or very poor health ranged between 0 and 2 per cent in the app-based delivery sector (see figure 4.4).

4.1.6 Education levels of platform workers

Workers on ***online web-based platforms*** are generally highly educated, especially in developing countries. Over 60 per cent of respondents engaged in online work, women and men alike, are highly educated (having attained a university degree) (see figure 4.5). A higher proportion of workers engaged on freelance platforms (83 per cent) are highly educated compared to those on microtask (64 per cent) and competitive programming (50 per cent) platforms. A larger share of respondents on competitive programming platforms (73 per cent) are pursuing a degree compared to those on freelance (25 per cent) and microtask (21 per cent) platforms.

A larger proportion of workers on online web-based platforms in developing countries (73 per cent) are highly educated compared to those in developed countries (61 per cent). This proportion is even higher among women in developing countries (80 per cent). This could be due to factors such as the lack of opportunities in the local offline labour markets, as well as additional barriers to women in particular that prevent them from accessing work outside their homes, including care responsibilities and prevailing gender norms.
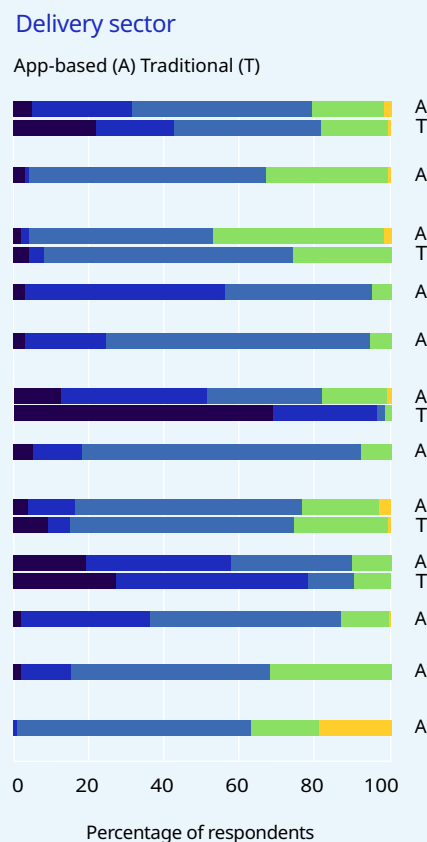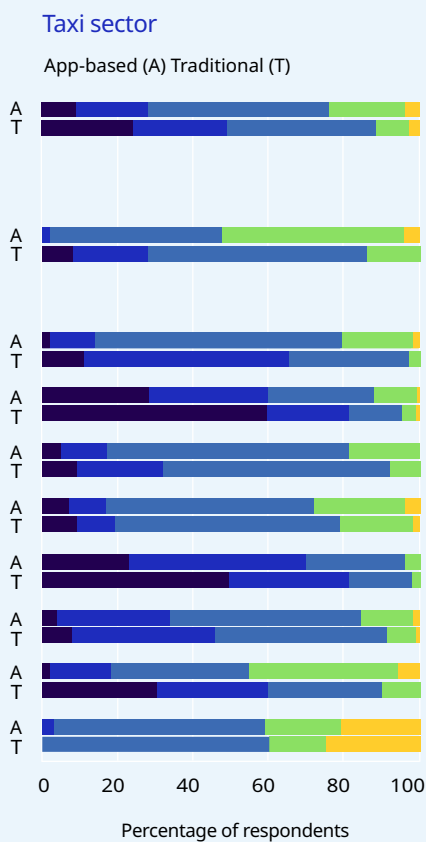
> **I started freelancing a couple of weeks after I graduated from college. I think I had gone to a couple of interviews beforehand but none of them called back so I decided to try freelancing** *– Female respondent on freelance platform Upwork (Philippines)*

A sizeable proportion of workers engaged in the ***app-based taxi and delivery sectors*** have high educational levels, including women and young people. Even though these sectors are often considered to be low-skilled, 24 and 21 per cent of app-based taxi drivers and delivery workers respectively are highly educated (see figure 4.5). These proportions are lower in the traditional sectors. In some countries, such as Chile and India, a considerably higher proportion of app-based taxi drivers and delivery workers are highly educated compared to those in the traditional sectors.

Furthermore, even though there are fewer women engaged in the app-based taxi and delivery sectors, a higher proportion of them are highly educated (42 and 29 per cent respectively) compared to men (24 and 20 per cent respectively). Younger app-based taxi drivers and delivery workers (18–24 years) tend to be highly educated (24 and 17 per cent respectively) compared to workers in the traditional sectors (12 and 4 per cent respectively). This reflects the challenges in the context of youth employment, where young people are often confronted with poor employment opportunities (ILO 2020d and 2020e) and look for any alternative possibilities to earn an income (Aleksynska 2021; Anwar and Graham 2020; Surie and Koduganti 2016).

> **I took a training programme in the mechanical field for operating machines. The training is now over, and until I find a job in that field, I am working as a delivery boy** *– Male respondent on app-based delivery platform Uber Eats (India)*

▶ **Figure 4.5 Educational levels of workers, by occupation and country**

Online work

Legend:
- Below primary/primary
- Secondary
- Higher secondary
- Bachelor's degree
- Postgraduate degree and above

Categories (top to bottom): Microtask, Freelance, Competitive programming, Developed countries, Developing countries, China, Ukraine, Male, Female, Total (without China, Ukraine), Total

Percentage of respondents

Taxi sector

App-based (A) Traditional (T)

Delivery sector

App-based (A) Traditional (T)

Countries (centre labels): Total, Argentina, Chile, China, Ghana, India, Indonesia, Kenya, Lebanon, Mexico, Morocco, Ukraine

Percentage of respondents

Sources: As for table 4.1.

4.1.7 Worker motivation for engaging in platform work

Complementing pay from other income sources is the main motivation for performing tasks on **online web-based platforms** (39 per cent), followed by the preference or need to work from home or for job flexibility (29 per cent), and as a form of leisure or because it is enjoyable (18 per cent) (see figure 4.6). Complementing pay is a major motivating factor among younger workers in particular (48 per cent for those aged 18–24 years) compared to older workers.

> **I also wanted to earn extra income to support some financial obligations for my family. The salary I earn from my current job is not enough to cover the growing need of my family** – *Male respondent on freelance platform Upwork (Philippines)*

> **I wanted a side income and had a try. And I was surprised I could earn some money** – *Female respondent on freelance platform Upwork (Canada)*

In developing countries, the key motivating factors are the preference or need to work from home or for job flexibility (36 per cent) and complementing pay (26 per cent), whereas in developed countries it is mostly complementing pay (43 per cent). Furthermore, although not being able to find traditional work is also a motivation for some in both developing and developed countries (7 and 8 per cent respectively), better pay than in other available jobs is particularly relevant for those in developing countries (11 per cent).

> **I live in an overpopulated country where it is very tough to get a good job. The pay is better than usual jobs, I am my own boss and I like the freedom** – *Male respondent on freelance platform Upwork (Bangladesh)*

Working from home or job flexibility are particularly important for women. A higher proportion of women (35 per cent) than men (25 per cent) on online web-based platforms are motivated by the preference or need to work from home or for job flexibility, and this is the case in developed and developing countries alike. About 23 per cent of women who perform online work have children under the age of six years. As women with young children tend to face a "motherhood employment penalty" and globally account for the lowest employment rates (ILO 2018a; Grimshaw and Rubery 2015), online work is providing opportunities to work while managing care responsibilities.

> **As a woman, I prefer to work from home. I earn better than others. I have a child. I can maintain my family instead of doing a regular job. That's the reason I prefer to work from home** – *Female respondent on freelance platform Upwork (Bangladesh)*

Competitive programmers are motivated to work on platforms to improve their skills, establish networks and enhance their future career prospects. About 85 per cent of respondents were motivated by this factor, which is a considerably higher proportion than that of respondents on freelance platforms (12 per cent). While some respondents participated mainly on CodeChef and Codeforces, which are platforms primarily used for improving skills, others participated on HackerRank and Topcoder, with the prospect of earning prizes, apart from enhancing skills and employment prospects.
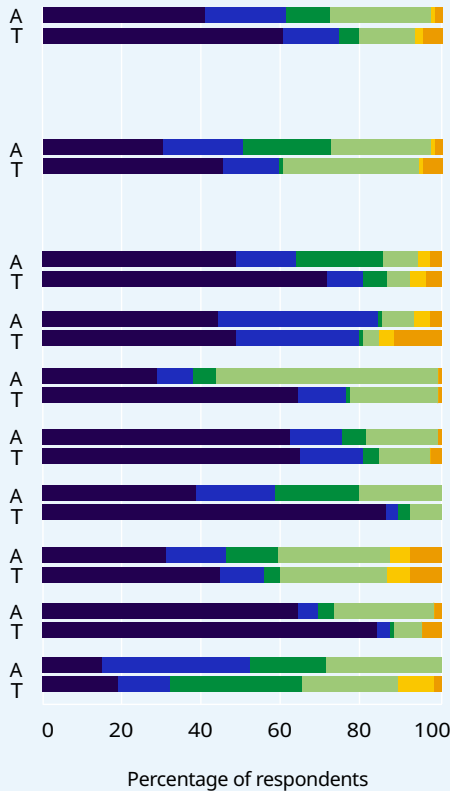
▶ **Figure 4.6 Most important reason for performing work on digital labour platforms, by occupation and country**
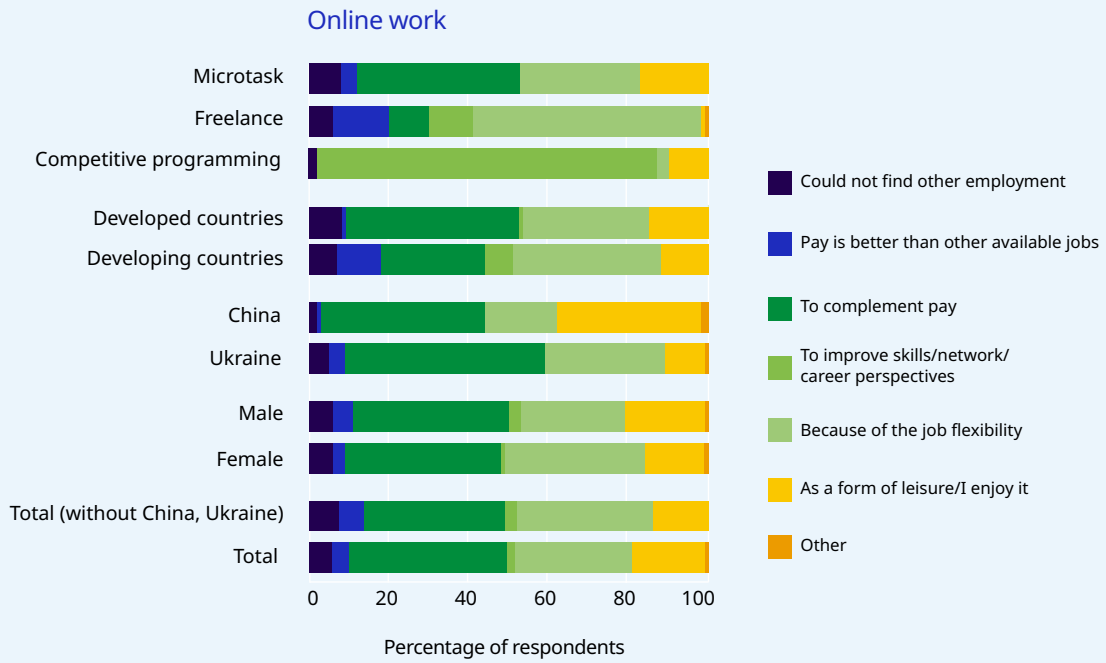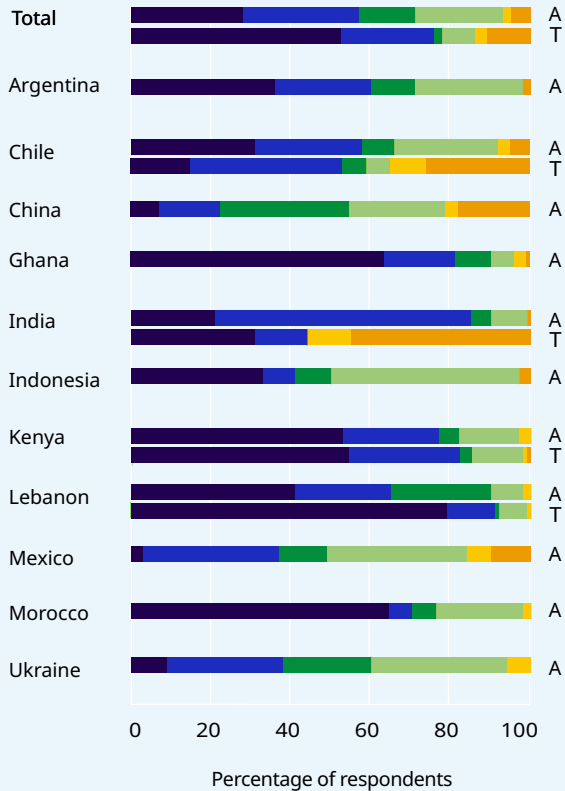

Online work

Taxi sector

App-based (A) Traditional (T)

Delivery sector

App-based (A) Traditional (T)

Percentage of respondents

Sources: As for table 4.1.

I like to do competitive programming because it challenges us to push our limits and think out of the box. It also helps to get a job in big companies as their tests are similar to competitive programming competitions – Male respondent on competitive programming platform HackerRank (India)

The lack of alternative employment opportunities is a prime motivating factor for many workers on **location-based platforms**. This is the case for 40 and 28 per cent of the respondents in the app-based taxi and delivery sectors respectively, and also a major motivating factor in the traditional sectors. Other key motivating factors among app-based workers include job flexibility, as well as better pay (see figure 4.6). At the same time, however, there are some differences across countries and also across population sub-groups in some countries. For instance, in Chile, while those app-based delivery workers born in the country are motivated by flexibility (42 per cent), migrant workers in particular are motivated by a lack of alternative employment opportunities (38 per cent).

App-based taxi driving was the only job that was available – Male respondent on app-based taxi platform Safe Boda (Kenya)

I started working as an app-based taxi driver to get instant money as I had an economic emergency situation caused by unemployment – Male respondent on app-based taxi platform Beat (Chile)

4.1.8 Worker satisfaction with platform work

A majority of workers on **online web-based platforms** are either satisfied or very satisfied with their work, and these figures are similar across the sexes (see figure 4.7). This is more likely to be the case for workers in developing countries (80 per cent) than for those in developed countries (71 per cent), and particularly so for women in developing countries (84 per cent).

I participate in freelance work because I was never this available to my children when I worked in the corporate set-up. This allowed me to become a mom yet still provide like a breadwinner – Female respondent on freelance platform Upwork (Philippines)

Online platforms are very good because there is free time for other activities and no pressure from the employer as opposed to working in an office – Male respondent on freelance platform Kabanchik (Ukraine)
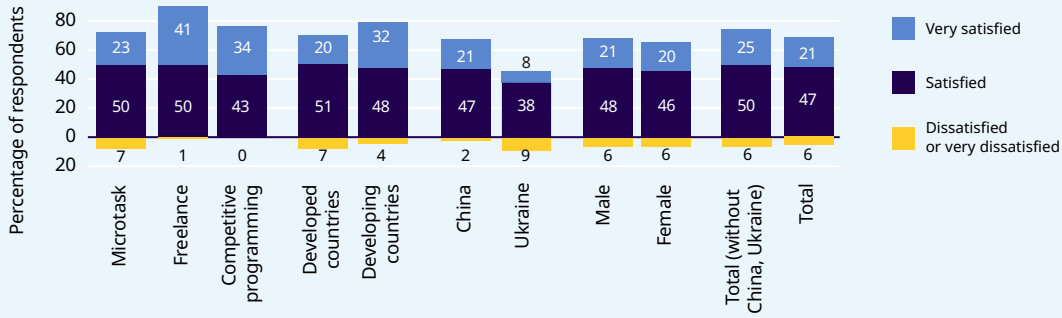
In the **app-based taxi and delivery sectors**, the majority of workers surveyed are satisfied with their work. A higher proportion of app-based taxi drivers are satisfied or very satisfied compared to traditional taxi drivers, while the opposite is the case in the delivery sector (see figure 4.7). In the absence of traditional work opportunities in the local labour market, app-based work provides workers with an income. This context might influence their satisfaction levels despite negative aspects of the work, such as long working hours and high work intensity (see section 4.2.3; Prabhat, Nanavati and Rangaswamy 2019; Griesbach et al. 2019).

When there is no other source of earning and all the daily expenses are paid for through this income only, then I have to be satisfied with it – Male respondent on app-based taxi platform Uber (India)

App-based taxi drivers in Morocco stand out as an outlier with high dissatisfaction levels (68 per cent), which could be associated with a strike during the period of data collection that is likely to have created higher awareness levels among the drivers about working conditions and pay. At the same time, while a single-measure job satisfaction indicator may provide some insights, concerns have been raised regarding its reliability and prevalent anomalies (Brown, Charlwood and Spencer 2012; Rose 2003; Oshagbemi 1999). Responses to single-measure job satisfaction questions have been observed to overestimate satisfaction levels in comparison with multiple-item measures

▶ **Figure 4.7 Worker satisfaction levels, by occupation and country**

Online work

Legend
Very satisfied
Satisfied
Dissatisfied or very dissatisfied

Taxi sector

Legend
Very satisfied and satisfied App-based
Very satisfied and satisfied Traditional
Dissatisfied and very dissatisfied App-based
Dissatisfied and very dissatisfied Traditional

Delivery sector

Legend
Very satisfied and satisfied App-based
Very satisfied and satisfied Traditional
Dissatisfied and very dissatisfied App-based
Dissatisfied and very dissatisfied Traditional

Sources: As for table 4.1.

(Oshagbemi 1999). These responses are determined more by "intrinsic" characteristics (such as flexibility, among others), rather than "extrinsic" characteristics (such as pay, contractual status or prospects for promotion, among others) (Rose 2003, 526–527). In Kenya, app-based taxi drivers have reported high levels of satisfaction (see figure 4.7) yet have undertaken strikes regarding pay and lack of consultation (Ochieng 2019; Nyawira 2019). Moreover, when asked about pay or regularity of work, respondent dissatisfaction was evident across both location-based and online web-based platforms. Notably, 44 per cent of app-based taxi drivers and 38 per cent of app-based delivery workers felt that they were paid unfairly.

The work is very stressful and I think we deserve better pay – *Male respondent on app-based taxi platform Yango (Ghana)*

Given such challenges with the single-measure indicator, research has emphasized the importance of complementing it with other dimensions or multiple-item measures (Brown, Charlwood and Spencer 2012; Oshagbemi 1999). In this regard, understanding the granularity of the working conditions and how work is being organized on platforms is fundamental to a better appreciation of both the worker experience and the opportunities and challenges that are emerging.

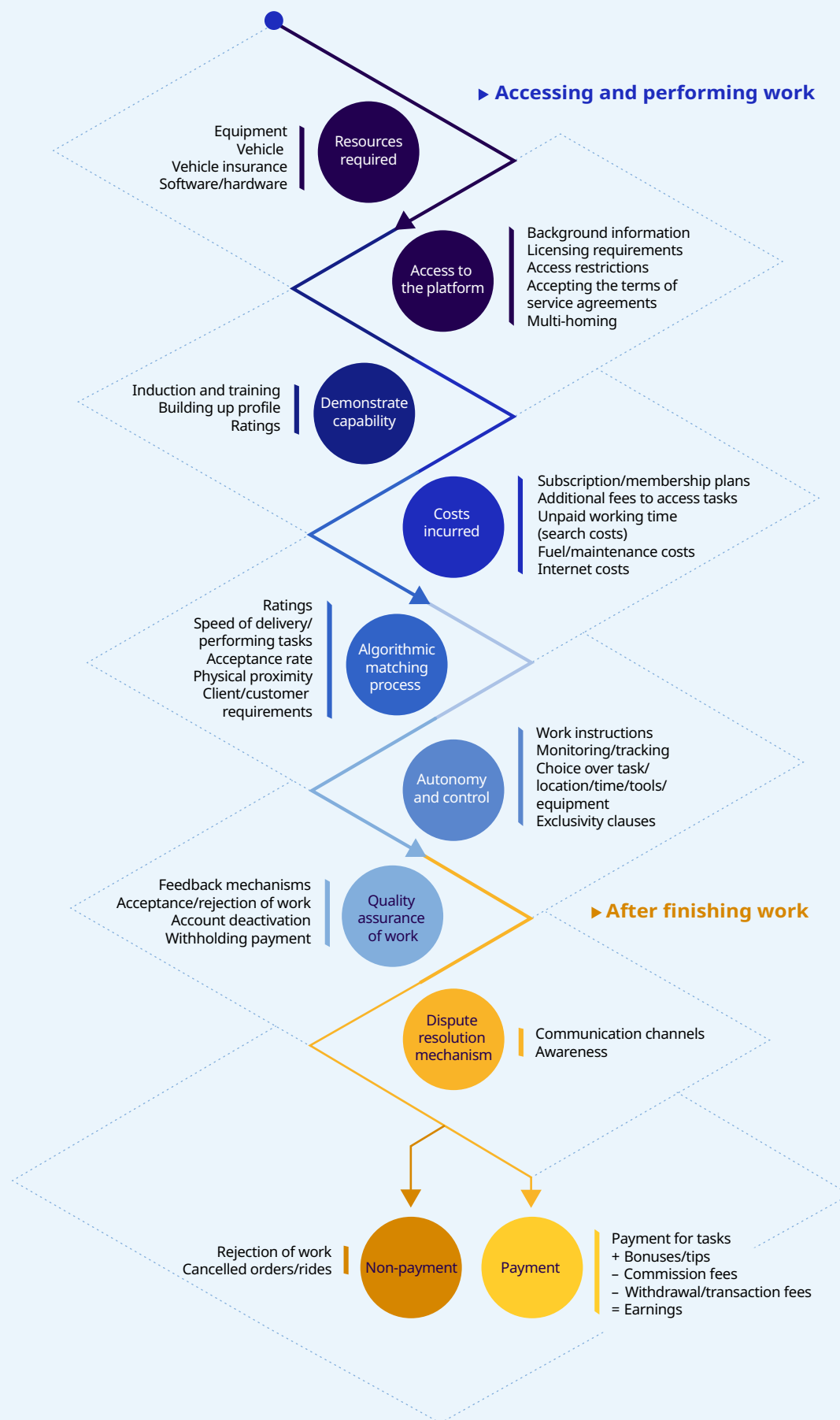## 4.2 Worker experience and the quality of work on digital labour platforms

The working conditions and worker experience on digital labour platforms can vary considerably. They are linked to and shaped by the relationship of the worker with the platform, and the way in which work is organized and managed by the platform. Initially, the experience may appear seamless, where tasks or clients are connected to workers via the platform for pay. Navigating through a digital labour platform and ultimately receiving payment for work done can, however, be fraught with barriers and challenges. Figure 4.8 captures the worker experience on digital labour platforms, both online web-based and location-based, from obtaining access to and performing work, to receiving feedback and payment. It also demonstrates the degree to which a worker is responsible for both the resources required (equipment, vehicle, vehicle insurance, software and hardware), and the costs incurred (subscription and membership plans, additional fees to access tasks, working time, fuel and maintenance costs and internet costs). The rest of the chapter relates the experience of workers and describes their working conditions, based on the new data collected for selected sectors.

4.2.1 Access to a sufficient amount of work

A major challenge in the labour market is matching jobs and workers with corresponding skills. The rise of digital labour platforms has been seen as a way to connect workers directly to work opportunities. However, the experience of many workers on digital labour platforms is nevertheless marred by several challenges to accessing a sufficient amount of work.

The majority of workers on ***online web-based platforms***, particularly in developing countries, would like to undertake more online work**.** Of the respondents engaged in online work, 86 per cent expressed this desire (see figure 4.9), with very small differences between male and female respondents. A higher proportion of respondents from developing countries (92 per cent) reported the desire to do more online work compared to those in developed countries (85 per cent). This is the case despite the fact that many respondents have another paid job, in developed (56 per cent) and developing countries (41 per cent), and the country-level surveys show these proportions to be quite high in Ukraine (68 per cent).

▶ **Figure 4.8 Design of a platform: The worker experience**

▶ **Accessing and performing work**

Equipment
Vehicle
Vehicle insurance
Software/hardware

Resources required

Background information
Licensing requirements
Access restrictions
Accepting the terms of
service agreements
Multi-homing

Access to the platform

Induction and training
Building up profile
Ratings

Demonstrate capability

Subscription/membership plans
Additional fees to access tasks
Unpaid working time
(search costs)
Fuel/maintenance costs
Internet costs

Costs incurred

Ratings
Speed of delivery/
performing tasks
Acceptance rate
Physical proximity
Client/customer
requirements

Algorithmic matching process

Work instructions
Monitoring/tracking
Choice over task/
location/time/tools/
equipment
Exclusivity clauses

Autonomy and control

Feedback mechanisms
Acceptance/rejection of work
Account deactivation
Withholding payment

Quality assurance of work

▶ **After finishing work**

Dispute resolution mechanism

Communication channels
Awareness

Rejection of work
Cancelled orders/rides

Non-payment

Payment

Payment for tasks
+ Bonuses/tips
– Commission fees
– Withdrawal/transaction fees
= Earnings

Source: ILO elaboration based on United Kingdom, Department for Business, Energy and Industrial Strategy (2018a).