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Digitalisation and the Indian Labour Market

Trends, Challenges, and Opportunities

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Abbreviations

AI	Artificial Intelligence
AIGWU	All India Gig Workers' Union
AMT	Amazon Mechanical Turk
API	Application Programming Interface
ASHA	Accredited Social Health Activists
BPM	Business Process Management
BPO	Business Process Outsourcing
CITU	Centre of Indian Trade Unions
DPIIT	Department for Promotion of Industry and Internal Trade
DTC	Direct-to-Consumer
eNAM	electronic National Agricultural Market
FLPR	Female Labour Participation Rate
GDP	Gross Domestic Product
GoI	Government of India
ICT	Information and Communications Technology
IFAT	Indian Federation of App-Based Transport Workers
ILO	International Labour Organization
INR	Indian Rupee
IT	Information Technology
IT-BPM	Information Technology - Business Process Management
IT-BPO	Information Technology - Business Process Outsourcing
ITeS	Information Technology Enabled Services
ITU	International Telecommunications Union
JJN	JustJobs Network
LFPR	Labour Force Participation Rates
ML	Machine Learning
MNCs	Multinational Corporations
MSMEs	Micro, Small and Medium Enterprises
NASSCOM	National Association of Software and Service Companies
NEP	National Education Policy 2020
PLFS	Periodic Labour Force Survey
SMEs	Small and Medium Enterprises
STEM	Science, Technology, Engineering, and Mathematics
UNCTAD	United Nations Conference on Trade and Development
USD	United States Dollar
WDI	World Development Indicators

Executive Summary

With a population of 1.4 billion, India is well on its way to becoming the world's most populous country. Its youth population alone, aged 15 to 29, is larger than the total population of the United States, or of any other industrialized country. It is understandable, then, that the government is increasingly looking to technology to enhance the efficiency, impact, and scale of its interventions, at the same time that the private sector sees market opportunities to develop various technology-based solutions. The two together are propelling digitalisation and changing the face of the Indian economy and labour market.

This report provides an overview of how digital trends in India are unfolding and their impact on India's world of work. It highlights the opportunities, but especially the challenges of these developments to shed light on where policy intervention is needed to harness the potential of technology to improve labour market outcomes. How digitalisation and its impact across India's heterogenous world of work are understood and managed today will have a bearing on how they play out by 2030.

For this report, the study deployed a mixed-methods approach consisting of both secondary and primary research. The secondary research included a survey of existing literature, a systematic press scan, and the collection and analysis of macroeconomic, labour market, and technology-related data. The primary research entailed 30 semi-structured interviews, 21 of which were with a range of workers, digital entrepreneurs, and platform and Business Process Outsourcing (BPO) companies, and nine interviews with current and former policymakers, and other subject area experts.

The report begins by examining labour market trends and delineating definitions of relevant labour market indicators. In recent years, India has seen flagging growth and an ailing labour market reflected in declining labour force participation; stubbornly high informal employment; a rise in unemployment; and a demographic bulge that underscores the importance of job creation at the scale India needs. The pandemic exacerbated these adverse trends dealing a blow to small businesses. As is the case in other developing countries as well, large businesses, which also tend to be formal businesses, had the capacity to withstand shocks. But smaller and unregistered businesses, which constitute a majority in India, were forced to scale down, shut down, or sell themselves in the wake of the pandemic. This led to a ricochet effect with the pandemic fuelling a loss of employment and income, deepening India's employment crisis.

The report examines trends in technology adoption and different dimensions of the digital divide. Closing the digital divide will be critical to how digitalisation will play out in India. Not only is there a gap between females and males in technology ownership and use, but the digital divide also manifests in terms of access to the right education and skills. Finally, there are variations across India, especially between rural and urban parts of the country, in terms of access to infrastructure to enable the acquisition of education and skills necessary to foster participation in a technologically driven economy. As the country learns to cope with the COVID-19 pandemic that has brought work and learning home, connectivity remains a key issue. In 2020, while 99% of the country's population was covered by cellular networks, only 24% of households had access to the internet (ITU, 2021).

With these labour market, demographic and technology adoption trends as context, the report looks at digitalisation across sectors of the Indian economy. It provides a broad overview of how 'ag-tech' is unfolding in Indian agriculture. Agriculture remains the country's most labour-intensive, least productive sector. A large proportion of employment in agriculture remains informal, and the sharing of low-productivity work is common. Public and private sector players are therefore keen to find technology-based solutions to improve agricultural productivity, whether it is through an online access portal

like the electronic National Agricultural Market (eNAM) – seeking to network physical agricultural markets from around the country to create one online marketplace, and Information Technology (IT) based applications to provide agriculture information services. These efforts, however, have thus far yielded limited results. This is not because the technology itself is the problem, but because a range of other factors such as access to technology and skills, to the size of landholdings, for instance, prevent technology tools from being deployed effectively. The literature and expert interviews, therefore, come up inconclusive in their assessment of the impact of agricultural technology, or ag-tech, on productivity, jobs, wages, and incomes.

With manufacturing's share in domestic output and employment showing no measurable increase in nearly three decades, there is hope that Industry 4.0 technologies can streamline manufacturing processes for greater efficiency and productivity. But with automation, these may come at the expense of employment at a time when the country is trying to boost manufacturing jobs. There is also a gendered aspect to the job losses in manufacturing; many of the jobs likely to be automated are often held by women (Tandon & Rathi, 2018).

Unlike agriculture and manufacturing, which witnessed a decline in jobs, employment in services rose by 17 million jobs between 2011-12 and 2017-18 amounting to about 31% of total employment in 2017-18 (World Bank, 2019). But employment in the service sector varies significantly: from high-skilled jobs such as computer programmers to what are considered low-skilled jobs such as drivers or domestic aides. The jobs at the top-end of the service sector are driving the growth and productivity of the sector, while most jobs in the sector are of the latter type. The key question for this report, then, is: where along this spectrum of service sector jobs do gig work, digital entrepreneurship, and BPO fall?

Digitalisation relies heavily on platforms. A platform is a digital interface that connects consumers to providers of goods, services, or information by using a two-sided application. The digital platform model relies heavily on network effects with each additional participant increasing the value of participation for all other platform participants. This network effect applies to both sides of the market with each additional service provider increasing the value of participation for other participating service providers (Bester et al., 2020).

While platforms may take many forms, in labour platforms, workers generate most of the value. These labour platforms offer different kinds of location-based or cloud-based services. Gig work varies in terms of required education and skill, and along other dimensions such as flexibility, autonomy, income, welfare, and representation. Cloud-based services tend to require a higher level of skill than location-based work. Moreover, certain opportunities for gig work are not equally accessible to women.

There is evidence that gig work has been growing in India, and more so with the onset of the pandemic, but there isn't a definitive estimate of its prevalence. Location-based gig work, which requires less specialized skill, technology ownership and internet access than cloud-based gig work also attracts more service providers because it has relatively lower barriers to entry. But these low barriers to entry can lead to an over-supply of labour in the sub-sector, driving down wages and working conditions. In addition, gig work is changing the employment relationship, going from a bilateral relationship between the service provider and a consumer to one mediated by a platform intermediary. This changing employment relationship calls for new modes of collectivization.

The growth of the platform economy has facilitated new opportunities for digital entrepreneurship. But what constitutes an entrepreneur is not well-defined in labour force surveys. Therefore, entrepreneurship can be found in different categories of labour status. Digital entrepreneurship, on or off platforms, is even more amorphous. Some digital entrepreneurs are self-employed, own-account workers. They are, therefore, considered to be informally employed. Others are not self-

employed, run enterprises, and are considered to be in regular wage work. If they have benefits, they are formally employed. But if they do not have benefits, they are considered to be in a smaller group of formal sector workers who are informally employed. These nuances in understanding different forms of digital entrepreneurship and where it fits in terms of labour status are important for formulating appropriate policies and effective targeting.

In the Business Process Outsourcing (BPO)/Business Process Management (BPM) sector, the industry's shift away from commodity services to high-end business services has brought on significant changes. Due to recent developments in artificial intelligence (AI), machine learning (ML), and robotics, larger modules of work can be automated, predicted, and managed, with only the least predictable and last-resort outcomes being diverted to customer service executives. This sector of employment has, therefore, reduced its workforce at the customer service level relative to what it was in the first decade of the century.

But the shift to BPM has also enabled higher-skilled jobs across engineering services, legal services, research and analysis, and medical business services amongst others, bringing worker profiles closer to those in Information Technology and related management services. This stark divergence in worker profiles – where on the one hand, work is being simplified to the degree that it can be performed by machines and on the other hand, BPM's move towards specialisation – is giving rise to unique challenges in the sub-sector. Most notably, as the bulk of the employment at the lower levels moves towards the workforce in AI- and ML-led data operations, this cadre of employees is also being 'uber-ized' or increasingly sourced via the gig economy. Since work on this level is repetitive and easily managed, it is being broken into tasks that can be performed by workers who do not need to be present on an office premise. This adds a new level of precarity in the lives of those employed at the lower levels because they are simultaneously at the risk of job loss due to automation, too.

Similar to what is happening with digital entrepreneurship, the complexity of this dynamic sub-sector, then, defies clear worker categorisation making it difficult for policymakers to understand and regulate BPOs/BPMs in a way that bolsters the sub-sector while improving outcomes for workers.

Based on these findings, this report makes the following recommendations:

1. What technology has to offer requires thoughtful deployment based on extensive field research to ensure that the requisite conditions for successful adoption and deployment of technology exist. Such interventions must be carefully piloted to see how they will play out, and their impact on labour markets should be carefully assessed.
2. Ensuring that digitalisation does not exacerbate inequities depends on the extent to which the government can close the digital divide. This entails:
    (i) Enabling equitable access to technology and skills for women.
    (ii) While digital literacy is important, good quality basic education is also a requisite for enabling participation in a technology-driven economy. Digital literacy and other forms of vocational training should be fully integrated with the education system to ensure that youth are prepared.
    (iii) Bridging the digital divide also means that schools with fewer financial resources, for example in rural areas, will need support to acquire the right infrastructure to support technological interventions.
3. The government can play a role in deliberately incentivizing 'work systems design' that favours augmentation over labour-displacing automation.
4. Aggregate numbers do not provide an accurate picture of the range of occupations in the service sector. While some are high-skilled, many are not. A nuanced understanding of the diversity of these service sector jobs is imperative to crafting policies and regulations that actually lift up those in less-skilled jobs in the sector. Gig work and digital entrepreneurship must be understood in this context.

5. Social safety nets and effective skills training systems, especially an effective apprenticeship system, are essential to support workers in the face of technological change and labour market restructuring.
6. Small businesses need support to help them adopt technology. The government should explore whether other large companies could be incentivized to induct and support suppliers and sub-contractors in their own value chains in adopting and using technology. This could also be made a permissible and encouraged activity under the existing Corporate Social Responsibility law.
7. A new social compact between the government, companies and workers should be developed so that platform data can help with evidence-based policymaking.

The findings of this report were supplemented with feedback from a series of scenario planning workshops where policy-makers, researchers, union representatives, civil society, and representatives from the private sector were presented with two potential scenarios for the future of work in India to deliberate the different ways in which the future of work might unfold by 2030 (see Section 8, Annex 2 and 3). The recommendations from this report, along with insights from the scenario planning workshops, informed the Roadmap for Action 2030, which highlights critical policy recommendations toward charting a pragmatic path to managing digitalisation and work in India.

1 Introduction

With a population of 1.4 billion, India is well on its way to becoming the world's most populous country (United Nations, 2019). Its youth population alone, aged 15 to 29, is larger than the total population of the United States or of any other industrialized country (UNFPA, 2014). It is understandable then that the government is increasingly looking to technology to enhance the efficiency, impact, and scale of its interventions, at the same time that the private sector sees market opportunity for developing various technology-based solutions. The two together are propelling digitalisation in India and changing the face of the economy. These evolving transformations have a deep impact on the Indian labour market.

This report provides an overview of how digital trends are unfolding and their impact on India's world of work. It highlights the opportunities, but especially the challenges of these developments so as to shed light on where policy intervention is needed to harness the potential of technology to improve labour market outcomes. How digitalisation and its impact across India's heterogenous world of work are understood and managed today will have a bearing on how they play out by 2030.

Discourse on the impact of technology on labour markets often centres on some broad questions. For instance, 'will technological progress reduce labour demand, enhancing polarisation and exclusion, or will the crowding-out effects be compensated for efficiency gains? What are the net effects of these developments?' Even if data to answer these questions were available, which they are not, in the context of a heterogeneous country like India, examining the effects of digitalisation in such sweeping terms will neither yield meaningful insights nor specific policy recommendations.

At this juncture, technology is being considered, applied, and adopted in uneven ways across sectors and sub-sectors of the Indian economy with varying impacts on different segments of workers. This research does not try to discern the net effects of digitalisation on the Indian economy. Rather, it aims to provide an overview of how digitalisation is being applied, or its potential applications, in different sectors of the Indian economy, namely, agriculture, manufacturing as a subset of industry, and services. The study then delves deeper into three emerging phenomena in India's service sector – namely, the platform economy, digital entrepreneurship, and Business Process Outsourcing, to shed light on how these three phenomena are shaping, and are being shaped, by India's labour markets.

In the absence of specific data on the size of these phenomena, the study provides broad estimates from the literature, but then hones in on how gig work, digital entrepreneurship, and BPO work interact with informality and formality, and the quality of this work. In the absence of specific data on how digitalisation is affecting productivity with knock-on implications for wages and economic mobility, the latter indicators serve as proxies, however imperfect. This report draws on extensive secondary research, but also primary interviews with a range of workers, government officials, businesses, and other experts.

Digitalisation relies heavily on platforms and while much of the emerging ecosystem of digital work takes place through platforms, there are forms of digital entrepreneurship and BPO work that are not mediated through platforms. Nonetheless, digital entrepreneurship for the purpose of this study is restricted to four types of internet-based entrepreneurship that rely on the use of platforms. Similarly, while not all BPO is mediated through platforms, the new avatar of the BPO sector is becoming 'uber-ized' or increasingly sourced via the gig economy. This study examines the evolving BPO sector trends both on and off platforms.

Following the introduction, section two lays out the labour market trends in India and delineates definitions of different labour market indicators. This section lays the necessary foundation for understanding how digitalisation is changing work arrangements and shifting labour status. Section three discusses technology adoption, specifically the existing digital divide which has a bearing on how digitalisation will play out. Section four provides a broad overview of how digitalisation, specifically ag-tech, is unfolding in Indian agriculture; how automation is upending employment in manufacturing; and the growth and diversity of service-sector employment. Sections five, six, and seven examine emerging forms of work on labour platforms, in digital entrepreneurship, and BPO respectively, and evaluate these forms of work on dimensions of quality. Finally, section eight takes stock of relevant policy and regulatory frameworks and concludes with recommendations on managing digitalisation to harness its benefits and minimize costs toward a brighter future of work for India by 2030.

The findings of this report were supplemented with feedback from a series of scenario planning workshops where policymakers, researchers, union representatives, civil society, and representatives from the private sector were presented with two potential scenarios for the future of work in India. They were asked to deliberate over the different ways in which the future of work might unfold for India by 2030.

The first scenario was based on the status quo, where current trends continued on their trajectory without additional policy and regulatory interventions. In this scenario, the current inequities continued to grow as policy and regulation failed to manage technological disruption. In the second scenario, policy and regulatory action helped technology deliver on its promise of large-scale development, a resilient and equitable economy, and prosperous workers. With these two scenarios in hand, in a final scenario planning workshop, participants deliberated over what is pragmatic and desirable leading to a final Roadmap for Action 2030. The recommendations from this report, along with insights from the scenario planning workshops, informed the Roadmap for Action 2030, which highlights critical policy recommendations toward charting a pragmatic path to managing digitalisation and work in India (see Section 8 and Annex 4).

2 Labour Market and Demographic Trends

2.1 Labour Force Participation

A confluence of factors contributed to India's flagging growth (World Bank, 2021) and an increasingly ailing labour market in recent years. At 46 per cent in 2021, down from 54% in 2010, fewer than one out of every two persons of working age (15+ years of age) were participating in the labour market (ILOStat, 2021). Female and male labour force participation rates (LFPR)[1] have declined over the last decade with the female labour force participation rate (FLPR) significantly lower than the male rate (ILOStat, 2021). Just over one in five Indian women of working age are either employed or are looking for work.

1 The labour force participation rate is a measure of the proportion of a country's working-age population (aged 15+) that engages actively in the labour market, either by working or looking for work. The male labour force participation rate is a measure of the proportion of a country's male working-age population (aged 15+) that engages actively in the labour market, either by working or looking for work. The female labour force participation rate is a measure of the proportion of a country's female working-age population (aged 15+) that engages actively in the labour market, either by working or looking for work.

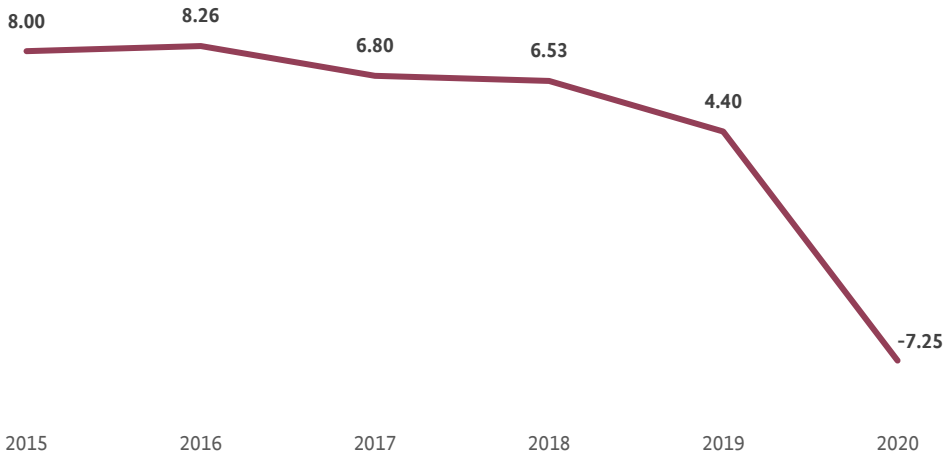

Figure 1: India's Gross Domestic Product Growth between 2015-2020 (Annual %)[2]
Source: International Labour Organization (ILO) modelled estimates, 2021; 2022 Projection

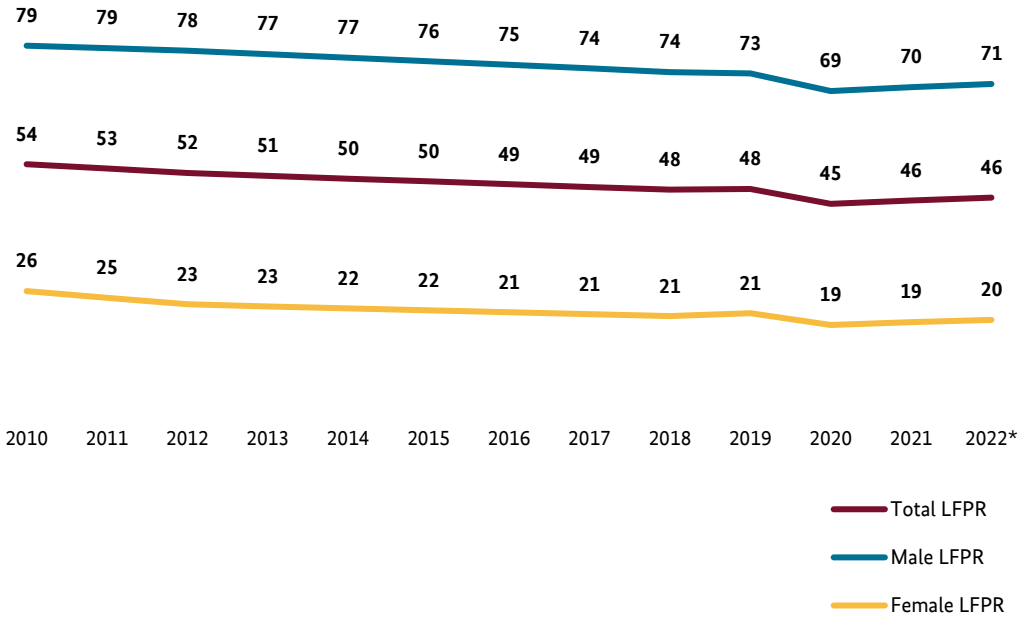

Figure 2: India's Labour Force Participation Rate between 2010-2022 (Annual %)
Source: ILO modelled estimates, 2021; 2022 Projection

2.2 *Informality*

Defining informality, and a nuanced understanding of India's large and heterogeneous informal sector, are central to understanding the structure of its economy and its labour market. Informality is comprised of both informal employment and informal (unregistered) enterprises. Both, informal employment and unregistered enterprises, are characterized by low levels of productivity (ILO, 2021; ILO 2022; Uni, 2018; Dewan & Peek, 2007), though in the aggregate, the contribution of the informal sector to Gross Domestic Product (GDP) is significant. As per the government's statistics, India's informal sector accounted for approximately 52% of its GDP in 2017-18 (PLFS, 2017-18; Nagaraj & Kapoor, 2021; SBI, 2021).

The 17th International Conference of Labour Statisticians (ICLS, 2003) defined informal employment as those (i) employees in jobs where their employment relationship is, in law or in practice, beyond the purview of labour legislation, income

2 Annual percentage growth rate of GDP at market prices based on constant local currency.

taxation, social protection or entitlement to certain employment benefits, such as advance notice of dismissal, severances of pay, paid annual or sick leave; and, (ii) self-employed – own-account workers,[3] employers and unpaid family helpers. The share of non-agricultural informal employment stood at 69.5% in 2019-20 (PLFS, 2019-20); if one includes those employed in agriculture then the share of informal employment in total employment increases to over 90%.

Category of Workers (Rural+Urban)	2017-18	2018-19	2019-20
Female	71.0%	71.5%	72.9%
Male	54.7%	54.1%	56.5%
Total	68.2%	68.4%	69.5%

Table 1: Non-agricultural informal employment (% of total employment, 15+)

Source: PLFS, 2019-20

Self-employment, consisting of the sub-categories of own-account workers and unpaid family workers, constitutes 53.5% of employment in India. Regular wage workers, also a proxy for formal employment, constitute 22.9% and casual labour is 23.6% (PLFS, 2019-20). Based on the above definition of informal employment, all those in self-employment are also in informal employment.

Additionally, informal employment can also exist in the formal sector where workers are beyond the purview of labour regulations because they do not have a written contract, and/or they lack other benefits. In 2019-20, 67% of regular wage workers did not have a written contract, 53% were not considered eligible for paid leave, and 54% were ineligible for any social security benefit.

Category of regular wage / salaried employees	% of regular wage / salaried employees who had no written job			% of regular wage / salaried employees not eligible for paid leave			% of regular wage / salaried employees not eligible for any social security benefit		
Year	2017-18	2018-19	2019-20	2017-18	2018-19	2019-20	2017-18	2018-19	2019-20
Male	72.3	70.3	68.1	55.2	54.7	53.1	49	51.2	53.6
Female	66.8	66.5	65	50.4	50.6	49.8	51.8	54.4	56
Persons	71.1	69.5	67.3	54.2	53.8	52.3	49.6	51.9	54.2

Table 2: Overview of informal employment in India, 2017-20

Source: PLFS, 2019-20

Beyond informal employment, the informal sector also comprises unregistered enterprises, that is, unincorporated enterprises owned by households. Fixed and other assets in such enterprises do not belong to the production units but rather to their owners. They do not have a legal entity other than that of the household (ILO, 1993). Registration of an enterprise or incorporation may refer to registration (or lack thereof) under factories or commercial acts, tax or social security laws, professional groups' regulatory acts, or similar acts, laws, or regulations established by national legislative bodies (ILO, 1993). Over 99% of Indian enterprises have fewer than 20 employees and just under 70% are unregistered (MMSME, 2022).

3 Own-account workers are those workers who, working on their own account or with one or more partners, hold the type of job defined as a self- employed job, and have not engaged on a continuous basis any employees to work for them during the reference period.

2.3 Unemployment

Unemployment is typically low in India because a large share of the working age population cannot afford to be unemployed (Dewan, 2018), substantiated by the high levels of informal employment. The fact that unemployment is a poor indicator of labour market health in the developing world with large informal sectors is a well-acknowledged fact (Dewan & Peek, 2007; ILO, 2021; ILO, 2022). But India's problem is as much about the quality of jobs as the quantity. Low-productivity and low wages and this understanding is a staple of academic and policy discourse on employment in the Indian context (Mehrotra, 2018). That said, as in many parts of the world, India too saw an uptick in unemployment after 2019 (ILOStat, 2021) as a result of the COVID-19 induced economic shocks, with a disproportionate adverse impact on youth employment (ILO, 2022).

2.4 Demographics

With a population of approximately 1.4 billion, India is not only the second-most populous country in the world, but it is still amidst a demographic boom. There are 335 million youth between the ages of 15 to 29 (GoI, 2019). The World Bank estimates that eight million individuals join the labour force each year (World Bank, 2018). While such a large and growing youth population drives down dependency ratios, it also exerts pressure on the economy to create enough jobs to absorb the new entrants into the labour market. Labour market pressure will only mount as individuals between the ages of 20-59 years old are expected to increase their share of the population from 50.5% in 2011 to about 60% in 2041 (GoI, 2019). Simultaneously, India is expected to experience declining fertility and rising life expectancy leading to over a twofold increase in the number of old persons in the country over the same period. Their share in the total population is expected to rise from 8.4% to 15%. This underscores the need for a strong economy that generates enough jobs, but can also care for its old (GoI, 2019).

2.5 The Pandemic is Exacerbating Labour Market Pain

The COVID-19 pandemic and associated containment measures are exacerbating India's labour market challenges (ILO, 2022; Economic Survey, 2021-2022). Larger businesses that also tend to be formal businesses, had both the financial reserves to withstand the shocks longer and greater access to government assistance than unregistered, smaller businesses. The pandemic destroyed many such businesses (ILO, 2021; ILO, 2022).

As noted earlier, 99% of India's enterprises have fewer than 20 employees and just under 70% are unregistered (MMSME, 2022). Estimates suggest that up to 59% of the start-ups and micro, small and medium enterprises (MSMEs) in India scaled down, shut down or sold themselves (LocalCircles, 2021) as a result of the pandemic, fuelling a loss of jobs and income. MSMEs account for 30% of GDP and 85% of employment. It therefore follows that as small businesses collapsed, this had major repercussions for employment and income (ILO 2022; Economic Survey, 2021-2022). The decline in labour force participation during the pandemic years also suggests that some were discouraged and dropped out of the labour force (Annex 1, Figures 11-18; ILO, 2022). Evidence also suggests that some settled for work that is informal, or less well paid, or below their level of qualification (Bhatt et al., 2021).

Piling on to a weak foundation of lack of productive jobs and low wages that characterize India's large informal sector, the onset of the pandemic is manifesting in a decline in private consumption that is responsible for nearly 55% of GDP but is still 3.5% below pre-pandemic levels (GoI, 2021). This, in-turn, adversely affects production and investment creating a vicious cycle.

These economic, labour market, and demographic trends, and the ensuing challenges exacerbated by the pandemic, provide the context in which digitalisation is unfolding in India. With a well-documented scarcity of jobs; the prevalence of informal employment; a large and growing youth population; a high number of small, informal businesses many of which had trouble weathering the COVID-19 crisis; policymakers are confronting tremendous pressure to create more jobs, improve productivity, and access to social protection, especially for vulnerable workers.

3 Technology Adoption

Against this labour market and demographic backdrop, technology seemingly raises the possibility of improving productivity and efficiency; creating employment; improving access and delivery of services including welfare. Yet for all the benefits that technology potentially offers, its effective adoption, application, and subsequent outcomes are contingent on several factors. The World Bank (2016):

> *"Digital technologies have spread rapidly in much of the world. Digital dividends—that is, the broader development benefits from using these technologies—have lagged behind. In many instances, digital technologies have boosted growth, expanded opportunities, and improved service delivery. Yet their aggregate impact has fallen short and is unevenly distributed. For digital technologies to benefit everyone everywhere requires closing the remaining digital divide, especially in internet access. But greater digital adoption will not be enough."*

3.1 The Digital Divide

The digital divide – whether related to inequities in access to technology or education and skills – is a significant barrier to harnessing the benefits of digitalisation. This divide exists along various social and economic dimensions such as gender, caste, minority status, disability, and others. This section focusses on gender. Data disaggregated by caste, religion, and disability status amongst others is still sparse.

3.1.1 Ownership, access, and use

In 2020, 99% of India's population was covered by a mobile cellular network (ITU, 2021). But less than one in four, 24%, of households had internet access at home (ITU, 2021). 53 out of every 100 inhabitants had an active mobile-broadband subscription in 2020 (ITU, 2021). Only 41% of individuals used the internet in 2019 (ITU, 2021). Only 15% of the female population used the internet in 2018, while 25% of the male population did so (ITU, 2021). Between 2019 to 2020, female smartphone ownership rose significantly by 11 percentage points from 14% to 25% (GSMA, 2021). It is still low, and is lower than male smartphone ownership, which went from 37% in 2019 to 41% in 2020 (GSMA, 2021). The low female rates also reflect social norms that restrict access to information for women (GSMA, 2021).

3.1.2 Requisite education and skill

Beyond the digital divide in ownership, access and use, there is also a divide in who has the requisite education and skills to use technology. First, a substantial body of literature, including the National Education Policy (NEP) 2020, points to the poor quality of education (NEP, 2020; ASER, 2021). Given the skill-biased nature of technology (IJN, 2016; Violante, 2008), low levels of requisite education limit a large proportion of people from participating in a digitally driven economy (Dewan & Khan, 2019). While India has made tremendous gains in achieving gender parity in education, female participation in training remains low (PLFS 2019-20; Dewan & Sarkar, 2017).

3.1.3 Requisite infrastructure

In addition to access to technology itself and the education and skills to use it, there is a need for accompanying infrastructure to enable effective use of technology in education. As the Kasturirangan Committee notes in the Draft National Education Policy (NEP, 2019):

> *"The use of technology in education is likely to require considerable investment in basic infrastructure such as electricity, hardware and connectivity. The bulk of schools and colleges in remote and rural areas do not have access to the basics (electricity, hardware and reliable connectivity) and, government must ensure that this situation is remedied at the earliest, if not at the level of each individual school then certainly at the level of school complexes.*
>
> *With regards to end-user hardware, it is important to draw a distinction between institutional devices such as desktop computers, classroom projectors, WiFi routers, etc. and personal devices (such as smartphones and laptops) [...] A key area of concern is the non-availability of local expertise to help use and maintain all the relevant hardware and software at these locations. Funding for hiring trained IT staff, at school complexes for instance, must be provided as needed."*

The committee's suggestions are also reflected in the National Education Policy 2020 (NEP, 2020).

These trends in technology adoption then offer both caution about how many more foundational investments are required to enable the effective use of technology by individuals and in educational institutions, but also provide optimism about the prospect for growth in technology penetration and adoption.

With this as the context, Section Four takes a bird's eye view of digitalisation in agriculture, manufacturing, and services to tease out how technology intersects with the existing labour market context in these sectors.

4 The Nexus of Technology and Work – A Sectoral Overview

Borrowing the pathways identified in Charting Pathways for Inclusive Growth (Dercon & Ndulu, 2018), this report examines India's digital-led growth in agriculture, services, and manufacturing, and its nexus with productivity and employment. In doing so, it explores how these trends play out in the dual economy[4] that characterizes most developing economies, certainly India.

4.1 Agriculture

In 2018, agriculture constituted 44.1% employment (PLFS, 2017-18) and contributed 16% to GDP (World Bank, 2020). Agriculture remains the most labour intensive, albeit least productive, sector in the country. A large proportion of agriculture remains informal, and the sharing of low productivity work is common (Mehrotra, 2019). Rising farmer debts, poverty, and a low quality of life make farming less attractive relative to manufacturing, services, and other non-farm livelihoods (Singh et al., 2019).

4 One side of the dual economy is considered modern, organised, and formal while the other side is considered traditional, unorganised, and informal (ILO, 2021). For the purposes of this report, dualism as an analytical concept helps us understand the nature of employment and effects of digitalisation in these interconnected parts of the Indian economy.

	2004-05	2011-12	2017-18
Agriculture	268.7	231.9	205.3
Manufacturing	53.9	59.8	56.4
Non-manufacturing (industry)	29.4	55.3	58.9
Services	107.3	127.3	144.4

Table 3: Sectoral employment trends in India (2005-2018); in absolute numbers (million)
Source: Mehrota & Parida, 2019

Against this backdrop, some believe that technology[5] offers the prospect of raising agricultural productivity and potentially wages; assuming rising productivity is accompanied by wage increases. This could facilitate a structural transformation, provided other sectors have the capacity to absorb workers that transition out of agriculture and to deploy them productively. There are a range of technologies and related uses in agriculture – from biotechnology, different kinds of mechanization, and associated automation of processes, to the application of 'Industry 4.0' technologies such as IT, AI, and ML to farming. The literature suggests that mechanization in agriculture is labour displacing, but this depends on the technology itself. This report takes a broad look at Industry 4.0 technologies – 'ag-tech' and their nexus with productivity and employment. The ag-tech sector in India is broadly categorized into four:

(i) Big data leverages farm data to determine opportunities and key areas;
(ii) Market linkage models that help farmers keep abreast with market prices;
(iii) Farming as a service, which typically refers to technology-enabled on-demand renting of equipment such as tractors, and technological solutions such as digital payments;
(iv) Internet of Things (IoT)-enabled technology for remote monitoring and tracking.

Current estimates state that India received USD 1 billion or INR 79 billion in ag-tech funding, making the country third in the world in terms of ag-tech investments and start-ups (IBEF, 2021a). With such high investor interest, it is expected that Indian ag-tech companies will witness investments worth USD 30-35 billion or INR 2400-2793 billion by 2025 (IBEF, 2021a). The Finance Minister's 2021-22 budget speech (Sitharaman, 2022) specifically highlighted:

> *"For delivery of digital and hi-tech services to farmers with involvement of public sector research and extension institutions along with private ag-tech players and stakeholders of ag-value chain, a scheme in PPP (Public Private Partnership) mode will be launched. Use of 'Kisan Drones' will be promoted for crop assessment, digitalisation of land records, spraying of insecticides and nutrients."*

In deploying these technologies, the Government of India (GoI) seems to be motivated by a quest for efficiency and scale, while the private sector is looking to leverage market opportunities.

How this story will play out in terms of employment is unclear. Both the literature as well as expert interviews for this report suggest that the impact of these technologies on productivity, jobs, wages, and incomes is inconclusive. The assumption that the application of these technologies is productivity-enhancing is questionable because of certain pre-existing conditions that obstruct their efficacy.

Take, for example, the electronic National Agricultural Market, or eNAM (enam.gov.in) – an online trading platform for agricultural commodities launched by Prime Minister Narendra Modi in 2016 with the ambition to use technology to forge

5 This report does not analyse fintech – whether public or private. An analysis of India's 'Direct Benefit Transfer' system used for the disbursement of funds under Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), or other such schemes, for example, is beyond the purview of this report. Over 90% of India's population is already linked to the Unique Identification Authority of India through the Aadhaar card – the world's largest biometric unique identity system. Various payments and schemes are increasingly linked to Aadhaar, which poses its own set of opportunities and challenges (and until 2018 was under litigation for its constitutionality). The obstacles confronted by the Aadhaar linked cash transfer under the 'Jan Dhan Yojana' scheme after the onset of the pandemic, for instance, explicates some of the opportunities and challenges confronting the applications of such fintech in the country.

a 'One Nation, One Market' in the agricultural sector. eNAM is intended to network the existing Agricultural Produce Marketing Committee (APMC) physical markets to create a unified national market for agricultural commodities. However, physical agricultural markets are highly specific to the State in which they are located. Simply linking them up to create a unified national market has not worked. Currently, eNAM handles less than 1% of commodity trading volumes and accounts for less than 0.1% of the total trading value in the APMC channel (Gupta & Li, 2021). "eNAM was adopted as a 'plug and play' approach and the result is a marketing scheme with very little buy-in." (Krishnamurthy & Chatterjee, 2020).

IT-based applications that, for instance, provide farmers with information on expected rainfall or the optimal seeds given a particular soil type may hold promise. However, the farmer must then have the ability to adjust irrigation for farming; obtain the appropriate seeds, which may or may not be part of the government subsidy program; and then still navigate the complex processes ranging from selling produce through middlemen to bringing the produce to the 'mandi', or marketplace, and then hope to fetch a reasonable price for the produce contingent on a public auction system. In this way, technology itself cannot solve the problem alone.

Moreover, low incomes, low education levels, and a lack of spare capital to invest in technology characterise the majority of farmers, with deep inequities between men and women. And farmers are still better off than the labourers that work on the farms. More than 70% of Indian farmers farm on one hectare of land, while the national average land holding is less than two hectares, constraining the potential benefits of ag-tech adoption and deployment (PwC & FICCI, 2020). First, small landholdings are not conducive to reaping the benefits of economies of scale, thus limiting the efficacy of ag-tech interventions. Second, landholding becomes even more complex when we factor in caste – historically marginalised Dalit households have lower access to land compared to other households; when Dalit households do own land, the size of the holdings is much smaller compared to the size of holdings of other groups (Kodiveri, 2006). With technology diffusion constrained, then, by economic and social factors, the potential of ag-tech must be seen in a way that is cognizant of these realities.

4.2 Manufacturing

Technology enabled the restructuring of trade into supply chains with distributed production across the globe (Gereffi, 1994). Manufacturing has since been associated with large development gains in Asia. Though India's industrialization has stagnated with manufacturing's shares in domestic output and employment showing no measurable increase in nearly three decades (Nagaraj, 2021). Between 2011-12 and 2017-18, without accounting for economic stagnation brought on by the pandemic, the manufacturing sector experienced a decline of 3.5 million jobs (NSS, 2011-12; PLFS, 2017-18).

Figure 3: Manufacturing Value-Added between 1991-2020 (% of GDP)

Source: World Bank, 2021

With this context of India's relative lacklustre performance in manufacturing, technology offers both the prospect of improving productivity, efficiency, and supply chain linkages, but at the same time, automation threatens to derail the labour-intensive growth that so many of India's Asian neighbours – from Bangladesh to Vietnam – have relied upon (JJN, 2015).

In 2014, Prime Minister Narendra Modi launched the Make in India campaign that prioritised manufacturing-led growth. The campaign set a target of expanding the manufacturing sector to comprise 25% of GDP and to add 100 million new jobs (Modi, 2014). These aspirations unrealized, the GoI hinged renewed hope on technology as a way to expand manufacturing. GoI launched the SAMARTH Udyog Initiative in 2019 to facilitate an ecosystem for Industry 4.0 technologies in Indian manufacturing enterprises of any scale – multinational corporations (MNCs), large, medium, or small. The initiative aimed to "take the automation of manufacturing processes to a new level by linking the cyber and the physical – incorporating AI and enabling customized and flexible mass production technologies" (Ministry of Heavy Industries and Public Enterprises, 2021).

Across manufacturing subsectors – automobile manufacturing, drugs and pharmaceuticals, textiles, electronics, food processing industries, and cement and gypsum products, technology such as 3D printing, computer-aided data analytics, artificial design stimulation, and technology-enabled management are reshaping production and employment (IBEF, 2021b). In 2020, India was among the top fifteen countries with the most annual installations of robots (IFR, 2021). Companies including Schneider, Siemens, ABB, and Rockwell successfully transferred updated manufacturing technologies to India that are now being adopted by Indian MNCs as well. In addition to that, both Samsung and Amazon committed to building two new digital manufacturing plants in the country (Samsung, 2018; Jaiswal, 2021).

But the growing adoption of technology in manufacturing also poses some challenges. While the link between incorporating new technologies and increased manufacturing productivity may be evident, less obvious is the claim now occasionally made in some Industry 4.0 discourse that jobs will also be protected (Godbole et al., 2021).

In digital manufacturing plants, such as the ones proposed by Samsung and Amazon, Industry 4.0 technologies and principles can streamline manufacturing processes, leading to greater efficiency and productivity. But, in the bargain, such changes can lead to labour substitution. 'Work systems design' that propagate automation can be incentivised to augment rather than replace workers along with social security and effective skills training to support workers in making labour market transitions.

Despite the GoI's push to automate manufacturing regardless of the scale of the enterprise, micro-enterprises with investments up to INR 10 million, or USD 125,000, and turnover up to INR 50 million, or USD 627,000, often do not have the capital or the technical knowledge to incorporate or use technology in their businesses (MMSME, 2021). Businesses of this size comprise the overwhelming majority. The digital divide affects not only individuals; it can also exacerbate inequalities between businesses. The chairman of Maini Group, an Indian manufacturing and design company, said in an interview that adopting Industry 4.0 is still a challenge because "one does not know at what size one must [automate]." A lack of information about the return on investment makes technology adoption difficult for MSMEs (Das, 2020).

Industry 4.0 is also changing the skill sets needed in the sector as manufacturing jobs become new-age, high-order, and skill-intensive (Chenoy et al., 2019). From automobile analytics engineers, 3D printing technicians, ML-based cyber security experts, to e-textiles specialists, technology diffusion in manufacturing means there is a need to build capacities of many different types of workers. Since routinized jobs are most likely to be automated, uneven skills development runs the risk of further entrenching labour market polarisation. In simpler terms, without better access to skills, the creation of new jobs by Industry 4.0 will only benefit those who already have the skills or the means to obtain them. There is also a

gendered aspect to job losses that must be factored in; many of the jobs likely to be automated first are often held by women (Tandon & Rathi, 2018).

4.3 Services

For over a decade, the services sector in India has been the fastest-growing sector with the highest gross value added at 48.9% in 2020, relative to industry and agriculture (World Bank, 2021). Unlike agriculture and manufacturing, which witnessed a decline, employment in services rose by 17 million jobs between 2011-12 and 2017-18 amounting to about 31% of total employment in 2017-18 (World Bank, 2019). In the aggregate, services value added per worker (constant 2015 USD) also increased steadily and significantly over this period (World Bank, 2021).

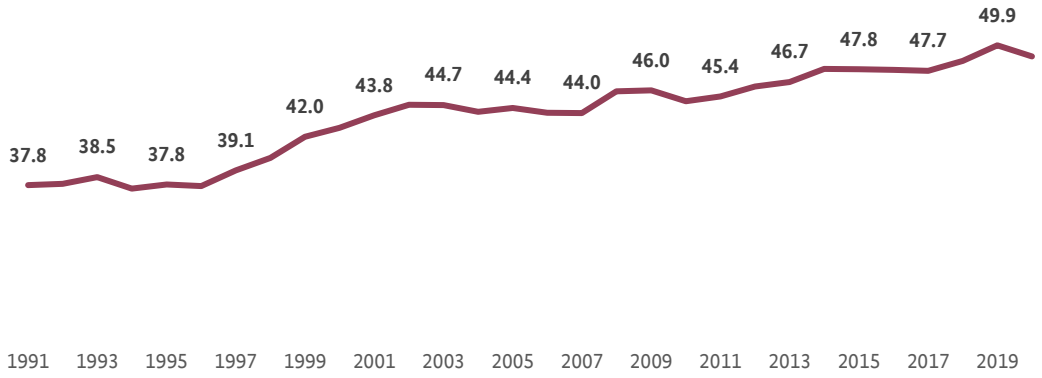

Figure 4: Services Value Added between 1991-2020 (% of GDP)

Source: World Bank, 2021

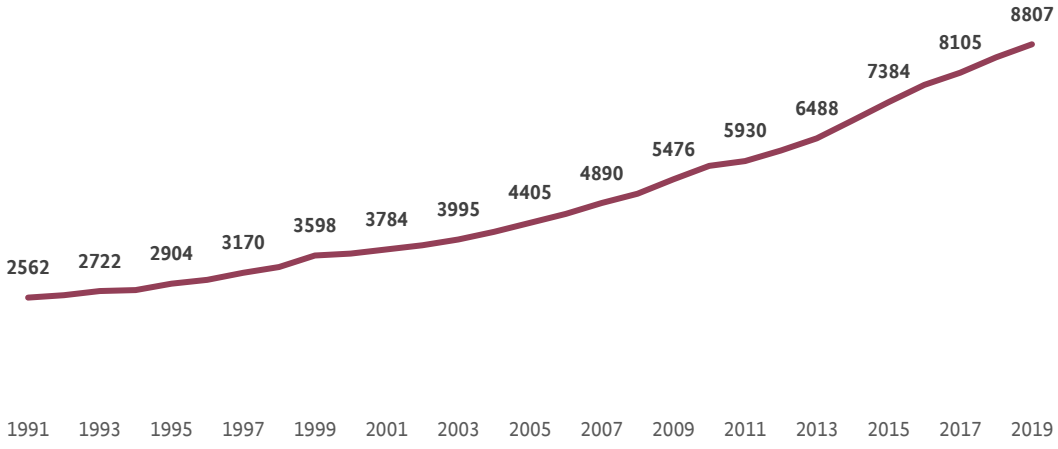

Figure 5: Services Value Added between 1991-2019 (per worker; constant 2015 USD)

Source: World Bank, 2021

For some, these aggregate data provide enough evidence of the merits of service-led growth and point to a structural transformation in the Indian economy. However, India's service sector is characterized by extensive heterogeneity with great diversity in economic activity (Pais, 2020). The sector's contribution to GDP is largely driven by certain sub-sectors such as software and financial services, that require higher levels of education and skill and tend to be formal, white-collar jobs. Workers in these sub-sectors tend to receive higher wage and non-wage benefits.

The technology services sector in India – defined as those that use business or technical expertise to further business or information processes for organisations (Gartner, n.d.) – includes enterprises performing functions including IT consulting and support, maintenance and repair, data recovery services, and provision of advice and assistance on management of computer resources (RBI, 2019).[6] Catapulted by the widespread adoption of the cloud, AI, and other emerging technologies, the technology services sector is expected to be worth USD 300-350 billion, or INR 23900- 28000 billion, by 2035 (NASSCOM, 2021). At a time when the service sector suffered an 8% decline in the annual growth of Gross Value Added (GVA, constant 2011-12 prices) because of the decline in sub-sectors such as hospitality and tourism, the above technology-based sub-sectors fared well (Economic Survey, 2020-2021). To further support them, the government introduced reforms including lifting of telecom-related regulations from the IT-BPO sector, introducing consumer protection regulations for e-commerce, and opening the space sector to private players. These sub-sectors are on the opposite end of the spectrum to others in the service sector such as personal services.

Sub-sectors such as personal services have a large contingent of workers that are self-employed and informal. These sub-sectors have lower barriers to entry than jobs at the top end of the value spectrum (BCG & MSDF, 2021). With lower barriers to entry, these sub-sectors see a surplus of labour, which exerts downward pressure on working conditions and wages (Dewan et al., 2022).

> *"For some observers, the dramatic increase in productivity of the services sector reflects rapid strides made by educated professionals employed in business process outsourcing, software, financial, and telecommunication services. But this dynamism is the visible dimension of India's services sector growth. What about individuals employed as domestic servants, maids, cooks, and drivers in the personal services sector?"* (Nayyar, 2012)

The latter are often invisible in data and therefore, arguably, in policy.

This discussion provides critical context for subsequent sections of this report that examine work on labour platforms, digital entrepreneurship, and BPO activities, to better understand how these forms of work are distributed across this spectrum of service sector work.

5 India's Platform Economy

> *"Platforms are to the network age what the factory was to the industrial revolution – the principal site of economic activity around which everything else is organized."* (IT for Change, 2018)

A platform company is a corporate enterprise whose business model uses the internet and a two-sided application programming interface (API) to source, schedule, manage, ship, and bill task-based, project-driven work (Gray & Suri, 2019). Digitalisation relies heavily on platforms. While much of the emerging ecosystem of digital work takes place through platforms, there are forms of digital entrepreneurship and BPO work that are not mediated through platforms. This section focusses on digital labour platforms.

6 This description borrows from the Reserve Bank of India's classification of IT services. Another definition comes from the Ministry of Commerce and Industry's Directorate General of Commercial Intelligence and Statistics in a report for United Nations Conference on Trade and Development (UNCTAD, 2015): "A definition of Information and Communications Technology or ICT-enabled services has been developed by UNCTAD and the following 10 categories of services have been classified as ICT-enabled services. ICT-enabled services are services delivered remotely over ICT networks. Potentially ICT-enabled services: (i) Telecommunications, (ii) Computer Services (including computer software), (iii) Sales and marketing services, not including trade and leasing services, (iv) Information services, (v) Insurance services, (vi) Financial services (vii) Management, administration and back-office services, (viii) Licensing services, (ix) Engineering, related technical services and R&D and (x) Education and training services."

In India, the last decade has seen a proliferation of various platforms serving as intermediaries between a seller and service provider delivering a range of goods and services to a growing market of consumers. Digital labour platforms are a subset of platforms that combine technology with human labour to provide various business offerings. These may broadly be classified into crowd work, cloud-based platforms or geographically tethered location-based platforms. Amazon Mechanical Turk (AMT) or Clickworker are examples of the former that facilitate computer-interfacing work like data entry or web design. In contrast, geographically tethered platforms such as Ola, Swiggy, or Urban Company are on-demand and are modelled along physical service delivery that require movement of goods or people (Surie, 2020).

Methodologically, this section builds on extensive prior secondary and primary research that the JustJobs Network (JJN) has conducted on platforms. The secondary research is supported by ten semi-structured in-depth interviews including three platforms and seven cloud-based and location-based workers. The interviews with cloud-based workers were with women respondents only while the location-based workers included two men and two women. The focus on women respondents was to ensure that gendered experiences of cloud-based workers are well understood. As detailed later, cloud-based workers experience unique challenges, but those challenges are especially severe for women workers. Selected quotes from the respondents are added to support the findings.

5.1 *Size of the Platform Economy*

8% of online web-based and location-based platforms are concentrated in India, second only to the United States' 29% share (ILO, 2021). Projections suggest that gig economy transactions could be worth over USD 250 billion, or INR 19,000 billion, by 2025 (BCG & MSDF, 2020).[7] As of 2020, an estimated three million workers were registered on the eleven major Indian platforms scored by Fairwork (2020); half in geographically tethered work (Fairwork, 2022).[8] However precise counts of how many workers are tied to labour platforms is difficult to assess due to a lack of data. Given the prevalence of hundreds of additional platforms in India, the number of workers engaged on platforms is likely to be much higher. That said, the workers engaging on platforms still constitute a relatively small share of the labour force, though their share is growing with renewed impetus from the pandemic (ILO 2021; ILO 2022).

Globally, Indian workers are the largest suppliers of online labour; between 2018 and 2020, India's share of total supply increased by 8%, bringing the total to about 24% (ILO, 2021). Other South Asian countries such as Bangladesh and Pakistan are also large suppliers at 15 and 12% respectively. This high share is attributed to India's large, highly educated English-speaking workforce, and to the high global demand for software and technology development. Creative and multimedia services, as detailed in the section on digital entrepreneurship, was another category where the share of the Indian labour supply increased (ILO, 2021). These factors coupled with a large and growing youth population and a dearth of jobs in the economy draw service providers to work on platforms.

The proliferation of platform companies has important implications for the nature of work. While traditional employment was characterized by a bilateral relationship between an employer and a worker, employment in the platform economy is characterized by a trilateral relationship between a service provider, a consumer, and a digital platform (Dewan et al., 2020). In India, the popularity of platform companies like Zomato, Swiggy, Uber, Ola, and Urban Company among others is largely a response to the growing demand for services by India's middle class (Parwez & Ranjan, 2021).

7 Based on a conservative estimate of monthly earnings of INR 16,500 (USD 206).
8 The platforms are: Ola, Uber, Swiggy, Zomato, Flipkart (EKart), Amazon (ATS), Housejoy, Urban Company, Bigbasket, Dunzo, Grofers.

5.2 Platform Business Models

Digital platforms work on a two-sided marketplace model in which they act as a matching intermediary between a service provider and a service consumer. As a result, the success of the platform depends heavily on a large number of service providers and consumers using the platform. This network effect is critical to the success of the platform as each additional participant on the platform increases the value of participation for all other platform participants. Similarly, each additional service provider that participates on the platform enhances the value of participation for each service consumer (Alstyne et al., 2016). Some key aspects of the platform business model are as follows.

5.2.1 Incentives to attract service providers and consumers

To seed the marketplace in its early years, the platform may provide incentives to attract one or both sides of the marketplace. For service providers, these incentives can be in the form of a sign-up bonus and performance-linked bonuses. For consumers, these incentives can be in the form of free trials, discounts, and cashbacks. As more service providers and consumers sign up, the platform is able to scale up its operations and focus on retention (Chenoy, 2018). Successful and frequent interactions allow the platform to reduce transaction costs, minimize market failures, and manage reputation (Choudary, 2018).

Asymmetries in information about how long a platform is instituting an incentive for a service provider can lead to adverse consequences. As companies such as Uber sought to capture market share in India, they announced significant incentives on the basis of which workers withdrew loans for vehicle purchases. Once the platform reached a certain level of market saturation, the company began reducing incentives. This made it difficult for many drivers to pay off their loans (IFAT, 2020).

5.2.2 Revenue

To generate revenue, platform companies rely on a few different streams; primarily, commission charged to the service provider and platform fees charged to service providers and consumers. They may also offer premium membership, preferred listing, advertising options, and delivery charges to diversify revenue generation.

5.2.3 Data

The digital nature of the platform business model also enables it to generate a wealth of data on its service providers and consumers. This is a competitive advantage of the platform business model. The platform is able to develop and populate market metrics that provide real-time information on market conditions. These metrics inform algorithmic decision-making to optimise outcomes for the platform business (Choudary, 2018).

There are, nonetheless, concerns regarding data collection at this scale. First, privacy: For example, Zomato's delivery partner agreement states that Zomato can, "store, process, access, and use delivery partner information for certain purposes" (Zomato, n.d.) as it may deem fit. The exclusive access to this data provides platforms with enormous power (ILO, 2021; Choudary, 2018). The vast troves of data collected by platforms are not available to individual users, leading to a power imbalance (Choudary, 2018).

A second issue concerns public access to this data. Just as data allows platforms to gain market advantage, it can be helpful to researchers, civil society, and government in understanding the market. But this data typically remains inaccessible to everyone except the private platform that is responsible for collecting it. This, then, widens the information asymmetries. For instance, the platform has data on both the service provider and the consumer, but the service provider does not have

information on the consumer or the platform. Modest exceptions here are the ride-hailing companies sharing opportunities for drivers to rate passengers or offering complete information about ride destinations.

The evolution of the platform economy and the restructuring of employment is happening at a rate faster than the ability of regulations and institutions to keep up. This means that when platforms can take advantage of a regulatory gap, they have a great deal of flexibility and autonomy in how they restructure employment (Randolph et al., 2019). Public availability of this data can enhance policymaking, accountability processes, market knowledge, and worker well-being (Bester et al., 2020).

5.2.4 Algorithms

Algorithms determine how much work or what kind of work or what price or incentive a service provider receives. Particularly with the help of technology, such as algorithmic management, firms can structure their business in a more transactional manner with limited personal interactions with the digital labourers (Wong, 2020). This can lead to what is called 'platform discipline' in the form of systems of ratings, rewards, and penalties.

The absence of 'guardrails' can serve to entrench existing inequities. Seemingly neutral algorithms can create an additional barrier, for example, against women. Studies have found that platform workers providing domestic services avoid reporting harassment because they fear negative ratings from clients (Athreya, 2021); a claim substantiated by beauty workers interviewed for this study.

5.3 Typology of Gig Platforms in India

The most popular gig platforms in India are food aggregators such as Zomato and Swiggy and transportation service providers such as Ola and Uber (Fairwork, 2021). Urban Company, a household services provider, and Dunzo, a delivery partner, are other popular gig platforms. All of these can collectively be categorized into labour platforms, a subset of digital platforms.

Figure 6 presents a typology of platforms along with examples of platform companies in India.

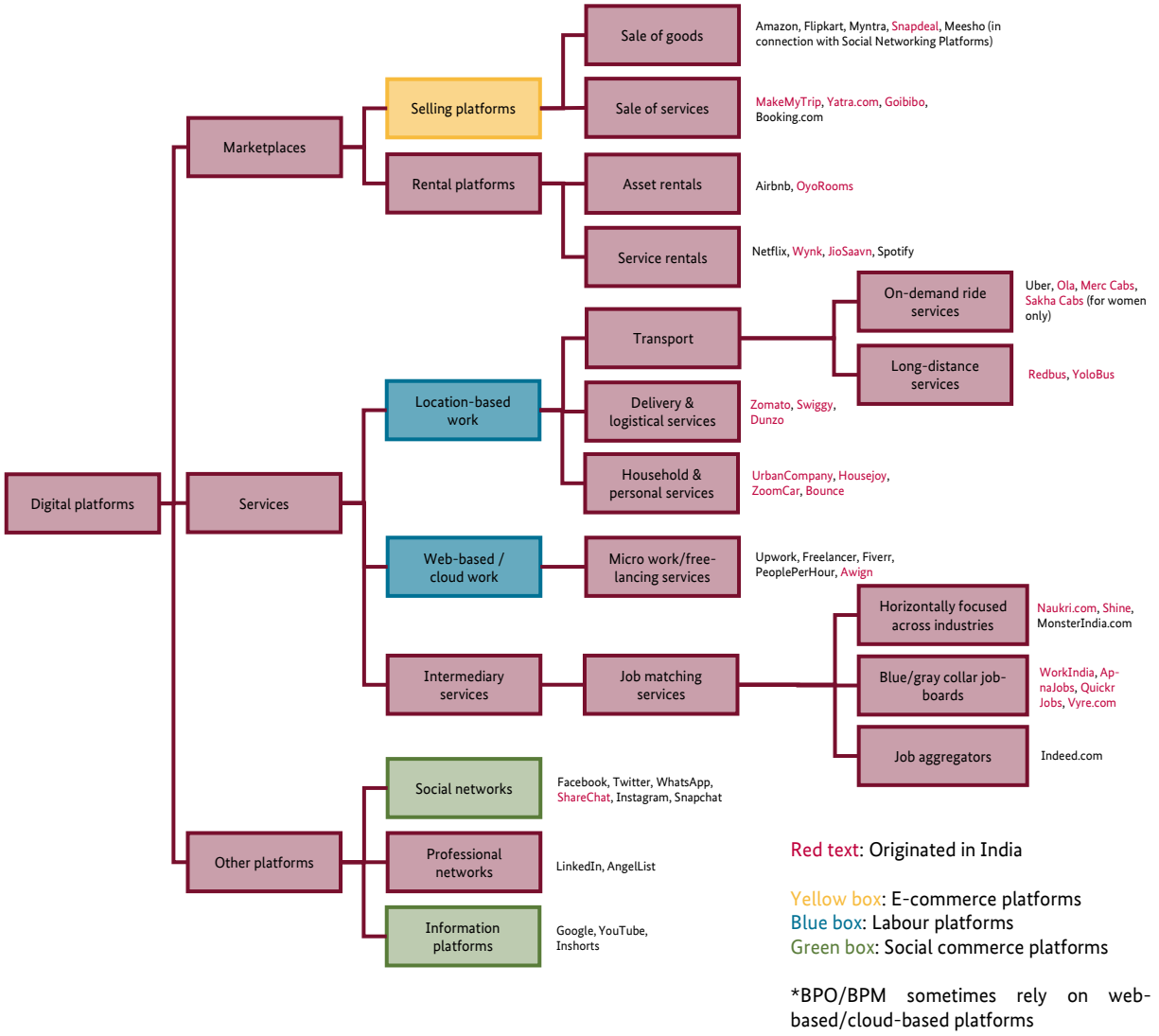

Figure 6: Typologies of platform companies in India

Source: Dewan & Seth, forthcoming 2022

As a subset of digital platforms, labour platforms can be understood as those where workers produce a large share of the value created. These labour platforms can be categorised into two distinct categories:

Location-based work platforms refer to platforms that primarily focus on geographically tethered labour services. These are required at a specific location at a specific time. This category consists of transport services, delivery services, and household and personal services. Transport services can be further sub-categorised into on-demand ride services (e-hailing) and inter-city, long distance ride services.

Cloud-based work platforms refer to platforms that provide labour services that are extended remotely via the internet from anywhere, with the transaction taking place online. This includes online freelance services and micro-work. Since many of the platforms that serve as a digital intermediary for micro-work also offer opportunities to engage in freelance work, the two are combined into one category.

In India, more than 80% of all gig work on labour platforms is location-based (Bester et al., 2020). Logistics and transportation services, such as Uber and Swiggy, and household and personal services platforms, such as Urban Company, dominate the labour platforms market in India (Bester et al., 2020).

BOX 1: COVID-19's impact on the platform economy

Location-based platform workers have frequently raised the matter of unfair work conditions, but during the pandemic, the nature and magnitude of their precarity became newly visible. When the first lockdown went into effect with very little notice or advance preparation, nearly all location-based platform workers experienced a loss of income. A survey by the Azim Premji University of 770 location-based gig workers in Delhi, Mumbai, Bengaluru, and Chennai found a severe income loss for workers in these jobs. While 90% of the respondents had reported an income in excess of INR 15,000 per month (USD 197) prior to the lockdown in March 2020, after the lockdown in August, this proportion dropped to 10% (Azim Premji University, 2021).

Some chose to return to their villages because the city became unaffordable; those who could not, stayed back to survive on what work they could find (Parwez & Ranjan, 2021). Food and transportation platforms took pains to market the safety of their processes; however, workers on these platforms often had to work in unsafe conditions, initially lacking personal protective equipment or guaranteed healthcare in case of infection (Behera, 2020). The second wave, in April 2021, was especially harrowing for gig workers as their shifts went up to 12-15 hours to respond to increasing online orders and they became subject to police harassment (TOI, 2021).

When it comes to cloud-based work, interviews corroborate the fact that these workers tend to have higher-levels of education and digital literacy that enables them to engage in this form of work. Women workers expressed an appreciation for being able to work from home and balance domestic responsibilities with income generation. Nonetheless, this form of work is insecure as demand is uncertain. The pandemic particularly cast a light on this aspect of gig work. Following the pandemic, cloud-based workers were able to continue working and were better off relative to location-based workers, but they did see a decline in their workloads as well. In an interview conducted by JJN researchers in 2021, a respondent said, "If I say work is less, I can give you in monetary terms. So, if it was INR 5000 per month (USD 67) earlier, it's one or two thousand rupees (USD 27) a month now. It's this kind of a fluctuation [after the pandemic] (Dewan, Personal Communication, 2021)."

5.4 *The Nature and Quality of Work on Labour Platforms*

Platform companies offer a different set of opportunities for income generation for workers and generally offer easier access to consumers. The kind of work, however, and the quality of employment generated in the platform economy differs across location- and cloud-based work, and within these sub-categories as well. Table 4 represents five dimensions of platform work – flexibility, autonomy, income, welfare, and representation that emerged as reoccurring issues from our interviews. The table culls key findings:

Dimensions of employment	Insights from Respondent Interviews
Flexibility	• Work on platforms is considered to be self-employment (whether contract based or not). It is therefore more flexible than regular wage/casual work. This offers flexibility. Workers find this attribute to be attractive. One cloud-based respondent noted: "This allows me to take care of my children and in-laws and still bring some money. I work in between my chores." • Nonetheless, gig work essentially breaks up jobs into smaller tasks. Workers therefore have to take on multiple gigs to generate enough income which undermines flexibility. A location-based beauty worker noted: "I used to work in a salon. I left that job because this gave me more flexibility, but the time I spent finding an auto and going from one gig to the next, I lose more time and feel tired." • Cloud-based platforms offer more flexibility as they are location agnostic. • Women, however, have to balance this work with domestic responsibilities, diminishing the perks of said flexibility.
Autonomy	• Workers have to adhere to standards and norms established by the platform despite being self-employed. • Workers are often unable to select/reject work freely as rejections beyond a certain threshold are penalised. • Worker ratings exert pressure to accept jobs to build online profiles. But unlike on location-based platforms, cloud-based workers face fewer negative effects of rejecting requests.

Income	• Gig workers, whether location-based or cloud-based, noted that they have to work multiple gigs to piece together the income that they would have had in a regular wage job. Location-based respondents noted that sometimes they end up working more. Conveyance costs and material costs also dip into their incomes. • Access to local minimum wages remains limited. Of the 11 platforms surveyed by Fairwork, only 3 platforms had rates equivalent to the local minimum wage. Additionally, none of the platforms paid wage plus costs (Fairwork, 2021). • Discrepancies in pay exist across countries and platforms. For instance, AMT workers in the United States reported median pay of USD 3.01, or INR 239, per hour and workers in India reported USD 1.41, or INR 112, per hour for the same category of work (Hara et al., 2019).
Benefits	• As self-employed workers, all such workers are considered to be in informal employment. Since platforms are not employers, they are not obligated to provide welfare benefits. Self-employed workers are responsible for their own benefits; in reality few spend for it. None of the respondents in the interviews had health insurance or other social insurance. • A study by the Indian Federation of App-based Transport workers documents ballooning debt among gig workers subsequent to the pandemic. Workers that got COVID-19, on average, spent between INR 40-60,000 (USD 535-803) for treatment in the absence of health insurance (IFAT, 2020).
Representation	• Trade unions are predicated on the traditional employer-employee relationship, but gig work has introduced a different kind of employment relationship. • Workers operate in disconnected settings and without an awareness of other service providers on platforms, making organising difficult. • However, social media channels like WhatsApp are creating opportunities for workers, that may otherwise be disaggregated, to connect. Location-based respondents, nonetheless, expressed fear that if it was discovered that they were part of such organized groups on WhatsApp, that they would be barred from the platform. One respondent spoke of a location-based platform company that mandated a disbanding of the WhatsApp group. • Akin to location-based workers, cloud-based workers also find it challenging to seek representation. • There are however worker forums that have emerged where workers can share information and push crowdwork platforms to adopt better practices (Adams-Prassl & Berg, 2017).

Table 4: Key dimensions of platform work

5.4.1 Freedom of Association and Collective Bargaining

On the one hand, growing self-employment induces a break from traditional forms of freedom of association and collective bargaining. In the absence of alternatives, this break-down can significantly weaken the position of workers (ILO, 2021). On the other hand, platforms provide an opportunity to aggregate workers, though the benefits of such aggregation are more in terms of the potential to deliver social protection, than association for collective bargaining.

The pointed impact of the COVID-19 pandemic on location-based gig workers has compelled increasing numbers of workers to organise and speak out against insecure working conditions. In July 2021, delivery partners[9] from Swiggy and Zomato took to Twitter to galvanize support for their cause and expose their respective platforms' exploitative practices.

Figure 7: Tweet posted by an anonymous gig worker

Source: SwiggyDE via Twitter, 2021

9 Platforms such as Swiggy and Zomato, the largest food-delivering apps in India, call workers making deliveries 'delivery partners' or 'delivery executives.'

To contest the increasing casualization of labour on a larger scale, the Centre of Indian Trade Unions (CITU) initiated the All India Gig Workers' Union (AIGWU) that helps organize gig workers across platforms, e.g. supporting protests by Urban Company workers. Their demands include, among others, improved working conditions, a transparent commission structure, and basic social security (AIGWU, 2021).

In December 2021, two months after the protests began, Urban Company filed a lawsuit in the local district court against its service providers for protesting the company's alleged unfair labour practices. The company sought a permanent injunction from the court restraining the women from holding any demonstration, dharna, rally, gherao, peace march, shouting slogans, entering, or assembling on or near the office premises (Ara, 2021). The fact that women, who already face barriers in accessing platform work, are subjected to hostile actions by platform companies necessitates a closer look at women's work in labour platforms.

5.4.2 Women's Work and Labour Platforms

Flexibility and opportunities for home-based work are attractive for women workers (Dewan & Jamme, 2021). Still, it is unclear if and when platformisation will raise female labour force participation (FLPR). In the interviews conducted for this study, as well as other fieldwork, most women working on labour platforms were either already working before or were in education. While the small sample sizes of this study do not provide evidence of trends, they do cast doubt on certain assumptions. First, the assumption that women engaging in home-based work or gig work were not in the labour market before is wrong. Second, that they were in informal work before, and therefore gig economy work is the same, or better, is also unsubstantiated. For instance, respondents noted moving from physical beauty salons to obtaining work through a platform. More broadly relating to gig work in general, research does not support the fact that the workers entering platform work were in informal employment before. Some were, some were not; there is no large-scale data; though small studies (Fanggidae et al., 2016) as in the case of this one, point to the fact that some workers actually moved from formal to gig economy work, which by virtue of being self-employment is essentially informal employment.

Moreover, certain opportunities for gig work are not equally accessible to women. While there is a lack of granular data on women on platforms, we know that societal restrictions on women's movement, a lack of provision for safety and privacy, inadequate redressal mechanisms offered by platforms, and unequal access to technology are some of the reasons why women participate in location-based platforms in small numbers (Kasliwal, 2020). Some platforms have made efforts to address this. The food delivery app Zomato announced in 2021 that they are increasing women's participation to 10%, up from 0.5% in selected cities such as Bengaluru, Mumbai, and Pune (Zomato, 2021). They are doing this by enhancing access to safety-related education and tools, incorporating an SOS button attached to a helpline on their platform, and extending support from the restaurant partners.

Women face fewer such barriers in cloud-based work. Those that self-select into this type of work are also more educated and skilled than those that opt for location-based work. Moreover, working from home enables women to circumvent societal restrictions on movement and allows them to manage other responsibilities alongside work. Though this raises an important question, particularly in a patriarchal society like India's, whether such opportunities for home-based work further entrench restrictive societal norms.

6 Digital Entrepreneurship

Advancing technology and its growing adoption are prompting a rise in digital entrepreneurship in India (Economic Survey, 2021-2022). Spread across start-ups, freelance work, micro-entrepreneurship, and e-commerce, to name a few, digital entrepreneurship offers a range of services from job-matching portals, companies exploring the provision of education, skills, and health services online, as well as the entire value chain of supporting services from designers to developers (Economic Survey, 2021-2022). At this stage, there are no authoritative categories or data on digital entrepreneurship in India. For the purposes of this study, digital entrepreneurship is further categorized into software development, agency work, content creation, and e-commerce. To provide some structure and depth to its treatment of digital entrepreneurship, this study limits its examination to the aforementioned categories.

While there is some diversity in conditions, these categories of digital entrepreneurship then reflect those among the self-employed that have higher education and skill levels and are from the higher end of service sector jobs. Methodologically, since digital entrepreneurship remains a largely unexplored and new subject, secondary research in this section is supported by insights gathered from freelancing, e-commerce, and popular content creation platforms. In addition to that, the findings are supported by six interviews with freelancers, digital artists, and start-up founders.

6.1 Scale of Digital Entrepreneurship

The digital entrepreneurship ecosystem in India is complex and not clearly defined. As a result, it is difficult to measure its scale. This study focuses on software development, agency work, content creation, and e-commerce because these categories comprise the largest segments in internet-driven entrepreneurship that are mediated through platforms.

Digital start-ups are one of the most popularly discussed forms of digital entrepreneurship. As of 2020, there are 41,317 start-ups in India recognised by the Department for Promotion of Industry and Internal Trade (DPIIT). These are across 54 industrial sectors, up to five years from the date of incorporation/registration and have a turnover of less than INR 25 crores, or USD 3.3 million (DPIIT, 2020). These were responsible for just under 500,000 jobs providing for 0.1% of the labour force, using 2018 as the base (DPIIT, 2020). Of these, 41% are in technology-related sectors and therefore, can be considered digital start-ups (DPIIT, 2020). These digital start-ups are frequently touted as one indicator of the success of digitalisation in India. From a labour market perspective, however, their share of employment is small. If every single one of these start-ups went on to create 30 jobs, digital start-ups would still only engage a 0.1 share of the labour force.

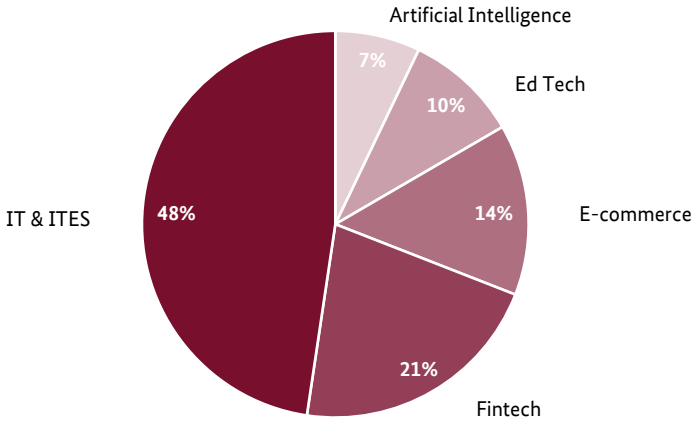

Figure 8: Sector concentration of technology start-ups in India as of 2020

Source: DPIIT, 2020

Freelance workers who fall under agency work and content creators also comprise a large share of digital entrepreneurs. While not all freelance workers are digital entrepreneurs, arguably those with the aspirations to scale their services into a business can be considered so. There is currently a lack of data about freelancers, but we know that in 2020, nearly 35% of the labour supply on English-language freelancing platforms was located in India alone (Fairwork, 2021). In an interview in 2021, a freelance worker with profiles on Fiverr and Upwork, noted:

> *"I think this career has a good future and I want to continue pursuing this field going forward. I am looking to create a team to manage the growth in my business and want to hire people with other skill sets."*

India's e-commerce sector, specifically, is estimated to be worth over USD 55 billion, or INR 4,400 billion, in gross merchandise value in 2021 (Malik, 2021). The online retail market is estimated to be 25% of the total organized retail market and is expected to reach 37% and USD 350 billion (INR 28,000 billion) in value by 2030 (InvestIndia, n.d.). The surge in digitalisation because of the pandemic has significantly added to the e-commerce sector's valuation. Accelerated implementation of this level of digitalisation is also helping reduce inventory costs from 5% of overall costs to 3% by 2025, which translates into the creation of USD 12-15 billion, or INR 957-1,200 billion, of economic value (Ministry of Electronics and Information Technology, n.d.). While data on fragmented digital entrepreneurs is limited, 300,000 sellers manage their inventory directly on Amazon demonstrating a strong interest in e-commerce (Ministry of Electronics and Information Technology, n.d.).

6.2 Typology of Digital Entrepreneurship

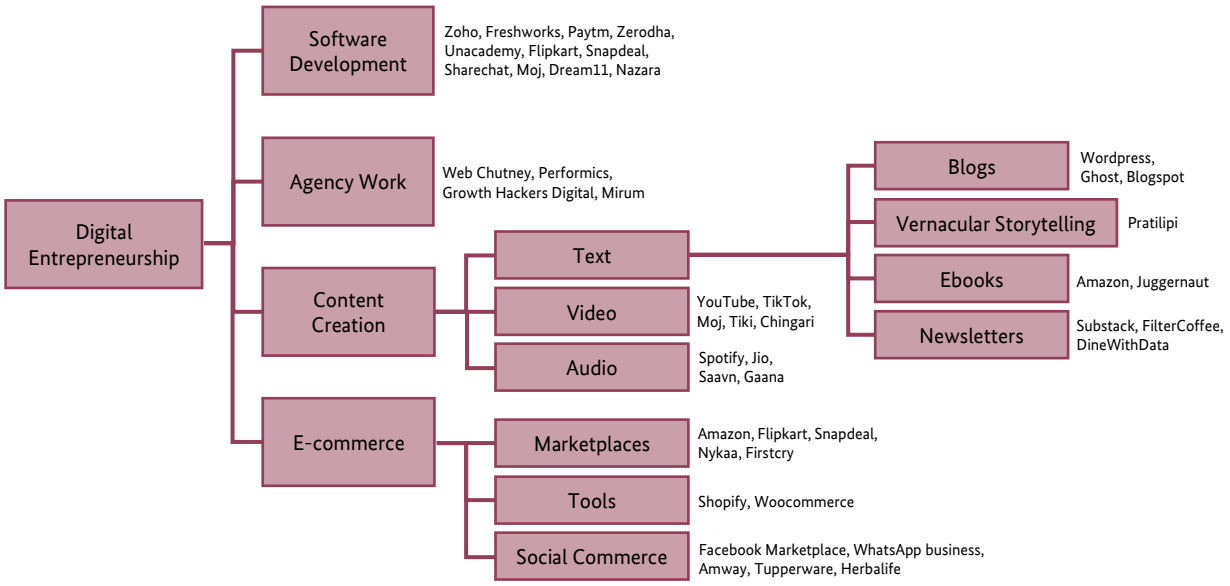

Figure 9: Typologies of Digital Entrepreneurship

Source: Own illustration

6.2.1 Software Development

Software development encompasses engineering and coding-led product development by highly skilled entrepreneurs. Over the past decade, India has seen a steady increase of software products released for domestic and international users across various sectors. For example, Zoho.com is an enterprise management software suite targeted toward Small and Medium Enterprises (SME) customers. They claim to have over 60 million users globally. Another example is Freshworks.com, a Chennai-based company that provides a customer management software suite to over 40,000 companies worldwide and records an annual turnover of USD 300 million (INR 24,000 million). Most of these software companies are funded by venture capital.

In addition to software businesses catering to overseas customers, there are many software companies that are developing products for the Indian consumer. Some of the most active sectors for these start-ups have been fintech (Paytm, Cred, Razorpay, Mobikwik, Policybazaar, Acko, Zerodha), ed-tech (Byju's, Unacademy, Vedantu, Quizizz), e-commerce (Flipkart, Snapdeal, myDukaan, Meesho), social media (Sharechat, Moj, Tiki, Mx Takatak) and Casual Gaming (Dream11, Gamerton, Nazara, PlaySimple, 99games, Octro).

6.2.2 Agency work

Over the past decade, India has seen a large increase in digital agencies that work on projects for Indian and overseas clients. Their work primarily comprises website development, content creation, and social media management for clients that are transitioning from an offline presence to online marketing and distribution. The size of these agencies can vary greatly, with small agencies being just a one-person enterprise to well-established agencies employing hundreds of workers engaged in complex software projects. A typical agency employs five to ten workers that cater to 10-15 customers concurrently.

6.2.3 Content Creation

Content creation is one of the most visible forms of digital entrepreneurship in India. With the cost of mobile data down to USD 0.26, or INR 20.74 per gigabyte, the number of people that have affordable access to online content has increased

significantly (BBC, 2019). Today, 41% of Indians have access to the internet, with the majority relying on 4G mobile data (World Bank, 2021). This increase in mobile internet users has created an audience larger than the entire population of the United States and Europe combined for online content. Leveraging this audience are a host of new-age content creators that are using platforms like YouTube, Juggernaut Books, Pratilipi, and TikTok clones to develop content suitable for the next billion users in English and Indian regional languages.

Content creation can be further classified in four broad categories based on the medium used:

- *Video*: Video is a major, widely used medium for Indian content creators. YouTube is the most popular video platform; in 2021, YouTube's user base in India amounted to approximately 459 million users. This number is projected to reach 833 million users by 2025 (KPMG, 2019). At the end of 2019, about 1,200 Indian YouTube channels had one million or more subscribers, of which 120 channels were run by women (KPMG, 2019). Content creators are compensated directly by YouTube based on the advertising revenues generated by their channel. Advertising revenue is linked to video views; rates range from USD 0.5-5.0, or INR 39.8- 398.2, per 1,000 video views. Creators may also choose to monetize by partnering with brands or selling merchandise.
  After TikTok's was banned in India in 2020, numerous Indian versions emerged, including Moj, MX Takatak, Tiki, Roposo, Chingari, Snack, and Sharechat.
- *Audio*: Audio as a medium for digital entrepreneurship is much smaller compared to video. Despite that, there are entrepreneurs building content businesses using this medium, especially across platforms like Spotify, Jio Saavn, and Gaana.
- *Text*: Text is the second most popular medium for content creators. Some sub-divisions within this medium include blogs, newsletters, and e-books that are published and monetized through various platforms.
  - Blogs: Blogs are the oldest form of text-based content creation on the internet. In India, many entrepreneurs have leveraged blogs to publish content around consumer technology, self-help, and entrepreneurship amongst others. Bloggers primarily earn by hosting ads from online advertising networks such as Google AdSense and through affiliate marketing programs.
  - *Vernacular storytelling*: Vernacular short stories have emerged as a highly popular form of text-based content creation in India. There are over 31 languages in India with over one million native speakers, with about 10 languages boasting over 35 million speakers each. This has provided an untapped audience for many regional writers to publish and monetise their content. The most popular app for vernacular text-based content creation is Pratilipi. This Bengaluru-based company has over 370,000 creators and an audience of 30 million monthly active users in 12 Indian languages.
  - *E-books*: E-books are a small but growing form of text-based content creation. With the advent of dedicated online publishers, many authors try to reach a wider audience, both domestic and international. Amazon and Juggernaut Books are the two most prominent online publishing platforms in India. Juggernaut claims to have about 1.5 million readers and 1,500 writers on its platform.
  - *Newsletters*: New online tools like Substack and WhatsApp allow digital entrepreneurs to publish newsletters in innovative ways. For example, FilterCoffee is a daily morning newsletter, delivered by email, that focuses on finance and business news. It claims to have over 10,000 readers and is currently free. DineWithData is a WhatsApp-based newsletter that covers start-ups and venture ideas. It is delivered at daily at dinner time. It charges INR 450 (USD 6.50) as a one-time subscription fee for premium content.

6.2.4 E-Commerce

E-commerce enables the sale of physical goods and services through online platforms. E-commerce entrepreneurs use the internet to reach a wider customer base for their products by listing products on online marketplaces and creating their own online stores. The products are directly distributed from the manufacturer to the consumer, eliminating the need for

a long distribution chain. The founder of a direct-to-consumer (DTC) online seller of mobile phone accessories told us in an interview in 2021 that,

> *"[without] online marketplaces, it is impossible to launch a brand in the market. Marketplaces give you a borrowed distribution network and since we have a borrowed supply chain, it becomes easier for us to reach the Indian market. We can focus on product quality control and the rest is taken care of by Amazon. As a result, the entire DTC industry has emerged because of e-commerce platforms."* (Taneja, Personal Communication, 2021)

E-commerce can be further divided into three sub-categories:

- *E-commerce marketplaces*: These platforms are two-sided marketplaces that aggregate suppliers and consumers on a single online platform in a way similar to a brick-and-mortar supermarket. In India, both horizontal and vertical marketplaces operate successfully. Horizontal marketplaces, such as Amazon, Flipkart, Snapdeal, list a broad range of products across diverse categories. Vertical marketplaces are focused on a particular product, category, or industry. Such marketplaces, such as Nykaa for cosmetics and FirstCry for baby products, benefit the consumers by providing a large selection of options and in-depth reviews of each brand.
- *E-commerce tools*: In recent years, digital products such as Shopify and WooCommerce have launched, enabling digital entrepreneurs to create their own online stores and distribute products without relying on e-commerce marketplaces. Unlike e-commerce marketplaces, digital entrepreneurs building independent digital stores have to spend a significant amount of money on advertising to attract customers.
- *Social Commerce*: Social commerce is a relatively new phenomenon in the Indian market. It can be understood as digital entrepreneurs utilising their online social networks, typically Facebook and WhatsApp, to sell goods and services and earn a commission from the sale. Typically, digital entrepreneurs involved in social commerce are resellers that would select a range of products from an online catalogue and market them within their network of family and friends using online social networks. This business model is very similar to multi-level marketing companies seen in the offline world; for example, Amway, Avon, Herbalife, and Tupperware are some companies that successfully use entrepreneurs to resell their products within their social circle for a commission. Social commerce tends to be popular among women (Dewan & Jamme, 2021).

BOX 2: COVID-19's impact on digital entrepreneurship

On the demand side, the pandemic diminished consumers' purchasing power leading to a decline in spending on lifestyle goods, an increased need for flexible payment options and a reprioritization of basic necessities (KPMG, 2020). A digital entrepreneur interviewed for this study said that "the pandemic hit me negatively. I had just started my business in 2019 and it took me 11 months to scale orders to 350 per day. When I opened my office after the lockdown, I had 900 parcels returned to me."

In contrast, however, due to increased digitalisation after the onset of the pandemic, a freelancer working in marketing and social media management said that "the pandemic provided me more business as more and more offline businesses made websites and social media accounts." Another said that while they "lost a lot of social media clients during the pandemic and had to give remaining clients concessions to retain them, the pandemic has also been a blessing in a way as small businesses have started valuing digital services a lot more. Potential for e-commerce is huge and [I am] banking on that to grow in the future."

Similarly, two women entrepreneurs using e-commerce platforms documented a significant increase in their clothing and homeware online shops, respectively. Though the latter noted difficulties in obtaining inputs because of supply chain shocks during certain periods of the pandemic. Both women had tertiary levels of education and were working prior to the pandemic. But once the pandemic hit, they took their side-business prime.

By and large, as consumers increasingly turned to online channels during the pandemic, companies and industries took a leap towards digital adoption. Indian e-commerce's global share increased from 14% in 2019 to 17% in 2020 (UNCTAD, 2021). While not all e-commerce qualifies as digital entrepreneurship, the overall market recorded sales worth USD 55 billion during 2021 with the addition of 40 million new shoppers, showing the impact of digitalisation (IBEF, 2021c).

6.3 Employment in Digital Entrepreneurship

Entrepreneurs are not a defined category in labour force surveys. Therefore, entrepreneurship can be found in different categories of labour status. Digital entrepreneurship, on or off platforms, is even more amorphous. Some of those in digital entrepreneurship, as described in the typology above, are self-employed, own-account workers. They are therefore considered to be in informal employment. But the segments of digital entrepreneurship chosen for this study suggest that these entrepreneurs have higher levels of education and skills, which taken as a proxy for income, suggest that these individuals are better-off financially. Yet, the fact that they are beyond the purview of labour regulations and social protection renders them informal even though their quality of working conditions is very different from a self-employed informal worker who runs a chai (tea) stall for instance.

Further delving into the category of self-employed entrepreneurs, consider a seller on an e-commerce platform like Etsy India, who has a much higher degree of autonomy, for instance over pricing and standards, and a service provider on a freelancing platform who doesn't have the same autonomy. Is it an accurate depiction to refer to both as entrepreneurs? Does entrepreneurship not signify a degree of autonomy?

Beyond the category of digital entrepreneurs that are self-employed, some run enterprises. They are therefore not considered to be self-employed but are in regular wage work. If in this category of labour status, they have benefits, then they are considered to be in formal employment. But if they do not have benefits, then they are considered to be in a smaller group of workers that are in the formal sector but are in informal employment. Yet in discourse, all are subsumed under this broad category of entrepreneurs; and if their work has a nexus to technology, then they are often termed digital entrepreneurs.

But nuance matters. It matters because these ambiguities make way for misinterpretation of how digitalisation is unfolding and how it affects different segments of workers. These nuances matter because without them, policy can neither be formulated appropriately, nor targeted effectively.

7 Business Process Outsourcing (BPO)

The formation of the Business Process Outsourcing industry in India was accidental and serendipitous; coming to light at a time when there existed infrastructure, a boost to an entrepreneurial culture, and a readymade labour force conversant in both English and basic computer skills to form the moving force behind the rise of the sector. Two decades since its inception, the BPO industry in India has moved beyond commodity BPO services[10] and support functions such as voiced-based services to now offer a slew of high-end business services to accelerate innovation and provide sustained value. These include complex functions such as engineering design, equity research support, and pharmaceutical research.

Indian BPO firms now assume full process management responsibility, for instance in revenue cycle management to provide greater value in business verticals[11] in sectors such as healthcare and banking, financial & accounting services, and insurance (BFSI). This results in a strategic partnership between the customer and the outsourcing service provider with

10 Where BPOs offer services for processes that are uniform across organisations, such as payroll and standard customer rerouting, such that they can be treated as commodities that can be easily outsourced.
11 Specific focus areas of multinationals that need enough attention and specialized knowledge that they function like independent entities.

sophisticated financing methods in place. The customer's firm acquires strategic stakes in the outsourced operations, thus sharing risks and gains with the outsourcing service provider and creating increased business worth for both partners.

Methodologically, this section builds on prior research on the Indian call centre economy (Krishnamurthy, 2018). The secondary research is supported by five interviews of firms and workers and select quotes from the respondents are added to buttress the findings. The worker profile is fleshed out through a systematic scan of job portals and through conversations with recruiters at BPO/BPM companies.

BOX 3: Definitions of BPO/BPM

Business Process Outsourcing – As a process, business process outsourcing occurs when businesses optimize their operations and reach by outsourcing and offshoring ITeS (Information Technology Enabled Services). In India, this manifested in customer service work being sub-contracted to Indian workers and creating a call centre, the layperson's term for BPO, sub-sector (Krishnamurthy, 2018).

Business Process Management – BPM is the acceleration of the BPO sub-sector where instead of general service, specialized business solutions for specific models are offered. These are typically brought on with a smarter use of technology, distinct skill demands, and an overall reinvention of a sub-sector.

7.1 Scale of BPO/BPM

The Indian IT-BPO (Information Technology - Business Process Outsourcing) industry has now transformed in business parlance as well as in structural organisation into the IT-BPM (Information Technology - Business Process Management) industry and currently, in this new avatar, contributes roughly 8% to India's GDP (IBEF, 2021d). NASSCOM (National Association of Software and Service Companies), the trade association and advocacy group associated with the technology industry, commented that "the industry continues to be a net hirer of skilled talent, adding 138,000 people in Financial Year 2021, and robust hiring plans for in Financial Year 2022 with the top 5 Indian IT companies planning to add over 96,000 employees" (NASSCOM, n.d.). In terms of revenue, the BPM sub-sector earned USD 38.5 billion, or INR 30,710 billion, in revenue in 2020-21, a significant portion of which came from exports to the United States, United Kingdom, Europe, and the Asia-Pacific (Economic Survey, 2021-2022).

7.2 Industry in Evolution: BPMs and New Typologies

BPMs are broadly understood to be part of an approach that seeks to manage and optimize business processes very often with the smart use of technology and third-party vendors. They are the latest form of reinvention and even acceleration of what began in the late 1990s as India's call centre boom, when MNCs took note of India's stable political conditions, English- speaking population, a technologically advanced telecommunications environment, and an amenable time zone difference of eight to twelve hours between the United States and India, in order to set up nightshift-based telephonic customer support services to Western economies (Krishnamurthy, 2018).

The industry's shift from commodity BPO to offering specialized business solutions for specific business models, accompanied by smarter technology use, has brought on significant cultural shifts. Developments in AI, ML, and robotics over the last five years has meant that larger modules of work can be automated, predicted, and managed with only least predictable and last-resort outcomes being diverted to customer service executives.

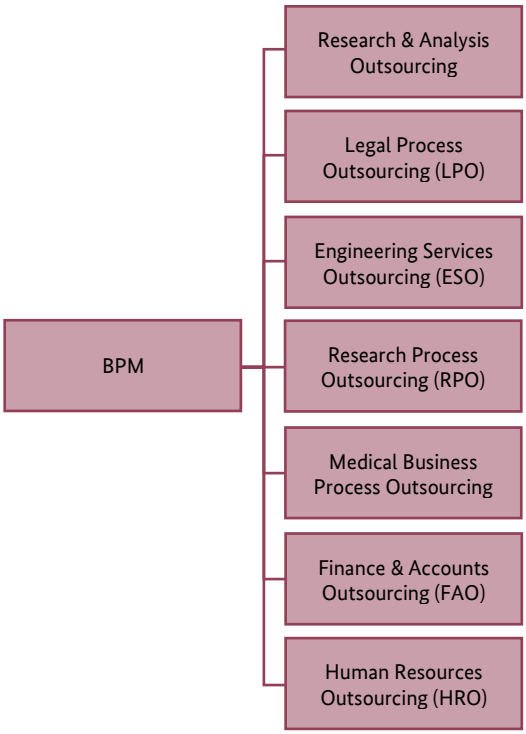

Figure 10: Typologies of BPM work

Source: Own illustration

At the other end of the spectrum, BPOs or BPMs are moving beyond commodity services and support functions to offer a slew of high-end business services such as engineering design, equity research support, and pharma search amongst other offerings. Figure 10 details emerging typologies for the BPM sub-sector. This list will only grow longer as outsourcing service providers get more specialised in their offerings. In other words, the trend of multi-process BPOs has gotten more specialized, and therefore capable of greater expertise.

In regard to women's participation, the BPO/BPM sub-sector has always been strongly focused on hiring women, with women constituting 34% of the workforce as of 2019 (Deka, 2020). However, from a societal point of view, call centre jobs – the layperson's term for BPO jobs in the early years – were considered less respectable for women. With a shift to specialised management, this outlook is starting to change. Despite this, the gender biases in the sub-sector cannot be underestimated. As detailed in Box 4, women continue to face isolation, misogyny, and pointed health problems due to lack of proper infrastructure.

BOX 4: COVID-19's impact on BPOs/BPMs

GlobalData a leading data and analytics company estimated that the BPO market witnessed a 9% decline in value due to disruptions caused by COVID-19 related restrictions and the challenges faced by service providers in moving their operations to work-from-home (GlobalData, 2020).

To counter distress in the sub-sector, Government of India revised the laws on Other Service Providers (OSPs) that allowed BPMs to accommodate pandemic-friendly work-from-home arrangements and permitted companies to run both international and national contracts on the same infrastructure. This was especially critical as the BSFI sector that contributed 30% of revenue to the BPO industry in India slowed down considerably as a result of economic decline in the United States and the European Union (The Hindu, 2020). In November 2021, NASSCOM undertook a survey to assess the impact of OSP reforms on the IT-BPM sub-sector and found that 92% of the participants stated that OSP reforms helped reduce compliance burdens while almost all participants expressed satisfaction with the work-from-home relaxations (Economic Survey, 2021-2022).

7.3 Employment in BPO/BPM firms

7.3.1 Gigification

As the bulk of the employment at the lower levels moves towards workforces in AI- and ML-led data operations, this cadre of employees are also being 'uber-ized' or increasingly sourced via the gig economy. Since this work is repetitive, predictable, and easily managed, it can be 'game-ified' and broken into easily understandable tasks that can be performed by workers who do not need to be present on an office premise. As a venture capitalist with investments in AI remarked in an interview, "the grunt work behind AI and ML, such as data labelling, is an example of BPOs plugging into the gig economy [...] you replace the unstable human dependency with a mix of software services with predictive functions and human intervention."

7.3.2 Loss to automation

Just as the grunt work gets broken into small tasks spread over several gig workers, BPO jobs are also being lost to automation. With developments in AI and ML, larger modules of work are getting automated. This is leading to this level of BPO work being meagrely staffed. An Assistant General Manager at an ITeS firm among the top 10 in the country told us in an interview that, "the risk that companies needed to take with humans, they want to reduce. Automated bots are preferred to humans."

7.3.3 Diverging worker profiles

BPOs/BPMs are simultaneously moving in two separate directions. On one hand, work is being simplified to the degree that it can be performed by machines with only minor support from human workers. On the other hand, BPM is moving towards specialisations, bringing BPM worker profiles closer to those in IT and IT management services with the need for domain expertise. As disparities in skills sought widen, inequality in wages and social protection persists. Additionally, the lack of a straightforward categorisation of workers in the sub-sector makes it difficult for policymakers to understand and regulate BPOs/BPMs in a way that improves outcomes for workers.

BOX 5: Labour issues in the BPO sector

The CITU-affiliated All India IT and ITeS Employees' Union released a BPO workers' demand charter in November 2021 detailing the following labour issues concerning the BPO sector in India:

- 9-10 work hour shifts
- Breaks limited to only one hour per shift
- Frequent changes in timings of the shifts
- Intrusive and unethical work tracking mechanisms
- Unclear leave policies
- Refusal by employers to cover cost of work-from-home equipment (Wi-Fi, routers, electricity, etc.)
- Lack of proper facilities such as washrooms and lockers at work
- Different facilities for different strata of workers, including password- protected or locked washrooms

8 Charting a Pragmatic Path to Managing Digitalization and Work

This section provides an overview of a potential pragmatic scenario for the future of work in India by 2030. The pragmatic scenario is based on discussions between relevant stakeholders on two extreme scenarios (see Annex 2 and 3). One of the extreme scenarios is based on the status quo, i.e., the continuation of current trends without further coordinated policy and regulatory action. In this case, current inequalities are exacerbated by the failure of policy and regulation to address technological disruption. While the other extreme scenario assumes that policy and regulation help technology deliver on its promise of large-scale development, resilient and equitable economies, and prosperous workers.

In a workshop, relevant stakeholders were presented with the two extreme scenarios. Through various discussions, the pragmatic path was developed under the known conditions of the two extreme scenarios. The charted pragmatic path describes a potential pathway for the BPO /BPM sector, digital entrepreneurship, and gig economy in the broader macroeconomic context. The discussions of the workshop and the pragmatic scenario were then used to develop recommendations and a roadmap for action to consider for the relevant stakeholders such as government representatives, the private sector, international organizations, and civil society.

8.1 Economic, Labour Market and Demographic Background

COVID-19 disrupted economic and social lives in the early part of the decade and India was no exception. Now in 2030 – a decade after the pandemic reduced growth and diminished hard-fought development gains – India is beginning to revive growth and make meaningful strides towards fostering a more resilient economy.

This recovery was achieved because of policy changes that occurred alongside digitalization and helped create digital infrastructure, offered support to smaller businesses, and began preparing the country's youth for a changing work environment. However, with digitalization playing such a critical role in recovery, regulations remain laggard to technological trends. If India wants to make its economy equitable as well as resilient, regulation must play a greater role in the upcoming decade.

The earlier years of the decade were tumultuous. To reverse the damage done by the pandemic, India needed to maintain double-digit growth through 2029. While India regained growth to 8.5 percent in 2022-23, the growth rate dropped again and only reached desired double-digit rates by 2026. This was largely because of government spending that substantially increased a few years after the pandemic, especially in the health and education sectors. Coupled with rapid digitalization, growth of the SME ecosystem, and investments in preparing India's youth for higher value-add jobs in services, this put India on the path to economic recovery.

India also remains a service-led economy and the service sector's contribution to GDP remains capital-intensive rather than labour intensive. However, increased investments in education and skills are starting to pay off and there is hope that services may create more high value-add jobs than the sector has so far. If India is able to continue to build and leverage the capacities of an appropriately educated and skilled workforce, it may capture some of the BPO/BPM work that is being outsourced from America, Europe, and other regions.

With another decade remaining of India's demographic advantage, policymakers are hopeful that better returns on job creation and structural revisions to the education sector will help the country finally take advantage of its large youth population. However, for this to happen, the coming decade needs to see consistent, if not greater, returns on job creation.

8.2 Labour Force Participation, Unemployment, and Informal Employment

Labour force participation declined because of the stagnation brought on by the pandemic but is now beginning to rebound. By supporting small businesses, including microcap and nanocap industries, the country has seen higher returns on job creation. Coupled with investments in education and skilling programs, this is allowing the previously discouraged youth to skill, upskill, and reskill themselves adequately for the available jobs.

The female labour force participation rate that witnessed a steady decline since 2005 is showing signs of rebound, too. Through innovative awareness generation campaign, increase in women's political participation, and most recently, amendments to the social security code, women's working conditions are improving. While the implementation of the amended code remains to be seen, a distinct but overdue mindset shift in the country is helping.

Finally, on-demand and piecemeal gig work remains highly sought, but self-employment is no longer synonymous with informal work. Minimum wage regulations and social security provisions that are extended to contracted workers as well as gig workers are helping them stay out of the informal economy.

8.3 Concentration of Power

Data is power, and over the last decade this power has been amassed by technology companies. To prevent this consolidation of power, the government has attempted to implement open technology and data sharing infrastructure to benefit small businesses. However, these regulations have been frequently flouted by tech companies.

Regulations remain laggard to tech trends. This has given rise to the need for a tech watchdog, that provides checks and balances on ethical technology and digitalisation practices. This watchdog attempts to regulate how data is collected, stored, shared, and distributed to prevent accumulation of power in larger corporations.

Technology companies no longer dominate the policy discourse. Funding is now diverted to non-tech small businesses, including microcap and nanocap companies that are innovating in the spheres of ag-tech, finance, manufacturing, and ed-tech. In 2030, small businesses have given returns on job creation, with 50 million new jobs created in the last decade (Das & Ghani, 2021).

Developmental organisations play a critical role in ensuring that economic growth is leveraged towards human development. Through government policies, both for profit and non-profit organisations that prioritise social returns are able to raise funding for their welfare activities. The Social Stock Exchange (SSE), which was set up in 2021, has provided a pathway for impact investment at large scale (Shreyashi & Kumar, 2021).

8.4 Jobs for Youth

For the last few decades, India's economy was not creating enough formal jobs to absorb the nearly eight million labour market entrants each year. The COVID-19 pandemic disrupted the economy and destroyed jobs, forcing a large section of the youth population to resort to on-demand, piecemeal gig work with low entry barriers (Bala, 2021).

Since then, the youth population has remained fragmented, with people on both ends of the skills spectrum. While the high-skilled population has access to good quality jobs with some social security benefits, various government measures are put in place to protect the interests of youth engaging in low-skilled occupations. These measures include minimum wage regulations and a social safety net for contract as well as gig work, pathways to career progression through reskilling, upskilling, apprenticeships, and on-the-job-training. Through its Social Security Code, the government created a Social Security Fund in which platforms had to put one per cent of their revenue to subsidize welfare benefits for other workers.

Recognising that digital skills are an essential part of preparing youth for emerging new forms of work, school and higher education curricula is now designed to incorporate digital skills and awareness. The National Education Policy (NEP) 2020 is now starting to be implemented across the country; it is incorporating skills needed for a digital world into the education system in age/grade appropriate ways. In addition, building youth capacity in communication, problem-solving, and the ability to adapt to situations that arise on the job, is also prioritised (Dewan & Sarkar, 2017).

Through the NEP 2020 and various other government interventions, the skills training ecosystem has been re-oriented to break down the education and skills training silos and form a continuum from education, skills, to labour market entry. Industrial Training Institutes have been central in this, with vocational courses now designed on the basis of expertise gaps identified in demands by the market and rooted in local opportunity mapping. The public skills training system systematically engages with the private sector, with an emphasis on apprenticeships or on-the-job training.

8.5 Women's Agency

There has been a distinct mindset shift in the country, where now women are no longer seen as just contributors to the family but are also acknowledged and encouraged in their role as contributors to the society. Through innovative awareness-generation campaigns celebrating women role models in atypical careers, more women are gravitating towards male dominated careers like in STEM, environmental sciences, life sciences, AI, aviation etc. Where previously only 14 percent of STEM jobs were occupied by women in 2020, women's share has now reached 25 per cent (Jayan, 2020).

India has also witnessed an increase in women's political participation at the grassroots level, and more and more women are taking over community leadership roles with greater decision-making power. Frontline workers such as the all-female community of the Accredited Social Health Activists (ASHA) workers and Anganwadi workers are now recognised and incentivised as community leaders and role models. Government policies recognise the need for women to occupy positions with decision-making powers in social and political institutions. With more women holding top positions in social institutions of justice and empowerment, government policies and programmes have adopted progressive values that enhance women's agency and autonomy in both personal and public spheres.

Female labour force participation rates have stopped declining with more women taking up a range of jobs, including home-based and location-based gig work, but not limited to these. Over the last decade, various judicial pronouncements, as well as amendments to the Social Security Code 2020, have resulted in improved working conditions for women. Companies now provide maternity benefits, day-care support, transportation, and a safe working environment for not just employees, but also contract and gig workers. However, the implementation of these amended regulations still remains uneven.

Since the pandemic in 2020, women's share in gig work has remained high. Even though the gender pay gap, which was 8-10 per cent in 2021, has closed, women still do not have opportunities to earn as much as men (Kar, 2019). However, years

of protests and social media campaigns, gig worker unions have been able to negotiate improved working conditions, particularly for women gig workers (Bhattacharyya, 2022). Government bodies have partnered with platform companies to deliver training and upskilling programs to ensure that women gig workers have clearly defined pathways to career progression and upward mobility (Sharma, 2019).

The NEP has now adopted a life-cycle approach to women's education, and schooling is not limited to young girls anymore. Various education programmes encourage women to return to education after taking a break. Vocational training institutes offer incentives and career pathways for women opting for non-gender normative occupations.

9 Key Messages and Recommendations

The study lays out the unfolding patterns of digitalisation in India and its impact across sectors, namely, agriculture, manufacturing, and services. In addition to providing a bird's eye view of some developments related to digitalisation in these sectors, the study delves into digital entrepreneurship, platform-based gig work, and BPO to examine how these evolving phenomena intersect with labour markets and work.

Imperative to answering the question of if, and perhaps more importantly how, India will be able to leverage digitalisation for a better future of work, is dispensing with certain pre-conceived notions.

First, technology itself offers tremendous promise, but it does not operate in a vacuum. Leveraging it successfully is contingent on a number of accompanying factors. Assessing net effects, then, can lead to false narratives about the efficacy of technology when in reality, careful study and understanding of context-specific circumstances is what will create greater chances of successful deployment of technology.

Second, assumptions that workers engaging in digital work – whether gig work, digital entrepreneurship, or BPO/BPM work are necessarily the same, or better off than they were prior to taking up this kind of work are deeply misguided.

(i) Large-scale research and data on the before, after, and in-between trajectories of workers engaging in this form of work are lacking.
(ii) The interviews conducted for this study, other fieldwork that JJN has engaged in India and elsewhere, as well as research done by ILO (2021) and LIRNEasia (Aguilar et al., 2020) suggest that some workers are drawn to some attributes of this work – such as the flexibility of gig work – and therefore leave full-time, formal jobs to enter this world.
(iii) Finally, by virtue of becoming self-employed, either as a contractor in gig work, or an entrepreneur – regardless of the skill level, entrants into this form of work are essentially adding to the incidence of informal work. This form of work then, is beyond the purview of labour regulations and social protection coverage.

Third, there is tremendous variation in this kind of digital work. Some of it is higher skilled, while other kinds of gig and BPO work are less so. Similarly, digital entrepreneurship is also a spectrum, but what constitutes an entrepreneur is not well defined. In the absence of clear regulations around what constitutes an 'employer' or an 'entrepreneur', it is difficult for regulation to accurately target support to these different, sometimes overlapping, categories of workers.

Fourth, in a country like India with a large and growing youth population, a majority of whom have low levels of education; in the absence of enough formal employment; and with low barriers to entry, many are entering this form of work. Moreover, gig work in particular breaks up a job into smaller tasks and spreads it across more people. These facts are driving the

growth of the sector in India and exerting downward pressure on wages and working conditions. Therefore, some digital work is high-skilled with greater degrees of autonomy and benefits, but this form of work does not constitute the majority of digital work in India. While we do not have a breakdown of how many workers are employed in different kinds of digital work sub-categories, we do know that the share of workers with high levels of education and skills, and these types of 'good' jobs, are fewer in number than other forms of low-skilled workers and work.

9.1 Recommendations and Roadmap for Action 2030

The present and future of work in India depends on the ability of policymakers, businesses, civil society, and workers to understand India's competing trends and realities to harness the benefits of technological change while minimizing the costs. To this end, this report settles on the following recommendations based on secondary and primary research, and the outcomes of the scenario planning workshops.

9.1.1 Upscaled research and increased data availability

- What technology has to offer requires thoughtful deployment based on field research to ensure that the requisite conditions for successful adoption and implementation exist. Technology interventions must be carefully piloted to see how they will play out, and their impact on labour markets should be carefully assessed before full-scale deployment.
- Aggregate numbers do not provide an accurate picture of the range of occupations in the service sector; while some are high-skilled, many are not. A nuanced understanding of the diversity of these service sector jobs is imperative to crafting policies and regulations that actually uplift those in less skilled jobs in the sector. Gig work and digital entrepreneurship must be understood in this context. More research and outreach are needed to explicate the range of jobs and occupations in the service sector and where gig work and digital entrepreneurship fit on this spectrum.
- A new social compact and associated regulation between the government, platform companies, and workers should enable the use of platform data to facilitate evidence-based policymaking.
- Labour force surveys should include questions to better capture gig work, digital entrepreneurship, and other technology related occupations.

9.1.2 Help address low female labour force participation by creating opportunities and environments that are conducive to women's economic engagement

- Enhance opportunities for women's economic participation, including in gig work and entrepreneurship, through addressing time poverty. Easing the burden of domestic and care responsibilities through the provision of childcare, maternity benefits, and other such entitlements is key to fostering women's economic participation.
  (i) These entitlements should feature prominently in Central and State social security schemes.
  (ii) Recognising the important contributions and appropriately remunerating and supporting community workers such as ASHA and Anganwadi workers is key to this effort.
- Create safe working environments by instituting safety-related education, protocols, and redressal mechanisms for women, including in location-based and online work.
  (i) Regulations should require companies, including platforms, to have such redressal mechanisms in place to deal with issues pertaining to women's safety and freedom from exploitation and discrimination.
  (ii) Platforms should be required to provide safety-related education and tools for female service providers, especially for location-based occupations.
- Investing in urban infrastructure to ensure proper lighting and safe transport will support women's economic participation.

- Enable equitable access to technology, education and training, and subsequent access to a wider range of occupations than just those that are gender-normative.
  (i) This can be done through public campaigns to ensure that girls have equal time and access to technology in school, institutions of higher education and training, as well as at home.
  (ii) Institute specific schemes to draw and support women and girls in STEM, environmental sciences, life sciences, AI, aviation, and other such fields.
- Implementation of the National Education Policy 2020 should adopt a life-cycle approach to women's education, where schooling and other educational programmes encourage women to return to education after taking a break, as well as offer career pathways for women opting for non-gender normative occupations.

9.1.3 Create a continuum between education, training, and employment

- While digital literacy is important, good quality basic education is also a requisite for enabling participation in a technology-driven economy. Education and training must be fully integrated to make youth employable. To this end, the National Education Policy's proposal for such integration should be implemented effectively, especially in the development of the National Curricular Framework.
- Bridging the digital divide also means that schools with fewer financial resources, for example in rural areas, will need support to acquire the right infrastructure to support technological interventions. The need for technical know-how can be supported by recruiting trained local youth, especially young women, and stationing them in such areas to help with the induction and use of technology.
- Better engagement of the private sector to expand apprenticeship programs will ensure that youth are acquiring knowledge and capacities that are in-demand by the market, including technological access and know-how.

9.1.4 Work with the private sector to ensure fair competition and engagement

- A national watchdog, comprised of experts from GoI, civil society, and academia working in technology accountability, could monitor technology companies to help prevent the concentration of power.
- Small businesses need support to adopt and use digital technology. Government could provide incentives to large companies so that they work with their suppliers and sub-contractors to help them gain access to technology and related capacities. Some initiatives such as Amazon's Local Shops Initiative and Amazon Saheli are examples of how big companies can work with smaller businesses. This could be made a permissible and encouraged activity under the existing Corporate Social Responsibility law.
- Automation in manufacturing is threatening jobs at a time when the government is keen to boost manufacturing output and employment. The government can play a role in deliberately incentivizing 'work systems design' that favours augmentation over labour-displacing automation. Niti Aayog could lead the effort in engaging with the private sector and delineating best practices in this regard.

9.1.5 Invest in social security and foster new methods of collectivization for workers

- Social safety nets are essential to support workers displaced by automation, and also those entering gig work or digital entrepreneurship. But targeted support also depends on clearing up definitional ambiguities in regulation and surveys.
- Implement minimum wage and social security benefits for not just employees and contract workers, but gig workers as well.
- Build social safety nets and explore options for taxation of digital companies including platforms. A staggered tax slab, based on profits and longevity of operations, for platform companies that contributes to a Gig Workers Social Security Fund can be managed by the government. Platform companies would be required to manage the enrolment of gig

workers into the fund to provide access to programs such as life and health insurance, and Employee Provident Fund. The government would be responsible for the disbursement of funds as well as monitoring compliance by platform companies.

- Access to freedom of association and collective bargaining should remain a cornerstone of labour markets even as the nature of work changes. Regulations must ensure that this right is protected for gig workers.
  (i) Companies should not be allowed to break up WhatsApp groups or other such forums for worker collectivization.
  (ii) To ensure that individuals are empowered from an early stage, labour education should be offered as part of the school curriculum. When imparted during school years, labour education can strategically nurture individuals who are strong, independent, and aware of their needs to understand that solidarity is the bedrock of all collective action.

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Annex 1: Technology adoption – India relative to other select countries

This annex details network coverage, ICT access at home, mobile cellular subscriptions, active mobile broadband subscriptions, total internet use, female internet use, and male internet use in India as well 13 other countries across Asia, Africa, and South America.

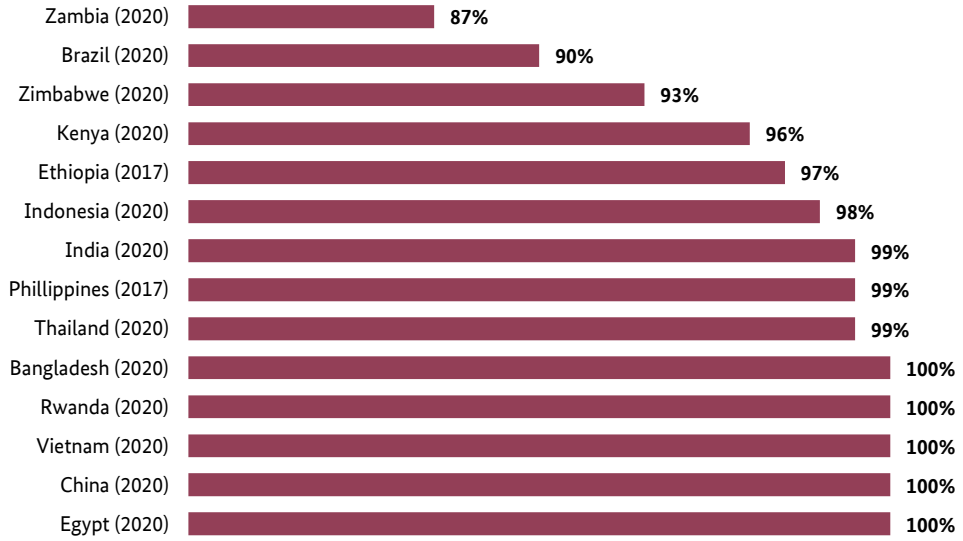

Figure 11: Percentage of the population covered by mobile cellular network in 14 countries across Asia, Africa, and South America
Source: ITU, 2021

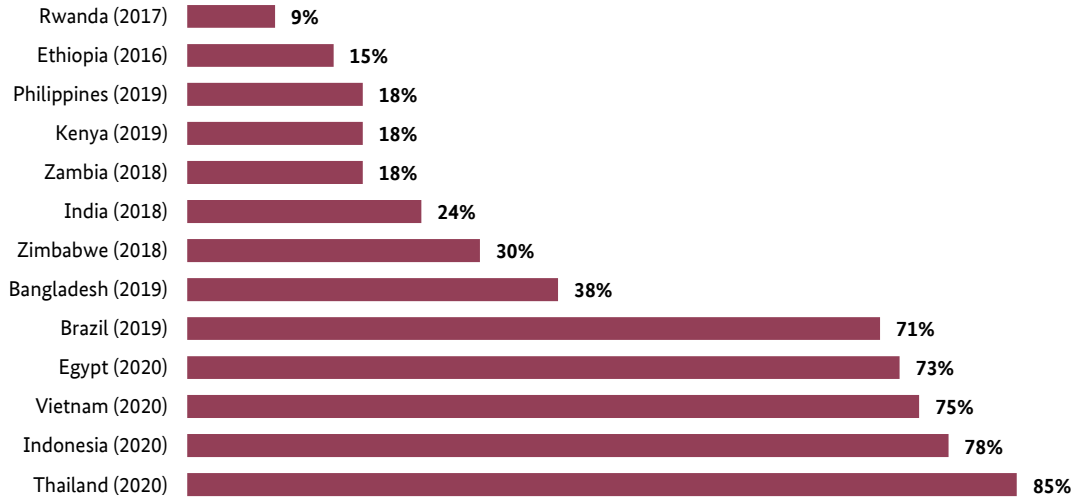

Figure 12: Percentage of households with internet access in 14 countries across Asia, Africa, and South America
Source: ITU, 2021

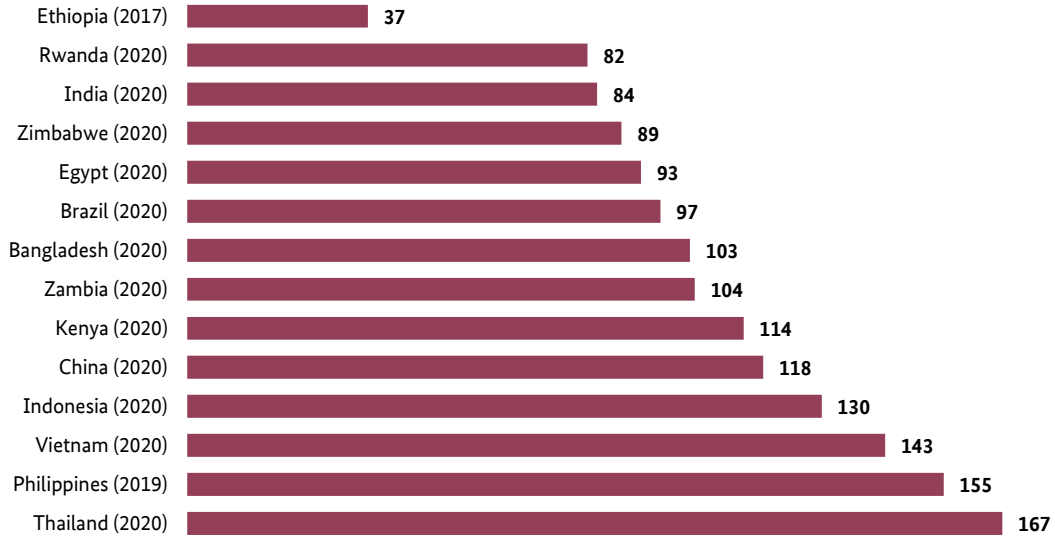

Figure 13: Mobile cellular subscriptions per 100 inhabitants in 14 countries across Asia, Africa, and South America
Source: ITU, 2021

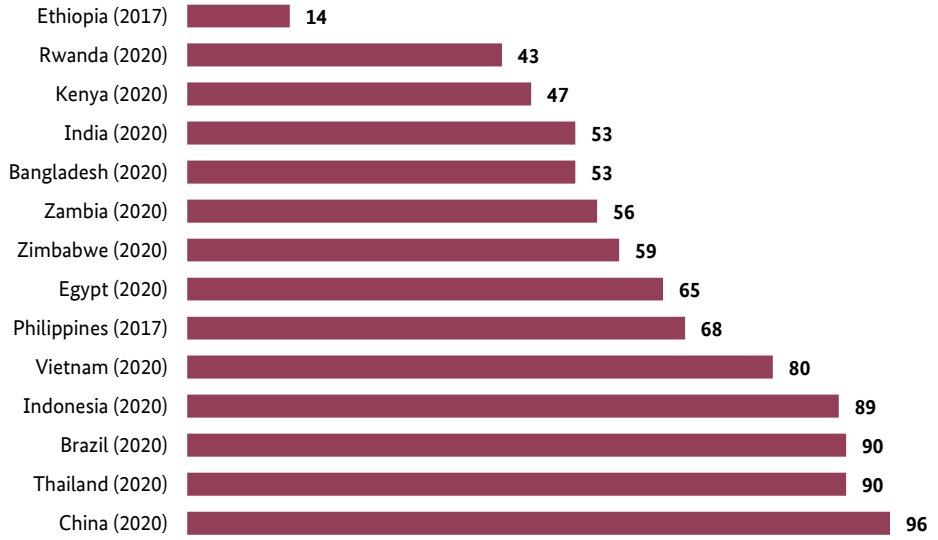

Figure 14: Active mobile broadband subscriptions per 100 inhabitants in 14 countries across Asia, Africa, and South America
Source: ITU, 2021

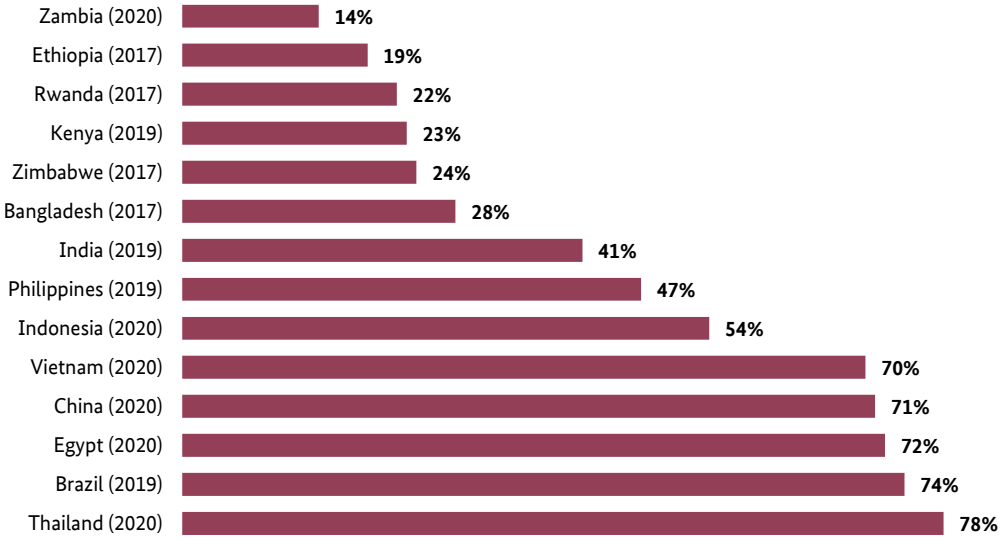

Figure 15: Percentage of total individuals using the internet in 14 countries across Asia, Africa, and South America
Source: ITU, 2021

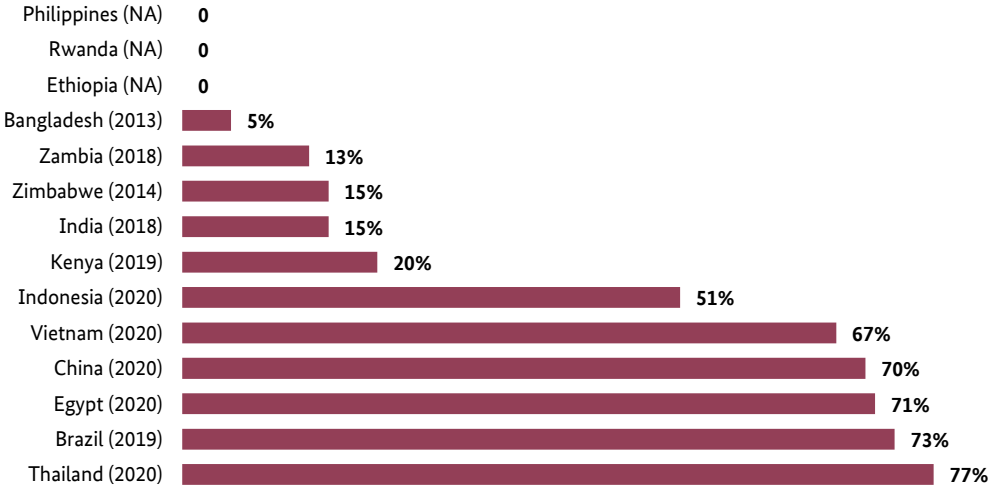

Figure 16: Percentage of female population using the internet in 14 countries across Asia, Africa, and South America
Source: ITU, 2021

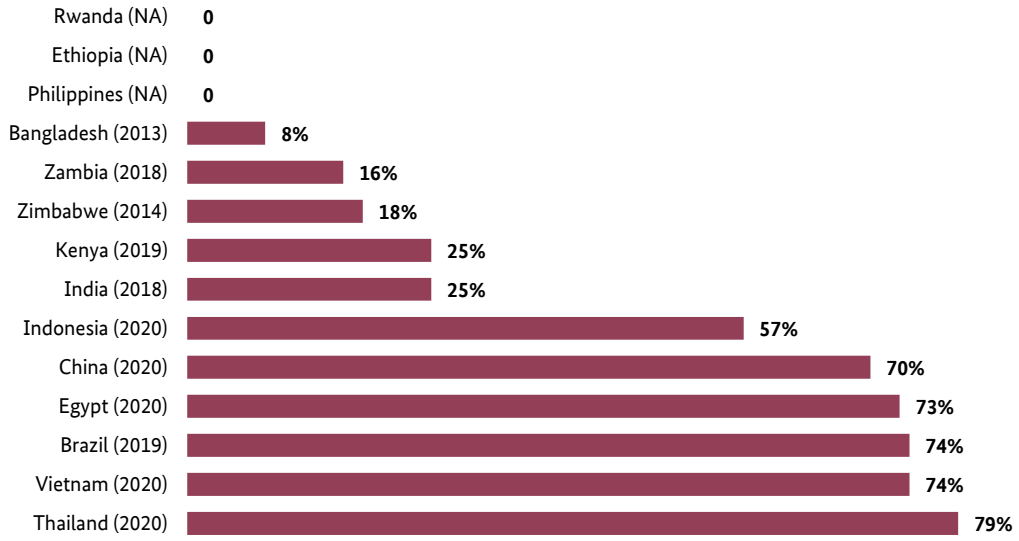

Figure 17: Percentage of male population using the internet in 14 countries across Asia, Africa, and South America
Source: ITU, 2021

Annex 2: Baseline Scenario – A World of Work where Status Quo leads to Deepening Divides

The Failed Promise of Digitalisation

A decade ago, the COVID-19 pandemic struck. It severely disrupted economic and social lives across the globe for a better part of two and a half years and India was no exception. While some countries, such as China and Vietnam, experienced swift economic rebound, economic growth and recovery remained laggard in India. Now in 2030 – a decade after the pandemic shrank growth and diminished hard-won development gains – India is still struggling to regain its lost economic momentum.

Against this backdrop, digitalisation – with automation as its driving force, has continued to unfold. But technology has neither been able to deliver the promised scale in development interventions, productivity or efficiency gains (Dewan, 2022a); nor have the emerging forms of work enabled by digitalisation created enough or better opportunities for a majority of India's labour force.

This is in part because the infrastructure for technology access and use has not expanded as rapidly and as equitably as was desired (rural/urban, gender, and socio-economic divides persist). When contrasted with the global market, such as South Africa, the Middle East region, and South Korea where digital adoption has spread rapidly and equitably, India also struggled to hold up as an international contender. Technology adoption by Indian SMEs has also remained slow, discouraging investments.

International frameworks and conventions have found little concrete application in the country. Central government policies and regulations continued to struggle in regulating technology companies – whether they be platforms, BPO/BPM enterprises, or protective legislation for self-employed entrepreneurs. At the same time, translation of Central directives at the state-level has also been limited. Policies and regulations are hard to design and implement for a country with such regional and cultural heterogeneity, especially when the pace and scale of technological change continue to advance faster than the ability of governance to adapt.

The Economic, Labour Market, and Demographic Backdrop

Growth & the Service Sector

While India regained growth to 8.5% in 2022-23, it was unable to maintain double-digit growth through 2024-29, which is what it needed to make up for the losses during the COVID-19 years. India's increased growth for this decade has largely been propelled by government spending; some investment flowing into Indian companies, especially technology companies, and capital-intensive growth of services.

India continues to be a service-led economy, but much of the sector's contribution to GDP is capital-intensive rather than labour-intensive and is propelled by a small group of more skilled workers.

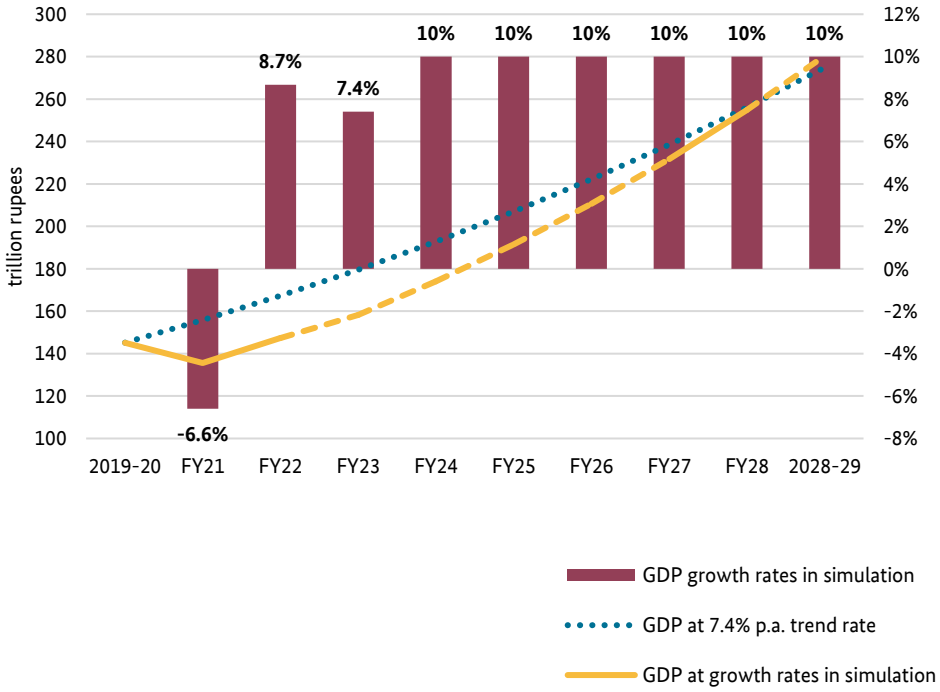

Figure 18: GDP Growth Simulation
Source: Personal communication Partha Mukhopadhyay, based on data from NAS, MoSPI and assumptions[12]

Labour Force Participation, Unemployment & Informal Employment

Labour force participation declined slightly, due mostly to discouraged youth dropping out of the labour market. The steady decline in female labour force participation witnessed since 2005 continued, albeit at a much slower pace. The rise in the unemployment rate seen during the COVID-19 crisis eventually fell just recently to a pre-crisis level of 6.1%. But data suggest that the share of self-employment has continued to rise, widening informal employment; the share of regular wage workers that are ineligible for social security also continued to rise, fuelling growing labour market precarity.

Demographic Bulge

With only another decade or so left of its demographic advantage, where the working age population exceeds the dependent population, policymakers continue to face mounting pressure to productively engage their large and growing youth population.

Trends Culminate in Growing Polarization

Looking back over the last decade, as of the time of this analysis in March 2030, digitalisation has continued to unfold in the absence of significant and effective policy and regulatory interventions to manage its effects. There is a deepening divide between large corporations and small; between enterprises and workers; between female and male workers; between educated, skilled, and socio-economically better off youth, and their economically-disadvantaged counterparts. This growing polarization is fuelling discontent and social unrest.

[12] This is the average of actual GDP growth from 2014-15 to 2018-19 (since Modi, before Covid). Numbers in bold are figures from the National Accounts Division of MOSPI. The figure of 7.4% is taken from Sitharaman, 2022.

Concentration of Power

Monopolistic and oligopolistic tendencies and anti-competitive behaviour by companies (including platforms) has led to an accumulation of power in larger corporations that has both stripped small businesses of opportunity and weakened worker agency. Small and medium enterprises claim a smaller share of employment because of the consolidation of businesses (ILO, 2022; Dewan et al., 2021). This consolidation was facilitated by the ability of larger businesses to adopt and apply technology, and by the supply-chain shocks with the onset of the COVID-19 pandemic.

The percentage of unregistered firms dropped from 70%, but only because many of these small firms were beyond the purview of government assistance and were unable to withstand shocks imposed by digitalisation and the pandemic; many, therefore, failed. Government touts the reduction in the number of unregistered firms and the increase in the number of people working in large firms (even though there are fewer people working overall) as a success.

Consolidation means that there are fewer options for regular wage work, and more people are vying for fewer jobs. This has made the job market more competitive, exerting downward pressure on wages, working conditions, and rights such as the right to collective bargaining and freedom of association. Some workers, especially youth, unable to find gainful employment became discouraged and dropped out of the labour market. Others turned to self-employment, on- and offline. With a rise in the number of self-employed workers, collectivization becomes more challenging.

In the absence of mandated data sharing arrangements, companies continue to amass power from consumer and worker data that cannot be effectively leveraged in service of policymaking.

Weakening Women's Agency

Rather than addressing the root causes of the decline in women's labour force participation, policymakers and 'society' at large hinge their hopes on emerging forms of digital work – especially home-based work – in enabling women to engage in income generating activities. They are happy for this to be the means by which women's economic empowerment is enhanced.

As such, there are no meaningful efforts to:

(i) Engage in community programs to 'root out the patriarchy' that (a) makes it difficult for women to feel safe outside their home and restricting their movement; (b) lays a disproportionate burden of domestic responsibilities on women restricting the time they have to work, even if they are working from home; (c) perpetuates the view that women are 'less valuable' workers than men, manifesting in lower wages, or in pushing them into gender normative occupations.
(ii) Pass, implement and enforce a range of regulations that enable women's work, especially outside the home (e.g., separate bathrooms, creches, safety, hiring quotas, enforcement of equal wages etc.)
(iii) Introduce 'new' education or skill initiatives that specifically enable women's increased labour force participation, upskilling/reskilling, or career progression.

As a result, most women continue to remain outside the labour market. Some take up various forms of home-based gig work, digital entrepreneurship, and BPO/BPM. Those that want to take up jobs outside the home are gently nudged by their families toward considering in-home opportunities instead. Women themselves, given the burden of housework, submit to preference for working from home.

Those that engage in location-based work are still restricted to gender normative occupations like beauty-work. Some are working in transportation and other male-dominated forms of location-based gig work, but the numbers continue to be small. Women experience little career progression or little enhancement in their economic empowerment.

Lack of Good Jobs for Youth

A lack of good jobs is fostering discontent among youth and giving rise to unrest (Dewan, 2022b). 'Job riots' that started to gain momentum in 2022 have grown in frequency and intensity (Daniyal, 2022). Technology has enabled more capital-intensive as opposed to labour intensive growth, where machines, robots and artificial intelligence have replaced workers in routinized work. Business consolidation means that there is less employment, but also fewer opportunities for less educated and less skilled youth in smaller businesses.

Certain sectors such as BPO, which had provided many with jobs in the early part of the century, have become increasingly automated now adding fewer jobs than they did in the past. And the jobs that did come about with new forms of BPO/BPM are becoming polarized between those that call for a higher skill level, or those that are 'uber-ized' with micro-taskers and freelancers doing the necessary tasks.

Gig work has broken up jobs into smaller tasks. Labour platforms continue to serve as intermediaries between consumers and a large group of self-employed service providers. But neither the government nor platforms have been able to work out how to provide social security to these self-employed contractors, who, when left to their own devices, don't purchase such benefits in the private market. Most of these self-employed workers therefore do not have social security benefits; they face constant uncertainty in market-demand for their services; and despite working long hours to earn incentives, they end up with relatively low incomes.

The government has continued to invest in skills training through short-term schemes such as Pradhan Mantri Kaushal Vikas Yojana and Deen Dayal Upadhyay Grameen Kaushalya Yojana, and a network of Industrial Training Institutes (ITIs), but in the absence of real incentives to promote apprenticeships or Sector Skill Council reform, training continues to be supply driven as opposed to demand-led, leading to frustration among youth. Many of whom don't find work even after getting trained, and the ones that do find employment don't see a wage premium. Despite these efforts, though, less than 10% have formal training – this is up from 3.2% in 2019-20.

A majority of the 350 million youth between the ages of 15-29 have low levels of education and skills. Much of the training through government schemes builds capacities for traditional trades that require more physical rather than cognitive labour. Many trained youths therefore enter forms of self-employment as e.g., carpenters, electricians, masons in the service sector. Others, unable to find regular-wage jobs enter forms of gig work that have low barriers to entry. The more educated youth with higher levels of digital literacy, become digital entrepreneurs, but the pool of youths that have this background and can afford to take on the risks associated with entrepreneurship is small.

Annex 3: Ideal Scenario – A world of work where decisive policies & regulation harness digitalisation to serve human development

A decade ago, the COVID-19 pandemic struck, severely disrupting economic and social lives across the globe for a better part of two and a half years. India was no exception. Now in 2030 – a decade after the pandemic reduced growth and diminished hard-fought development gains – India has not only managed to revive growth. It has done so through measures that foster a more resilient, inclusive, and equitable economy. These measures have also made India an attractive destination for foreign investment, supporting job growth.

The Economic, Labour Market and Demographic Backdrop

India regained growth to 8.5% in 2022-23. Growth continued to expand over the next several years as the government restructured its spending priorities to support higher expenditure on health, education, and training as well as on instituting a wider social safety net. It also expanded infrastructure for technology access and use, financed through public private partnerships and brokered additional trade agreements to expand its exports of goods and services. Demand-side measures revitalized production, creating more employment, while supply-side measures created a more productive workforce better matched to the demands of the private sector. With better education and skills, more young people are starting to participate in higher-value-add jobs in services. The demographic bulge continues to be a challenge given the scale of the large and growing youth population, but these supply-demand-side measures are creating a promising environment for young people.

Labour force participation has therefore seen a slight increase owing mostly to discouraged youth re-entering the labour market. The steady decline in female labour force participation witnessed since 2005 has also just started to rebound. It remains to be seen if these positive trends will continue to gain momentum.

The rise in the unemployment rate seen during the COVID-19 crisis eventually fell just recently to a pre-crisis level of 6.1%. But the expansion of the social safety net is also prompting a reduction in informal employment.

Unfolding Patterns of Managed Digitalisation

Digitalisation is playing a key role in scaling development interventions from the provision of health and education services to enabling different opportunities for income generation. But the benefits of digitalisation are being realized because the government has taken measures to (i) create a foundation where technology-based interventions are effective, and (ii) institute policies and regulations to ensure that technology advances in ways that benefit both companies, but also workers.

Taking each in turn: To create a foundation where technology-based interventions are effective, (i) the government helped bridge the digital divide by expanding the infrastructure to improve technology access and use across rural and urban

areas. It has established guidelines for States to institute programs that provide preferential access to technology at discounted rates for schools in the most backward parts of the country. (ii) Special emphasis was placed on fostering the ability of young girls to use technology in schools and training institutions as they are unlikely to have equal access in their homes. These measures were built into the implementation of the National Education Policy (NEP) 2020. The NEP's goal of integrating digital literacy and other forms of vocational training with the education system to ensure that youths are prepared was realized. (iii) Government-backed ag-tech, health-tech, and ed-tech interventions called for careful pilots to ensure that the interventions yielded the desired results. Only those that were successful in the pilot stages were adopted. The same was true for portals. The government also drastically reduced its number of portals, consolidating them with the assistance of States and district administrations.

Policies and regulations were instituted to ensure that technology advances in ways that benefit both companies, but also workers. (i) The government took decisive action to check the monopolistic and oligopolistic tendencies of businesses providing special protections to small businesses. (ii) Small businesses were given targeted support to help them adopt technology. The government worked with large companies to incentivize them to induct and support suppliers and subcontractors in their value chains to adopt and use technology. (iii) The government deliberately incentivized 'work systems design' that favours augmentation over labour-displacing automation. (iv) A new social compact between the government, companies, and workers was developed so that platform data could be used for evidence-based policymaking. (v) Building on the definitions of a platform company and gig work/worker that the Social Security Code outlined, the government instituted special taxation rules for platform companies which were collected into a government fund that was then used for public provision of social safety nets. (vi) The Central and State government worked along with the National Skill Development Corporation, Sector Skill Councils, and the State Skill Development Missions to create and implement effective employer run skills training systems and expand apprenticeships.

When relevant and possible, the government subscribed to international frameworks and conventions both in spirit but also in concrete drafting of policy and regulations.

What are the outcomes of these developments?

Shared Power for Shared Benefits

Policies and regulations are pulling the economy into being more resilient, inclusive, and equal. Company strategists have started to pilot new models of stakeholder capitalism (Dewan et al., 2021). This new model brings together a wider range of stakeholders – customers, workers, suppliers, the local community as well as traditional shareholders – to share information and dividends, toward smoother functioning markets.

Harnessing Opportunities for Women

Realizing that homebased gig work is not going to be the panacea to improve women's labour force participation, policymakers have focused on instituting a wider set of policies that enable women to engage in income generating activities more broadly. These include instituting more public campaigns to address patriarchy like 'Beti Bachao, Beti Padhao' (Save the girl child, educate the girl child), but extending to women's economic participation by also passing, implementing, and enforcing a range of regulations that enable women's work, especially outside the home such as separate bathrooms in the place of work, creches, safety, hiring quotas, and enforcement of equal wages. The government has also instituted special incentives to bridge the digital divide with a special focus on women.

As a result, female labour force participation rates stopped declining. In the last couple of years, we have started seeing a slight rebound with more women taking up a range of jobs, including but not limited to home-based and location-based gig work.

Good Jobs for Youth

Job riots are starting to become a thing of the past. While the economy still isn't producing enough jobs to absorb the large and growing youth population, there is less angst among youth because there is better labour market matching, and education and skills trainings are yielding better employment outcomes. The government's focus on labour-intensive growth composition, economy-boosting expenditure, and expansion of jobs is creating a smoother labour market, reducing an over-reliance on digital entrepreneurship (and entrepreneurship in general), gig work and even on BPO sectors alone.

These sectors continue to grow and thrive, but because there are other options for income generation, there isn't an oversupply in these sectors that would drive down wages and working conditions. Moreover, government regulations and data-sharing arrangements have created an opportunity for workers – whether they are self-employed contractors, entrepreneurs, or employees – to have better social safety net coverage and to be protected by labour regulations.

Annex 4: Roadmap for Action 2030

Based on the discussions in the final scenario planning workshop

Concentration of Power	
1	Introduce a **legislative package** that: • Regulates big companies from self-dealing and rigging the marketplaces they operate. • Institutes a new social compact between the government, companies, and workers so that platform data is used for evidence-based policy making. • Incentivise 'work systems design' that favours augmentation over labour-displacing automation. • Incentivises companies to induct and support suppliers and sub-contractors in their own value chains in adopting and using technology.
2	**National Watchdog** Set up a national watchdog, comprising of GoI, CSO/NGOs working in tech accountability, and small tech businesses to monitor the regulation of tech companies.
3	**Alternative models for taxation** A staggered tax slab – based on profits and the longevity of operations – for platform companies that contributes to a Gig Workers Social Security Fund.
4	**Support to small businesses** Incentivize big companies to support small businesses with adapting to technology through the existing Corporate Social Responsibility law. Divert funding to non-tech small businesses, including microcap and nanocap companies, in agri-tech, finance, manufacturing, and ed-tech.

Enhancing Women's Agency	
1	**Political participation at grassroots level** Recognise and incentivise community workers, like ASHA workers and Anganwadi workers, as community leaders and role models.
2	**Access to technology and skills** Ensure that girls have equal time and access to technology in schools, institutions of higher education, and training institutions, as well as in their homes.
3	**Social Protection** Mandate companies to provide maternity benefits, daycare support, transportation, and safe working environment for not just employees, but also contract workers and gig workers.
4	**Life-cycle approach to education** NEP to adopt a live-cycle approach to women's education, where schooling and other educational programmes encourage women to return to education after taking a break. Offer career pathways for women opting for non-gender normative occupations.
5	**Infrastructure** Safe efficient affordable public transport. Microloans for private vehicles available for girls to enable access to education and work outside the home.

Good Jobs for Youth	
1	**Implementation of NEP** to provide access to vocational courses and digital skills as early as middle school, giving students the flexibility to choose and experiment.
2	**Digital Skills** Digital literacy and other forms of vocational training to be fully integrated with the education system to ensure that youth are prepared for jobs of the future.
3	**Reforming the skilling ecosystems** Design skilling programs on the basis of expertise gaps identified in labour market demand, and rooted in local opportunity mapping.
4	**Apprenticeships** Systematic engagement between the public skills training system and private sector to provide access to apprenticeships and on-the-job training
5	**Social safety net** Regulate minimum wage and social security benefits for not just employees and contract workers, but gig workers as well. Mandate platform companies to not just contribute, but also manage enrolment of gig workers into a Gig Workers Social Security Fund.

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