



► ILO Brief

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Digital technologies and how India can use it to its advantage

The development of information and communication technologies (ICTs) since the mid-1980s was believed to offer a new 'development paradigm' for developing countries such as India to create new markets and employment opportunities in knowledge-intensive services. India embarked on an ambitious effort to integrate ICT development into its national policies, and seized this opportunity and developed a range of IT-enabled services from software and R&D services at one end of the skill spectrum to business processes such as call centres at the other end.¹ This gave an impetus to the export of software and 'IT-enabled services' and paved the way for India to dominate the outsourcing market.² It allowed firms in advanced economies either to offshore and procure IT-enabled services, or to procure these services on-site to reduce operational costs, costs of monitoring the workforce and to access skilled labour as part of their business strategy.³ This strategy also helped Indian firms in IT-enabled services from software and R&D, as they were able to build a reservoir of skills and technical knowledge through its turnkey projects that could be deployed in a range of industries through the entire economy, by codifying and

disseminating their processes in a strategic fashion and by adopting innovations that have been developed in one domain to another. With the on-going digital transformations in the economy, this repository of skills and knowledge could be harnessed and utilised effectively to bring about a productive transformation of the Indian economy.

The development of ICT since the mid-1980s also led to outsourcing of low-skilled 'routine' jobs to call centres in India and other developing countries, as firms worldwide tried to cut costs. India had been observing jobless growth during this period, and the call centres provided employment opportunities for young graduates (with general education) coming from small towns, rural areas and urban middle class, as these jobs did not require any specific skills. However, this process led to job polarization in the IT labour market as call centres and BPOs mushroomed, and affected the way work was organized, and subsequently job quality.⁴ The impact of call centre jobs on different aspects of workers' job quality such as career progression, employment stability and income security is quite debatable, but at least there was some degree of protection for these

¹ Parthasarathy, B. 2010. The computer software industry as a vehicle of late industrialization: Lessons from the Indian case. *Journal of the Asia Pacific Economy* 15(3): 247-270.

² Parayil, G. 2005. Introduction: Information capitalism. In: Parayil G (ed) *Political Economy and Information Capitalism in India: Digital Divide, Development and Equity*. Technology, Globalization and Development Series. London: Palgrave Macmillan UK, pp. 1-10.

³ Hirschheim, R and Dibbern, J. 2009. Outsourcing in a global economy: Traditional information technology outsourcing, offshore outsourcing, and business process outsourcing. In: Hirschheim R, Heinzl A and Dibbern J (eds) *Information Systems Outsourcing: Enduring Themes, Global Challenges, and Process Opportunities*. Berlin, Heidelberg: Springer, pp.3-21; Rubery, J. and Grimshaw, D. 2001. ICTs and employment: The problem of job quality. *International Labour Review* 140(2): 165-192.

⁴ Rani, U. and Furrer, M. 2021. "Digital labour platforms and new forms of flexible work in developing countries: Algorithmic management of work and workers" in *Competition and Change*, Vol. 25 (2): 212-236.

workers.⁵ The Indian BPO industry continues to grow at 9 per cent in 2019 and employed about 1.1 million people in 2017,⁶ offering outsourcing services to more than 65 countries. India continues to be the largest exporter of ICT services and this sector accounted for about 51 per cent (\$135.9 billion) of the total exports in 2019.⁷

The current trends in digital technologies are further driving forward the digitalization of trade and services, which is becoming a new engine for economic development for many developing countries. The

development of digital infrastructure serves as an important approach for countries to elevate themselves in the digital value chains, which can be observed in a number of developing countries including India. The rise of the digital economy is also associated with the development of a number of digital technologies such as artificial intelligence (AI), cloud computing, blockchain, digital platforms, among others. The digital economy can be broadly classified into three components: digital infrastructure, digital services and digital trading (see table 1).

► **Table 1: Classification of digital economy**

Type	Comprises of	Industry
Digital infrastructure	Telecommunication equipment and services	Telecommunication services Manufacturing of telecommunication equipment Construction sector
	Computer hardware	Manufacturing of computers and electronic and optical products
		Manufacturing of electrical equipment
	Computer software	Software programmers, coders, developers
Digital services	Financial services	Financial experts
	Legal and patent services	Legal & patent services
	Accounting services	Accountants
	Software services	Software programmers, coders, developers
	Medical consultation and other services	Doctors, medical transcribers, etc.
	Research & Development	Research & Development
	Translation, transcription services	Translators, transcribers
	Low-skilled tasks such as tagging, content access or content moderation	Content moderators, etc
	Low skilled services such as taxi, delivery, domestic work, care work	Taxi, delivery, domestic workers, care workers
Digital trading (across a range of sectors)	Wholesale	Wholesale
	Retail	Retail

⁵ Ramesh, B.P. 2004. 'Cyber coolies' in BPO: Insecurities and vulnerabilities of non-standard work. *Economic and Political Weekly* 39(5): 492-497; James, A. and Vira, B. 2012. Labour geographies of India's new service economy. *Journal of Economic Geography* 12(4): 841-875.; Mirchandani, K. and Poster, W. 2016. *Borders in Service: Enactments of Nationhood in Transnational Call Centres*. Toronto: University of Toronto Press.

⁶ <https://www.hindustantimes.com/business-news/bpo-industry-challenged-outsourcing-giant-india-losing-to-china-small-countries/story-13T7SBBiHb8ZujWChE8B7N.html>.

⁷ NASSCOM (National Association of Software and Service Companies) 2019, *Industry Performance: 2018-19 and what lies ahead*, New Delhi: NASSCOM.

Countries are positioning and integrating themselves in the digital global value chains to reap the benefits of a growing digital economy. In India, the digital economy along with the ICT sector is estimated to contribute over 13 per cent to its GDP,⁸ while the government is aiming to enhance the contribution of the digital economy to 20 per cent⁹ of GDP by 2025. This anticipated growth is based on the demand for digital services and digital trade from both domestic as well as foreign markets.

Digital technologies such as cloud computing and cloud infrastructure have also enabled the development of innovative business models such as digital labour platforms, of which there are two broad types: online labour platforms and location-based platforms.¹⁰ The location-based platforms such as taxi and delivery services are quite popular, but there are a number of other sectors such as domestic and personal services, health care, medical consultation and education, among others where platforms have penetrated. While these platforms have created some work opportunities, there are challenges with regard to working conditions which are associated with low incomes, irregularity of work, lack of social protection, lack of access to workers' collective and individual rights and protection, and occupational safety and health risks.

The online labour platforms have enabled work to be outsourced globally across borders so that work can be performed remotely from any location. Work on these platforms covers a range of tasks from labelling and data processing, content access and content moderation to web design and software development. India is one of the major destinations for such work according to the data provided by the online labour index. These developments are viewed positively by the Indian government, as they are an important source of jobs and foreign exchange, and the government is investing in digital infrastructure and training programmes to support their expansion.

However, there are many tasks that are outsourced on these platforms which are low-skilled and performed by highly educated workers (graduation and above, and

with STEM education) further polarising the labour market. Some of these tasks such as content access, market research and reviews are geared towards the promotion of websites or products, which neither require any particular expertise nor improve the workers' skills. Similarly, some of the tasks performed in the BPOs or call centres in India include content screening or content moderation, with the purpose of removing objectionable material from the web. More than 95 per cent of the workers who are hired in these BPOs or call centres are IT professionals with a university degree in engineering or computer science and there is no relationship between their educational qualifications and the work they perform, with little learning or career advancement in these jobs. Some of these tasks also have psychological impacts on the workers and could have lifelong effects. Further, on online labour platforms, workers are poorly paid, and they often lack access to traditional employment benefits such as social protection, paid leave, minimum wages, limited working hours, right to establish and join trade unions and collective bargaining.¹¹

The on-going trend of generating opportunities either through online labour platforms or BPOs and call centres begs the question as to whether this is a beneficial development outcome for the highly educated workforce and the best use of skilled labour in the country. As education is an important factor for economic development, there have been investments on the part of both the households and State in education over the past decades to equip their workforce with different skillsets. The educated labour force is then being used inefficiently instead of developing and using their skills more productively to fulfil the innovation and productive needs of the country. Some of the current trend of outsourcing that we observe is quite similar to that of the earlier trend with BPO and call centres, wherein many of the jobs are 'dead-end' jobs not requiring any specialized skills and are of a routine nature, without decent working conditions.¹²

⁸ For more details, see: <https://www.trade.gov/country-commercial-guides/india-information-and-communication-technology>

⁹ For more details, see: https://www.business-standard.com/article/economy-policy/govt-aims-to-enhance-digital-economy-s-contribution-to-20-of-gdp-in-5-yrs-120091502151_1.html

¹⁰ ILO (2021). *World Employment and Social Outlook 2021: The role of digital labour platforms in transforming the world of work*. ILO: Geneva.

¹¹ Refer to ILO (2021).

¹² Refer to Rani and Furrer (2021).

Given this trajectory, policy makers and researchers are often preoccupied and concerned about how to move from low-value added services to high-value added services. It is not clear if the high-value added services imply high revenue per employee or whether such services are for the benefit of the larger society and economic development. Whatever it may be, the concern should be much more on who is going to reap the benefits from such a transformation and who appropriates that value. Furthermore, supporting the growth of higher value-added services is important for attaining new heights of prosperity as outlined in Vision India 2047 but evidence suggests that these higher value added services tend to have a symbiotic relationship with the manufacturing sector, suggesting that efforts to support high-value added services be coupled with those aimed at promoting manufacturing.¹³ High value added services such professional and business services have

been separated from manufacturing via outsourcing and yet their demand is often derived from the production of manufactured goods. High-value added services and manufacturing (including in the manufacture of electronic and related products needed for digital infrastructure) together also provide the opportunities for both productivity growth and a wider employment base, given the labour-intensity of the latter.

From a development perspective, the question is how to utilize this new emerging technology in a way that uses the educated workforce and brings about a productive transformation in the society and that contributes to economic development, and improves the human development index. Below are some thoughts or suggestions to take forward this idea.

Building and developing digital infrastructure to address the digital divide

Information and communications technology (ICT) infrastructure is a pre-requisite for the growth of the digital economy, and there still exists some digital divide. While internet adoption in India is quite high, with about 622 million active internet users in 2020 and is poised to increase in the next five years and touch 900 million by 2025,¹⁴ small towns account for 40 per cent of active internet users in the country, and rural India continues to lag behind. In addition, there are gender gaps as only 42 per cent of Indian women surveyed in 2020 had ever used the internet, compared with 62 per cent of men, while in rural areas, this was even lower with nearly 34 per cent of women and 55 per cent of men having ever used the internet.¹⁵

To harness technology so that the benefits can be shared equally by firms and workers, and both men and women would require addressing the digital divide. This will also allow for a transition towards formality, provide improved access to markets and facilitate access to

public services, which can lead to productivity gains. The expansion of ICT infrastructure in India and a growing internet user base would be quite important to address the digital divide as well as to reach out to rural areas to provide value added services. This will require more investments and finance for developing or upgrading the digital infrastructure to reduce the widening gaps, so that existing inequalities are not exacerbated and to ensure there is universal access to all. The development of ICT and digital infrastructure in areas such as education, health etc. would not only generate employment opportunities in the sectors identified in Table 1, but would also have multiplier effects in a number of other sectors in the economy.

There is an important opportunity to promote sustainable digital infrastructure to address the digital divide, which contribute towards India's goal of reaching net-zero¹⁶ emissions by 2070. Available evidence shows that digital infrastructure, including data centres and

¹³ Dasgupta, S.; Kim, K. B.; Pinedo Caro, L. 2017. As much to be gained by merchandise as manufacture? The role of services as an engine of growth, *The Japanese Political Economy*, 43:1-4, 9-37, DOI: 10.1080/2329194X.2018.1544031

¹⁴ For more details, see: <https://economictimes.indiatimes.com/tech/technology/india-to-have-900-million-active-internet-users-by-2025-says-report/articleshow/83200683.cms?from=mdr>

¹⁵ For more details, see: <https://www.dw.com/en/indias-digital-divide-grows-among-rural-women/a-55949074>

¹⁶ See, for more information: <https://theprint.in/environment/india-will-reach-net-zero-emissions-by-2070-pm-modi-says-at-cop26-as-he-promises-panchamrit/760353/>

telecommunications systems, have considerable implications for electricity consumption and emissions.¹⁷ Public investment in developing and upgrading ICT infrastructure that is energy efficient and is supported by renewable energy will enable the country to leap-frog towards an environmentally sustainable digital economy, and can help reduce global emissions by 15 per cent.¹⁸ The benefits of digital technologies can hence also be harnessed in multiple sectors to address the impacts of climate change, and reduce emission levels. In the Indian context, digital technologies can play a particularly important role in strengthening the resilience and efficiency of the agricultural sector,

improving early warning systems for natural hazards, while also supporting innovations in the field of green technologies across various sectors from transportation to manufacturing. Leveraging digital technologies in the context of climate change and environmental sustainability would however require a fit-for-purpose policy framework, and the ILO's Guidelines¹⁹ for a just transition towards environmentally sustainable economies and societies for all provides important guidance.

Using digital technologies for productive transformation of the society and economy

While India continues to earn revenues through ICT exports, given the vast potential in the domestic market in the coming years, it would be important to look inward and develop a domestic strategy as it is going to be a key driving force. There is an increasing demand for the application and deployment of ICTs, digital tools and devices in a number of sectors in the economy, such as agriculture, health, education, manufacturing and a range of services. As mentioned earlier, India has developed a reservoir of skills and technical knowledge, which can be harnessed to develop innovations or new technological solutions at a relatively low cost that could be accessible to all. India is also a hot bed for 'frugal innovations' or 'ingenuous innovations' or '*jugaad*', which can be tapped more effectively.

One of the areas where India could use digital technologies in an effective and impactful way, where the society as a whole can benefit is in the health sector.²⁰ The digital transformation in this sector also emerges as a low-hanging fruit, especially given the focus and momentum that has been generated for ensuring access to quality healthcare since the outbreak of the COVID-19 pandemic. India has a large network of primary healthcare infrastructure across the country,

including in some of the remote areas, but it has only a limited number of good doctors, and providing quality health care can be a challenge. The health care sector has already drawn a lot of attention in recent years from NGOs, MNEs and start-ups who are looking at preventive health care devices and provision of care services to certain targeted populations. There is huge dependence in India on exports for diagnostic tools and devices, despite India being a significant producer of pharmaceutical products, and not adequate attention has been given towards developing diagnostic devices domestically.

Government could focus their attention towards encouraging and supporting firms to develop low-cost domestic devices and technologies with the repository of skills and technical knowledge so they can be accessible even in rural areas at affordable prices. It could promote policies which encourage public-private partnership with local companies or MNEs and ensure easy availability of finance for such projects at lower interest rates. Diagnostic health devices such as, portable ophthalmic imaging device help in preventing blindness as they detect common disease such as diabetic retinopathy, glaucoma, cataract etc. While the skills and knowledge of

¹⁷ See, for more information: <https://www.iea.org/reports/data-centres-and-data-transmission-networks>; <https://actu.epfl.ch/news/data-centers-need-to-consider-their-carbon-footpri/>

¹⁸ See, for more information: <https://www.weforum.org/agenda/2019/01/why-digitalization-is-the-key-to-exponential-climate-action/>

¹⁹ See, for more information: https://www.ilo.org/global/topics/green-jobs/publications/WCMS_432859

²⁰ This section largely draws from Balaji, P., Aoyama, Y. and Menon, N. 2015. "Innovating for the bottom of the pyramid: Case studies in healthcare from India" Chapter 6 in S. Hostettler et al. (eds.) Technologies for Development, Springer International Publishing, 2015. which provides a description of four case studies and illustrates how India can develop a domestic strategy for addressing some of the health needs of those who are at the bottom of the society.

highly qualified personnel can be in used in developing such devices, at the same time it would be important to train personnel or enhance the capabilities of health care workers and *anganwadi* workers in rural areas with basic or minimal ophthalmological training so that they can perform some of these tasks. Similarly, AI and other digital tools and devices can also significantly enhance the diagnostic and treatment capabilities of nurses, physicians' aides, and other medical technicians. This can allow less skilled practitioners to enhance their capabilities and perform tasks that earlier only doctors could perform because of their professional education and experience.²¹

Health care service delivery in rural and remote areas is quite a challenge in India, as it is often difficult to attract doctors to these areas. The rise of digital labour platforms especially telemedicine platforms or teleradiology can be used effectively to diagnose and treat patients in remote parts of the country. Digital platforms provide cloud infrastructure where data and images can be archived and accessed for remote diagnosis by doctors. These telemedicine platforms can be linked with the public health care centres in remote parts or rural areas where patients can be remotely attended to, and with hospitals in urban cities where a pool of doctors or physicians and specialists can diagnose and provide quality care services to these populations. While many of the doctors might cater to the demands of urban and overseas patients, they can also provide services to rural populations. In addition, to creating opportunities for doctors, it can also create opportunities for low-skilled persons such as *anganwadi* workers or health care workers in rural areas or assistants for doctors who are able to administer the required treatment once it has been diagnosed. There is

a huge potential for such platforms to provide high value-added services to the rural and remote communities, however there are challenges of financing such initiatives, training of personnel and ensuring that the services provided are for a larger public good. There is also the challenge to negotiate and manage the balance between the digital technology and the human elements in servicing those needing care.

To develop such a domestic strategy, government could provide business incentives to small and medium sized enterprises to develop products, tools and devices which are focused on providing high value-added services to the society and economy. These incentives could include access to financing at affordable interest rates, coordinating them with local public employment services so that they can recruit suitable workers, providing training so that requisite skills can be built up, among others. Public financing would be crucial as private financing largely comes from venture capital funds with a profit motive and they might not necessarily be interested in developing a public or social good. Government can also encourage the introduction of learning organisations where workers can develop technical as well as cognitive, social and soft skills, and where there is scope for continuous learning. Public policy can also play an important role in shaping the desirable social and economic outcomes of new digital technologies and business process innovations. Finally, digital technologies can also be used for establishing an efficient social security ecosystem, and the National Digital Health Blueprint already underlies such a framework. The E-health system can be used for providing health care services, health surveillance, medicine, health insurance, and at the same time used for research and building up knowledge.

Strengthening institutions in the digital era

- Social dialogue institutions for consultation and consensus-building on strategic directions would be key for developing strategies that foster a process of bringing about productive transformation in the economy that leads to more and better jobs.
- To ensure decent work for workers on digital labour platforms, it would be important to guarantee that platforms and their clients provide certain minimum rights and protections to the workers, which include among others:
 - Ensuring that workers' employment status is correctly classified and is in accordance with

²¹ Acemoglu, D., and P. Restrepo (2019). "The wrong kind of AI? Artificial intelligence and the future of labor demand." *Cambridge Journal of Regions, Economy and Society* 13, No. 1, pp. 25-35.

national legislation and ILO standards²², to avoid disguised employment;

- Guaranteeing that all platform workers, without distinctions based on their contractual status, effectively enjoy the right to associate and to bargain collectively,
- Guaranteeing that workers on digital labour platform enjoy labour rights, including protection against discrimination, occupational safety and health, fair remuneration, limitation of working time, access to efficient disputes resolution mechanisms and ensuring that relevant laws are applied effectively to digital labour platforms and their workers and that the new challenges arising in this respect from the digital transformations are fully taken into account;
- Ensuring adequate social security benefits for all workers, including platform workers, by extending and adapting policy and legal frameworks, as well as administrative processes, where necessary.

- Digital technologies can also be effectively harnessed to provide decent work to all workers. For instance, governments in a number of countries have started to utilize digital technologies to promote formalization through the registration of both economic units and of employment, digital payments or electronic payroll, the provision of social protection and other benefits, filing and payment of taxes, among others.²³ This strategy could be replicated and scaled up in a variety of different contexts, including on digital labour platforms so as to ensure decent work to all workers. Technologies can also help in increasing compliance through maintenance of digital records, which are transparent and using targeted inspection and enforcement. Similarly, with increasing work intensification, working time can be digitally maintained to ensure protection of wages for hours worked, as well as to ensure compliance with working time regulations.

²² See in this respect the Employment Relationship Recommendation, 2006 (No. 198).

²³ Juan Chacaltana, Vicky Leung and Miso Lee, “New technologies and the transition to formality: The trend towards e-formality”, ILO Employment Working Paper No. 247, 2018.

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