

Contribution of the ICT Sector to National Income and Employment

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Abstract

Digital economy has played a major role in the growth process, especially of the service sector. It is argued that the rise of digital services, in particular, information and communication technology sector (ICT) is not only contributing to service sector but is also enhancing the productivity of manufacturing industries in terms of demand of computer hardware, telecom equipment, electronic components and semiconductor devices. India has emerged as the leading hub in the world for digital services, in particular, ICT services, accounting for more than half of global outsourcing business today. However, different definitions have been used for estimating the ICT sector in India because the concepts, methods and applications involved in ICT are constantly evolving. In this context, this paper has adopted the latest OECD, 2015 definition and Industry codes (4-digit NIC codes) to understand its contribution to country's economy and employment.

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1. Background and Motivation

Today we are witnessing a phase of transition in the global economy, a restructuring that is heavily influenced by the emergence of digital technologies. The worldwide development of digital economy mainly Information and Communication Technologies (ICTs) has accelerated dramatically over the past two decades. It continues to have a transformative impact globally - the way we live, work and develop our economies. The ICTs is creating new opportunities for trade by globally connecting businesses and entrepreneurs, opening new ways of generating income, supporting productive activities and creating decent jobs.

Digital economy has played a major role in the growth process, especially of the service sector. It is argued that the rise of digital services, in particular, information technology is not only contributing to service sector but is also enhancing the productivity of manufacturing industries in terms of demand of computer hardware, telecom equipment, electronic components and semiconductor devices. Furthermore, mobile phones with internet connectivity and digital solutions have allowed enterprises to cut costs, streamline supply chains, and easily trade products and services worldwide. Increased trade at reduced costs can have positive spill over effects on the economy through enhanced competition, productivity and innovation, as well as improved access to information, talents and skills and newer dynamic technologies such as blockchain, artificial intelligence, etc. The transformation of data into digital intelligence is the key to success in digital economy, which has become a new economic resource for creating and capturing value.

The estimate of the size of ICTs ranges from 4.5 to 15.5 per cent of the world GDP. The global estimates of employment in ICTs stood at 39 million in 2015, with computer services accounting for more than one-third (38 per cent) share. Its share in total employment has been increasing and accounted for 2 per cent. The investment in ICTs has increased substantially in both developed and developing countries worldwide. The value of global production of goods and services of ICT crossed USD 1 trillion and stands at USD 1.3 trillion in 2018. The share of global production of ICT goods and services has gone up to 6.5 percent of the total global GDP, and the sector employs around 100 million people around the world (NASSCOM, 2018). While the export of ICT services grew by 40 percent between 2010 and 2015, amounting to USD 467 billion, the trade in ICT goods stood over USD 2 trillion in 2015 (UNCTAD, 2018).

India has the largest share of computer industry among the developing countries. The relaxing of trade barriers has further encouraged ICT sector growth and expansion. India has emerged as the leading hub in the world for digital services in particular ICT sector accounting for approximately 55 percent share of the US\$ 190 billion global outsourcing business in 2017-18 (CII, 2019). The availability of a large pool of skilled and technically qualified people at a fairly cheaper cost, as well as effective government policies such as economic reform measures in 1990s, opening of IT parks across the country; partial privatization of telecommunication; development of Special Economic Zones that helped IT companies get tax benefits; a large number of resources readily available in the country, low operating costs, tax breaks and sops offered by the government, etc has favoured India as an outsourcing destination. According to a report by the McKinsey Global Institute (2018), the ICT sector has shown the highest productivity level amongst all the segments and is thus, known as the main driver of growth in the services sector.

India ranked fifth falling behind United State of America (USA), European Union (EU), China and Japan in terms of value addition of ICT, which is also fastest growing market for ICT usage. Indian ICT companies have set up over 1,000 global delivery centres in about 80 countries across the world. Its cost competitiveness in providing ICT services, which is approximately 3-4 times cheaper than the US, continues to be the mainstay of its Unique Selling Proposition (USP) in the global sourcing market. It remains renowned as a hub for digital capabilities due to the presence of around 75 percent of the global digital talent in the country. Today, India figures as the fourth largest start-up hub in the world, and is expected to be home for over 30000 start-ups by 2020. With the forward-looking policies of the Government of India and deregulation of Foreign Direct Investment (FDI) norms, the Indian ICT sector has become one of the fastest growing sectors of the economy.

In addition, the ICT sector has to play an important role in the implementation of Sustainable Development Goals (SDGs), 2030 which have been adopted by 193 countries across the world including India. One of the main goals (Goal 8) of the SDGs 2030 is to achieve sustainable and inclusive growth; full and productive employment and decent work for all women and men, including young people and persons with disabilities.

In this context, the notion of inclusive growth and decent employment needs to be examined in context of emerging sectors of Indian economy like ICT sector, which provides productive employment. There is a pressing need to examine the impact of emerging digital technologies on Indian economy. Therefore, the objective of the paper is to explore the contribution of ICT sector on national economy in terms of income and employment, and emerging challenges. Additionally, this paper highlights some important policy suggestions for improvement and future growth of the ICT sector in India. This paper attempts to address few key research questions to examine the above objective: Is faster growth of digital technologies i.e. ICT sector in past decades has led to its increased contribution to national GDP, export earnings, Foreign Direct Investment and employment? In spite of faster growth in ICT sector compared to non-ICT, does the ICT sector offers better quality jobs? These research questions and objectives rightfully deserve to be investigated by the policy makers and researchers to design appropriate policies.

There remains a dearth of studies which have analysed the performance and contribution of the Indian ICT sector in a comprehensive way by adopting ICT definition from international standard (codes). However, different definitions have been used for estimating the ICT sector in India because the concepts, methods and applications involved in ICT are constantly evolving. Understandably, there is an urgent need to assess the performance of the ICT sector by examining its contribution to economy and employment by using a detailed definition using international standard. In this context, this paper adopts the latest OECD, 2015 definition and Industry codes (4-digit NIC codes) to define ICT sector and understand its contribution to India's economy. This includes activities of both manufacturing and services sectors. The latest available data of Periodic Labour Force Surveys, income data from the Central Statistics Office, unorganised sector rounds of the National Sample Survey and Annual Survey of Industries data has been used to understand the employment and income contribution of the ICT sector in India. In addition, other relevant data sources and relevant literature has been used for the comparisons.

This paper is divided into five sections. This section is followed by brief literature review especially for Indian context and Digital India Programme. The third section describes the sources, methodology and framework. The fourth section, summary of findings discusses the

findings for contribution of ICT sector to GDP, Export, Foreign Direct investment and employment, as well as, findings about productive and decent employment in ICT sector which has been analysed across four dimensions; opportunity for work, security of work, fair working conditions and freedom of association. The last section concludes the paper and provides the way forward.

2. Brief Review of Literature and Digital India Programme

The contribution of ICT on economy has been analysed by many authors in the developed and developing economies alike in the last two decades. But the following literature review mainly focuses on studies that have specifically been conducted in India. From the years mid-1990s and 2000s onwards, the success of ICT industry in India has stimulated interest among academicians on the potential role it can play in India's economic development. The available literature argued that ICT sector contributes significantly in national income and employment. By use of ICTs, many non-tradable services have become tradable. Although, such evidences were much stronger in the developed countries in the past, however, in recent decades, even developing countries like India have experienced similar trends (Dasgupta & Singh, 2005; Yousefi, 2011; Sharma & Sehgal, 2010; Mitra et al, 2011; Mehta, 2018; ICRIER, 2018).

It is also widely acknowledged that ICT sector contributes significantly in employment creation in most of the developing countries (including India) across the world with higher share of women workers compared to other traditional industry and services sector. This sector is providing relatively more productive or high-income jobs compared to other traditional sectors. However, some studies have highlighted poor working conditions and a few studies also referred to workers engaged in ITeS/BPM segment as 'Cyber Collies' and 'Dummies' (Basan & Rani, 2004; Abraham, 2007; Mehta, 2012; Kumar, 2001; Chandrashekhar, 2000; Babu, 2004; Joseph & Abraham, 2005; Vijayabaskar et al. 2001; Basan & Rani, 2004; Joshi, 2010; Sarkar & Mehta 2010; Sarkar & Mehta 2016; Mehta & Singh, 2017).

These studies also reveal how ICT sector which is one of the fastest growing segments, have high potential for contributing to the economy. They explain how India's ICT sector, in the recent decades, has shifted from revenue composition to a more sophisticated and high-end service, the outsourcing activities also called Business Process Management (BPM). The most significant benefit can be obtained from engaging highly skilled resources in outsourcing process, which is considered the core or critical competence of India. It has a vast pool of English-speaking skilled people at a lower salary compared to similarly qualified professionals in the developed countries, which is the comparative advantage of the country.

However, there remains a dearth of studies which have analysed the performance and contribution of the Indian ICT sector in a comprehensive way by adopting ICT definition from international standard (codes), mainly because the concepts, methods and applications involved in ICT are constantly evolving.

After approving the **e-Kranti: National e-Governance Plan (NeGP) 2.0** with the vision of "Transforming e-Governance for Transforming Governance", in March, 2015, the

Government of India launched its flagship Programme - **Digital India**² in July 2015, with a vision to *transform India into a digitally empowered society and knowledge economy*. The focus is to define India's tomorrow. It is an umbrella programme that covers multiple government offices. It weaves together a large number of ideas and thoughts into a single, comprehensive vision so that each of them can be implemented as part of a larger goal. Each individual element stands on its own, but is also part of the larger picture. The Digital India programme is centred on three key vision areas:

- Digital Infrastructure as a Core Utility to Every Citizen
- Governance & Services on Demand
- Digital Empowerment of Citizens

The focus is to bring transformation to realise:

Indian Talent + Information Technology = India Tomorrow

The Digital India program aims to provide the much-needed thrust to the nine pillars of growth areas, namely Broadband Highways, Universal Access to Mobile Connectivity, Public Internet Access Programme, e-Governance: Reforming Government through Technology, e-Kranti - Electronic Delivery of Services, Information for All, Electronics Manufacturing, IT for Jobs and Early Harvest Programmes.

Another initiative, Common Service Centres (CSC) 2.0 scheme is one of the mission mode projects under Digital India. Based on the assessment of CSC scheme, the Government launched the **CSC 2.0**³ scheme in 2015 to expand the outreach of CSCs to all Gram Panchayats across the country. CSC 2.0 scheme would consolidate service delivery through a universal technology platform, thereby making e-services, particularly G2C services accessible to citizens anywhere in the country. Key Features of CSC 2.0 scheme are:

- A self-sustaining network of 2.5 lakh CSCs in Gram Panchayats
- Large bouquet of e-services through a single delivery platform
- Standardization of services and capacity building of stakeholders
- Localised Help Desk support
- Sustainability of Village Level Entrepreneurs (VLE) through maximum commission sharing
- Encouraging more women as VLEs

CSCs are the access points for delivery of essential public utility services, social welfare schemes, healthcare, financial, education and agriculture services, apart from host of B2C services to citizens in rural and remote areas of the country. It is a pan-India network catering to regional, geographic, linguistic and cultural diversity of the country, thus enabling the Government's mandate of a socially, financially and digitally inclusive society.

3. Sources, Methodology and Framework

Data used for the analysis includes GDP from Central Statistical Organisation (CSO); output, revenue and export earnings from Department of Electronics and Information Technology (DEITY) and National Association of Software and Services Companies (NASSCOM); and

² <https://www.digitalindia.gov.in/>

³ <https://csc.gov.in/>

employment data from NASSCOM and National Sample Survey Organisation (NSSO). In addition, other sources such as published reports, economic surveys, and publications of Ministry of Electronics and Information Technology (MEITY), NASSCOM, TRAI, journal articles, newspaper articles and other relevant material from the web were also consulted for the study. The analysis is mainly based on data of IT-BPM segment, which constitutes more than three-fourth of the sector's export earnings and 65 percent of the domestic sales.

Framework: In order to understand the work and working conditions of workers in the ICT sector, the **Modified Decent Work Framework** designed by the International Labour Organization (ILO) has been used. The ILO's primary goal has been to promote opportunities for women and men, to obtain decent and productive work, conditions of freedom, equality, security and human dignity (ILO 1999, p. 3). Work has been defined as central to the people's well-being. In addition to providing income, work can pave the way for social and economic advancement, strengthening links between individuals, their families and communities. Such welfare, however, hinges upon the work being decent. A decent work is one that encompasses the aspirations of people in their working lives. The ILO has four strategic objectives for decent work (Ghai, 2003) with gender equality as a crosscutting objective as given below (Box 1).

Box 1

Employment Generation: an economy that generates opportunities for investment, entrepreneurship, skills development, job creation and sustainable livelihoods.

Guaranteeing Right at Work: to obtain recognition and respect for the rights of workers. All workers particularly disadvantaged or poor workers, need representation, participation and laws that work for their interests.

Extending Social Protection: to promote both inclusion and productivity by ensuring that women and men enjoy working conditions that are safe, allow adequate free time and rest, take into account family and social values, provide for adequate compensation in case of lost or reduced income and permit access to adequate health care.

Social Dialogue: Involving strong and independent workers' and employers' organisations are central to increasing productivity, avoiding disputes at work and building cohesive societies.

Source: Mehta, 2016.

The interrelated dimensions that have been discussed above have been modified and broadly categorised into four broad heads for the purpose of this study, namely –

- Opportunity for work
- Security of work
- Fair working conditions
- Freedom of association

Each dimension is further elaborated in detail to understand the work and working conditions of ICT employees in the Indian ICT Sector. The indicators used for the analysis under the four decent work dimensions have been given in Box 2.

Box 2

Dimensions	Variables
Opportunity for work	<i>Gender, locations, age, education/skill, occupations, regional presence</i>
Security of work	<i>Employment status, nature of job (formal/informal; public/private), contract period</i>
Fair working conditions	<i>Social security benefits, paid leave, average wage/salary, working hours, annual leaves</i>
Freedom of association	<i>Union/association presence and membership</i>

Definition of ICT Sector

The definition of ICT sector has evolved over the years after many debates and discussions. Keeping in mind the crucial role played by the ICT sector in the economy, there is a high demand for defining ICT and its quality statistics by planners and policy makers for informed decision making. The concepts, methods and applications involved in ICT sector are constantly evolving. Different definitions have been used for ICT sector by various countries and organisations (MOSPI, 2010). Because of the overwhelming presence of the ICT in various economic activities, it is difficult to clearly define ICT sector and prepare activities and product classifications for this sector. For instance, in India, it has been predominantly used to denote one particular sub-sector- software and IT enable services/business process management, which accounts for a substantial proportion of the total ICT sector in the country. Considerable amount of discussions and debates have taken place in various international forums to devise uniform and standard definitions and to create the activity and product classification to adequately capture this sector.

The Organisation for Economic Cooperation Development (OECD) has taken a leading role in standardising the definition of the ICT sector, and provides a statistical basis for measurement of ICT in an internationally comparable manner which has largely been adopted by its member countries. The general principle adopted by OECD to identify ICT economic activities/industries as “The production (goods and services) of a candidate industry must primarily be intended to fulfil or enable the function of information processing and communication by electronic means, including transmission and display”. Accordingly, the definition of ICT that was first adopted in 2002 on the basis of International Standard Industrial Classification of All Economic Activities (ISIC) rev. 3.1, which was further modified with new release of ISIC rev. 4.0 released in 2008 that classified ICT sector into three broad categories viz. manufacturing, trade and services (OECD, 2009; Sarkar and Mehta, 2010; Mehta, 2016). This classification is adopted in classification of industries in India as National Industrial classification (NIC), which is used to identify the ICT sector at 4-digit level (Sarkar & Mehta, 2010; Mehta, 2016).

For this paper, the definition of ICT is adopted from OECD International Standard Industrial Classification (ISIC) Rev. 4.0 released in 2015 which classified ICT sector into three broad categories viz. manufacturing, trade and services. The United Nations Statistics Division has also accepted the OECD definitions for the analysis of ICT sector for its member countries.

ICT definition based on new classification ISIC rev.4 [OECD]

(1) ICT Manufacturing

- 2610 Manufacture of electronic components*
- 2620 Manufacture of computers and peripheral equipment*
- 2630 Manufacture of communication equipment*
- 2640 Manufacture of consumer electronics*
- 2680 Manufacture of magnetic and optical media*

(2) ICT Trade

- 4651 Wholesale of computers, computer peripheral equipment and software*
- 4652 Wholesale of electronic and telecommunications equipment and parts*

(3) ICT Services

- 5820 Software publishing*
- 61: Telecommunications
 - 6110 Wired telecommunications activities*
 - 6120 Wireless telecommunications activities*
 - 6130 Satellite telecommunications activities*
 - 6190 Other telecommunications activities*
- 62: Computer programming, consultancy and related activities
 - 6201 Computer programming activities*
 - 6202 Computer consultancy and computer facilities management activities*
 - 6209 Other information technology and computer service activities*
- 631 Data processing, hosting and related activities; web portals*
 - 6311 Data processing, hosting and related activities*
 - 6312 Web portals*
- 951 Repair of computers and communication equipment*
 - 9511 Repair of computers and peripheral equipment*
 - 9512 Repair of communication equipment*

The National Industrial Classification (NIC) Codes, 2008 at the four-digit level has been used in this paper. The analysis is based on data on employment and unemployment collected by the National Sample Survey Organisation (NSSO), Government of India for the year, 2011–12, and latest data on employment collected by NSSO through Periodic Labour Force Survey (PLFS) for the year, 2017-18. In addition, the Labour Bureau Survey's (2015-16) data, National Sample Survey (2011-12) and other relevant secondary literature have also been consulted for the analysis. This paper uses principal workers (as 15+ years) for the purpose of analysis.

4. Summary of Findings

This summary of findings section is divided into two parts-

- Contribution of ICT sector to *GDP, Export, Foreign Direct Investment and Employment*
- Productive and Decent Employment in ICT sector across *Opportunity for work, Security of work, Fair working conditions and Freedom of association*

4.1 Contribution of ICT Sector to GDP, Export, Foreign Direct Investment and Employment

The Indian economy has grown at a decent pace during the last two decades. In 2018-19, India surpassed France and emerged as the sixth-largest economy in world with only USA, China, Japan, Germany and United Kingdom leading before it. The country continues to remain one of the fastest-growing economy in the world, despite a slight drop in its GDP growth in the recent years, from 7.2 percent in 2017-18 to 6.8 percent in 2018-19 (Economic Survey, 2019). The average growth rate of India was not only higher than China during 2014-15 to 2017-18 but much higher than that of other top major economies (measured in terms of GDP at current USD terms). In terms of the Purchasing Power Parity (PPP) adjustments, India's GDP at current international dollar ranks third in the world, only behind China and USA. The ICT sector has emerged as one of the most dynamic sectors in India's economic growth and is responsible for global recognition of the country as a 'software and information technology' power (Jha, 2011). Its importance has been reinforced by the emergence and thriving of ICT services in the country, which has made India a major global provider of IT-BPM services.

The service sector dominates the Indian economy, by contributing over 54 percent to country's Gross Value Added in 2019. This dominance of the sector is attributed to the emergence of ICT services, and regarded as 'growth engine' of the sector. It is argued that the rise of these services in particular ICT services is not only contributing to service sector but is also enhancing the productivity of manufacturing industries in terms of demand of computer hardware, telecom equipment, electronic components and semi-conductor devices. Some digital services like telecommunication have characteristics of both the sectors; services and manufacturing. Moreover, the growing importance of telecom in tandem with the Information Technology Enable Services (ITeS) or Business Process Management (BPM) services has the potential of stimulating economic growth and serves as a common carrier for other sectors of the economy. This makes Indian information and communication services sector a unique example of service sector leading to a growth of manufacturing industry (Mani, 2012, Mehta, 2015). Due to strong ICT services, India has moved up the global value chain while delivering several critical services to numerous clients globally. Indian companies have set up delivery centres across the world and are catering to various countries by providing them these services.

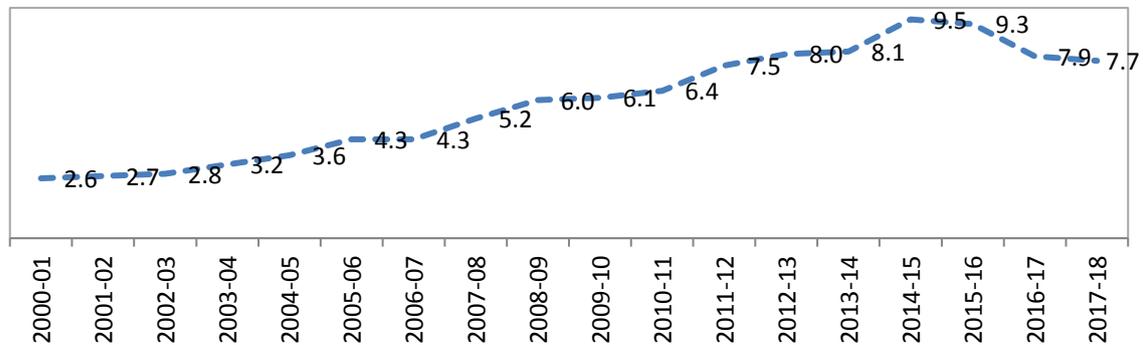
In particular, the development of the ICT sector has led to generation of direct and indirect employment for a large pool of educated and skilled manpower in India (Mehta & Singh, 2017). Ministry of Electronics and Information Technology, Government of India has also asserted that the employment potential and prospects of the ICT sector are robust and promising. It has special significance in the Indian socio-economic milieu, in the sense that it enables and enlarges the ambit of employment opportunities for a large number of females and low-skilled workers such as drivers, attendants and security guards among others.

4.1.1 Contribution of ICT sector to GDP

The aspect which makes ICT sector crucial to the Indian economy is its rising contribution to the national income or GDP, which has been steadily increasing over the last two decades. The share of IT-BPM output to GDP has increased from just 2.0 percent in 2000-01 to 6 percent in 2009-10 and further moved at its highest level of 9.5 percent in 2014-15 (Figure 1). This is a remarkable achievement for ICT sector in a country which used to be predominantly

agrarian and the primary contributor to the GDP was agriculture till the 1990s. However, the share of IT sector has declined by almost 2 percentage points to 7.9 in 2016-17 and 7.7 percent in 2017-18. This could possibly be due to global factors such as recession, particularly in the USA, and the depreciation of rupee value in terms of US dollar, resulting in a low value of export earnings.

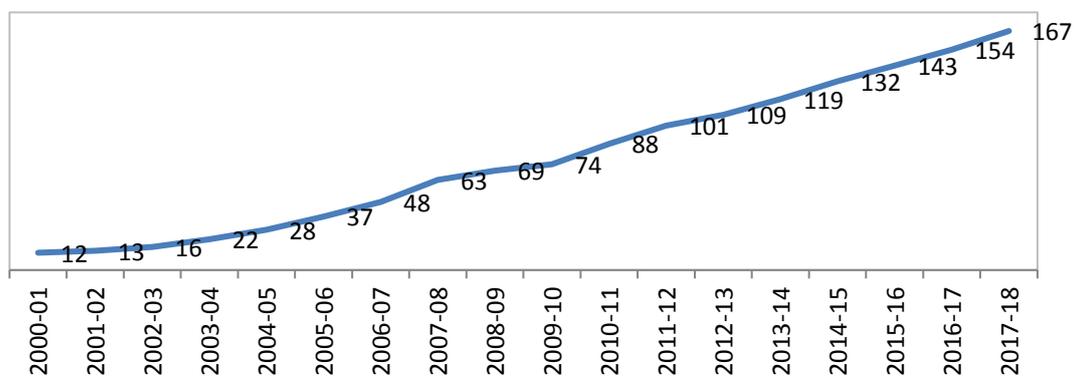
Figure 1: Contribution of ICT Sector to GDP (in percent)



Source: NASSCOM & MEITY, 2019

One of the prime indicators of the strength of the sector is its total revenue or output. The market size of the ICT sector has increased substantially during the last two decades. It was estimated to be at US \$167 billion in 2017-18, which was almost twice the level of amount in 2010-11(88 billion US\$) and 15 times the amount (US \$12 billion) in 2000-01 (Figure 2).

Figure 2: Market Size of India's ICT Sector (in Billion US \$)



Source: NASSCOM & MEITY, 2019

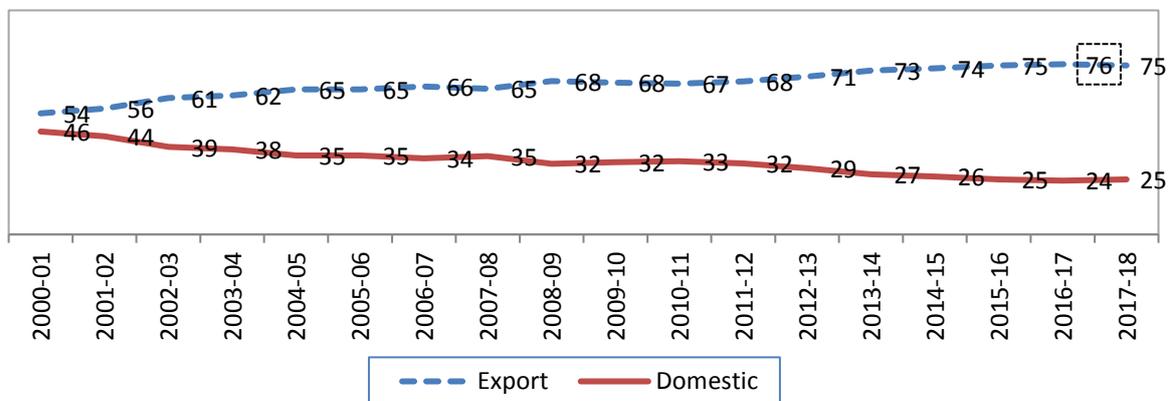
In the value terms, the output has gone up multiple times but the growth of the sector has slowed down in the recent years. The annual average growth rate of ICT sector's output was at 24.7 percent during 2001-10, while it slowed down to two and half times less at 10.5 percent during recent decade of 2010-18. However, India's IT-BPM sector is still growing at a double digit annual average growth rate, which is highest among all the sectors of the economy in the country. The double-digit annual growth rate of ICT sector has been possible due to comparative advantage it enjoys in the global IT sector in terms of the cost. With a large pool of workers having IT and language skills, it is an advantageous position to move towards producing high value-added goods and services. IT companies have included new service lines such as package software implementation, system integration, research and development engineering and remote networking management. BPM companies have also

started offering more complex services such as financial research and analytics, actuarial modelling and corporate and business research. The availability of large number of workers with a combination of engineering and managerial skills has helped India’s ICT sector to move towards high value-added goods and services (Allad & Maisuria, 2015).

ICT sector has also indirectly contributed to the economy due to the strong harmonization between ICT sector and rest of the sectors. Its use can enhance the productivity and efficiency in the key areas such as accounting, procurement, inventory management, and production and operation management. It is argued that use of ICT sector contributes to other sectors of the economy. Due to these inter-linkages, the growth of ICT sector has a multiplier effect on the output of other sectors. Every dollar spent by the ICT sector (on domestically sourced goods and services) converts into a total output of about two-three dollars in the economy. This output is driven by the derived demand from firm-level spending i.e. capital expenditures as well as operating expenditures and a high level of consumption spending by professionals employed in the sector (Mehta & Singh, 2017).

The past studies indicate that out of total revenue of the sector around 45 percent is spent in the domestic economy through non-wage operating expenses, capital expenditure and consumption spending by professionals. This spending, in turn, generates additional output via its direct and indirect backward linkages with other sectors and the induced effect of wages and salaries. The sectors that are most affected by this multiplier effect are housing/construction, transport services, communications, consumer durables, food items and clothing (NASSCOM, 2018).

Figure 3: Distribution of Revenue by Export and Domestic (in percentage)



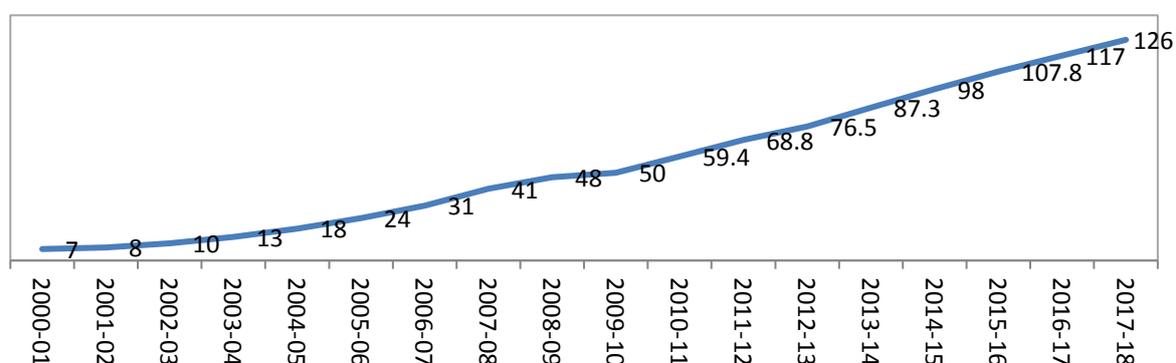
Source: NASSCOM & MEITY, 2019

ICT sector caters to the overseas (export) as well as the domestic market. Exports contributed more than three-quarters (76 percent) of total revenue in 2017-18, leaving the share from domestic market at 24 percent. As shown in Figure 3, Indian ICT industry’s revenue share from export has gone up over the years from 54 percent in 2000-01 to 67 percent in 2010-11 and further increased to 75 percent in 2017-18. On the other hand, during the same period, the share of domestic market in the total revenue has declined. This clearly indicates the dominance of ICT export earnings in the sector’s revenue, and is expected to grow further as the outsourcing business of large technology contracts is increasing, with the growing adoption of cloud market in India through big data, analytics, blockchain, artificial intelligence and Internet of Things (IoT) (McKinsey, 2017).

4.1.2 Contribution of ICT sector to Export

Digitalization has made more services tradable by enabling their delivery over ICT networks. Some countries have been successful at developing an export industry in ICT services. Among the top exporters, the relative importance of ICT services in total services exports varies considerably. In Finland, India, Ireland and Israel, this share is higher than 25 per cent. The global sourcing market in India continues to grow at a higher pace compared to the ICT industry. India is the leading sourcing destination across the world, accounting for approximately 55 per cent market share of the US\$ 185-190 billion global services sourcing business in 2017-18. Indian ICT companies have set up over 1,000 global delivery centres in about 80 countries across the world. India has become the digital capabilities hub of the world with around 75 per cent of global digital talent present in the country.

Figure 4: Export Revenue from ICT Sector (in Billion US\$)



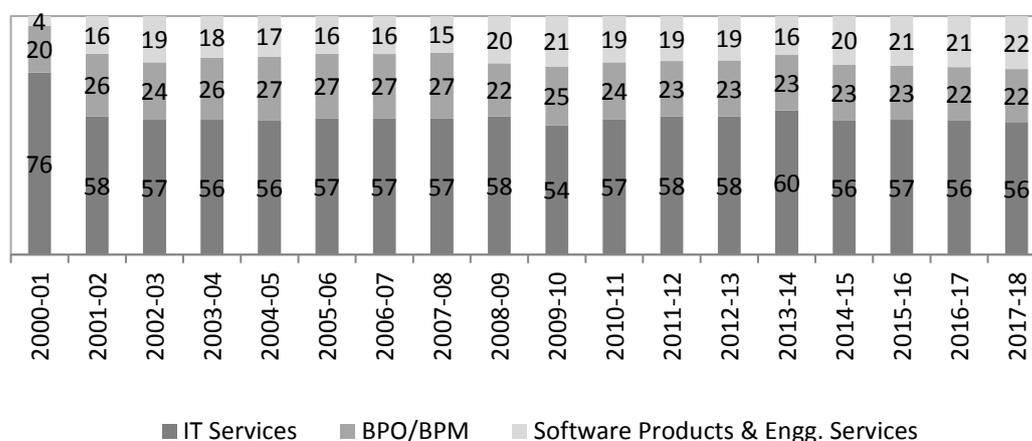
Source: NASSCOM & MEITY, 2019

The value of exports from IT-BPM sector is estimated at US \$126 billion in 2017-18, which is almost twice the value that it was at in 2010-11 of US \$59 billion and 19 times more than the value it had in 2000-01 of 7 billion (Figure 4). The exports grew at an annual average growth rate at 29.6 percent during 2001-10 and at 11.2 percent during 2010-18. The gain in export revenues is driven largely by an increase in the use of services pertaining to the so-called SMAC (Social Media, Mobility, Analytics and Cloud) technologies, as well as Artificial Intelligence, embedded systems, and so on. SMAC technologies create a significant impact on the software exports, as opportunities have grown for mobile applications, enterprise products, governance, cloud and cloud ready products (IBFE, 2019).

There is a diversification of export earnings across three major segments—IT services, BPM services and engineering & research and development services. Integrated and niche service providers exist across the three segments, as well as in each segment respectively. While IT services have been the mainstay of the sector, BPM and engineering services have built upon India's value proposition. The segment wise distribution of ICT exports shows that the domain of IT services is the largest service segment of the sector with 56 per cent share in total exports followed by both BPM and software products and engineering services segment at 22 per cent each (Figure 5). The share of the software product & engineering services has been rising over the years, while the growth in share of the other two segments has either stabilised or declined marginally. It is the domain-specific solutions that focus on convergence, customization, efficiencies and localization, machine-to-machine technology

and newer technologies around SMAC play a significant role in driving the growth of software products & engineering services.

Figure 5: Export of IT-BPM Sector by Segments (in percentage)



Source: NASSCOM & MEITY, 2019

4.1.3 Contribution of ICT sector to Foreign Direct Investment

A number of foreign investors are investing in Indian ICT sector thus, contributing to the growth pie of Indian economy. There are a number of multinational companies that have set up their bases in India and directly invest in those businesses in the country such as Google, Apple, Accenture, Microsoft, Samsung and Nokia etc. These companies have established their IT, BPM or manufacturing units in the country as they benefit by employing Indian professionals every year from a large pool of institutions at a very reasonable salary.

As per the Department of Industrial Policy and Promotion, which falls under the Ministry of Commerce and Industry, Government of India, the FDI inflows into the services sector (US\$ 28,264 million) accounted for more than 60 percent of the total FDI inflows (US\$ 44,366 million) into India. In 2018-19, the FDI from the ICT sector constituted 6,415 million US\$ in computer software and hardware and 2,668 million US\$ in telecom. The sector ranks 3rd in India in attracting FDI share and constitutes almost one-third (32.1 percent) of the total FDI inflow of services sector and one-fifth (20 percent) of the total FDI inflow in the country.

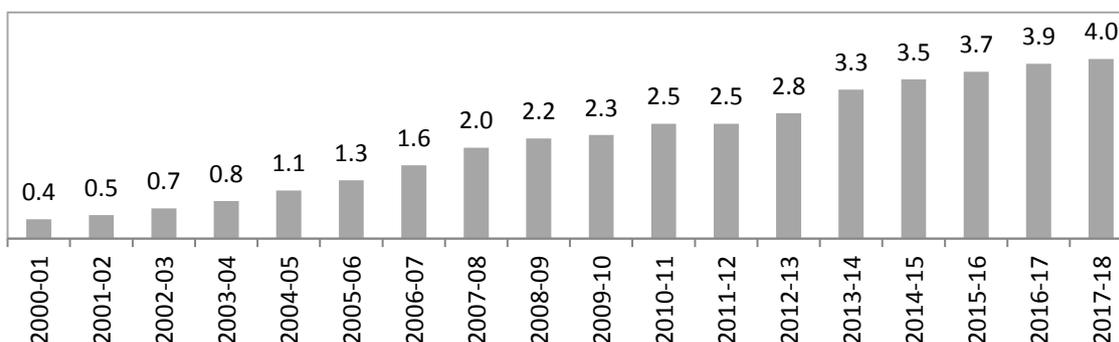
4.1.4 Contribution of ICT sector to Employment

Another most important aspect of Indian ICT sector is how it has led to employment generation for a large number of unemployed youths in the country. Today, the ICT sector is one of the largest private sector employers in India, creating both direct and indirect employment opportunities. It creates direct employment particularly for educated and skilled youth in the urban areas and indirect jobs in several associated sectors, such as transportation, real estate and catering, security and housekeeping and so on.

In 2017-18, the sector provided direct employment for 4 million people, which was an increase from the 0.4 million in 2001-02, 1.3 million in 2005-6 and 2.54 million in 2010-11 (Figure 6). The employment in the sector grew at 22.8 percent annual average growth rate

during 2001-10 and at 7.4 percent during 2010-18. Other reliable employment estimates of National Sample Survey Organization (NSSO) also show that ICT provided employment to 4.5 million in 2017-18. The sector offers easier access to women for seeking employment opportunities than other traditional sectors, which is also reflected in their high representation in the sector. Women occupied more than 34 percent of jobs in the IT-BPM sector, which is higher than any other industry and services sector of the Indian economy (Mehta & Singh, 2017; IBEF, 2019).

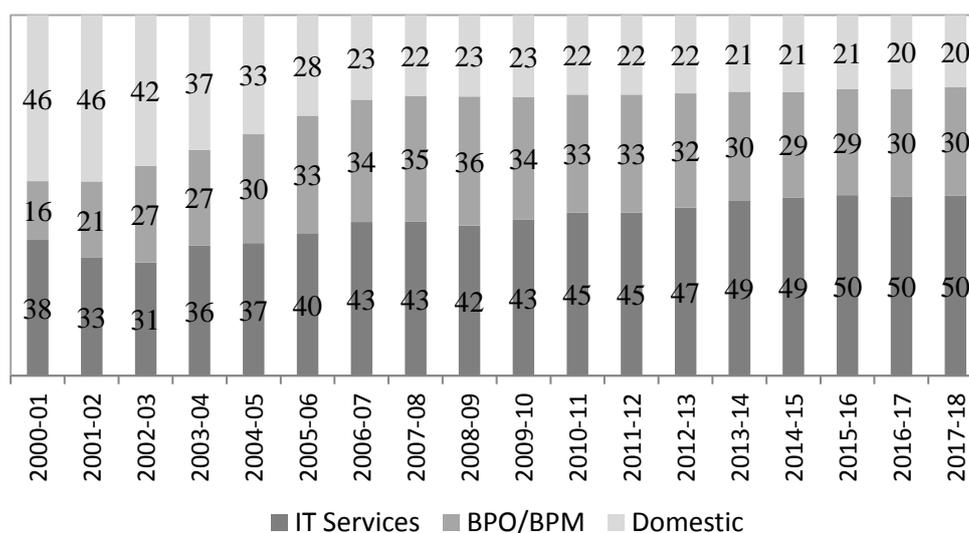
Figure 6: Employment in IT-BPM Sectors (in millions)



Source: NASSCOM & MEITY, 2019

Across the three segments, IT services consist of half of the total IT-BPM employment in the country in 2017-18; followed by BPM (30 percent) segment and domestic segment (20 percent) (Figure 7). Over the years, the share of employment in IT services has increased significantly from 38 percent in 2000-01 to 50 percent in 2017-18, while share of employment in BPM has increased almost twice from 16 percent to 30 percent during the same period.

Figure 7: Segment wise Employment in ICT Sectors (in millions)

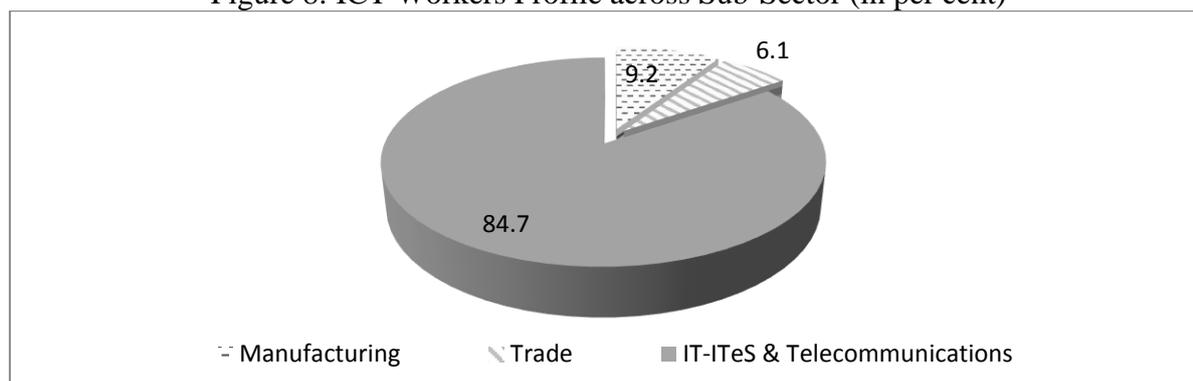


Source: NASSCOM & MEITY, 2019

ICT sector also creates indirect employment and one direct job in the sector, generates four additional jobs in rest of the economy (Mehta & Singh, 2017). For example, the IT and BPM sector also provide transport, security guard and catering facility to their employees. In

addition, the salary in IT sector employees is much higher than other traditional sector, and they hire maids, servants, cooks, and drivers etc. This creates indirect employment; as estimates shows that one job in IT sector create four-five additional jobs. According to the Labour Bureau and National Sample Survey's employment estimates, the ICT sector provided employment opportunity to 4.5 million people in 2017-18, which was up from 3.9 million in 2011-12, and four times from 1.09 million in 1999-2000. However, the share of employment in ICT sector is still low at around 1 percent of the total employment in the country.

Figure 8: ICT Workers Profile across Sub-Sector (in per cent)



Source: PLFS, National Sample Survey Organisation, 2017-18

The ICT sector is broadly divided into three segments –

1. Manufacturing
2. Trade and Communication & Information Technology
3. IT enabled Services/Business Process Management (IT-ITeS/BPM)

Across the segments, majority of ICT workers are involved in IT-ITeS/BPM (84.7 percent) industry followed by manufacturing (9.2 percent) segment and trade (6.1 percent) segment in 2017-18 (Figure 8). Among these, IT- BPM is the more gender friendly, with the share of female employment (86.6 per cent) being higher as compared to males (84.3 per cent) This reveals that IT-IBM segment dominates the sector, which is the only sector analysed for ICT sector by most of the previous studies in India.

4.2 Productive and Decent Employment in ICT sector across Opportunity for work, Security of work, Fair working conditions and Freedom of association

Productive and Decent Employment in ICT sector has been analysed across Opportunity for work, Security of work, Fair working conditions and Freedom of association.

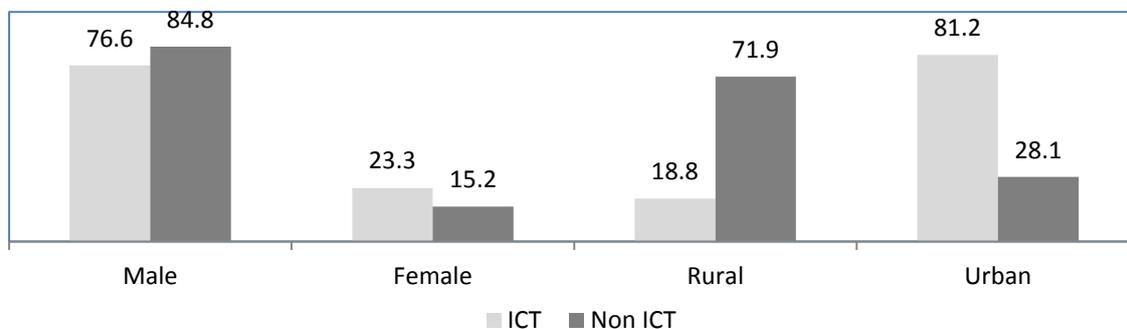
4.2.1 Productive and Decent Employment in ICT sector: Opportunity of Work

This dimension of decent work includes parameter of profile of workers such as gender and locations, age, social groups, education/skill levels, job type/occupations and regional presence of ICT sector.

Gender and Locations: Employment in the non-ICT sector is overwhelmingly male-dominated, with only one out of every seven workers in the sector being a female, as compared to one out of every 4 workers in the ICT sector (Figure 9). Additionally, it is

concentrated in urban areas (81.2 percent) especially in the metro cities, but has been gradually shifting to smaller cities and towns over the years. Around 41 percent of ICT workers were employed in metros with 47 percent of them working in IT- BPM segment. It is also estimated that creation of one job in the ICT sector provides four indirect additional jobs in rest of the economy, mostly for less educated people (Mehta & Singh, 2017).

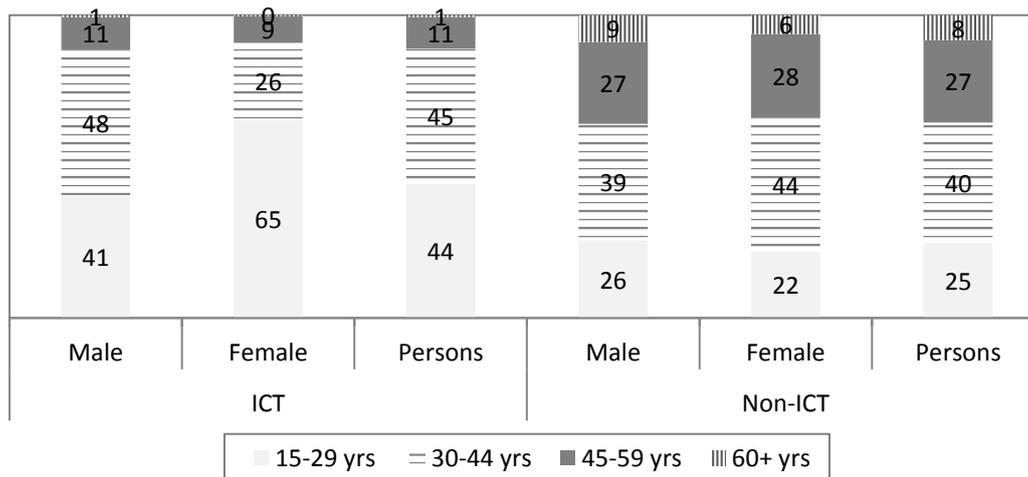
Figure 9: Gender and Location-wise Employment (in percent)



Source: PLFS, National Sample Survey Organisation, 2017-18

Age-Profile: The age profile of ICT and Non-ICT sector clearly reflects that the ICT sector is still dominated by youth (15-29 years) and middle-aged workers, when compared to non-ICT sector (Figure 10). The youth workers (44.3 percent) in ICT sector are significantly higher than Non-ICT sector (24.7 percent). However, the increasing proportion of middle age workers in ICT sector reveals that the sector is now maturing and not that new in India. The share of young female (65.4 percent) in ICT sector is significantly more than their male counterpart (40.6 percent). In addition, the share of young female working in ICT (65.4 per cent) is almost three times higher than female in non-ICT sector (21.9 per cent) indicating their rising participation in the ICT sector in the recent years.

Figure 10: Age-Profile of ICT and Non-ICT workers (in percent)

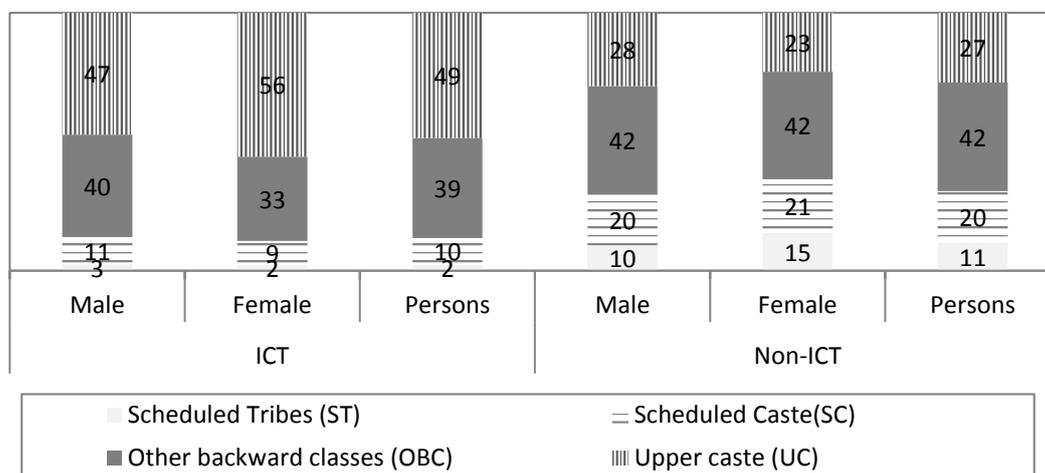


Source: PLFS, National Sample Survey Organisation, 2017-18

Social Group: ICT sector's employee profile across social groups indicates historically prevailing social division of India, where marginalized groups particularly Scheduled Caste (SC) and Scheduled Tribe (ST) are excluded from the mainstream development. In ICT sector, workers belonging to the upper-caste (48.5 percent) and Other Backward Classes

(OBCs) (38.7 percent) are engaged significantly more than non-ICT sector i.e. upper caste (27.0 percent) and OBCs (42.1 percent), while relatively more of SC (20.0 percent) and ST (10.8 percent) workers are engaged in non-ICT sector than SCs (10.3 percent) and STs (2.4 percent) workers in ICT sector (Figure 11). There is not much difference between share of male and female workers across the social groups.

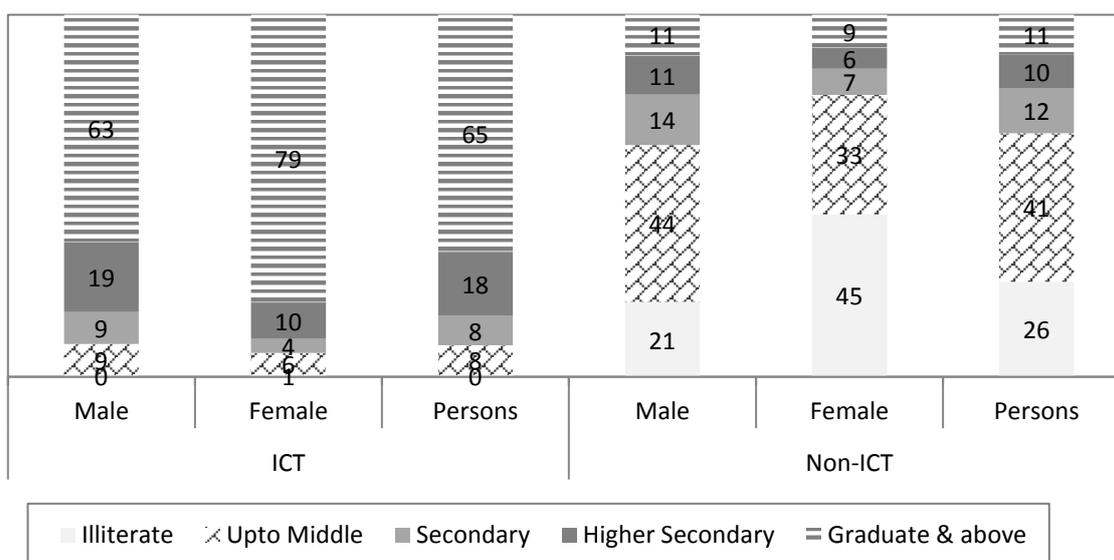
Figure 11: Social Group of ICT and Non-ICT Workers (in per cent)



Source: PLFS, National Sample Survey Organisation, 2017-18

Educational/Skill Level: More than half (65.4 percent) of the workers in the ICT sector have a graduate-level education or above, as compared to just 10.9 percent in the non-ICT sector (Figure 12), where the majority is educated up to secondary school or have a lower level of educational qualification. Similarly, the education level of both female and male ICT workers is significantly higher than their counterparts in the non-ICT sector. About four-fifth (79.4 percent) of the females and 62.9 percent of male workers have a graduate-level or above qualification in the ICT sector compared to only 9.2 percent of female and 11.4 percent of male workers possess similar qualification in the non-ICT sector.

Figure 12: Education Levels of ICT and Non-ICT workers (in per cent)

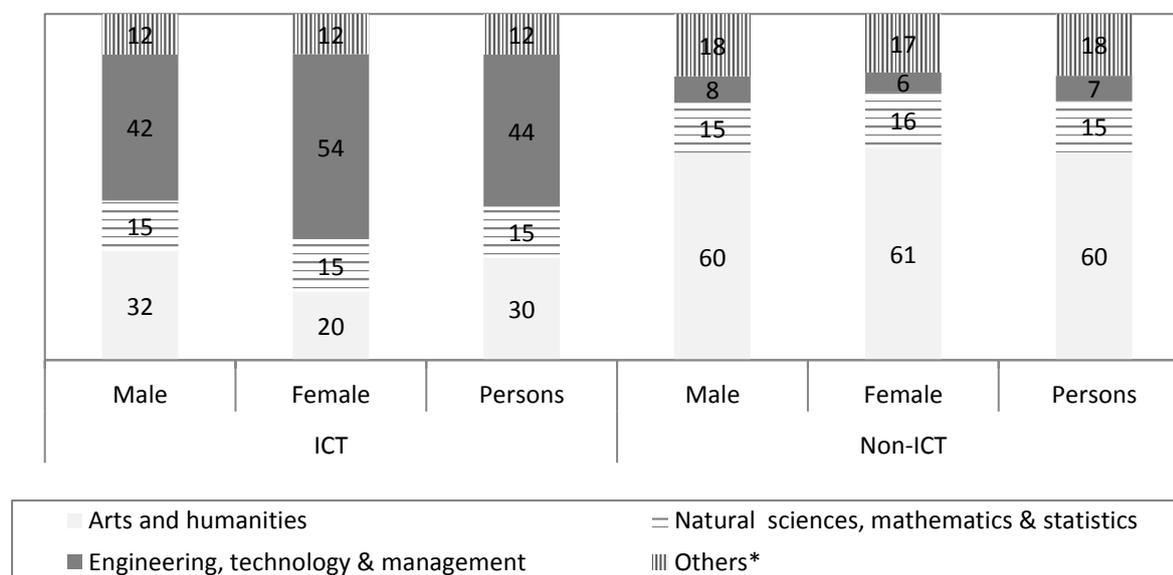


Source: PLFS, National Sample Survey Organisation, 2017-18

Interestingly, in both ICT and non-ICT sectors, female workers have higher educational qualification than male workers, i.e., the share of female graduates is higher than the male graduates. However, in the non-ICT sector, more than three-fourth of female workers (77.9 percent) educated up to the middle level compared to 64.1 per cent of the total male workers.

Further, the stream wise distribution presented in Figure 13 shows that number of workers from engineering, technology and management studies (43.9 percent) in the ICT sector are significantly higher than the non-ICT sector (7.3 percent). On the other hand, almost similar proportion of workers from other streams such as arts, humanities, natural science, mathematics and statistics are engaged in both ICT and Non-ICT sector. The share of female workers (53.5 percent) from engineering, technology & management stream is higher than their male counterpart (42.1 percent) in the ICT sector. This confirms the gender friendliness of ICT sector compared to the other sectors of the economy (Mehta, 2016; Joshi, 2010).

Figure 13: Educational Stream of ICT and Non-ICT Workers (in percent)



*medical, agriculture and accounting etc
 Source: EUS, Labour Bureau Survey, 2015-16

Job Type or Occupations: The National Classification of Occupation (NCO) Codes, 2004 have been used, in order to identify employees’ occupations and skill level as per ILO and OECD definition. The broad distribution of job profile across skill level shows that 38.4 percent of the total ICT workers are engaged in high skilled jobs such as professionals; one third (32.6 percent) of the workers are engaged in medium level skills such as clerks, service workers and shop & market sales workers, agricultural & fishery workers craft & related trades workers, plant & machine operators & assemblers jobs; one-fourth (25.5 percent) in low skilled jobs of technicians such as associate professional, while just 2.4 percent in unskilled elementary jobs (Figure 14). Contrary to the ICT sector, it is those who are low skilled (64.5 percent) and unskilled (27.2 percent) who dominate the non-ICT sector. The share of females (45.1 percent) in high skilled jobs is more than male (37.1 percent) in ICT sector, while female (32.9 percent) engaged more in unskilled job than male (25.6 percent) in non-ICT sector. This reflects less gender bias in the ICT sector compared to the non-ICT

sectors in terms of access to employment and level of occupations of compared to other sectors of the economy.

Figure 14: Job by Skill Type - ICT and Non-ICT Workers (in per cent)

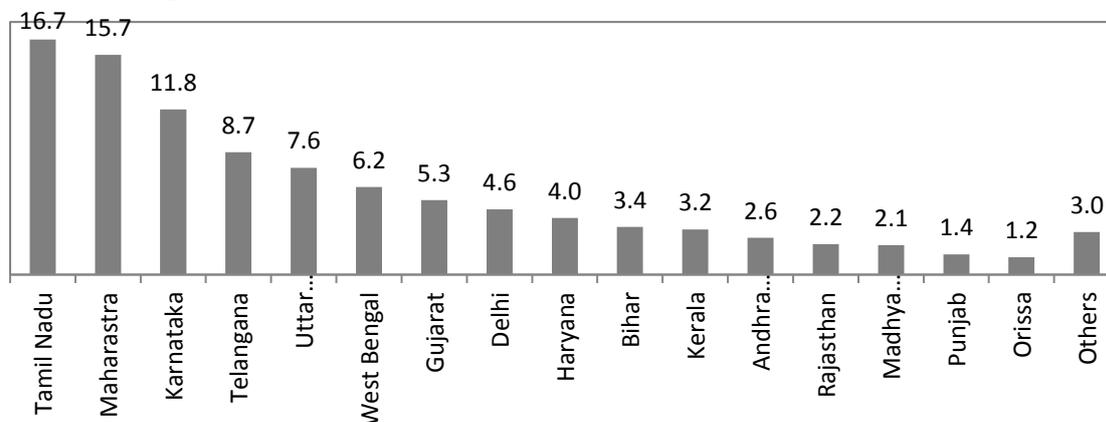


Source: PLFS, National Sample Survey Organisation, 2017-18

Note: I. Professionals (High Skilled); II. Associate Professional (Medium Skilled); III. Clerks, Service Workers and Shop and Market Sales Workers, Agricultural and Fishery Workers Craft and Related Trades Workers, Plant and Machine Operators and Assemblers (Low Skilled); IV. Elementary Occupations (Unskilled)

Regional Presence: The ICT sector is concentrated in cities, particularly the mega cities and metros, but has been gradually shifting to smaller cities and towns over the years (Figure 15). About 68 percent of the employees in ICT sector are employed in urban areas, including metros. More than 80 percent of the ICT jobs are located in the nine states i.e. Tamil Nadu (16.7 percent), Karnataka (11.8 percent), Maharashtra (15.7 percent), Uttar Pradesh (7.6 percent), Telangana (8.7 percent), West Bengal (6.2 percent), Gujarat (5.3 percent), Delhi (4.6 percent) and Haryana (4.0 percent). The major IT centres located in these states are Chennai, Bengaluru, Pune, Noida, Hyderabad, Gurugram and Kolkata. Their presence is also prominent in more urbanised states. Southern Indian states such as Tamil Nadu (Chennai city), Karnataka (Bengaluru city), Telangana (Hyderabad city) and Maharashtra (Mumbai and Pune city) deserves special mention.

Figure 15: Location-wise Distribution of ICT Workers (in per cent)



Source: PLFS, National Sample Survey Organisation, 2017-18

Across the spectrum of the ICT sector, jobs in the IT-ITeS and Telecom segment are mostly situated in developed states such as Tamil Nadu (18.5 percent), Karnataka (12.4 percent), Maharashtra (15.4 percent), Telangana (9.4 per cent), Uttar Pradesh (6.7 percent), West Bengal (5.8 per cent), Gujarat (5.4 per cent), Haryana (4.3 per cent) and Delhi (3.6 per cent). These states constitute around 81.5 percent of the total jobs of IT-ITeS and Telecom segment in the country. In the trade segment, Maharashtra (18.6 percent), Delhi (14.9 per cent), Rajasthan (9.8 percent), Gujarat (9.0 percent), West Bengal (8.3 percent), Tamil Nadu (8.2 percent), Rajasthan (5.2 per cent), Punjab (5 per cent), Uttar Pradesh (4.6 per cent) and Kerala (4.5 per cent). These states constitute 78.4 per cent of the total jobs in the trade segment of ICT sector in the country.

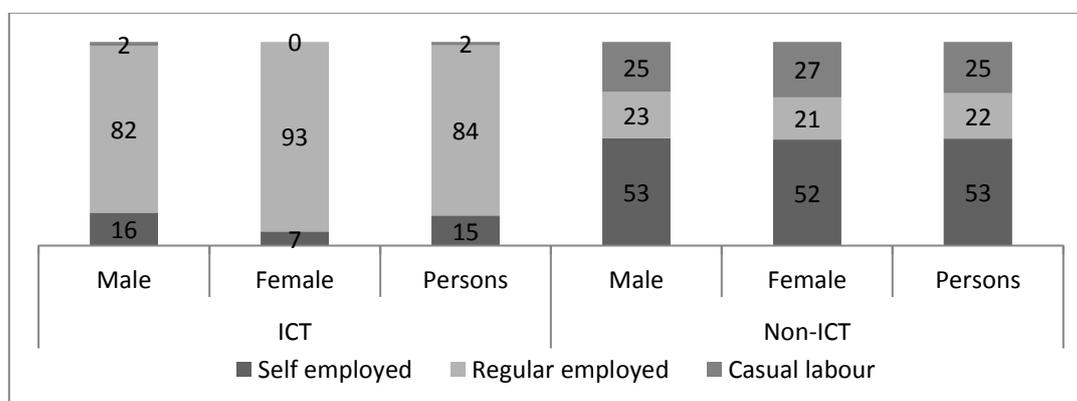
Lastly, the manufacturing jobs in ICT dominate in industrialized and urbanised states such as Maharashtra (16.4 percent), Karnataka (11.8 percent), Tamil Nadu (6.6 percent) with some exception such as Uttar Pradesh (18.3 percent) and West Bengal (8.7 percent), and other states such as Delhi (7.5 per cent), Bihar (6.8 per cent), Telangana (6.2 per cent) and Rajasthan (5.0 per cent). These states constitute slightly more than 87 percent of the total jobs in the manufacturing segment of ICT sector. This reveals that the ICT jobs mostly dominate the developed, urbanised and industrialized states, with some exceptions of less developed states like Noida in UP due to its locational advantage and situated in National Capital Region.

4.2.2 Productive and Decent Employment in ICT sector: Security of Work

The security of work dimension of decent work includes parameters such as status of employment, formal and informal employment, and employment by type of enterprise, period of employment or contract period.

Status of Employment: The status of employment is taken as a measure that indicates the quality of jobs. It is regular employment (those who received salaries on regular basis) which is considered to be of better quality, as compared to self-employment and casual employment (those who received salaries under periodic contract or on daily basis) due to the nature of those jobs, the duration of contract and social security benefits. Casual work is purely temporary and does not offer any social security benefits (Mehta & Singh, 2017). Regular employees (83.5 per cent) dominated the ICT sector followed by self-employed (14.8 percent) and casual (1.7 percent) workers (Figure 16).

Figure 16: Employment Status of ICT and Non-ICT workers (in per cent)



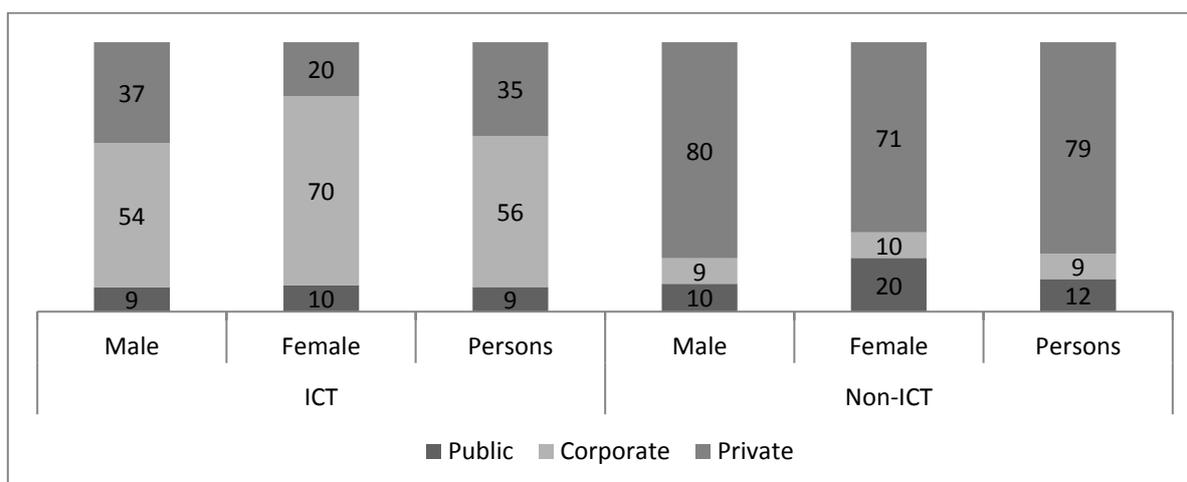
Source: PLFS, National Sample Survey Organisation, 2017-18

In contrast, among non-ICT sector workers, regular employment constituted least proportion with 22.2 percentage, while self-employed made up more than half (52.6 percent), casual workers constitute one-fourth (25.2 per cent). Both female and male workers are predominantly regular in ICT sector, while self-employed dominate in non-ICT sector. This indicate that ICT sector provide better quality of employment in terms of payment and regularity of jobs compared to non-ICT sector both male and female workers.

Employment by Enterprise Type: Further, the security of work has been analysed by examining the type of enterprises, which gives indication of nature and quality of job. Traditionally it has been the public sector (government and public enterprises) jobs and in recent times the corporate sector (public and private limited companies) jobs that are considered to offer better and secure jobs, as compared to private (non-corporate those belonging to proprietorship and partnership enterprises) sector jobs.

In the ICT sector, regular workers are engaged more in corporate enterprises (56 percent) than in (non-corporate) private enterprises (34.8 percent) and public enterprises (9.2 percent) (Figure 3.10). On the other hand, more than three fourth (78.5 per cent) of the regular workers in non-ICT sector are engaged in private enterprises followed by public (12.1 per cent) and corporate enterprises (9.4 per cent).

Figure 17: Workers by Enterprise Type and Male/Female (in percent)



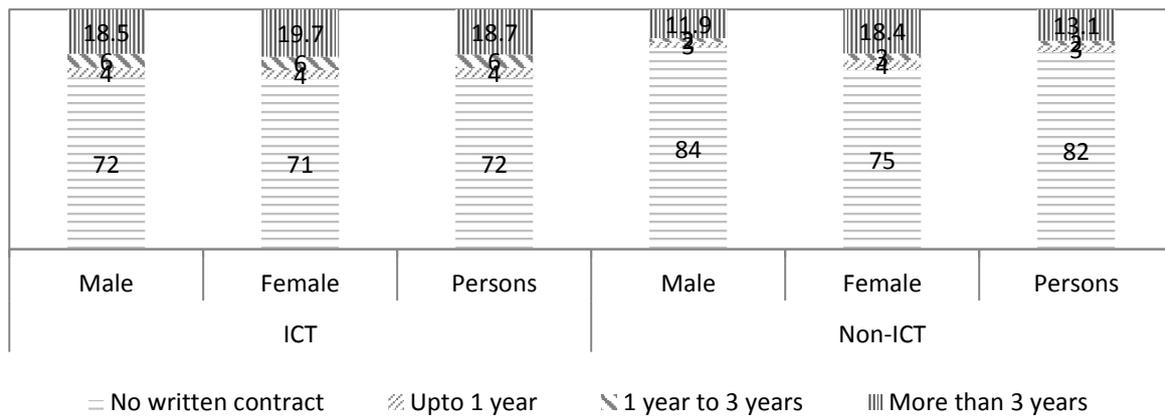
Source: PLFS, National Sample Survey Organisation, 2017-18

Male workers (37.4 percent) engaged more than female workers (20 per cent) in private enterprises (male and 20 percent female), while female workers (70.1 per cent) engaged more than male workers (53.5 per cent) in ICT jobs in corporate enterprises. Female regular workers (19.9 per cent) engaged more in public enterprises than their male (10.4 per cent) counterparts in non-ICT sector, while the opposite is true in the case of private enterprises. It is considered that corporate and public enterprises provide better quality jobs in terms of payment and other benefits than private sector. Hence, the above analysis indicates ICT workers are better placed in terms of quality of jobs compared to workers working in non-ICT sector.

Period of Employment or Job Contracts: The higher number of workers in regular and formal sector employment does not necessarily mean that security of work is concomitantly

high. The nature of job contracts offered forms an additional aspect resulting in the security of work. Analysing the nature of job contracts seems to indicate a dualistic pattern in the ICT sector. Only less than one-third of the regular workers reported job contract in ICT sector (28.5 percent), which is significantly higher compared to non-ICT sector (17.8 percent) (Figure 18). Contract with a longer duration i.e. more than 3 years is still relatively less for ICT workers (18.7 percent) but more than non-ICT workers (13.1 per cent). On the other hand, a contract period of which is of shorter duration i.e. up to 1 year and 1 -3 years period is also reported more in ICT sector (4.0 percent and 5.8 percent) than in non-ICT sector (2.8 percent and 1.9 percent).

Figure 18: Period of Job Contract (Written Contract) of ICT and Non-ICT Workers (in per cent)



Source: PLFS, National Sample Survey Organisation, 2017-18

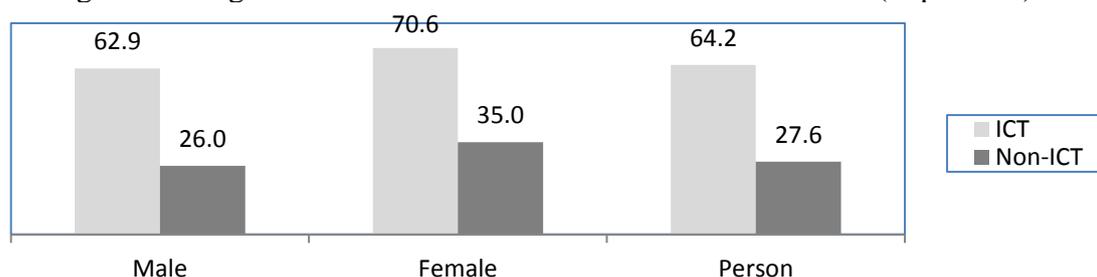
In terms of gender disparity, the proportion of female workers who reported ‘with any job contract’ is almost equal to male workers in ICT sector. However, studies conducted in the dynamic ICT sector, which employs a high proportion of skilled workers and has a high turnover rate reveals that contract period is not a major issue. The shorter duration of contracts is not welcomed by a large proportion of workers who engaged in low-skill jobs in the ICT sector (Babu, 2004; Upadhyay, 2007, Mehta and Singh, 2017). This indicates that the belief of having higher degree of permanence or regularity of job in the ICT sector may be a fallacy, as these studies indicate that the workers in the sector are largely appointed on a project basis rather than on a permanent basis.

4.2.3 Productive and Decent Employment in ICT sector: Fair Working Conditions

The dimension of fair working conditions of decent work includes parameters such as paid leave, average earnings, working hours, annual leaves and social security benefits.

Paid Leave: Eligibility for paid leave is another key indicator of job quality in the labour market as leaves play an important role in work-life balance of a worker. It was found that ICT sector enterprises are more likely to offer paid leave than non-ICT enterprises. Around 64 percent of the ICT workers reported eligible for paid leave, which is more than twice of workers in non-ICT sector (Figure 19). Female workers reported that their eligibility for getting paid leaves in both - ICT sector and non-ICT sector, is higher than their male counterparts.

Figure 19: Eligible for Paid Leave - ICT and Non-ICT Workers (in per cent)



Source: PLFS, National Sample Survey Organisation, 2017-18

Average Wage/Earnings: The average wage of a worker is reported in broad ranges in the Labour Bureau Survey, which shows that the average monthly income of ICT sector is significantly more than the non-ICT workers. Almost half (49.5 percent) of the ICT workers' average monthly salary is above Rs. 20,000 when compared to 14.7 percent of the non-ICT workers (Table 4.1). On the other hand, 62.6 percent of the non-ICT workers' average monthly salary is below Rs. 10,000 compared to 23 percent of ICT workers belonging to the same category. However, the gender difference by the share of workers across the income category is not visible. But the broad income category data does not reflect the actual wage or salary differences across gender and different sectors.

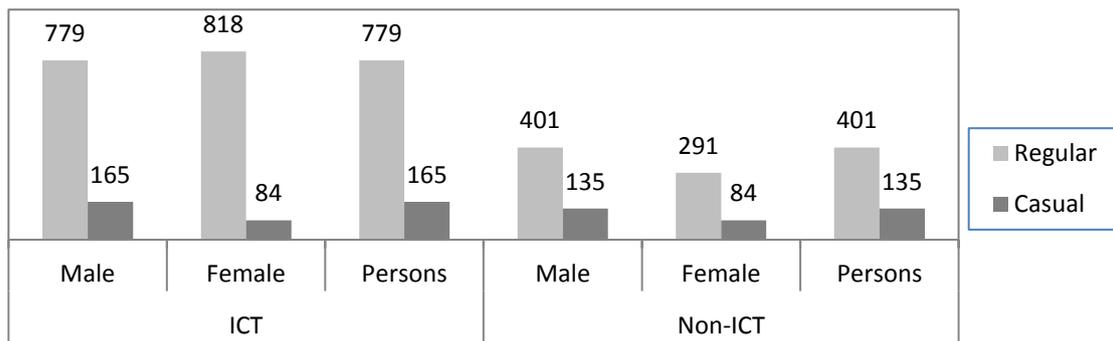
Table 4.1: Average Monthly Salary (in INR.) of ICT and Non-ICT workers

Average Income	ICT			Non-ICT		
	Male	Female	Persons	Male	Female	Persons
Upto 5000	2.7	1.5	2.6	15.4	18.0	16.0
5001-10000	20.6	19.1	20.4	46.0	48.3	46.6
10001-20000	28.2	23.1	27.5	23.1	21.2	22.6
20001-50000	33.6	33.3	33.5	13.1	10.0	12.3
50000+	14.9	23.0	16.0	2.4	2.4	2.4
Total	100	100	100	100	100	100

Source: EUS, Labour Bureau, Government of India, 2015-16

This difference can be examined from National Sample Survey data on wages/earnings of paid workers- regular and casual. The data reveals that average daily earning of ICT workers is significantly higher – almost three times more – than non-ICT workers (Figure 20). This is because workers in the ICT sector earn almost double than non-ICT workers, and the share of regular workers in the ICT sector is much higher. Overall, regular workers earned several times more than casual workers, but casual workers earned more or less similar salaries in both the ICT and non-ICT sectors. Higher salary for regular workers implies that there is a larger wage differential between regular and casual workers within the ICT sector. Also, in the ICT sector, casual female workers earned half as much as men, but in regular employment they earned somewhat more than men on an average. In the non-ICT sector, women earned considerably less than men in regular employment and with this difference being relatively greater in casual employment. In consequence, the contrast in salaries is starker among women workers than among men in ICT sector.

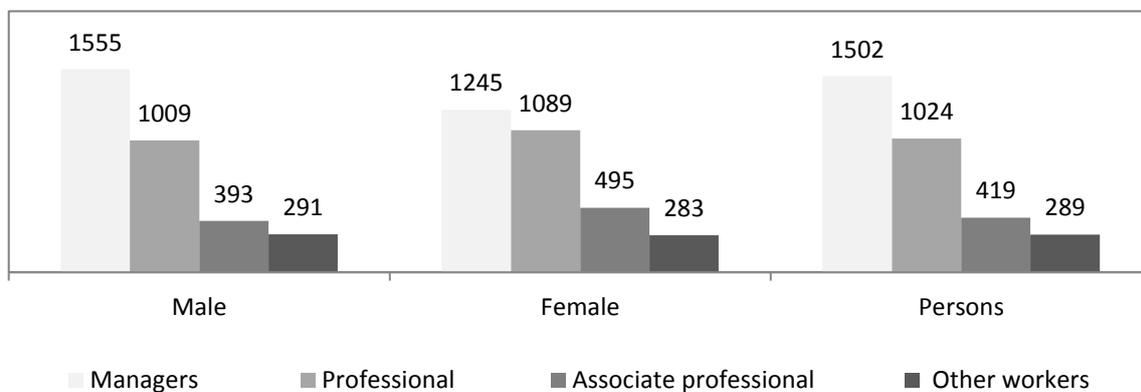
Figure 20: Average Daily Earning (in INR) in ICT and Non-ICT Service Workers



Source: PLFS, National Sample Survey Organisation, 2017-18

Further, the segment wise and skill/occupation distribution has been analysed to understand the difference in earnings among regular workers across their skill levels in two prominent segments-IT-ITeS and communications. In IT-ITeS segment high skilled workers such as managers earned 3.5 times the salaries of business & administrative staff and 5 times the salaries of clerical & secretarial staff (Figure 21). Male managers earned 25 percent more than the female managers, indicating that top management positions in IT-ITeS are overwhelmingly occupied by men. A gap in average daily earnings between men and women is observed despite there being no gender difference in the share of jobs at managers' level in IT-ITeS services (Sarkar & Mehta, 2014). Such difference is not observed at other levels of employment. In fact, women in business and administrative positions earned 25 percent more than their male counterparts.

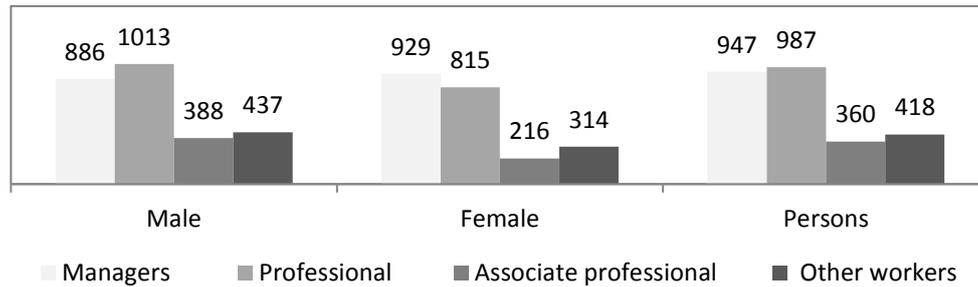
Figure 21: Average daily earning (in INR) of Regular IT-ITeS Workers across Occupation



Source: PLFS, National Sample Survey Organisation, 2017-18

The difference in average daily earnings across occupations is comparatively lower in the communication sector than in IT-ITeS services (Figure 22). Although the female's average daily salary at the managerial level in the communications sector is relatively higher, it is lower at all the other levels. One surprising observation is that the average daily earning at the lower level in the communications sector is lower than the same average for other low-skill jobs. This is an effect of the practice of outsourcing these types of jobs, which results in lower salaries.

Figure 22: Average daily earning (in INR) of Regular Communications Workers across Occupation

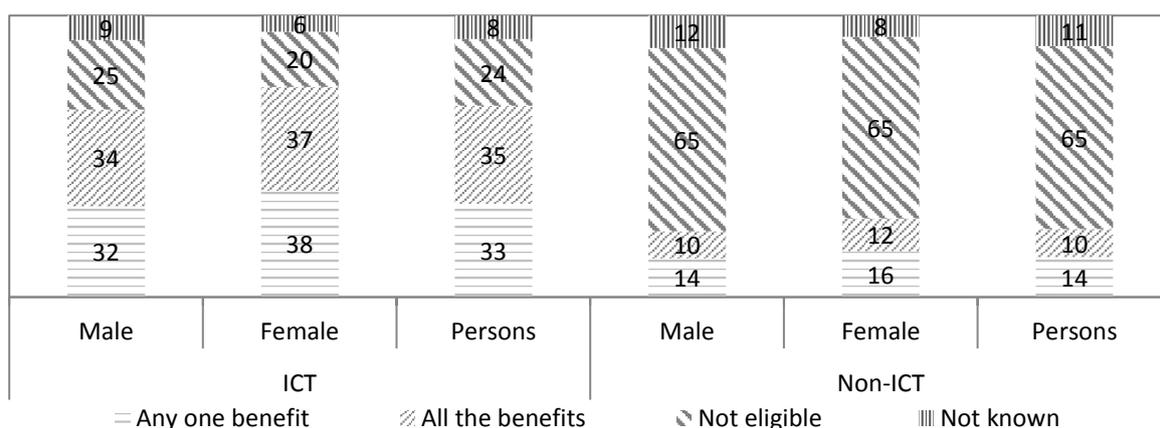


Source: PLFS, National Sample Survey Organisation, 2017-18

Managers in the IT-ITeS sector earned a salary which was one-and-a half-times more than the salaries of managers working in the communications sector. In technical and professional roles, workers in IT-ITeS earned somewhat more than their counterparts in the communications sector. In lower occupational categories, there is hardly any difference in salaries between the IT-ITeS and communications sectors.

Social Security⁴ Benefits: The coverage of social security benefits is one of the important indicators of the quality of employment. The prevalence of social security measures in the ICT sector is significantly higher than in the non-ICT sector and much higher proportion of female in non-ICT have social security compared to male. In the ICT sector, the gender difference is far less but is in the favour of the female workers. More than three-fourth (77.9 percent) of the ICT workers are covered under at least one social security benefit, while 34.8 percent covered by full gamut of social security benefits (Figure 23). However, only one fourth (24.2 percent) of the workers in the non-ICT sector are covered under at least one social security benefit, and 10.0 percent covered by full gamut of social security benefits. There is a slight difference between male and female with latter being covered more under the social security benefits compared to the former.

Figure 23: Social Security Benefits - ICT and Non-ICT Workers (in percent)



Source: PLFS, National Sample Survey Organisation, 2017-18

⁴Social Security schemes in India include provident fund, pension, health care service, maternity benefits, and gratuity (Mehta, 2018).

Working Hours and Annual Leave: The working hours and annual leaves are two important aspects of working conditions in any sector. In the Indian ICT sector, work or job is predominantly target-based and is mostly operated through a mechanism of contractual agreements with the clients that run on a time-bound basis. Employees are always under pressure to complete the assignments or targets in time. Therefore, annual leaves to the employees in ICT sector are far less than in the non-ICT sector in India.

Table 4.2: Working Conditions (percent) in IT-ITeS Sector

	IT	ITeS	Total
Leave			
Annual Leave	23	26	25
Casual Leave	11	12	11
Average Working hours			
Night Shift Per day	9	9	9
Day Shift Per day	10	9	9
Availed entitled leave (per cent)			
	62.7	79.3	71.0

Source: IHD Survey and Mehta & Singh, 2017

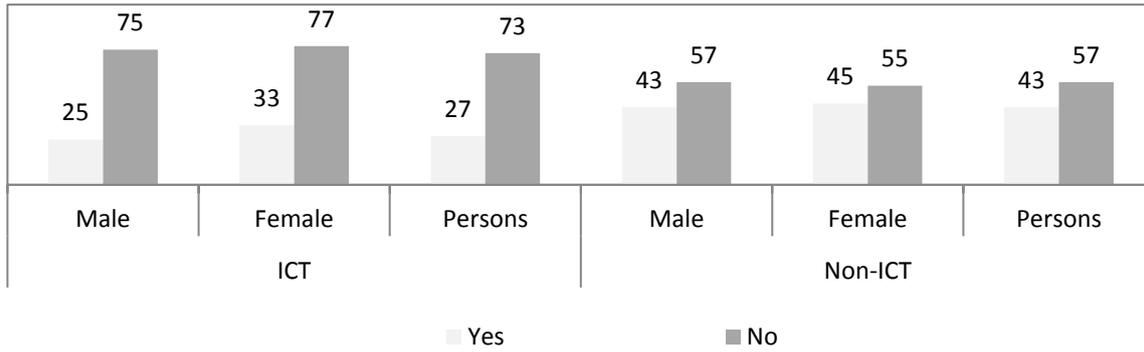
As per the survey conducted by (Mehta & Singh, 2017), the human resource heads of the firms revealed that when deadlines approach nearer, there are instances of working for 16-18 hours a day and staying back in the office over the weekend. Survey results also confirm that women employees availed only 25 days of annual average leave and worked for about 9 hours per day in day and night shifts (Table 4.2). Around 30 percent of them were unable to avail their entitled leaves due to deadlines and work targets. This phenomenon is more pronounced in the IT segment than in the ITeS segment.

4.2.4 Productive and Decent Employment in ICT sector: Freedom of Association

The freedom of association dimension includes presence of union/association and its membership.

Presence of Union/Associations: It is well established that the presence of a union or having an association membership facilitates the bargaining power of workers (Mehta, 2012). The presence of unions and/or associations is substantially higher in the non-ICT sector (43 percent) than in the ICT sector (27 percent). Across gender, it is a higher proportion of female employees who reported presence of union at their work places or industry in both the ICT and the non-ICT sector (Figure 24). While when accounting for sectors across ICT segments, it is the communication sector that has a higher presence of unions/associations when compared to IT-ITeS and manufacturing segment. The major reason behind this is the greater presence of public sector companies in the communication sector and a larger presence of outsourcing work in IT-ITeS and in the small segment of manufacturing (Sarkar & Mehta, 2014).

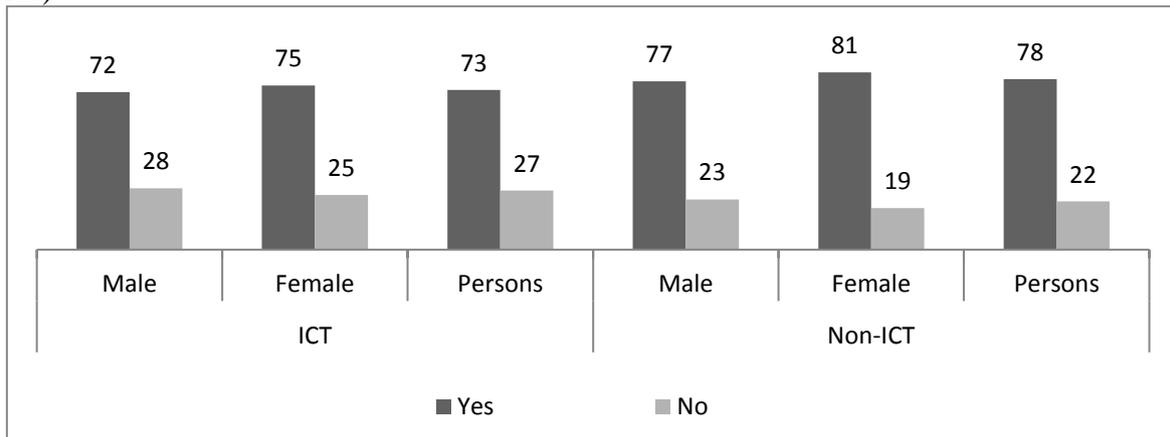
Figure 24: Presence of a Union of ICT & non-ICT Workers (in per cent)



Source: Unit record data, NSS 68 Round, Employment and Unemployment Survey, 2011-12

Membership: The membership details are largely similar across both the ICT and non-ICT sectors, with one significant difference being that the proportion of males who reported being a member of the union or association was higher than the females – the reverse is true of the non-ICT sector (Figure 25). Further, within the ICT sector, it is observed that a higher share of male workers in the communications sector are members of a union or association compared to the workers in the IT-ITeS sector (Sarkar & Mehta, 2014).

Figure 25: Proportion of ICT & non-ICT Workers as Members of Union/Association (in per cent)



Source: Unit record data, NSS 68 Round, Employment and Unemployment Survey, 2011-12

However, some of the past studies highlight how the ICT workers have revealed that due to greater skilling and a higher salary, there is no need felt for establishing a union or association. Few of them also reported that, due to fear of job loss, they did not want to participate or have membership with some employee organizations. However, in the recent years, UNITES and some other member associations have come up and are taking up the concerns of employees with the employers (Mehta & Singh, 2017; Mehta, 2012).

5. Conclusions and Way Forward

This paper clearly shows that contribution of ICT sector in GDP, export earnings, FDI and employment has been increasing over the years. The high contribution in national income compared to employment clearly indicates that the sector is generating productive employment compared to other traditional sector. It means ICT sector has led to the emergence of a 'new economy' in the country and has been the provider of better paid jobs. Yet, employment growth in the sector has been close to double-digit level in the recent years, which is highest among all the sectors of the economy. After considering the indirect employment this sector has generated, its total employment contribution goes up to more than 10 million.

This sector is predominantly mega cities/metro-dominated and its share in the total urban employment is more than 2 percent. More than 80 percent people are employed in formal segment and it is completely dominated by regular workers. More than half of these workers are employed in the public and corporate sector. The level of education plays a significant role and this sector constitutes more than 45 percent of those with educational level of graduate and above. However, self-employed workers are relatively more qualified than the regular workers. The IT and IBM segments have more than 70 percent workforce who are graduates and above. The earnings are the outcome that reflects the value of jobs in any sector and the wage/earnings level of ICT workers is higher than that of the non-ICT workers.

Social security benefits are more in the ICT sector than in the non-ICT sector. However, social security benefits of informal sector workers, both in ICT and non-ICT, are almost negligible. On one hand, long-term job contract (more than three years) in the ICT sector is more in comparison to the non-ICT sector. However, contractual jobs up to three years (about 15 per cent) indicate low security. In the ICT sector, presence of associations/workers' forum in the activity has gained momentum over the years. Around 36 percent of the workers in the ICT and nearly 30 percent in the non-ICT sector reported to have presence of union/association in their activity.

In a nutshell, ICT sector is largely mega cities/metro located and is a provider of regular and formal sector employment. Nonetheless, with the onset of gig economy and use of ICT, its reach is unlimited. However, it has low union/association presence and a substantial segment is not covered under social security benefits. These problems are more noticeable in the IBM segment than in the IT segment and these are intensified by the fact that the sector has experienced high and unprecedented growth of employment in the past decade. Conditions of employment for the 'low skilled' segment of the IBM sector are not very good, provoking some researchers to term it 'Cyber Coolies'.

There is therefore, an urgent need for new regulations on workers' safety and social security so the SDG 2030 agenda of decent and productive employment with high and inclusive growth can be achieved. Further, ICT sector justifies periodic reforms and strengthening to compete globally and harness the 21st Century opportunity to leapfrog towards the vision of Digital India, New Economy, USD 5 Trillion economy by 2025 and New India.

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