Role of the Indian IT Sector in Attainment of the SDGs: A Qualitative Study

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Introduction

The Indian IT (Information Technology) or ICT (Information and Communication Technology) Sector along with the associated ITeS (IT-enabled Services), including the BPOs (Business Process Outsourcing) and BPMs (Business Process Management), began in the 1970s and contributes 9.3% to India's GDP along with 56% of the global outsourcing market. It employs over 50 lakh individuals if ITeS are also included (IBEF 2022). Due to its large size, economically, socially, and environmentally, the IT sector plays a vital role and offers a strong incentive in realizing the Sustainable Development Goals (SDGs); a UN initiative with 17 goals and 169 targets adopted during the United Nations Sustainable Development Summit in September 2015 by 193 members. It is the core concept of the mission of 'Transforming Our World and the 2030 Agenda for Sustainable Development' (United Nations Industrial Development Organization (UNIDO) 2017). IT, along with Finance and Telecommunication, are relevant across almost all the targets of SDGs. The 2030 Agenda states that with global interconnectedness, ICT is providing the impetus for human progress, bridging the digital divide and development in knowledge societies. The aim is to end poverty, fight inequality and injustice, and handle climate change by 2030. India ranks 112 out of 165 countries in 2023, as per the Global Sustainable Development Report, 2023. IT sector has the power to achieve each SDG agenda, through innovative business models for development, management systems, operational frameworks, good practices, and participation in multistakeholder initiatives, within the expected timeframe.

UN warned the countries that a more ambitious and vigorous response is required to attain the 2030 Agenda. Unfortunately, although IT employs a large percentage of India's well-educated population, most IT professionals, especially those working on the lower levels, are not fully aware of SDGs and how they contribute towards their attainment through their technical and non-technical involvement. The situation is alarming, to the extent that even those who are giving a certain percentage of their monthly and yearly salaries for supporting CSR (Corporate Social Responsibility) activities or are even directly involved in skill development are unaware of what these funds are being utilized for and how much impact they are making through their actions.

This work discusses the major SDGs and a sectorial analysis of the critical role the Indian IT sector has played in attaining these SDGs by including India's social and cultural norms. Through this study, it has been found that IT professionals, especially those who are working in the lower levels, with under eight years of work experience, are not entirely aware of the SDGs and their importance. This work would be an addition to promoting good corporate citizenship and responsible business conduct in India. The paper also touches upon plausible suggestions regarding the ways the IT sector can involve its major resources, including human resources, to not only implement policies that help speed up the process of sustainable development but also make their employees and employers understand their individual roles and contribution in attaining

the SDGs.

The next section provides details of the literature, followed by methodology used. The fourth section provides a comprehensive view of how the Indian IT sector contributes to attaining these SDGs. The last section provides result and conclusion.

Literature

The integrated economic, environmental, and social aspects are the prime drivers for sustainable development. The Brundtland Commission of the United Nations coined the word sustainability in 1987, which means 'the ability to meet the present needs without compromising the ability of future generations to meet their own needs' (United Nations n.d.). The 17 SDGs have high-level objectives; 169 targets support them. As per author Le Blanc (2015), all the SDGs are interconnected. Hence, any change in one impacts others, directly or indirectly. It is essential to view them as a network for increasing collaboration and commitment, as well as to bring systematic changes in the world (Richnák and Fidlerová 2022). Since technological growth and innovation provide a strong stimulus for socioeconomic development, they can also help achieve SDGs when used effectively and efficiently (Ridho, Vinichenko, and Makushkin 2018). It is well known that apart from providing technological innovation, and economic growth, the private sector provides employment to people from all walks of life. As per Pedersen (2018), the private sector plays a vital role in attaining the SDGs through contribution in terms of resources, expertise, and experiences. It is essential to study the level of knowledge about SDGs in organizations so that the organizational policies and strategies can be aligned as per the requirement of the agendas (Fidlerová et al. 2022).

Indian IT has been collaborating with The International Federation for Information Processing (IFIP) for "ICT and Sustainable Development" (International Federation for Information Processing n.d.). It is a parent organization that overlooks Information Technology Societies in more than 56 countries across the globe. The agenda is to support scholarships and discourses in the area of Sustainable Development for all, using IT as a tool for inducing better coordination and interaction between environmental, societal, and economic variables. They are termed as 'stretch' goals, more extensive and ambitious than the Millennial Development Goals, which can be achieved only through deep and fast development of societies (The Earth Institute Columbia University and Ericsson 2015).

In order to know the actual progress in Sustainable Development, India has taken a significant step forward by developing a National SDG Indicator Framework (NIF) with 306 indicators (Ministry of Statistics and Program Implementation, Government of India n.d.), in line with Global Indicators Framework, which has 231 indicators (Statistics Division n.d.) for the 17 goals, based on the priorities and needs of the country. Data is generated and managed through multiple sources, iteratively, through central and state ministries, research institutes, civil societies, global organizations, and the UN (NITI Aayog 2020). This has been possible through the use of IT.

Pineda-Escobar (2019) suggested that the implementation of SDGs has become part of the sustainable plans and strategies of the organizations. The research by GRI (Global Reporting Initiative) indicates that businesses have started integrating SDGs into their corporate reporting based on relevancy (GRI and ENEL 2019). The prioritized goals are 8, 12, and 13. In 2018, a study was carried out by KPMG to analyze the importance of

SDGs in the corporate sector. As per the study, 55% of reporting companies are paying the most attention to SDGs 4, 8, and 12 (King 2020). In general, it has been noticed that the biggest businesses are more proactive and systematic in their reporting against SDGs.

The new approach to business strategies stresses the significance of social and environmental consequences along with economic gains (Baldassare et al 2017). ICT projects can be directly applied to attain economic, social, and environmental developments by leveraging existing, widely used technologies, and incorporating newer, improved technological solutions. It can be used to spread awareness as it can rapidly diffuse into local masses and be globally applied (Jayaprakash and Pillai 2018). IT can help generate holistic computational business models and integrated tools that can aid in optimized decision support systems by leveraging massive data, analytics, and contextual management. They can be used in economizing resources and reducing the costs of services. However, there are also problems related to high electronic waste generation due to the large-scale use of IT services and products. Hence, the impact of IT on the achievement of SDGs should be comprehensively viewed, at the sectorial level, to have better knowledge about the advantages, limitations, challenges, and opportunities, primarily since IT services and products are already being used at a macro level. The following section discusses the methodology used for this study.

Methodology

I have been carrying out multi-sited patchwork ethnography in the IT organizations in India, since March 2020, across 40 organizations, including Multinational and Transnational Organizations and startups, with their genesis in India and Global West. The interviews included 112 Indians from various backgrounds in IT, like software development, sales and marketing, project management, Android/iOS development, technical consultancy, design, and other IT-enabled services. They are between 21 and 58 years of age. These individuals serve at various designations and job levels across different technologies and organizations. After extensive content and document analysis, I followed a focused, semi-structured interview approach. The questions concerned IT organization work culture, inclusivity and diversity, work environment, gender neutrality, social engagements, employment opportunities, health and work-life balance, and other compliance activities. The interviews were in English and Hindi, per the respondents' preferences. For all the interviews carried out in English, Otter.ai was used for transcription. The accuracy of the transcription was manually checked by me and verified. The ones in Hindi were manually translated and transcribed into English. The data was collated using Microsoft Word and analyzed manually to identify the research themes. Data triangulation was carried out by reviewing online available reports, documents, and primary data gathered. The graphs were created using Microsoft Excel.

| No. of Respondents -112	Males - 60	Females – 51	Others- 1
Methodology	Online- 36	Offline- 19	Combination - 57
Type of Organization	MNC- 74	Medium Level - 14	Startup - 20

Table 1: Interview details

The following section discusses current findings related to SDGs attainment by the IT sector and the steps that can be taken by organizations in the future to realize each goal faster. Each goal has been discussed individually regarding progress made, with direct or indirect involvement of the IT sector.

Current Findings and Future Possibilities

We are halfway through the stipulated timeline of SDG attainment, and it has become necessary to know where India stands currently so that proper steering of courses can be done for the next 6+ years.

During my fieldwork in IT organizations, it was observed that most organizations have compulsory compliance activities. These activities focus on IT professionals' ethical, moral, environmental, cultural, and social awareness. The organizations arrange short-term training programs that focus on social and cultural sensitivity, environment protection, gender neutrality, inclusivity, diversity, innovation, creativity, and the like, to name a few. This training program is often followed by small tests or assessments, which are to be cleared by the IT professionals as part of their compulsory assignments. Usually, they happen once a year. Even though these surveys cover a large portion of SDGs and their targets, IT professionals are unaware of the purpose behind these compliance activities. I conducted interviews with IT professionals to know their current level of awareness of SDGs and the attitudes toward these compliance activities. As per my findings, 70.7% of the 112 IT professionals I interviewed do not know what SDGs are. Only 29.3% of IT professionals, who are serving at medium or top levels in the hierarchy, and have over eight years of work experience, have a certain idea about SDGs. This may be due to the reason that the strategy and policy formation in Indian IT usually happens at the top levels. As per my study, there is a lack of awareness and knowledge about SDGs and their targets, especially at the lower level in the IT industry, even though these professionals are directly or indirectly involved in activities that help move forward to fulfill the SDGs' requirements.

Response for SDG knowledge

Yes
29.3%

No
70.7%
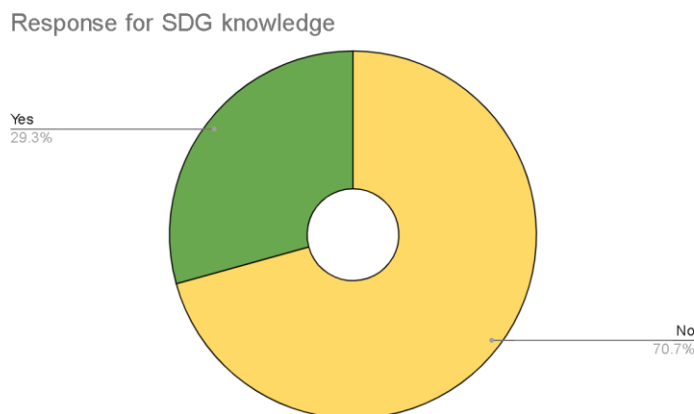
Figure 1: Response for SDG knowledge

Based on my interactions with the professionals and the collating of indices from SDG India Index (NITI Aayog 2023b) and data available online, I gathered the following findings through the analysis of primary and secondary data.

Goal 1 – End Poverty: The overall Index Score for SDG 1 is 60 for India. IT helps in job creation, access to markets, technical and skill development, at a high rate for people from all walks of life, including those from technical and non-technical backgrounds (United Nations Industrial Development Organization (UNIDO) 2016). I got a chance to visit some villages and communities adopted by IT MNCs in India and observed their impact on employment generation, upskilling, upliftment and better life. Internet and digital learning technologies can provide timely information for increased productivity and

equal rights to economically vulnerable sections on account of better income and livelihood. Recently, World Bank has predicted that internet connectivity can generate $2 trillion of economic growth and more than 140 million new jobs by 2030 (World Bank 2019). Mobile and Internet banking can provide the impetus for introducing technological development (Corporate Citizenship 2016).

Goal 2– End hunger: The overall Index score on SDG India Index and Dashboard for SDG 2 is 47. IT creates efficient integrated systems that seamlessly supports the entire supply chain from rural producers to global markets through cross-industrial partnerships and networking between existing food system stakeholders and in e-agriculture (United Nations Industrial Development Organization (UNIDO) 2016). Over 234 million ration card databases in India have been digitized across India, supporting computerization of supply chain management along with Aadhaar seeding and biometric authentication of ration cards facilitating automation of Fair Prices Shops and installation of electronic-Point of Sales machines. Another example is a mobile application, AgriMarket, and web portal Agmarknet that have been deployed to update farmers about crop prices in India (NITI Aayog 2023a). Most IT giants that I have visited sponsor NGOs that help provide food and other necessities. In the future, deployment of IT can increase efficiency and enhance the functioning of food commodity markets and their derivatives through direct and timely access to market information, like food reserves, logistics, and weather forecasts. This will positively impact agricultural yield, soil quality, waste management, and agriculture productivity by controlling food price volatility.

Goal 3 – Good health for all: Currently, the overall Index score is 74 for India. As per my respondents, IT organizations like TCS, Microsoft, Adobe, Infosys, IBM, and others have provided health packages, equipment, health funds and support to employees and families during difficult times, by switching completely to work from home. IT enabled health services have been a boon during the COVID-19 pandemic. For example the contact and tracing application, AAROGYA SETU, was effectively used in India(NITI Aayog 2020), which has the facilities for online medical consultation, Home Lab tests, and e-pharmacy. Similarly, AI-powered online consultation and telemedicine platform, Mfine connects diagnostic labs and pharmacies with doctors and patients. Qure.ai developed an AI-enabled tool for chest X-Rays, Staqu developed AI-enabled thermal imaging camera for large-scale screening of COVID-19 cases and Forus Health, is an AI system, that can help diagnose preventable blindness. Indian government also launched E-Sanjeevani with help of IT startups and Gramin (rural) Healthcare in India that has helped in teleconsultation. Digital devices aid in addressing the sexual and reproductive needs of women. ICT solutions like early warning systems, crowdsourcing, and improved monitoring systems can be developed to facilitate implementation of ICT in healthcare for inclusive and better treatment of diseases and healthcare services for all. This will help improve crisis management and support humanitarian organizations (Corporate Citizenship 2016).

Goal 4 – Provision of Quality Education: As of now, the overall Index score on SDG India Index and Dashboard for SDG 4 is 57. Expansion of internet access, and upgradation of school infrastructure has facilitated digital learning in India. PM e-Vidya, a multi-mode access to digital and online education, Samagra Shiksha scheme, and Unnayan Banka, a multiplatform model for learning implemented in Banka, Bihar are examples of initiatives that increased the quality of education through modern animated, contextualized, and comprehensive videos on TVs, mobiles, and projectors in India. It

has helped more than 80% of teachers to be formally trained even in remote or low-income areas. Digital initiatives like DIKSHA and Shala Kosh, Shagun, and Shala Saarthi have been implemented to contribute towards the digitalization of learning and education (NITI Aayog 2020). During my field visits, I noticed that IT MNCs in India support weekend and adult schools through groups of volunteers in the rural and sub-urban areas. They educate about newer technologies and teach subjects like Maths, Science, etc. to eventually create pool of educated, IT literate, entrepreneurial, and industrial human resources who can use state-of-the-art technologies by providing the necessary opportunities and knowledge in technology-intensive industries (United Nations Industrial Development Organization (UNIDO) 2016).

Goal 5 – Gender equality: The Index score for SDG 5 for India is 48. A Gender-neutral participation and inclusive workplace can tap individuals' potential and capabilities, leading to better productivity, growth, and entrepreneurial opportunities in the long term. IT organizations have implemented gender neutral policies and have made it mandatory to have a certain percentage of representation from women in the organizations. I was told that there are strong Anti Sexual Harassment Policies in majority of the companies. Irrespective of their backgrounds, LGBTQ+ communities have also started getting new opportunities for career growth. ICT systems expand e-transparency by cutting costs, providing easier access to information, and automating systems (Corporate Citizenship 2016). The Internet provides users access to information that helps stakeholders identify and fulfill their organizational and community duties. The fast-paced digitization has provided access to markets, education, training, and development opportunities for sustainable livelihood. Self-generating income from IT enabled businesses reduce the gender wage gap and provide more control to women over their earnings. For example, Atal Innovation Mission and Women's Entrepreneurship Platform, is helping IT professionals in India (NITI Aayog 2023a).

Goal 6 – Accessibility to Clean Water and Sanitation: As of now, the overall Index score on SDG India Index and Dashboard for SDG 6 is 83. I noticed water treatment and harvesting plants on the IT campuses with extensive use of recycled water. The usage of ICTs in smart water management and WASH services is vital for the availability of water and sanitation practices. Digital technologies also help set up infrastructure, optimize processes, lower expenditure, and deliver better services (Corporate Citizenship 2016). India has launched Water Resources Information System for management of water related information. It has been proclaimed that using ICT can increase irrigation efficiency by saving 70 % of water (ITU 2021). Localized data systems on water can be used efficiently by implementing better coverage and coordination between institutions.

Goal 7 – Provide Affordable and Clean Energy: The Index score for SDG 7 is 92 for India. IT sector supports one of the largest infrastructures in the SEZs, and industrial centers to realise, low-carbon and low-emissions growth path by incorporating rules and regulations to realize innovative, smart, locally relevant, environmentally sound, energy-efficient production processes and technologies. During my field visit, I noticed that most IT giants utilize Solar Energy for daily requirements like street lights, water heaters, and the like. Sensors, and automation of equipment is a common practice in most organizations for energy conservation for computers, laptops, hubs, server rooms, and other areas with high power loads. Smart grid systems can reduce carbon emissions at high rates worth EUR 79 billion (Smart, 2020). Enforcement of standards and required specifications by regulatory bodies for energy conservation and consumption in

infrastructure and commercial buildings can help maintain energy efficiency (NITI Aayog 2020). Smart grids, buildings, homes, and smart logistics, have been implemented to enhance energy efficiency across various locations.

Goal 8 – Promote Good Jobs and Economic Growth: The overall Index score on SDG India Index and Dashboard for SDG 8 is 61. The startup ecosystem running in incubation centers like Atal Incubation Center or even those supported by other IT organizations help promote innovation, entrepreneurship, and ample employment opportunities. They support structural transformation that helps increase labor productivity, social protection, and worker security. For example, MIMO (Minimum Investment Maximum Outcome) is an Android application through which organizations can connect and hire employees from rural and remote areas.

Goal 9 – Support Industry, Innovation, and Infrastructure: The overall Index score for SDG 9 is 55, with a significant variation among the Indian subnational units. IT helps industrialization processes that boost livelihood, higher employment, living standards, and economic growth, including through partnerships and linkages between industries and the local economy. Stellapps Technologies has supported dairy supply chain digitization in India. In May 2022, National Data and Analytics Platform (NDAP) was launched to democratize easy access to public government data on a user-friendly platform (NITI Aayog 2023a). Highbar Technocrat Ltd. Provides digital solutions for increasing the efficiency of the infrastructure industry (Valuer 2020). ICT is helping build smart cities for a better quality of life at economical rates (Corporate Citizenship 2016). By supporting infrastructure upgradation and retrofitting industries, IT can make them sustainable, resource-use efficient, clean, and environmentally sound through better scientific research, technological upgradation, encouraging innovation, and social and economic restructuring. Even upgradation in the server rooms, which consume high levels of energy, can help reduce power consumption in data centers by 50-80%.

Goal 10 – Reduce Inequality: The overall Index score for SDG 10 is 67 for India. A multipurpose Smart Card has been provided for people of LGBTQ+ communities to provide easy access to schemes and services in India. For example, Jan Dhan-Aadhaar-Mobile (JAM) program provides pan-India access to bank accounts under Jan Dhan Yojana, a biometric identity for about 90 % of people that have helped in endorsing financial inclusion of over 200 million in India. These expansions have provided economic empowerment and freedom through the provision of credit, insurance, and Direct Benefit Transfers (DBT) systems (NITI Aayog 2020). In future, IT can help improve the Government's statistical capacity in gathering large-scale data disaggregated by gender, class, caste, social category, race, ethnicity, income level, religion, and region.

Goal 11 – Sustainable Cities and Communities: The overall Index score on SDG India Index and Dashboard for SDG 11 is 79. During the field visit, the development in major IT hubs was visible compared to those that were not. For example areas, like Hinjewadi, in Pune, has majorly developed in terms of infrastructure due to the presence of IT MNCs. The same is the case of Marathalli in Bangalore or Electronic cities in Mumbai, Chandigarh, Jaipur, Hyderabad, and others. Under India's Smart Cities Mission (SCM), 100 cities across the nation have been undergoing infrastructure upgradation, through digitization and automation (NITI Aayog 2023a). For example, Under the Bhubaneshwar Smart City plan, an e-portal named Bhubaneshwar One integrates geo-spatial data from Indian Government and private organizations to provide easy access to

information. Crowdsourcing helps in handling emergencies like fast dissemination of information, effective response to warnings, and dealing critical situations during and post-disaster, to name a few. In May 2022, an experienced studio on drones was launched to promote and create awareness about using drones and related innovative technologies (NITI Aayog 2023a). The Unified Logistics Interface Platform (ULIP) provides real-time information on multi-modal transport, which is necessary for stakeholders working in silos. However, there is a strong requirement to have better database management and dissemination for systematic and consistent monitoring (Corporate Citizenship 2016).

Goal 12 – Responsible Consumption: As of now, the overall Index score for this SDG is 74 for India. Many of the development and training centers of IT MNCs in Mysore, Bangalore, Delhi, Pune, and Mumbai have installed Sewage Treatment Plants (STP), waste conservation and management system, rainwater harvesting systems, pollution control, the introduction of non-Chlorofluorocarbon (CFC) equipment for air conditioning, measures for increasing energy efficiency. Green Rating for Integrated Habitat Assessment (GRIHA) is an important step to design and evaluate green buildings in India, mainly because IT has huge infrastructures. Using resources efficiently, green employment and workforce, sustainable infrastructure, equitable access to essential work from home, and hybrid working systems have helped drastically reduce carbon footprints. Reusing old ICT equipment could help raise revenue drastically.

Goal 13 – Climate Action: As of now, the overall Index score on SDG India Index and Dashboard for SDG 13 is 54. IT organizations are mostly Green campuses. They are quite active in making people ecologically aware through independent and collaborative awareness programs. They promote using community and pool vehicles for commute and do not prefer the usage of personal vehicles inside campus. United Nations Framework Convention on Climate Change (UNFCCC) also provides technical expertise, data collection, and analysis related to climate change information as well as the implementation of the Kyoto Mechanism, where IT has a substantial role to play through digitalization and automation, Machine Learning, Artificial Intelligence to provide possible solutions.

Goal 14 – Conserve Life below Water: The Index score on SDG India Index and Dashboard for SDG 14 has not been declared at the national level, but a significant variation between 23-65 is present among the subnational units. The marine sector has started using innovative and advanced technologies for the economical and sustainable management of marine resources.

Goal 15 – Protect, restore, and promote Life on Land: As of now, the overall Index score of India for SDG 15 is 66. During my field visit, respondents said that there are Tree plantation drives and awareness programs in their organizations regularly. Through ICT, local people are trying to sensitize and preserve the environment and wildlife (ITU 2021). A web-based role-based workflow application named Parivesh was launched to digitize and automatize, submission and monitoring of clearance proposals related to wildlife, forest, environment, and other CRZs (NITI Aayog 2020).

Goal 16 – Promote Peace and Justice: The overall Index score on SDG India Index and Dashboard for SDG 16 is 74. Complex humanitarian operations are better handled using ICT tools. People are using online social media platforms as weapons to speak against all sorts of discrimination and violence (Mandal 2022). For example, the Digital

India campaign provides e-governance solutions for citizen-centric projects. An online platform named Pragati is used for grievance redressal and monitoring. Aadhaar, a unique identity system covers over 90% of the Indian population that has helped increase the speed, fairness, efficiency, and transparency of delivering benefits and services to over 380 million beneficiaries under various Government schemes and programs. Significant progress has been made in digital governance, the digital economy, and the provision of several value-added public services. Blockchain is being used in Andhra Pradesh, India for land pooling, which has provided better security and greater transparency in government procedures (NITI Aayog 2023a).

Goal 17 – Partnerships for the Goals: As of now, the overall Index score on SDG India Index and Dashboard is 66. IT is one of the sectors with the highest number of global partnerships and coalitions. The digitalization of the Public Finance Management System (PFMS) has increased accountability, responsiveness, and transparency of the financial systems. The erstwhile Pan Africa e-Network Project that connects 53 African nations in tele-education and telemedicine has been technologically upgraded and renamed e-VidyaBharti and AarogyaBharati Network Project (e-VBAB). India has developed a SAARC COVID-19 Information Exchange Platform (COINEX) for all SAARC countries. India uses its e-ITEC network to help train healthcare personnel in neighboring countries (NITI Aayog 2020).

The above findings and analysis prove that the IT sector in India has been at the forefront of attaining SDGs and reaching the required targets. However, IT professionals need more awareness and sensitization about the role IT plays and how everyone can contribute towards it.

Result and Conclusion

The IT sector represents a significant segment of well-educated youth with uninhibited access to knowledge resources regarding SDGs and the global concerns of modern society. This study presents the progress that has been done until now in India to achieve the SDGs through direct and indirect involvement of the IT sector. This study also shows that there is still a lack of awareness among IT professionals about the SDGs. Only 29.3% of IT professionals, who are serving at medium or top levels in the hierarchy, and have over eight years of work experience, have a certain idea about SDGs. It is alarming to see that the professionals of the IT sector, who have such a substantial impact on SDG attainment, are not aware of these agendas, even though ICT forms the backbone of digital society. The outcome of the research is vital as it is the harbinger of policy design for accelerating progress towards the attainment of SDGs in the short period of 6+ years that are left at the closing of the decade of Agenda 2030. It may set out the pace for similar work for sector-wise analysis leading to macro and micro management of works in the digitally deregulated economy. The study is expected to be helpful for Policymakers, Human Resource Executives, IT employees, government officials involved in public-private partnerships and projects, and other SDG enthusiasts, who want to understand the current progress made in this area, through the lens of IT sector. If over 50 lakh employees in the IT sector could be made aware of the acute need for their participation in the agenda, the progress could be faster and more prominent.

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