RESEARCH ARTICLE

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A Study on Software Industry of India in Burgeoning of Economy

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Abstract

The Indian Economy experienced its highest growth rate in the past decade during the financial year that ended in March. The industrial and service sectors played a significant role in this impressive performance, contributing roughly 7% to India's GDP in FY2023-24. The rate of economic growth in India experienced an improvement during the 1980s. Information Technology, or IT, encompasses the electronic handling, retention, and transmission of various forms of information. Hence, Information Technology has the potential to be applied in all sectors of the economy. The actual influence of science and technology (ST) on economic growth and productivity is a subject of ongoing discussion, especially in the United States, which has been at the forefront and the most extensive adopter of ST. Undoubtedly, India's software business is more resilient, particularly in specific domains. Although the sale of packaged software to consumer and business markets necessitates economies of size and scope, as well as robust marketing and customer support, the project-oriented aspects of software development do not require them to the same extent. India's software sector remains quite limited in its scope. The Indian Software Industry has experienced significant growth in recent years, primarily driven by the rapid expansion of globalisation. It has achieved this expansion by becoming a significant component of the global software labour division. This study emphasises the role of the Software Industry in fostering the growth of the Indian Economy during the past decade. The Indian software industry has significantly contributed to the growth rate of the Indian economy.

Keywords: India, Software, IT, Economy, Revenue.

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Introduction

India is a highly significant and old civilization on a global scale. It has introduced concepts such as Yoga, Ayurveda, and Vedic Mathematics. Vedic Mathematics facilitates the execution of complex calculations effortlessly. India has had significant advancements in the field of mathematics as a result of its vast population and exceptional intellects.

Software technology and mathematics are closely intertwined as they both necessitate the use of problem-solving skills. Indians excel in mathematics due to their resilience and diligent work ethic. This is closely related to the competitive examinations administered by educational institutions in India. Experiencing childhood in India can be challenging due to the immense pressure exerted by Indian parents, educational institutions, and highly competitive admission examinations. A typical student must confront and manage all of these issues concurrently. The management of rivalry and pressure fosters the growth of resilience, diligence, and forbearance.

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The Indian Information Technology/ Software industry is currently a dominant force on a worldwide scale, and its influence on India has been unparalleled. It has greatly contributed to establishing the country as a favoured investment location for international investors and generating significant employment possibilities in India, as well as in the USA, Europe, and other regions worldwide. Over the past ten years, the industry has had significant growth in terms of revenue, with its relative share to India's GDP estimated to be approximately 7% in FY2023-24. India is the foremost global location for IT corporations to outsource their operations. With a track

record of successfully providing on-shore and off-shore services to clients worldwide, developing technologies present a wide range of new prospects for leading IT companies in India. The Indian IT/Software sector provides cost-effective solutions, excellent quality, exceptional reliability, prompt deliveries, and utilises cutting-edge technologies on a worldwide scale.

The Indian IT/ ITeS industry holds a prominent global position and has been steadily contributing to the increase in exports and the generation of employment opportunities. India's IT-BPM business, excluding e-commerce, is projected to achieve a value of USD 254 billion, with exports amounting to around USD 200 billion in FY2023-24 (E). The IT-ITeS Industry has generated significant employment prospects and is projected to employ 5.43 million professionals, representing an increase of 60,000 individuals over FY 2022-2023 (E). Female employees comprise 36% of the overall workforce in the business.

The Ministry of Electronics and Information Technology is overseeing strategic initiatives, fostering talent development programmes, improving infrastructure capacities, and providing funding for research and development to ensure India's dominant position in the field of IT and IT-enabled Services.

Objectives

- To study the role of Software Industry in GDP growth of India
- To study the growth and revenue patterns of Software industry over years
- To study the various investments/Developments, government initiatives
- To projection of the road ahead for software industry in development of Indian economy

Literature Review

Since the emergence of the IT industry in India in the mid-1990s, there has been a significant amount of research conducted on the Indian IT industry. This research has been driven by a growing understanding of its role in the development of a dynamic and liberalised Indian economy. According to Chandrasekhar and Ghosh (2006), the growth observed in developing economies such as India can be attributed to two distinct characteristics: 1. The rapid increase in the outsourcing of IT and IT-enabled services by enterprises in industrialised countries. 2. A rise in the magnitude of offshore these delegated operations to nations such as India. In a study conducted by Singh (2016a), it was shown that information technology (IT) has the potential to greatly enhance productivity. Building upon the same subject, Singh (2016b) and Singh (2016c) explained that the integration of IT and R&D not only enhances productivity, but also facilitates the transfer of technology, which confers a lasting benefit to businesses. Singh (2018) reaffirmed the findings and contended that the presence of trained (production) personnel is crucial for fostering growth. Singh (2019b) and Singh (in press) elucidated that Information Technology (IT) plays a pivotal role in substantially enhancing growth in the Indian manufacturing sector. Information technology (IT) plays a significant role in identifying and creating synergies in complicated transactions like mergers and acquisitions (Singh, 2017c). According to Ngai and Wat (2002), globalisation and IT are significantly transforming the nature of business and organisation. Information technology (IT) now plays a crucial role in enabling company operations. IT-enabled globalisation has significantly reduced the time and effort required for management functions that were previously time-consuming. The utilisation of IT tools renders geography and physical distance irrelevant. According to Abouzeedan (2005), e-globalization refers to the process of establishing commercial and cultural connections between individuals, companies, and countries through the widespread use of modern IT tools. According to Das and Narayan (2005), the software and services business in the country has demonstrated substantial pace, surpassing that of other industries. During 2002-03, there was an increase in the outsourcing of IT needs by big global firms to Indian companies, which aligns with global patterns. Software and services exports maintained their position as the major source of revenue in the IT industry. Indian ICT leaders and enterprises in the software sector experienced significant growth in long-term projects and successfully secured an increasing portion of the worldwide outsourced business. In 2005, J. Lui stated that the offshore Business Process Outsourcing (BPO) industry in India accounted for just 1.5 percent of the overall BPO market. This might be interpreted as indicating the remaining potential for growth that Indian enterprises still have. Nevertheless, India's current involvement in global outsourcing indicates its overwhelming control of the sector, accounting for 80% of the total. In a compelling study, Singh (2017a) conducted research on the major states of India in the manufacturing industries and discovered that information technology

(IT) had a significant part in fostering development in different states, including Karnataka and Tamil Nadu. Several other studies (Brunner, 1991, 1995; Dedrick & Kraemer, 1993) have examined the growth of the IT and ITeS sector in India. The studies conducted by Brunner (1991) and Dedrick and Kraemer utilised data from the pre-liberalization era of the Indian economy. In contrast, Brunner's 1995 study, conducted after liberalisation, focused on the technological advancements within the Indian IT industry. This study examines the impact of liberalisation on the expansion of the IT sector in India during a period of privatisation and deregulation. In recent studies, Singh (2017b) showed that a significant proportion of foreign direct investment (FDI) is directed towards disruptive service industries, particularly in the field of information technology (IT). Lal (2001) provides a definition of the Institutional Environment's role in the evolution of the IT sector in India. The government's policies and the quality of IT infrastructure in key cities have significantly influenced the growth of the IT sector in both the local and global markets. Nevertheless, the process of being acknowledged and put into practice is not without difficulties. There are concerns regarding the adjustments for the sectors seeing sustained growth. Numerous publications and studies in the field of IT have focused on investigating a wide range of these difficulties. Patibandla & Peterson (2002) and D'Costa (2003) noted several issues: 1. The different relationships within the industry 2. The involvement of transnational computer corporations (TNCCs) in the process of transferring and improving technology, The ramifications of the software industry for wider economic development. However, the country's growth has significantly benefited from the IT and ITeS sector in recent decades. The sector nevertheless has significant obstacles in terms of economic, social, and political acceptance in the country. Analysing the data below enables us to draw robust conclusions.

Research Methodology

Research Design

The study is descriptive in nature.

Data Collection

The data will be collected from secondary data.

Secondary Data

Secondary data are collected from the Institute, Journals, Articles, Website and Previous reports.

"Software Industry of India in Burgeoning of Economy"

Contribution of indian software-BPM industry in GDP of india

India holds significant relevance in the global business process management market as it is one of the leading outsourcing destinations for IT businesses worldwide. In fiscal year 2023, the IT-BPM sector made up around 7.5 percent of the country's GDP. BPM can be seen as a discipline rather than a mere process, encompassing techniques to enhance, analyse, automate, and optimise business processes.

Both domestic and international

The IT sector recorded an export value above 149.1 billion U.S. dollars in the financial year 2021. The banking, financial services, and insurance (BFSI) sector was the dominant segment in the export. The sector has also been generating substantial amounts within the country. In the fiscal year 2016, the IT-BPM business in the country created over millions of direct jobs.

What lies in store for the future?

By combining BPM and robotic process automation (RPA), it is quite probable that there will be strengthened collaborations with the constantly expanding IT and BPM sector in India. The industry has experienced a consistent growth in revenue over the years, and it is expected that this trend will continue due to the rapid expansion of the sector.

Figure 1 shows the percentage contribution of Indian software sector in Gross Domestic Product of Domestic economy in last fifteen (15) Years. The data is retrieved from statista.com which is a research and development website therefore a reliable source for information.

Table: 1 shows the exports and imports along with total revenue in US$ trends of Indian software industry of recent five (5) years. The table also shows year-over-year YOY growth of above said years. The data is taken from NASSCOM which also a research and development website and is a reliable source.

Recent investments/ developments in the industry

- Indian IT's fundamental capabilities and advantages have garnered substantial investment from prominent nations and corporations.
- The IT services and BPO/ITeS sector is projected to employ 5.4 million people by FY23, with an increase of 290,000 individuals.
- The public cloud services market in India generated

a revenue of US$ 6.2 billion in 2022 and is projected to reach US$ 17.8 billion by 2027, with a compound annual growth rate (CAGR) of 23.4%.

- In November 2022, ICICI Bank launched two more offerings, Loan against Deposits (LAD) and Dollar Bonds, specifically tailored for its Non-Resident Indian (NRI) customers. These products were made available at the bank's branch located in GIFT City.
- In November 2022, Amazon Web Services (AWS) introduced its second AWS infrastructure area in India, known as the AWS Asia Pacific (Hyderabad) area. It is projected that by 2030, the region will create over 48,000 full-time jobs per year as a result of investments exceeding US$ 4.4 billion in India.
- In November 2022, Google formed a collaboration with a nearby gaming business called SuperGaming, facilitated by its Google Cloud division. As a result of the agreement, game developers utilising Google Cloud for game development, hosting, and distribution will be granted access to SuperGaming's SuperPlatform game engine.
- HDFC Bank has formed a partnership with Flywire to allow its clients to make digital payments for fees to international institutions and universities.
- In August 2022, Network People Services Technologies (NPST) declared its ongoing development of a banking super app. The high-end platform is suitable for banks, fintech startups, and other BFSI players. It provides a smooth user experience by integrating all banking, financial, and transactional services into a strong and intelligent application.
- In August 2022, PwC India disclosed its intention to recruit 10,000 personnel in the field of cloud and digital technologies during the next five years.
- In October 2022, private equity and venture capital investments in the technology sector amounted to a total of US$ 157 million, spread across 12 different deals.
- The computer software and hardware sector in India received a total of US$ 97.31 billion in foreign direct investment (FDI) between April 2000 and September 2023. According to the data given by the Department for Promotion of Industry and Internal Trade (DPIIT), the industry was rated second in terms of foreign direct investment (FDI) inflows. Computer software and hardware account for 15% of the total foreign direct investment (FDI) inflows.
- In July 2022, the Union Bank of India (UBI) initiated a Metaverse Virtual Lounge and Open Banking Sandbox environment in collaboration with Tech Mahindra.
- ZStack International, a global pioneer in cloud computing, Infrastructure as a Service (IaaS), and Platform as a Service (PaaS) technologies, declared its expansion into India and the SAARC Region in June 2022.
- In June 2022, Redington India, an IT company, formed a long-term strategic partnership with Amazon Web Services (AWS) to promote the use of cloud technologies in India.
- Experian, an American Irish consumer credit reporting firm, intends to significantly expand its global innovation centre (GIC) in Hyderabad. The company aims to increase its workforce to approximately 4,000 personnel during the next three to five years. GIC will prioritise the adoption of emerging technologies in the BFSI sector, such as cloud computing, big data analytics, artificial intelligence, and machine learning, as reported by reliable sources.
- In 2021, the IT sector received PE investments of US$ 23.4 billion.
- India's IT startup ecosystem experienced a significant increase in investments, reaching a record amount of roughly US$ 36 billion in privately held companies in 2021, compared to US$ 11 billion in 2020.
- In March 2022, Licious, the leading Indian brand specialising in fresh animal protein and utilising technology, secured a total of US$ 150 million in a Series F2 fundraising round.
- In March 2022, Byju's secured an investment of US$ 800 million in a pre-IPO round, resulting in a valuation of approximately US$ 22 billion for the Bengaluru-based company.
- In March 2022, CredAvenue, a platform for trading debt, secured a fundraising round of US$ 137 million. The funding was headed by Insight Partners, B Capital Group, and Dragoneer Investment Group, resulting in a valuation of US$ 1.3 billion for the firm.
- In February 2022, Hasura, a software firm that provides developers with tools, secured a total of US$ 100 million in a recent investment round. The funding was spearheaded by Greenoaks Capital and resulted in Hasura becoming a unicorn company.
- The user's text is a bullet point.In January 2022, Google declared its intention to allocate a sum of US$ 1 billion towards investment in Bharti Airtel Ltd., an Indian telecommunications company, with the objective of promoting the development of India's digital ecosystem.
- Amazon has formed a partnership with Airtel to offer Amazon Web Services (AWS) to Airtel customers.

Additionally, Amazon plans to invest $1.6 billion in two new data centres in Hyderabad.

- In November 2021, Wipro formed a partnership with TEOCO to develop solutions that enhance network automation, efficiency, flexibility, and dependability for communication service providers (CSPs).
- In August 2021, Tata Consultancy Services was recognised as a leader in the NelsonHall NEAT for CX Services in Banking, Financial Services, and Insurance (BFSI).

National policy on software products (NPSP) – 2019

The Union Cabinet approved the National Policy on Software Products – 2019 on February 28, 2019. The policy aims to provide a strong environment for the development of Indian software products, promoting overall growth of the IT industry through intellectual property-driven strategies.

In FY 2023, the Indian Software Product industry achieved significant milestones by generating a total revenue of $14.2 billion, according to the NASSCOM projection. Without a doubt, 2022 witnessed significant expansion in the tech start-up sector in India. In addition to the unicorn tale, there was an increase in demand for collaborative applications, application platforms, security software, system and service management software, and content processing and management applications in the software product area.

The followings major programmes are being implemented under the National Policy on Software Products-2019:

The Indian software product registry (ISPR)

The Indian Software Product Registry (ISPR) has been established to evaluate the numbers, statistics, and database of Indian Software Product Companies (ISPC) and consolidate all software products into a single platform. The ISPR (www.ispr.gov.in) was established on October 21, 2019.

Indian video conferencing solution development innovation challenge

An Innovation Challenge programme has been initiated to build a novel Video Conferencing solution. The project aims to promote Indian software goods in accordance with the National Policy on Software goods. The programme has announced one winner and three runner-ups.

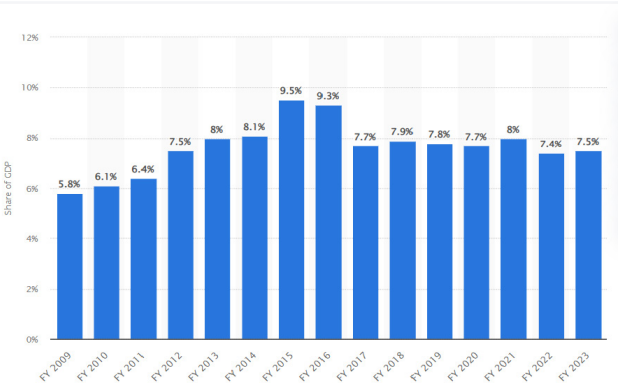
The ICT Grand challenge (ICTGC) is a part of the national Policy on software products

The National Policy on Software Products includes a provision to organise a minimum of 20 Grand concerns in order to foster the development of a diverse range of software products that tackle socio-economic concerns. An ICT Grand Challenge (ICTGC) initiative has been initiated to create inventive software solutions through a series of four challenges in a specific field.

The Ministry of Electronics & Information Technology (MeitY) has recently collaborated with the National Jal Jeevan Mission (NJJM) and the Department of Drinking Water and Sanitation, Ministry of Jal Shakti to successfully complete the ICT Grand Challenge. The objective of this challenge was to create a 'Smart water supply measurement and monitoring system' using information and communication technology (ICT). The programme has announced one winner and three runners-up.

SAMRIDH programme

The SAMRIDH programme is an accelerator programme initiated by MeitY that focuses on fostering product innovation, development, and growth for start-up companies.



Source: statista.com

Figure1: Contribution of Indian software-BPM industry in GDP of India FY 2009-2023

Table:1 Revenue Trends of Indian Software Industry

Description	*2019-20*	*2020-21*	*2021-22*	*2022-23*	*2023-24*
Exports	147	152	178	194	199.5
Domestic	44	45	49	51	54.4
Total Revenue	191	196	227	245	254
YoY Growth %	7.90%	2.09%	15.5%	7.9%	3.7%

Source: NASSCOM

The SAMRIDH programme has been initiated to provide assistance to current and future Accelerators in the process of identifying and expediting the growth of promising start-ups focused on product development. The program's primary objective is to expedite the growth of start-up companies by facilitating connections with customers, investors, and worldwide markets. The implementation of the scheme is being carried out by MeitY Startup Hub (MSH). Currently, there are 22 Accelerators being funded to support a total of 175 businesses under the scheme.

The iTamil nadu technology (iTNT) hub is located in chennai

The establishment of the iTamil Nadu Technology (iTNT) Hub in the Anna University campus, in collaboration with the State Government and Industry, aims to facilitate the participation of startups and enable them to capitalise on the opportunities available in Tamil Nadu. The main goal of Tamil Nadu Technology Hub is to foster the deep tech innovation ecosystem in Tamil Nadu, providing guidance, development, implementation, and support to companies, particularly during the scaling-up phase in deep tech.

Government initiatives for the Industry

- The government has implemented several significant measures to foster the growth of the IT and ITeS industry in India. These initiatives include:
- In March 2024, The Cabinet sanctioned a budget of more than US$ 1.2 billion (Rs. 10,300 crore) for the IndiaAI Mission, representing a substantial advancement in strengthening India's AI ecosystem.
- The Cabinet has authorised the PLI Scheme - 2.0 for IT Hardware, which has a budget of Rs. 17,000 crore (US$ 2.06 billion).
- In September 2022, the Ministry of Communications released the Telecommunications Bill 2022 for public consultation. This bill aims to establish a new telecommunications framework in India.
- In August 2022, the Indian Computer Emergency Response Team (CERT-In) and the Cyber Security Agency of Singapore (CSA) collaborated to organise the "Synergy" Cyber Security Exercise. The exercise aimed to enhance network resilience against ransomware attacks and involved the participation of 13 countries.
- In June 2022, Mr. Arvind Kumar, the Director General of STPI, announced that exports through STPI units have grown from Rs. 17 crore (US$ 2.14 million) in 1992 to Rs. 5.69 lakh crore (US$ 71.65 billion) in 2022.
- In May 2022, it was stated that Indians can now utilise their Digi Locker services via WhatsApp for convenient retrieval of their official documents.
- In April 2022, the Indian Computer Emergency Response Team (CERT-In) announced directives to enhance cybersecurity in the country.
- The government implemented the STP Scheme, a programme focused on the creation and export of computer software. This scheme is only for exports and includes the export of professional services through communication links or physical media.
- In November 2021, the government initiated the establishment of the Internet Exchange in Uttarakhand with the aim of improving the calibre of internet services in the state.
- The Karnataka government has entered into three Memorandums of Understanding (MoUs) valued at US$ 13.4 million (Rs. 100.52 crore) to support the growth of the state's technology sector.
- In September 2021, the Indian government unveiled a proposal to construct a cyber-lab as part of the 'Online Capacity Building Programme on Crime Investigation, Cyber Law, and Digital Forensics' with the aim of enhancing cyber security skills.
- •In September 2021, the Ministry of Electronics and Information Technology (MeitY) conducted a workshop with the objective of fostering the involvement of both public and private players in India and enhancing internet connectivity in rural regions, under the theme of 'Connecting all Indians'.
- The user's text is a bullet point.The Indian government initiated the Meghalaya Enterprise Architecture Project (MeghEA) in September 2021 with the aim of enhancing service delivery and governance in the state through the utilisation of digital technology. The ultimate objective is to elevate Meghalaya to a high-income state by the year 2030.
- In September 2021, the Indian government initiated Phase II of the Visvesvaraya PhD Scheme with the aim of promoting research in 42 emerging technologies in the fields of information technology (IT), electronics system design & manufacturing (ESDM), and information technology-enabled services (ITES).
- In September 2021, the Indian government established five National Institute of Electronics & Information Technology (NIELIT) Centres in three Northeastern states to enhance the accessibility of training facilities and job prospects.
- On July 2, 2021, the Ministry of Heavy Industries and Public Enterprises initiated the establishment

of six technology innovation platforms. These platforms aim to foster the development of cutting-edge technologies that will enable India to compete on a global scale in the manufacturing sector. The six technology platforms were created through collaboration between IIT Madras, Central Manufacturing Technology Institute (CMTI), International Centre for Automotive Technology (iCAT), Automotive Research Association of India (ARAI), BHEL, and HMT, in partnership with IISc Bangalore. • The Department of Telecom, Government of India and Ministry of Communications, Government of Japan, have signed a Memorandum of Understanding (MoU) to strengthen cooperation in the fields of 5G technologies, telecom security, and submarine optical fibre cable systems.

Other-Initiatives

Next generation incubation scheme (NGIS)

The Next Generation Incubation Scheme, also known as NGIS, is a forward-thinking and all-encompassing incubation programme that has been assigned by the Ministry of Electronics and Information Technology (MeitY) to the Software Technology Parks of India (STPI) for execution. NGIS aims to propel India's emergence as a leading Software Product Nation, positioning it as a global contender in the creation, manufacturing, and distribution of cutting-edge, high-performing, and secure software products, including embedded software. NGIS is now prioritising 12 specific locations in India, namely Agartala, Bhilai, Bhopal, Bhubaneswar, Dehradun, Guwahati, Jaipur, Lucknow, Prayagraj, Mohali, Patna, and Vijayawada. The objective of the Scheme is to provide assistance to 300 technology startups and entrepreneurs operating in the fields of information technology, IT-enabled services, and electronic system design and manufacturing.

Road ahead of the industry

India is the foremost choice for IT organisations worldwide when it comes to offshore. With a track record of successfully providing on-shore and off-shore services to clients worldwide, developing technologies present a wide range of new prospects for leading IT companies in India.

IT expenditure in India is projected to experience a growth rate of 11.1% in 2024, reaching a total of US$ 138.6 billion, compared to US$ 124.7 billion in the previous year.

The market for public cloud services in India expanded to US$ 3.8 billion in 2023 and is projected to reach US$ 17.8 billion by 2027.

By the year 2026, the extensive use of cloud technology can create job possibilities for a total of 14 million individuals and contribute an additional US$ 380 billion to India's Gross Domestic Product (GDP).

According to a survey conducted by Amazon Web Services in 2021, it is projected that India would have a nine-fold increase in the number of workers with digital skills by 2025.

In November 2021, Mr. Piyush Goyal, Minister of Commerce and Industry, Consumer Affairs, Food and Public Distribution and Textiles, commended the Indian IT sector for its exceptional competitive prowess, achieved without any government intervention. Additionally, he stated that India's service exports have the capacity to achieve a value of US$ 1 trillion by the year 2030.

Conclusion

There is unanimous agreement that the software industry in India will play a significant role in the country's economic development in the near future. The IT industry has the potential to create employment opportunities for millions of educated Indians in diverse IT-related roles and generate cash through the export of software and hardware. The government and private organisations have implemented numerous projects to use ICT into education and women's empowerment programmes. These programmes are primarily operational in select districts or specific communities. Nevertheless, there is still a considerable distance to cover and numerous obstacles lie ahead of us. The majority of IT-based programmes aimed at rural development, education, or women's empowerment are operational only in select districts inside developed states like Maharashtra, Karnataka, Andhra Pradesh, and Tamil Nadu. Underprivileged states such as Bihar, Orissa, and the north-eastern states have not yet seen significant implementation of IT-based development programmes for their rural populations. A significant portion of India's GDP is derived from the agricultural and commodities sectors, which are concentrated in various regions of the country. This presents the government with both an opportunity and an obligation to address the needs of these impoverished and underrepresented states. However, the evidence presented in the report unequivocally demonstrates the extent to which the software/IT sector has contributed to the growth in India. India's Information Technology

(IT) and Information Technology-enabled Services (ITeS) sector has a significant potential for expansion, contributing to the rise of the country's Gross Domestic Product (GDP) and overall economic development.

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