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Information Technology Industry in India: An Analysis of Literature

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Abstract

Outsourcing is not a new concept; it is a technique through which developed countries exploit developing countries competitive advantage in information and communication technology. In India, IT industry has appeared as a major contributor to the economy. It contributes an important share in exports, revenue, foreign exchange reserves and creates employment opportunities. Therefore, the information technology industry can play a vital role in economic development of the Indian economy. In this paper, the contribution of IT industry in GDP, exports and employment have been discussed and in this regard scholars' views and their suggestions for improving the economic-condition of the country with the help of IT industry has been discussed.

Keywords: Development, Growth, IT, ITes, Software Services and Hardware.

Introduction

From the growth pattern of low income economies, it has been observed that agriculture is the predominant sector. As progress takes place in these economies, the contribution of industrial sector in economic activities has increased. The development of industrial sector also promotes a wide range of activities in banking and insurance, transportation, trade and communication. On the basis of this pattern of development in low income economies Fisher, Clark, Rostow and Kuznets suggested that development is a three-stage process in any economy. In the early 1950s, when India started a programme of modern economic development, along with agriculture, industrial sector became the driver of growth. However, now a days the pattern of economic growth and the structure of the economy have shifted from industry to services (Papola, 2009). In the last three decades, in India the stepping up of growth in recent years has been due to the dynamism of the service sector while the contribution of industry inclined to sluggish.

In India, for a long period of time, the IT industry has remained an insignificant sector and the emergence of a nascent IT industry has been found in the early years of Independence. The contribution of this sector in the industrialisation process was negligible in the early 1990s. The main reason for this is that before 1990, the country had not done required efforts to build and nurture a knowledge infrastructure. The government had played the proactive role in the mid 1980s to mid 1990s for the growing pace of transnationalisation of business and trade (Heeks, 1996). Therefore, during 1980s, a strong effort in this regard had been placed in the discipline of electronic and telecommunications which increases the number of seats in the discipline of public engineering and technical education/training institutes. India's position as a preferred business process outsourcing (BPO) and knowledge process outsourcing (KPO) destination in the world had been emerged in 1990s with the economic reforms. At that time, India entered the global IT market by capitalising on the demand for low cost but high quality programming skills. Moreover, the establishment of number of software technology parks in different cities in India during the 1990s and afterwards is an exemplary initiative of the government for the growth and promotion of IT industry in India (Parthasarathy, 2004). Apart from this, external factors such as favourable domestic policy and attractive export promotion schemes were also helpful for the growth of IT industry in India. The establishment of technical and other professional institutes of higher education by the respective state government had also contributed to increase the number of IT and ITes trained graduates and professionals. The import-export policy of 1983-84,

foreign trade policies of 2004-09 and 2009-2014, laid a clear emphasis on the promotion of export from the IT sector. Also, the encouragement offered to the IT companies to set up operations in special economic zones (SEZs) and the foreign direct investment (FDI) policies adopted in the 1990s indirectly incentivised the IT industry. In addition to this, the deregulation of the telecom sector gave a big boost to the IT revolution in India.

The global slowdown that took place in 2007-08, has also an adverse impact on the Indian IT industry. The major MNCs, particularly from the United States and United Kingdom have cut down their orders and this all due to the US government policy that large scale BPO assignments are not assigned to the Indian IT firms. The MNCs of the industrialised countries look India as a preferred destination for outsourcing where cheap labour is available and the industry still comprises low-end IT services. Despite these external challenges, the Indian IT industry has performed remarkably (Das and Sagra, 2017). Indian IT industry is transforming itself from a service-based sector to a product driven industry to meet the future challenges of the world.

Objective of the Study

The main objective of this paper is to explore the views of other scholars regarding information technology industry in India.

Methodology

This paper is based on secondary work. The information is taken from the different journals like The Indian Journal of Labour Economics, Economic and Political Weekly, National Association of Software and Services Companies (NASSCOM) Reports, and Reports of Government of India.

Review of Literature

There are number of studies conducted on information technology industry by taking different aspects, whereas in this paper the aspects like the contribution of information technology industry in exports, employment and GDP have been taken. Apart from this, an attempt is made to study the policies of the government for expanding the Indian software industry. The studies related to IT industry are reviewed as following:

Kumar (1987) critically examined the computer policy of November 1984. The study reveals that new software policy has opened the Indian market to international competition at a time when the industry is still in its infancy stage. The labour cost in India is low and is unable to provide any cost advantage to the Indian software market because the size of the home market is small and the marketing cost in the international market is higher. The new policy is neither to promote growth of the industry nor it has increased the exports. It is mainly for raising the productivity of computers in the economy. It has increased the import intensity of software industry. The study further reveals that computerisation is highly labour displacing and increases the threat of unemployment. The author suggests that to overcome all these issues government protection is needed for the survival of the software industry in near future.

Heeks (1998) tried to examine that the Indian software exports are in the form of services not the software product. In India, nearly 40 per cent of exports were in the form of software services and just 5 per cent of exports came from packages in 1997-98. Indian companies have exported software to more than 40 countries and there is a heavy reliance on US market. During 1997-98, the US proportion of total exports was 65 per cent followed by UK 10 per cent, Europe 10 per cent, Japan 5 per cent and others 10 per cent. The US market dominates Indian software exports because it is the World's largest software market. The author further explained that software companies are not distributed evenly throughout India, but are mainly located around a few major cities, especially around Bangalore.

Edward (2001) made an attempt to examine the role of the internet and information technology (IT). The author has tried to discuss the channels through which the internet and information technology could help to boost productivity growth and overall economic performance. The study revealed that in order to take full advantage of this new technology, countries will have to make major investments in complementary areas, including research and development, education and infrastructure. The author suggested that if the information technology effort is undertaken as a part of system of initially reinforcing changes, it may become powerful tool for countries to move towards growth, development, and prosperity.

Joseph and Harilal (2001) analysed the challenges emerging in India's IT export boom with international mobility of Labour. The study revealed that the software sector in India has been grown at a phenomenal rate in terms of exports. The net export earnings are substantially less and more than 50 per cent of gross exports. The share of software products in India's export basket even today is negligible and has shown a marginal decline in the recent years. The author explained that international mobility of labour creates challenges in India's IT export boom. There is an urgent need of diversification not only in terms of product structure but also in terms of destination; because 60 per cent of India's export earning dependence is on the US market. The relaxation in visa restrictions for Indian software manpower initiated by the developed economies is likely to pose a major threat for the sustained growth and competitiveness of India's IT exports. The authors suggested that for encouraging the Human Resource Development in IT sector, the need is to explore the possibilities of devising proper incentive structure which will enhance the supply of technically skilled manpower.

D'costa (2002) tried to analyse the high-growth software industry and investigating the nature of outsourcing from India and its effects on local capability. The study revealed that in the absence of a strong domestic market, international outsourcing of software is structurally luring Indian firms to provide low value-added software services, foregoing more profitable complete projects and product development opportunities. The study further revealed that in

labour-intensive industries such as garments, footwear and consumer electronics outsourcing is cost driven while in capital-intensive complex goods, outsourcing is dependent upon the availability of technological and skill based infrastructure. The study concludes that outsourcing of software from India is predictable and anomalous. Foreign clients in search of cost competitiveness and resource access find low-cost, relatively high skill areas such as in case of India, there is abundant supply of skilled labor.

Singh (2002) made an attempt to examine the possibilities for broad-based IT-led economic growth in India without exacerbation of inequalities or creation of instability. The study revealed that for the success of IT-led growth incentives like venture funding, training and infrastructure and good communication links are important. India has a large supply of labour with IT skills. India graduates about 125,000 engineers a year, second only to the US worldwide. The study further revealed that the government fails to provide better infrastructure and communication links. The nature of the financial system overall still involves `Financial repression' with the banking sector and a large number of other financial institutions. Substantial inefficiencies remain in the financial system. The author suggested that broader reforms in the financial sector such as in the areas of functioning of Indian stock markets, corporate governance, regulation of banking and methods of central government borrowings are required for growth of IT in India.

Basant (2004) tried to analyse the evolution of the IT labour market in India. The study found that the widespread participation of workers with different skill/education profiles, gender, and regions would facilitate deepening of the labour market and eventually reduce costs. The composition of the IT industry in India is changing very fast. Hiring of new IT professionals was highest in south India at 44 per cent and the lowest in eastern India at 6 per cent in 2003. There is some regional deepening of IT workers in Andhra Pradesh, Karnataka, Maharashtra, Tamil Nadu, Uttar Pradesh, West Bengal and Delhi. The BPOs are largely concentrated into the northern region and are slowly spreading into the southern states also. The author concludes that the participation of more industrial sectors (manufacturing, trade, finance, government and education services), smaller firms, female workers, smaller towns and less educated workers has deepening the labour market for IT occupations. The author suggested that the policies relating to higher education, computer education and a sharper focus on the English language in primary and secondary education in mid-sized towns and long-term supply of skilled personnel in the telecom sector provided the basis for the IT boom in India.

Parthasarthy (2004) made an attempt to examine the evolution of public policy and policy-making institutions that facilitated the emergence of the software industry in India. The objective of the study is to analyse the domestic conditions under which the export industry has grown and to examine the policy changes which facilitated the qualitative expansion of exports and shifts in the spatial organisation of exports. The author divided the growth period of the industry into three phases. First phase, with restrictive policy regime, before 1984, the government followed the restrictive policy regime and there was no software industry in this time period. Second phase, 1984 to 1990, eased restrictions, government has eased the restrictions on the industry and IT companies entered into the global market with low programming cost. The establishment of Software Technology Parks of India and Electronic and Software Export Promotion Council (ESC) to promote electronic and software exports are major policy initiatives of the government. The third phase from 1990 to 2000 in which government has played a proactive role for the growth of the industry, economy-wide policy liberalizations has led to the rapid growth of exports. The nature of exports has also changed from programming services at client sites to offshore services. The author suggested that the domestic market will provides a good learning opportunity irrespective of the venturing into the global competitive market.

Wang (2004) made an attempt to examine the affect of digital economic revolution on Indian women. The study revealed that in early face of IT revolution, women mostly found jobs in the lower end work such as data entry and word processing, and assembly of electronic components. As manufacturing advances and manual jobs become obsolete, new opportunities in services such as information processing, software development, and call centre support are arising. There are estimated 38 per cent of female software programmers, largest of any demography, even then female programmers at times face discrimination in compensation and promotion. The study further revealed that IT has had a secondary affect on the India women through enabling entrepreneurship. Middle class women can now use the web as a medium to conduct small businesses out of their homes; they are earning supplementary income while attending the family responsibility. The IT infrastructure allows the rural communities to obtain necessary information to improve quality of life. Farmers can use the web or mobile phone to learn the spot price of the agriculture commodity, which will help them in the price negotiation and reach wider customer base. The rural community can also use the web to access health and educational information to assist in addressing the needs of villagers. The study concludes that although India's patriarchal societal views will take many years to change, however, with the growth of IT, more and more Indian women are engaged in business enterprises, multi-national careers, and have better opportunities because of the availability of goods, information and capital. The author suggested that the tradition of activism and collective organisation combined with the new tools of information technology will help Indian women to achieve self-reliance and self-respect through entrepreneurship and economic independence.

Kumar and Joseph (2005) tried to analyse factors that facilitate the emergence of India as a

major IT software and service provider in the world. The study revealed that the contribution of software and service sector to the economy highlights the role of policy initiatives and institutional interventions undertaken by the State in accomplishing this unique success, with a view to drawing lessons for other developing countries. During 2003-04 the software and related service sector accounts for over 2.6 per cent of GDP as compared with 0.5 per cent in 1996-97. The study further revealed that the software and service sector not only contributes significantly to export earnings and GDP but also emerges as a major source of employment generation in the country. In ITes/BPO sector, jobs have been rising rapidly, from 42,000 in 1999-2000 to 245,000 in 2003-04. In India, policy initiatives and institutional interventions made by the national government during the 1960s and 1970s laid the foundation for the development of a vibrant software industry. The setting up of a separate Software Development Promotion Agency (SDPA) under the erstwhile Department of Electronics (DoE) has been a major thrust area in this regard. An explicit software policy was announced in 1986 and software was identified as one of the key sector in India's agenda for export promotion. The policy provided software firms with various commercial incentives such as tax holidays, a tax exemption on income from software exports, export subsidies and the duty-free import of any hardware or software to be used 100 per cent for export purposes. The study concludes that the software and service sector accounts for over 20 per cent of India's total exports. There has been a marked decline in the share of on-site services and almost 60 per cent of India's software and service export takes the form of offshore services. The authors suggested that for building capabilities in skill and technology intensive sectors, such as software and services developing countries can adopt liberal trade and investment policies.

Balakrishnan (2006) tried to investigate the factors which are accounting for the development of Indian software industry in the global market by the growth of its exports. The study revealed that availability of world class programming skills by India in case of exports has increased its competitiveness. The MNCs have maintained their strong base in India due to the availability of skilled labour pool at a lower cost. The development of IT locations by the government in some specific sites such as Bangalore, Pune, Chennai and Hyderabad has also an important reason for the emergence of IT industry in India. The author also tried to examine the brief historical background of the Indian software Industry, the stages in the emergence of Indian software exports, its facts, figures, the typology of software exports, source of its relative competitiveness, future of Indian software exports and also the role of policies in the emergence of this industry in India. The author suggested that for the development of software industry the Indian companies should have to move into higher value added segments like development, support, product design and large complex projects.

Chakraborthy (2006) examined the organization, size and export performance of the Indian software industry. The study revealed that foreign participation in terms of Joint Venture Corporation or subsidiary organization still remains limited in the Indian software industry. The industry is represented mainly by the private domestic limited companies. Majority of these firms are engaged in contractual programming and designing activities. The study also revealed that the firms engaged in programming services account for the major share of employment In the industry. In India, only 17.5 per cent of software revenue was generated by the domestic market and rest by the export market, however, in export revenue more than 60 per cent revenue was granted by the US market. The study concludes that the export profile is being concentrated in the US market. India's software exports are skewed toward custom software work and programming services. Majority of the India's software exports are produced abroad at client's site rather than at off-share locations. The author suggested that to take advantage of the opportunities generated by the expended markets, path-breaking measures like to further liberate the economy, simplification of procedures, deployment of additional resources for technical manpower development, new marketing channels, enhancing global brand equity and providing state of the art infrastructure for software development should be taken by the government.

Mohapatra (2006) tried to examine the recent economic, industry and technology related trends of the Indian software industry. The study is based on the interviews of senior executives of Indian software companies in Bangalore and the US. The objective of this study is to understand the inflow and outflow pattern relating to human resources in the software industry and to compare the positions of the government sector and the industry on the adequacy of knowledge processionals to meet the projected and desired growth in India's software sector. The study explored the dichotomy in software industry and government policies. The study pointed out that the IT industry has contributed more than 2.87 per cent to India's GDP in 2002-03. Information technology industry recorded US$ 8.26 billion revenue in 2000-01 and increases to US$ 16.5 billion in 2002-03. The domestic market revenue was US$ 6.4 billion during 2002-03, of which software services contributed US$ 2.9 billion. The author concludes that Indian success in the software industry is due to human resource factors rather than innovation capability, national diffusion of technology and physical infrastructure. The author is of the view that there is an immediate need for greater interaction among industry, academia and the government to reorient the formal and non-formal education delivery systems toward the constantly evolving market needs.

Singh (2006) tried to examine the contribution of IT in India's economic development. The study pointed out that the size of the IT sector has increased at a tremendous rate of 35 Per cent per year during the last 10 years. Its contribution to the national gross domestic product was 8.5 per cent in

the year 2010-11**.** The study analysed that the services and software segment of IT industry in India is more robust than its hardware segment. The revenue of IT services and software and ITes/BPO together reached US$ 22.2 billion during 2004-05, out of which US$ 17.3 billion was earned through export. Hardware segment of the IT industry in India has not shown the same level of progress as experienced by ITes and software. The author suggested that besides standard policy initiatives such as improving infrastructure, strengthening training and education system and introducing flexible labour laws that affect every sector of the economy includes the IT sector, the government needs to take specific measures to promote IT use and make it accessible to every section of the society. In addition to this, the use of IT in rural banking and micro-finance may enhance efficiency in the informal sector and can impact broader cross-section of population.

Ilavarasan (2008) examined the occupational classification of software workforce in India. The study is based on the empirical data collected through task inventory and semi-structured interviews from two software firms located in Bangalore. The study pointed out that the classification of software workers is either inadequate or unresolved in India and other countries. The author classified the Indian software workers into four categories i.e. developers, module leaders, project leaders and project managers. Project managers are the workers who handle many projects at the same time. The study finds that the project managers are at the top and developers are at the bottom. No recorded or written guidelines exist in organizations to define the rates and to divide the work among them. The study revealed that the nature of classification of software workers do not form a discrete set of components in an occupational pyramid. The author concludes that there is dominance of low skilled software work in India. There is no clear cut division of labour and the Indian software workers cannot be divided into conception/mind and execution/hand workers.

Unni (2008) examined the entry of women in the new economy which has changed much in the economy and the society world over. The study revealed that the spread of the new economy has led to expectation of a rapid increase in productivity and increase in employment opportunities, particularly for women. The new economy has changed the consumption pattern and also the way people consume, interact and communicate with each other. The study explained that the growth of the ICT industry is found to be in the urban areas and the lower end of the industry is moving its location to smaller towns and for some lower end activities to rural areas. The author suggested that internet in particular, has immense potential to change the way women interact with each other and family, the way they shop, their entertainment and sources of information.

Joshi (2009) made an attempt to explore and estimate unexamined relationship/inter-sectoral linkages between growth of IT and ITes and overall growth of the economy. The study is based on primary data collected from 100 respondents of twenty IT and ITes firms located in Gurgaon. The study revealed that the growth of IT and ITes can impact the overall growth of the economy through inter-sectoral linkages by generating demand impulses in the economy. The consumption demand, production demand and demand for skilled workers will result into generation of secondary/indirect employment in the services sector. The study found that the proportion of IT and ITes in total employment is small, but the contribution of IT and ITes in total value added was very high. The 0.34 per cent of total workforce expected to be employed in the IT and ITes and contributing to 20.19 per cent to total value added through consumption expenditure. The author concludes that lack of social infrastructure, physical infrastructure, IT infrastructure, rupees' appreciation, US crisis and increasing regional disparities have adversely affected the growth of the IT sector. The author suggested that there is an urgent need of policy intervention to solve the problems relating to the IT sector.

Illiyan (2009) made an attempt to delineate various dimensions of software export from India. He pointed out that the Indian software exports have registered an annual compound growth rate of 45 per cent over the years. IT and IT enabled services (ITes) have generated revenue of the US$ 64 billion during 2007-08. The total IT software and services employment has increased from 284,000 in 1999-2000 to 1.63 million in 2006-07. The indirect employment attributing by the sector is estimated to about 8.0 million in the year 2007-08. The study concludes that sustainability of high growth rate of software export in future, shortage of skilled labour, low diffusion of information technology in the domestic market, regional concentration and concentration on software services rather than software product are some of the challenges faced by the software industry. The author suggested that the effective government policy, managerial attitudes and cyber-savvy leaders to encourage high risk, long-term investment, making available cheap hardware by reducing exercise duty and sales tax can provide a growth spurt to the industry.

Meenakshi (2009) examined the employment generation potential of the BPO. The study is based on the primary survey. NASSCOM has compiled a list of BPO companies registered with it, and that list was used for the selection of the sample. Three major segments of the BPO industry i.e., customer care, health care and finance BPOs are selected and for the survey Bangalore, Mumbai-Pune, Delhi-Gurgaon, Chennai and Hyderabad are selected. The study revealed that the recent global developments have shifted employment to IT and IT-enabled services industries of which the BPO industry is a significant constituent. The BPO is more developed in India because of Indian labour turned out to be less expensive than that of US local labourers. The author concludes that the employment in the BPO sector characterized by certain disadvantage such as odd hours-of-work, stress and varied cultural influences.

Venkatanarayana (2009) tried to analyse the situation of information technology workers in India. The study is based on NSS employment and unemployment survey, 2004-05. The study revealed that the information technology enable services (ITes) became potential factor in the growth of IT sector in India. The contribution of IT industry to the national income is significant and constantly growing. The study finds that in case of IT workforce in India disparities across sub-population groups distinguished by socio-economic characteristics such as age, sex, caste, religion, income group, educational levels are also seen. Formal education and proper skills play crucial role in the case of knowledge economy and IT industry. In India, IT sector employment is disproportionately in favour of half a dozen of major states. Six states namely Maharashtra, Tamil Nadu, Karnataka, Delhi, Andhra Pradesh and West Bengal contributed about 85 per cent of total IT sector employment in India in 2004-05. While Maharashtra contributed the highest (21 per cent) share of the total workforce in IT sector in India, followed by Tamil Nadu (17 per cent), Karnataka (14 per cent), Delhi (10.8 per cent) and Andhra Pradesh (10 per cent). The author concludes that the growth of IT sector may solve the employment problem in India.

Bhattacharyya (2012) made an attempt to examine the opportunities and constraints that the women employees face in the information technology industry in India. The study revealed that there is existence of feminization or glass-celling in the IT industry. Generally, the women workers are concentrated mostly at the lower level of job hierarchy in this sector, only 5 per cent women having senior level position. The 5 per cent high level women generally do work as software developers, architecture, tech leaders, consultants or project managers. On the other hand, women working at lower level as testers, programmers or in quality assurance. The percentage of female employees has steadily increased from 35 per cent in 2006 to 36 per cent in 2008 at junior level. The author suggested that easy international mobility, gender neutral policy based on knowledge-centric skills, possession, flexible work routine and physically less demanding work can encourage women participation in the IT sector.

Mehta (2012) made an attempt to examine the structural shift in employment from the traditional to the modern sectors which are leading to more productive and improved employment conditions. The study revealed that the modern service sector mainly the information technology (IT) and telecom sectors are providing better employment conditions to selected well-educated urban youth but are unable to attract the masses of the country. The study found that more than 3.9 million people were working in the ICT (IT and telecom) sector in 2009-10. Employment in the ICT sector was concentrated in urban areas whereas; more than 70 per cent of the workforce is residing in rural areas. ICT sector is overwhelmingly male-dominated and a majority of the workers in the IT sector are young, because of requirements of education and skill sets in this emerging sector. The study further revealed that the share of female workers in the IT sector has been growing over the years. The author suggested that by improving the quality of education and level of skill training among the rural masses, the government can improve the employment generation in the ICT sector.

Barnes (2013) made an attempt to critically examine the role of the IT industry in India's economic development. The study revealed that the state governments have given fiscal and industrial priority to the IT industry. State assistance to the IT industry has been predicated upon four main factors: India is surplus in skilled and technically qualified young workers, the dominant role of software services within the IT industry, the formation of political relations between industrialists and state institutions, and finally, the crucial role of software service export earnings in the stabilisation of India's external position. The study also revealed that to earn export earnings governments and policy makers have to made strategies for this high growth software services sector and to increase the employment opportunities in this sector with the help of surplus tertiary educated, English speaking and technically qualified young workers. The author concludes that fiscal support by successive governments at national and regional level, including financial subsidies, favourable tax treatment and resource allocation such as land, water and electricity are not sufficient for economic development of a country. The author suggested that expenditure on skill development is needed for further development of a nation in the IT field.

Bhattacharyya and Ghosh (2013) made an attempt to examine the opportunities and constraints the women employees face in the ICT sector in India. The study revealed that in 1990s and 2000s information technology sector has become the largest private sector employer for women in India. In IT industry at junior level, employment opportunities for female employees have steadily increased from 35 per cent in 2006 to 36 per cent in 2008. The study concluded that IT sector has helped many women to move beyond the traditional roles of wives and mothers and it enables them to seek employment and careers outside the home. The author suggested that policy makers should focus more on gender planning and gender sensitive priorities towards gender inclusive information sector i.e., policy towards women should shift from equality to equity.

Remesh (2013) examined that the employment contribution of the IT and ITes/BPO sectors is insignificant and this sector is not capable of structurally transforming the total employment scenario of the country. The study revealed that the growth of employment through this sector has been concentrated to the socially advantaged and economically well-off sections. Due to contract/project based assignments job insecurity in the sector is strikingly severe, also due to unearthly hours, odd time tables and unusual norms in an exclusively client-oriented sector, the employees are often found in socially excluding and demeaning situation. The study further revealed that higher pay packages in the sector in comparison to other sectors of the domestic

economy has led to a distinctly sharp social divide between IT workers and other workers in the economy. The author concludes that the IT/ITes sectors are more accessible to those who have better socio-economic backgrounds.

Dubey and Garg (2014) explained that among all the industries in India, the IT industry play an important role in achieving the objective of economic development. The main objective of this study is to examine the growth and performance of information technology in India. IT sector comprises of software services, IT enabled services and hardware. The author concludes that the IT sector has revolutionised the Indian economy by creating employment opportunities in various domains, as a result, the IT sector has emerged as a key contributor to the global economic growth.

Das and Sagra (2017) made an attempt to examine the role of state in the growth of information technology industry. They have studied the key constraints which the Indian information technology industry faced in the global market. The study revealed that there are various lapses in the government policy due to which industry has not prepared itself in the field of computer hardware manufacturing and still remained low in value. The study further revealed that the development in the IT industry has taken place when sub-national governments have played crucial role. The study found that most of the revenue of the industry comes from the exports mainly three times greater than the domestic market and among the exports IT services have dominant share. The software exports highly depend upon the US and Europe market. The IT industry is mainly located in few major cities like Bangalore, Chennai, Hyderabad and Mumbai due to the modern infrastructure availability in these cities and policies of the sub-national governments. The authors conclude that apart from the internal factor there are some external factors like strict immigration policy of the US, UK and OECD countries and anti-outsourcing business policy has also become a major threat in the future prospects of this industry. The authors suggested that the recent government initiatives like Make-in-India, 100 smart cities mission and digital India are helpful to improve the situation of IT industry and for this state initiatives like constant innovation, improving IT infrastructure are needed on large scale.

Conclusion

The literature revealed that the Indian information technology industry emerged as a major employment and exports oriented industry. The Indian IT industry is broadly categorised into IT services and software, ITes/BPO, and hardware segment. IT services and software continues to remain the key contributor to the IT sector's revenue. The importance of IT industry in the Indian economy has been measured from its contribution to gross domestic product (GDP). India has become one of the favored destination for sourcing software and ITes. The software sector in India is growing at a phenomenal rate in terms of exports and almost, 60 per cent of India's export earning dependence is on the US market. There is an urgent need of diversification not only in terms of product structure but also in terms of destination.

In addition to this, software industry has a great scope for people as it provides employment to technical and non-technical graduates and it generates employment opportunities not only directly, but also indirectly in those sectors which are linked to IT industry. In India, the IT sector is one of the largest employers of women; therefore, it can play a crucial role in women empowerment, also works as a step to reduce the gender inequalities. However, in India, IT sector employment is disproportionately infavour of some major states. The states like Maharashtra, Tamil Nadu, Karnataka, Delhi, Andhra Pradesh, and West Bengal are contributing more in GDP, exports and employment due to incentives provided by these states for the growth of the industry. Further, the authors suggested that investment in knowledge based industries will provide dominant position for the Indian economy in the world market.

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