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**INFORMATION TECHNOLOGY AND ITS ROLE IN
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Information Technology and its Role in India's Development

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Abstract – Information technology (IT) is an example of a general purpose technology that has the potential to play an important role in economic growth, as well as other dimensions of economic and social development. This paper reviews several interrelated aspects of the role of information technology in the evolution of India's Development. The IT sector, constituted by the software and services, Information Technology Enabled Services (ITES) and the hardware segments, has been on a gradual growth trajectory with a steady rise in revenues as witnessed in the past few years. The size of this sector has increased at a rate of 35% per year during the last 10 years. The share of information technology industry is 7 percent of gross domestic product (GDP) in Indian economy according to NASSCOM (www.imdr.edu; www.nasscom.org).

Keywords: Economic Growth, Social Development, IT-ITES, Contribution to GDP, Employment, Export, Revenue.

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1. INTRODUCTION

In his foreword to the NASSCOM-McKinsey Report (2002) over a decade ago, India's Minister for Communications and Information Technology called for a joint industry-government effort to "ensure that the Indian IT sector remains a dominant player in the global market, and that we emerge as one of the leading countries of the new millennium". The first of these goals pertains specifically to India's information technology (IT) industry,¹ which has done quite well in the ensuing decade. The second stated goal is much broader, much deeper, and much harder to achieve, seeming to imply that IT can be the cornerstone of India's development. Does it make sense to pin so much hope on India's IT industry? What contribution can it make to India's overall economic development? Can it help change the country, reduce poverty, change people's lives for the better? Or will the benefits be restricted to an educated elite with access to jobs and power? This paper offers a conceptual overview of the possible roles of IT in development, and the different dimensions in which IT impacts, or might impact India's economy. IT may have a special role to play in growth and development simply because of empirical characteristics that apply at the current time. For example, IT may be one of the sectors in which countries such as India have, or can develop, a comparative advantage. Even if this is so, IT is likely to share this characteristic with several other sectors. A somewhat more special characteristic of IT may be that it is a 'general purpose technology' (GPT, Bresnahan and Trajtenberg, 1995), distinguished by

pervasiveness, technological dynamism and innovational complementarities. In this case, IT is one of a special few technologies: other examples of GPTs include steam and electricity (both advances in power delivery systems) and synthetic materials.

briefly consider each of these possibilities – comparative advantage, GPTs (and complementarities more generally), and recombinant growth, in turn, as well as other aspects of IT and development, not necessarily linked to formal growth theory, including greater efficiency in governance and in the working of markets.

2. ROLE OF INFORMATION TECHNOLOGY ON INDIAN ECONOMY:

The Indian IT industry has grown almost tenfold in previous decade. Domestic software has grown at 46 percent while software exports have grown at 62 percent over the last 5 years. Information Technology enabled services (ITes) with elements like call centers, back office processing, contents development and medical transcription are key to rapid growth. The sector has an employment potential of 2 million by 2010. All this shows the significant contribution of software industry to Indian economy in terms of GDP and as an employment provider. India's concentration in software has been driven by two sorts of wage advantages that have reinforced each other as such the lower wages for Indian software developers relative to that of their US and European counterparts make Indian software

cheaper in global markets, and while the higher wages earned by software professionals in India relative to that in other industrial sectors has ensured a steady stream of supply of software professionals. India's overarching objective remains vitally one of accelerating economic growth and reducing widespread poverty. To effectively reduce poverty, the pattern of economic growth would need to be broad-based so as to bring about social development and improvements in the welfare of Indian peoples. To this end, priority should be bestowed to investing in physical as well as human capital, especially with respect to access to education, health and nutrition. It is also important to promote private-sector led growth and international trade. Furthermore, efforts would be needed to attend to cross-cutting issues such as environmental management. In a nutshell, India's quest for sustainable development should be based on the pursuit of the intertwined goals of accelerating the pace of economic growth, while also spreading the benefits widely among the population so as to make significant strides in poverty reduction. The Indian Information Technology and Information Technology Enabled Services (IT-ITES) industry has been contributing its role in the economic development of India since post liberalization era. The IT-ITES industry in India has today become a growth engine for the economy, contributing substantially to increases in the GDP, urban employment and exports, to achieve the vision of a powerful and resilient India. While the Indian economy has been impacted by the global slowdown, the IT-ITES industry has displayed resilience and tenacity in countering the unpredictable conditions and reiterating the viability of India's fundamental aloe proposition. The rapid growth of ITES-BPO and the IT industry as a whole has made a deep impact on the socioeconomic dynamics of the country, having a significant multiplier effect on the Indian economy. Apart from the direct impact on national income, the sector has risen to become the biggest employment generator with the number of jobs added almost doubling each year, has spawned a number of ancillary businesses such as transportation, real estate and catering; played a key role in the rise in direct-tax collection and has contributed to a rising class of young consumers with high disposable incomes. The pace growth of this industry is considered as a growth driver for the economy. India has become as "IT Super Power". The performance of IT industry can be revealed with the evidence of its contribution to the GDP (Gross Domestic Product) of the country, provision of employment opportunities all over the country, IT services and software exports and revenue to the country. This paper examines how does the IT industry is playing its predominant role in Indian economy with its various trends in the contribution to the GDP of India , IT exports, IT revenue trends and employment opportunities. Growth and Performance of Information Technology Industry in India: The contribution of India's IT industry to economic progress has been quite significant. The rapidly expanding socio economic infrastructure has proved to be of great use in supporting the growth of Indian information technology industry. Information

Technology (IT), a knowledge-based industry, has the tremendous potential of becoming an engine of accelerated economic growth, productivity improvement for all sectors of the economy and means of efficient governance. It enhances access to information, protects consumers, provides access to government services, makes skill formation and training more effective, improves delivery health services, and promotes transparency. It provides tremendous employment potential and linkages between government and the people both at the rural and urban level. Investment in knowledge based industries will determine the level of the country's dominant position in the world economy in the next two decades. The information technology industry has emerged as one of the fastest growing industries in India. As a proportion of Gross Domestic Product, the information technology industry revenue has grown from 1.2 percent in 1998 to an estimated 5.8 percent in 2009. India's domestic market is estimated to grow by 20 percent growth in 2008-09. Hardware segment is estimated to grow by 17 percent to be Rs.541 billion, information technology services segment is estimated to grow by 20 percent to be Rs.380 billion. Whereas software products and BPO segment is estimated to grow by 15 percent to be Rs.103.3 billion. Export growth is expected at 16-17 percent in 2008-09. Industry will continue to net hire and focus on value creation, provide direct employment to 2.23 million and indirect job creation estimated to eight million employees. Indian information technology sector is developing as the biggest source of revenue and employment generator. The growth of information technology industry will also develop the other industries of the economy. This industry has a number of customers in India, as well as also in abroad. The growth and prosperity of India's IT industry depends on some crucial factors. These factors are as follows: India is home to a large number of IT professionals, who have the necessary skill and expertise to meet the demands and expectations of the global IT industry. The cost of skilled Indian workforce is reasonably low compared to the developed nations. This makes the Indian IT services highly cost efficient and this is also the reason as to why the IT enabled services like business process outsourcing and knowledge process outsourcing have expanded significantly in the Indian job market. India has a huge pool of English-speaking IT professionals. This is why the English-speaking countries like the US and the UK depend on the Indian IT industry for outsourcing their business processes.

3. RURAL DEVELOPMENT

It may seem paradoxical that modern IT, typically associated with developed country markets and capital-intensive methods of production, has any relevance for a country where hundreds of millions, particularly in rural areas, still lack basic needs of health, education and sanitation. Nevertheless, there are many efforts underway in India and other

developing countries to demonstrate the concrete benefits of IT for rural populations, and to do so in a manner that makes economic sense.⁹ The general presumption behind these efforts is that resources spent in this manner have a positive return on development large enough to justify a possible diversion from other uses that directly address those basic needs.

The conceptual framework includes the idea that leapfrogging technologies may make economic sense. This is easiest to see within the class of digital communication technologies: mobile telephones and telephony over the Internet can be provided to people who have never had access to conventional circuit-switched wired telephone networks. The Internet as a delivery mechanism for daily news can be cost effective in areas where daily newspapers have not penetrated. More broadly, IT may help leapfrogging in other forms of economic institutions: village artisans may advertise and sell their creations on the Internet, without ever having been part of a conventional retail supply chain.

4. E-COMMERCE

E-commerce can be interpreted broadly to include business-to-business (B2B) transactions, or even internal processes. The latter are taken up in the next section, in a discussion of manufacturing. B2B transactions are part of the supply chain, and management of the supply chain is also a weak link in India. These complementarities arise from transactions situated in the B2B arena. In fact, developing countries have the opportunity to leapfrog over older, more expensive approaches such as Electronic Data Interchange, which represent significant legacy investments in countries such as the US.

For example, Miller (2001) surveyed the potential for B2B e-commerce in India. He gives the example of Reliance Industries, which, though still quite diversified, is now heavily into production and distribution of chemicals. Of the company's 20,000-plus customers in India, about 3,000 are major buyers, accounting for over three quarters of total sales. These major customers are electronically linked to a Reliance-controlled Internet-based market exchange. Using leased lines, customers can process orders, and Reliance can communicate dispatching details, better manage inventory, carry out invoicing, and provide customer support. Using this system, Reliance reduced receivables from 310 days to 90 days. General cost improvements came from an overall tightening and acceleration of processing within the company, and between the firm and its customers. The speed of order delivery greatly improved, and inventories were reduced. A shift by customers from leased lines to the Internet will provide further cost savings.

Indian e-commerce sites have had to adapt to the Indian scenario, in terms of logistics, payment systems and legal mechanisms. Interestingly, they have been reasonably successful, despite the institutional weaknesses. The use of cash on delivery and private couriers and the importance of trust and reputation have allowed e-commerce transactions to gain a foothold in Indian retailing. Recent moves to allow FDI in multi-brand retail in India specifically exclude e-commerce, providing some "infant industry" protection to India firms. Flipkart, for example, has not had to compete with giants such as Amazon, and will continue to be sheltered in this respect. Of course, content and market intermediary services such as eBay are very much part of online offerings in India. Furthermore, the nature of e-commerce is that Indians are also able to make purchases from foreign e-commerce sites, and in many cases shipping costs are not prohibitive. There is also very little to prevent foreign sites from acting as intermediaries between Indian buyers and sellers.

5. MANUFACTURING

Compared to many other developing countries, India's manufacturing sector has played an unusual role in the national growth experience. In 1950-51, the first year for which comparable data is available, manufacturing was approximately 9% of GDP. By 1979-80, this ratio had risen close to 15%, but thereafter has hardly increased. The highest share of manufacturing in any year was in 1996-97, at 16.6%: after then the figure has hovered on either side of 16%, even in the years when India's GDP grew at over 9% annually.¹⁹ In this context, the new National Manufacturing Policy's (NMP, 2012) explicit goal of increasing manufacturing's share to 25% by 2022 is extremely ambitious.

Panagariya (2008), comments on the situation of Indian manufacturing: "In contrast to other countries that have successfully transitioned from the primarily rural and agricultural structure to the modern one, rapid growth in India has not been accompanied by a commensurate increase in well-paid formal sector jobs. In large part, this has been due to a stagnant share of industry and manufacturing, especially unskilled-labor-intensive manufacturing, in the GDP. This pattern of growth has meant that the movement of the workforce out of agriculture and into the organized sector has been slow. Modernization of the economy requires the expansion of employment opportunities in the organized sector." (Panagariya, 2008, p. 309)

6. E-GOVERNANCE

Poor public service delivery is a major symptom of poor governmental performance in India at all levels. The problem is probably more acute at the sub

national level because day-to-day and basic services – such as health care, education, water and sanitation – are more the responsibility of sub national tiers, while, at the same time, these tiers of government have been disadvantaged with respect to fiscal and administrative capacity. Increases in patronage politics and rent-seeking over time have also resulted in a decline in the quality of public expenditure. Seeing this situation in terms of the functioning of accountability mechanisms, whether of elected officials to citizens or of other government employees to elected officials, a major problem is lack of good information flows both within government and across government boundaries to citizens.

IT has a dual role to play in the case of governance and administrative reforms aimed at increasing efficiency and effectiveness. First, the use of IT for improving internal government processes is important, through its potential to increase the efficiency of these processes. For example, the costs can be lowered, and accuracy improved, of data entry for tasks such as the preparation of electoral rolls and lists of welfare eligibility. Second, and perhaps more importantly (because it can hasten the first change), transparency, accountability and responsiveness can all be enhanced by using IT to alter the citizen-government interface. This second avenue is particularly relevant in rural areas, where government is both extremely important and also stretched very thin: effective access to government services can be difficult and costly for the average rural citizen.

7. CONCLUSION

This paper has provided a review and overview of various facets of IT in India's economy. The most obvious of these is the IT sector itself, including IT enabled services such as business process outsourcing. This sector has proved to be resilient and innovative, continuing to expand and upgrade its offerings. The export orientation of the sector has contributed to its competitive discipline and success, though that success has never been a foregone conclusion.

At the other end of the development spectrum, this paper discussed several aspects of rural IT in India. A decade ago, there were many ambitious attempts to harness the potential of IT for providing rural communications and other IT-based services. The story of these attempts illustrates many of the general problems of development. Often, the binding constraint was a lack of certain types of human and social capital. Low levels of income also were an obvious challenge in creating sustainable business models for rural Internet delivery. Nevertheless, various experiments and more ambitious ventures have provided lessons about how to go about such efforts in the future, and they have suggested that IT access for India's rural masses is not a pipe dream. Information technology is rapidly changing economic and social activities. It provides opportunities and challenges for

making progress with accelerated growth and poverty reduction in India. Indian IT industry is one of the key industries to contribute its significance in the growth variables of GDP of India, exports, revenue and employment. The emergence of Indian information technology sector has brought about sea changes in the Indian job market. The IT sector of India offers a host of opportunities of employment. With IT biggies like Infosys, Cognizant, Wipro, Tata Consultancy Services, Accenture and several other IT firms operating in some of the major Indian cities, there is no dearth of job opportunities for the Indian software professionals. The IT enabled sector of India absorbs a large number of graduates from general stream in the BPO and KPO firms. All these have solved the unemployment problem of India to a great extent. The average purchasing power of the common people of India has improved substantially. The consumption spending has recorded an all-time high. The aggregate demand has increased as a result. All these have improved the gross production of goods and services in the Indian economy. So in conclusion it can be said that the growth of India's IT industry has been instrumental in facilitating the economic progress of India. To conclude, it can be said that India is now an integral part of the *Global Village*, thanks to the developments witnessed in Information Technology.

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