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Waiting To Connect: Indian IT Revolution Bypasses The Domestic Industry-Shubhashis Gangopadhyay, Manisha G. Singh and Nirvikar Singh 2008 - Published by India Development Foundation, Gurgaon, pages 158, price Rs. 395

"Waiting To Connect" offers a very timely analysis since it is the age of connectivity and worldwide the focus is on Information Technology (IT). The book presents a rigorous exposition of impact of IT on the Indian manufacturing industry. The examination is corroborated with descriptive analysis of the ASI data; use of single and simultaneous equation models; and a survey of six cities to cover numerous facets of IT adoption in India. It is widely accepted now that the use of IT products and services has raised productivity in the manufacturing industry worldwide. Indian industry's experience in this respect has been no different. However, there has been no empirical investigation of the fact and this book by the IDF attempts to do just that using factory level data over six year period from the Annual Survey of Industries (1998-99 to 2003-04), Central Statistical Organisation to validate a correlation between the adoption of IT and its positive outcomes.

The book, with foreword by Ratan N Tata, comprises seven chapters starting with introducing the subject, moving on to IT use in the world economy, covering IT use in the Indian manufacturing based on the ASI data, presenting explanatory models, further spelling out the survey results of the six cities, listing out imperative policy implications and offering certain conclusions.

The book provides interesting insights into the state of affairs in the use of IT domestically and reiterates that IT is not a way of doing business, as yet, in India. The IT penetration in India is low, and most of India's IT and ITES[1] prowess is primarily meant for the foreign market. The Indian IT sector comprises IT software, ITES, and IT hardware, the composition of software to hardware being

[1] Information Technology Enabled Services.

70:30. The hardware growth is sagging primarily on account of poor infrastructure, high cost of finance, unfavourable tariff structure and large scale imports. India has, however, established itself as a preferred outsourcing destination especially in business / knowledge process outsourcing based services, HR services, customer care, and finance & accounting services on the back of low cost operations; quality products and services; aligning with the international standards; skilled manpower; and location and demographic advantages. Bangalore has emerged as the IT capital of India. Major global giants such as IBM, Intel, Microsoft, Oracle and SAP, *etc.* took to India as strategic market and a number of domestic companies such as TCS, Infosys, Wipro, and HCL technologies, *etc.* have grown to be globally competitive. Resultantly, India has moved up the value added chain towards high end development work, from code writing and software testing activities to systems integration, project management, high-end consultancy, and packaged software exports including critical applications, development and support, product design, HR management, and KPO for large and complex projects. *Hitherto* unexplored vertical segments that the Indian companies are now focusing on include financial services, telecom, manufacturing, healthcare, utilities, retailing, travel, transportation & logistics and governance.

Government support to IT industry has come forth in two forms *viz.*, a national IT policy formulated in 1998 and corresponding state government policies with emphasis on e-governance and tax holidays. Further, exemption of export earnings of IT industry from income tax has proved to be a powerful incentive for IT exports. The efforts are also on for spreading e-governance and its benefits to rural areas in a big way. However, considering the vastness of the country, the IT penetration has remained limited.

The book proposes that literature on linkages of spread of IT to productivity growth reveal the following : one no dramatic productivity improvements take place with the introduction of ICT[2] ; two positive

[2] 'C' refers to communication, which has become increasingly digitized, and is counted with IT in many statistical and conceptual exercises.

effects of ICT on productivity can hardly be overemphasised over a period of time and progress in quality and cost efficiency are two most important outcomes; three numerous downstream sectors too benefit from IT application; four work environment gets better leading to employee empowerment and finally, ICT acts as a complementary input and a substitute to other forms of inputs; it frees up resources for alternative use which is termed as capital deepening effect of computers. In a nutshell, the whole process of IT adoption manifests itself as a virtuous cycle with one component feeding into the other and *vice-versa*.

IT affects growth directly and makes the existing capital and labour more productive by raising the total factor productivity (TFP) and facilitating more efficient and effective use of inputs. Typically, studies confirm that in the developed economies IT contributes to productivity growth and overall economic growth. The evidence for developing countries is, however, mixed. In general, the impediments in the way of IT adoption in developing countries include high initial investment and operational costs; low levels of human capital; and the fact that the threshold level associated with positive network effects is yet to be reached in such economies. Researchers stress the criticality of skilled manpower in augmenting rates of return from ICT investment. Education in general and ability to read and speak English, in particular, play a crucial role in ICT adoption and application, and the book suggests that it is this demographic dividend which gives India an edge over other developing countries.

The book suggests that studies in IT application at the unit levels substantiate that performance gap between the firms with IT use and those that did not use IT increased over time. Further, the productivity effects of ICT taper off over time. In general, ICT use is more wide spread in the services sector than in manufacturing; and financial services are amongst the most ICT-intensive. The evidence also suggests that positive impacts occur only when ICT investment is complemented by skill and human capital augmentation, organisational changes, experimentation, and innovations by the ICT-users.

The book goes on to examine the extent of ICT penetration in the Indian manufacturing units, categorising these as small or large (employing < 100 workers or >/= 100 workers) in 15 states (selected as these did not change geographically or administratively over the review period) using the ASI data. The descriptive analysis based on ASI data throws up the following conclusions: first, while smaller units exhibited increasing adoption of ICT, the degree of penetration in such units remained lower than in larger units. Another significant observation is that small units have to spend proportionately more than the large units to gain any technological advantage by investing in computers for the reason of indivisibilities in IT investment. Incidentally, 85 per cent of all units happen to be small with 48 per cent using IT in 2003-04. Further, whereas 55 per cent of large units used IT in 2003-04, overall this percentage turned out to be 49 per cent for all manufacturing units. Third, among the five sectors analysed in this section, auto components sector emerged as the most computerised. Fourth, at the aggregate level, use of IT and profitability are positively correlated, with large units using IT showing much higher CAGR[3] as compared with large units not using IT. The same also was true for small units. Fifth, productivity per worker of non-IT using companies has gone down. Sixth, IT using companies hired more workers (proxy for unskilled) as well as employees (proxy for skilled) during the review period. The ratio of skilled to unskilled labour, however, remained high for IT using units. And finally, industries with a higher proportion of seasonally operating units have a lower proportion of units using IT.

The econometric analysis employs single equation models to assess individual relationships, using logarithmic form of variables. With inter-connected and/or simultaneous decision choices by producers, the issue is that the OLS estimates for each equation are biased. Simultaneous equation models, therefore, offer a more appropriate analysis of simultaneous decisions of the producers regarding the mix of quasi-fixed and/or variable inputs to test various

[3] Compound Annual Growth Rate.

relationships. The data are nominal and results confirm the beneficial impact of IT use for producers in terms of enhancing economic value over a span of six years (1998-99 to 2003-04) across all manufacturing registered units. Heckman estimation procedure is used to determine whether the choice of IT adoption by firms is a random or a systematic decision. It is found that the decision to invest in IT is non-random and based on several related economic factors which *inter alia* include assured supply of electricity (purchased or produced in captive plants) and positive significance of having computers, *i.e*., prior IT capital enhances the probability of additional investment in any given year. Short-term loans have a negative impact on IT adoption, free reserves being lower for units availing such loans. On the contrary, IT using firms show high return in terms of gross value added, operating profits, and sourcing funds from own resources (internal) as well as loans.

One fascinating revelation in the book is positive outcome of IT use on hiring workers (proxy for unskilled personnel) as well as employees (proxy for skilled personnel), the impact being higher for employees. Overall, IT use is beneficial for workers and employees in terms of much higher employment demand, better wages/ salaries and reduced work 'hours', thereby implying enhanced job-quality.

The question of why or how units use IT is addressed in the book, demonstrated through a survey of six cities namely, Bangalore, Chennai, Delhi, Kolkata, Lucknow and Mumbai. An appraisal of 870 companies across these cities revealed that more than half the firms confirmed the positive association between IT use and performance of the company. The industry norms and use of IT by suppliers were quoted as two primary factors driving IT adoption, and thus substantiating 'networking benefits' detailed in the econometric analysis results in the relevant chapter. Major impediments to IT use were identified as opposition from strong labour unions; irregular power supply; and lack of skilled labour, in that order. In the backdrop of the fact that IT is not a way of doing business in India, the book cites Delhi as an exception, which has taken to IT with considerable degree of seriousness. Further, IT can often act as a substitute for

lack of other resources and offers direct connectivity to markets. It is interesting to find in this context that a non-metropolitan city like Lucknow has taken to IT with remarkable intensity. The low level of IT use/ penetration is, however, borne out by the fact that in Indian industry management, clerical and marketing employees have greater access to computers and internet than the skilled workers.

In a nutshell, the book observes that the use of IT increases productivity and profits of the manufacturing firms. IT application encourages productive employment of both skilled and unskilled labour, and this is in sharp contrast to findings elsewhere that use of IT increases demand for skilled labour at the expense of unskilled. Now since IT use also enhances absorption of unskilled workers, it makes growth inclusive. The outcome has policy implications for a country like India where employment generation for a bourgeoning labour force is a daunting task.

The book concludes by outlining certain policy implications. It emphasises that for deriving positive networking benefits of IT, a minimum threshold level of penetration has to be achieved, and this can happen with the Government playing a catalytic role. Further, gains from IT use can be multiplied several-folds if everyone uses it since it recasts the operations, reduces transaction costs, offers networking advantages, enhances transparency and job quality, thus facilitating improvements in the investment climate. The main bottlenecks to the use of the IT are opposition from labour unions; lack of uninterrupted and adequate power supply; and shortage of skilled workers, in that order. In this context, developing a legal framework to promote electronic business; introducing greater flexibility in labour laws; support for wider broad-band access; local language software and content; overcoming infrastructure bottlenecks; educating labour unions about the employment effects of IT and leveraging network effects are some of the policy propositions which could strengthen IT use in the Indian industry. Further, proactive use of IT by the Government departments could facilitate reduction in transaction costs of doing business, better record-keeping, improve operational transparency, reduce corruption,

tighten monitoring and increase revenues. Better infrastructure and improved education for skill empowerment, especially in rural areas is the key to move ahead and make industrial growth more inclusive.

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