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Reviewing Digitalisation Role In Inclusive Growth

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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 economy. It considers the unexpected success of India's software export sector and the spillovers of this success into various IT enabled services, attempts to make IT and its benefits available to India's rural masses, e-commerce for the country's growing middle class, the use and impacts of IT in India's manufacturing sector, and various forms of e-governance, including internal systems as well as citizen interfaces. The paper concludes with an overall assessment of these different facets of IT in the context of the Indian economy.

1. Objectives

- This paper offers a conceptual over view of the possible roles of IT in development. And the different dimensions in which IT impacts or might impact India's economy.
- To Study the role of digitization in inclusive growth.

2. Research methodology

Secondary data is collected through reference books, research papers, articles and websites.

3. Introduction

With technology taking over almost all of manual labour, and the evident lack of skilled labourin India,it is imperative to have the country's labour force skilled in information Technology.With this in mind, India's Digital India Campaign aims to make technology central to enable change. The visionof this programme encompasses three areas:universal access to digital-infrastructure, government services, and citizen empowerment. This vision is further developed to include electronics manufacturing and job creation as well. IT may have a special role to play in growth and development simply because of empirical characteristics thatapply at the current time .In particular,the recent and continuing rapid innovation in IT make it a dynamic sector that is an attractive candidate as a contributor to growth for that reason alone, much as the automobile industry was targeted by the Japanese after World War II. On the other hand, there may be features of IT that make it attractive from a theoretical perspective one economic growth. For example, IT may be one of the sectors in which countries like India have, or can develop, a comparative advantage. Even if this is so, IT is likely to share this characteristic with several other sectors. IT may be unique in its impact on growth. In this view, IT has a special role in the process of innovation, because it affects the rate at which potential new ideas are converted into additions to the usable stock of knowledge in ways that nothing else can. The final aspect of IT's specialness explored here is that of efficiency gains and broader economic impacts. Static gains from the use of IT come from more efficient use of scarce resources, allowing higher consumption in the present: they are independent of any impact on growth. Benefits that are measurable as increased market-based economic activity, and hence show up in GNP statistics, are not the only component of development. Development can include improvements in the capabilities of the population, independently of any direct or indirect economic impact. Minimum levels of education, health and nutrition are perhaps the most important examples of such capabilities. The ability to participate in democratic decision-making can also fall into this category. Of course, broad-based improvements in the capabilities of a population can have positive impacts on long-run economic well being, but this is not a necessary condition for desiring such improvements. The role of IT in effecting improvements along non-economic dimensions must also be considered, though this role may be harder to quantify. Digital IT involves the electronic processing, storage and communication of information, where anything that can be represented in digital form is included in the term 'information'. Information goods typically have the characteristic that one person's use does not reduce their availability for another pers. Thus, a message or weather news can be viewed by many peoples, simultaneously or sequentially. Depending on the content of the news or message, different people may place different valuations on the information. Only friends and relatives may be interested in a personal message, all farmers in a district may be interested in local weather news, and so on commercial basis. IT dramatically increases share ability of information, and this affects the economics of private provision of information goods and services. Information goods may also be provided by the government. The potential rationale for government provision exists for any goods that are shareable, and where users cannot be excluded. The classic example is national defense, but such goods may also be local in character. Many local shareable goods can be provided exclusively, in which case private provision is a feasible alternative (in a club-like arrangement). In such cases, government provision may be justified more on equity grounds than on the basis of failure of private provision. In some cases, government financing

through taxes or statutory user charges can be combined with outsourcing of delivery to private providers to achieve both equity and efficiency goals. Often, private provision is feasible, but neglects the spillover benefits that it creates, in which case government subsidization may be socially beneficial. For example, primary education has private economic benefits that people are willing to pay for, but it can also have substantial non-economic benefits to the individual and to others in the society (improved understanding, ability to make sound judgments, political decision-making capacity, and so on). Additional roles of government that are important to bring out are in redistribution to achieve equity objectives, and in regulation of private activities through licensing and certification. In both cases, the government also uses economic resources, and IT has a potential role in increasing the efficiency of government. For both government and private provision, one of digital IT's main direct benefits is in increasing efficiency by economizing on resource use. Information that would otherwise be conveyed through face-to-face contact, post, courier, print delivery, telegraph or telephone may instead be communicated in digital electronic form via the Internet. Efficiency gains from Internet use are not automatic: the telephone, in particular, is an efficient means of communication for many types of information. IT also requires new investment, so the benefits of trips, time and paper saved must be weighed against the cost of installing and maintaining the new infrastructure. Efficiency benefits of IT are not restricted to the communication itself. IT can improve the efficiency of the telephone network, and it can make it possible to track and analyze communications. Word processing, maintaining accounts, inventory management, and other such activities that may not require long-distance communications are also made more efficient by IT. Experience with IT in developed countries, and the US in particular, suggests that information exchange related to the completion of market transactions is especially valuable. The ability of digital IT-based communications (combinedwith storage and processing) to bring together buyers and sellers more effectively represents major potential gains. These gains can come about through lower search costs, better matching of buyers and sellers, and even the creation of new markets. The successes of auction websites and employment websites in the US illustrate these gains. In the rural Indian context, farmers selling their crops and buying inputs, parents seeking matrimonial alliances for their children, and job seekers are all potential users of Intemet-based matching services. Farmers and fishermen can receive weather forecasts, market price quotes, advice on farming practices, and specific training. IT can also reduce transactions costs for completing transactions, such as milk delivery by farmers to cooperatives, or microcredit allocation and monitoring.

Different areas for study showing digitalization role in inclusive growth:

1) 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. Alternatively, the effect of the growth of the IT sector on the provision of technical education would be an example of a"backward linkage". In either case, there is a complementary at work. Information TechnologyandIndia's Economic Development, The general presumptionbehind these efforts is thatresources spent in this manner have a positive return on development large enough to justify apossible diversion from other uses that directly address those basic needs. The conceptualframework includes the idea that leapfrogging technologies may make economic sense.This iseasiest to see within the class of digital communication technologies: mobile telephones andtelephony over the internet can be provided to peoplewho have never had access to conventional circuit-switched wired telephone networks. The Internet asa delivery mechanismfor daily newscan be cost effective in areas where daily newspapers have not penetrated. Morebroadly. IT mayhelp leapfrogging in other forms of economic institutions:villageartisansmay advertiseand sellltheir creations on the Internet, without ever having been part of a conventional retail supplychain. Besides the obvious and as we have implicitly suggested with the leapfrogging examples, superficial -paradox of introducing modern technologies before satisfying basicneeds. The issues involved are not straightforward, since the implementation of rural IT involves organizational and social changes, as well as the adoption of a complex set of modern technologies. Indeed, two points to be emphasized are the catalytic role of IT in spurring complementary innovations, and the special nature of IT, distinguishing them from other types of modern technologies, including other GPTs, such as electric power. Even a simplified picture of rural household's economic activity drives home the point that they engage in a broad range of transactions and decisions with economic impacts. These include production and marketing decisions, saving, consumption, investment and risk management. What is noteworthy besides the complexity of this economic decision-making is that many decisions are made with very limited information, and that market interactions are often subject to high transaction costs, dueto imperfections and asymmetries in information, as well as high transportation costs, inefficient intermediation and time delays.Hightransaction cost will always prevent marginal transactions from being undertaken; in extreme cases, the market may fail to function at all. Given thisscenario, the role of IT can be understood in terms of reducing transaction costs, as well asimproving the efficiency of decision making within rural households (both as producers and as consumers). Reductions in communication and transaction costsare particularly beneficial wherethey can allow new markets to develop, in the sense that existing goods and services, otherwiserestricted to urban areas, or to a very limited segment of rural populations, no can be offered tobroader cross-sections of the rural population. Examples include financial services, particular types of education, health services, long distance communications, and expertise on a range of production-related decisions. Whether this can be done in a sustainable manner depends on the supply conditions for IT-based rural services.

2) E-commerce

E-commerce can be interpreted broadly to include business-to-business (B2B) transactions, or even internal processes. In Section 2, I discussed the complementarities between the IT sector and the rest of the economy. 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-commercein India. He gives the example of Reliance Industries, which, though still quitediversified, is now heavily into production and distribution of chemicals. Of thecompany's 20,000-plus customers in India, about 3,000 are major buyers, accountingfor over three quarters of total sales. These major customers are electronically linked toa Reliance-controlled internet based market exchange. Using leased lines, customers can process orders, and Reliance cancommunicate dispatching details, better manage inventory, carry out invoicing, and providecustomer support. Using this system, Reliance reduced receivables from 310 days to 90 days.General cost improvements came from an overall tightening and acceleration of processingwithin the company, and between the firm and its customers.The speedof order delivery greatlyimproved, and inventories were reduced. A shift by customers from leased lines to the internetwill provide further cost savings. Turning to retail, or B2C e-commerce, a key statistic is that

India has only about 150 million Internet users, of whom 75-80 percent is active or regularusers.Hence,thecurrentpotentialof the B2Cmarketiswell belowthatof thepopulation. About30 percent of the user base is inrural areas, including those w housemobile devices. Urbaninternet users prefer communication and social networking, while entertainment (e.g. music,photos and videos) is the primary driver of Internet use in rural India. Content sites such asYahoo!are popular in India, and Google offers multiple Indian languages for its search engine.Given issues of inadequate systems of payment and delivery, rural Internet users in India aremore likely to be part of the attention economy, paying for access to content through theirattention to advertising. Urban Indian consumers, however, are more like their Westerncounterparts, using e-commerce for a wide variety of goods. Since e-commerce came relativelylate to India, its trajectory did not follow that of the West, starting with books and CDs. However, goods that are expensive to stock in full variety, like books and music, are naturalcandidates for online selling. One already finds a wide range of sites for Indian e-commerce, either very broad-based, like Flipkart, or specializing in specific ranges of goods, such as apparel, shoes, electronics or household items. These online sites, to some extent, fill the gap of the absence of sophisticated department store chains, which are relatively weak or scarce in India (with the partial exception of the southern part of the country). 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 inmulti-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 asAmazon, and will continue to be sheltered in this respect. Of course, content and marketintermediary 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-commercesites, and in many casesshipping costsare not prohibitive.

3) Manufacturing

Compared to many other developing countries, India’s manufacturing sector has played anunusual role in the national growth experience. In 1950-51, the first year for whichcomparable dataisavailable, manufacturing was approximately 9% ofGDP.By 1979-80, thisratiohadrisenclose to15%but thereafterhas hardly increased. Thehighest share ofmanufacturing in any year was in 1996-97, at 16.6%: after then the figure has hovered oneither side of 16%, even in the years when India’s GDP grew at over 9% annually.19 in this context, thenewNationalManufacturing Policy’s(NMP, 2012) explicitgoalofincreasingmanufacturing’s share to 25% by 2022 is extremely ambitious. Panagariya (2008), commentson the situation of Indian manufacturing: “In contrast to other countries that havesuccessfully 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 paidformal sector jobs. In large part, this has been due to a stagnant share of industry andmanufacturing, 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) Of course, neither the NMP nor Panagariya is guilty of what might be termed manufacturing fetishism. The services sector in India is well recognized to have been successful in generating GDP growth as well as employment. This includes software and ITES, as well as a wide range of other services. The implicit argument in statements such as Panagariya’s is that the services sector by itself cannot provide the sustained growth in output or employment that will be needed in the long term.20 There are also problems with the nature of the manufacturing sector itself: for example, Kochhar et al. (2006) suggest that India’s manufacturing sectorwas more diversified, more skill-intensive, and less (unskilled) labor-intensive than average,compared to countries at similar levels of development. This skill bias was accentuated in the 1980s and 1990s, according to their empirical analysis, and would not be conducive to the kind of pattern of growth discussed by Panagariya. He goes on to argue that, “India must walk on two legs as it transitions to a modern economy: traditional industry, especially unskilled-labor-intensive manufacturing, and modem services such as software and telecommunications. Each leg needs to be strengthened through a set of policy initiatives.”(Panagariya, 2008, p. 287) His own policy recommendations include somewhat separate discussions for each of his two “legs” of the Indian economy. For labor-intensive industry, he

emphasizes labor law reform, bankruptcy reform and privatization, while software and telecommunications require attention to education and urban infrastructure. However, an important potential linkage exists between these two parts or "legs" of the economy, namely, the use of IT in domestic manufacturing as a potential avenue to spur productivity and employment growth in that sector. Chandra and Sastry (2002) summarized the findings of the 2001 National Manufacturing Survey (NMS). The focus of this survey was on the organized manufacturing sector, representing less than 1% of the country's firms at the time, but employing 19% of its industrial workers and contributing almost75% of gross value added. Chandra and Sastry were quite critical of Indian manufacturing management. Their study noted the lack of spending on R&D, and the relatively small numbers of employees with advanced degrees, in the surveyed firms. They also noted that Indian manufacturing firms gave low priority to investments related to information technology,such as computer-aided manufacturing (CAM), computer-aided design (CAD), computer integrated manufacturing (CIM), and computer-aided engineering (CAE). They also suggested that domestic IT firms did not have the right products for Indian manufacturing firms in these application spaces. The next NMS, in 2007, was analyzed in Chandra (2009). Supply chain management remained a key weakness in the later survey, and investments in R&D remained low, despite perceptible benefits to innovation. Investment and usage of IT on the shop floor also remained low, at about 45% for this later sample, which is not much higher than the 2002 figure. Chandra concluded, "Once basic IT investment is done, only then will Indian firms be able to implement and take advantage of automation on shop floors. IT firms in India have failed to develop a viable and low cost IT solution for Indian Manufacturing. Firms other than the large ones are struggling on this count." (Chandra, 2009, p. iv) Chandra (2009) also summarized regional differences in IT use among the NMS sample firms. IT use was highest in the South, and lowest in the East, but also in Uttar Pradesh (in the North). Interestingly, IT use tended to be concentrated among managers, and to some extent supervisors, with less IT use by operators on the shop floor. To some extent, the pattern of IT use (or non-use) was symptomatic of under-investment in both physical and human capital, reflecting high financial costs as well as an unfriendly policy environment. At the same time, Indian manufacturing firms were able to make strong profits in this period, despite their inefficiencies. Still more recently, a joint study by the National Manufacturing Competitiveness Council (NMCC) and NASSCOM specifically focused on promoting ITadoption in Indian manufacturing. The NMCC-NASSCOM report makes several familiar points, but with newer survey data to back them up. It starts by noting the relatively low penetration of IT in Indian manufacturing, especially among smaller firms, as well as its relatively low productivity in terms of value added per capita. As in the earlier NMS reports, the link between IT use and productivity is not quantitatively established in this report, but the case is made conceptually, by describing the numerous potential benefits of IT across arrange of applications, with several brief case studies.

4) 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 subnational level because day-to-day and basic services - such as health care, education, water and sanitation - are more the responsibility of subnational 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. There are now many examples of IT use in governance in India, and we will discuss some of them briefly, especially in the context of their impacts on expenditure quality and service delivery. Before we do so, we discuss a conceptual framework (Pritchett and Woolcock, 2004) in which to consider the examples. Pritchett and Woolcock begin by identifying two dimensions of variation for public services: transaction intensity and degree of discretion. They further distinguish between policies (when the service is non-transaction-intensive and discretionary), programs (transaction-intensive and non-discretionary problems) and practices (transaction-intensive and discretionary services). They argue that practices are the most challenging category from the perspective of governance. Shah (2006) adduces three types of benefits of IT within this conceptual framework: reducing discretion (converting practices to programs), reducing transaction costs, and improving incentives by improving information and transparency (the core of improved accountability). One of Shah's case studies is the computerization of the railway reservation system. Given the size and reach of the Indian Railways, this has rightly been perceived as one of the most successful government implementations of IT in India. Shah discusses how the use of IT achieved all three benefits, reducing the discretion of individual reservation clerks, cutting transaction costs, and increasing transparency (reducing information control by any individual) and thereby improving incentives for reservation clerks. A key feature of Shah's analysis is his identification of the stages of implementation: it began in 1985, and proceeded from branch-level databases to a unified national database, with electronic remote access by consumers (in other words, an IT-based citizen-government interface) via the internet coming much later. In fact, the vast

majority of ticket purchasers still do so by queuing up at reservation counters. As Shah observes, opportunities for discretion and corruption remain, but they have been substantially reduced. Examining the railway reservation example more closely, one can note that reducing discretion is a benefit when the discretion is misused: this is therefore a subset of improving incentives. Incentives are improved, and inappropriate discretion curbed, when digital information systems increase transparency and access by service users. Report cards that rank various e-governance initiatives (e.g., Kochhar and Dhanjal, 2004, 2005) use an array of evaluation criteria, including "ease of use," "speed of delivery," "low incidence of errors," "reduction in corruption," "staff behavior" and "staff competence." With some minor over-simplification, one can argue that these lists can also be reduced to the two fundamental criteria of reducing transaction costs and improving incentives. Going back to the Pritchett and Woolcock (2004) classification in the context of the railway reservation example, one can further argue that the key characteristic for citizen-facing public services is transaction-intensity, while discretion is a much more malleable characteristic.

4. 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. One joint lesson from the two polar extremes of IT in India's economy has to do with the role of government. When the government provided some basic infrastructure and human capital development roughly appropriate for software development and IT enabled services, the sector took advantage of global opportunities and took off. In the case of rural IT, the story is often one of government failure, failure to provide physical infrastructure (e.g., electric power), and failure to provide organizational infrastructure (e.g., efficient legal and regulatory frameworks).But this is just part of a larger story of government failing to deliver public goods when it is supposed to do so. This paper also examined e-commerce, which is a conventional outgrowth of IT and the Internet. Indian e-commerce is in its nascent stages, and is again held back by the government's inability to catalyze a rapid deployment of broadband connectivity, especially in urban areas. Indian entrepreneurs are not lacking in their desire to innovate and succeed, and are often hindered by an unfriendly environment for doing business. This problem is most acute in the case of manufacturing, and here the paper marshaled qualitative and quantitative evidence for the benefits of the use of IT in manufacturing, and throughout the supply chain, as well as the fact of its under-adoption. While it has been suggested that the Indian IT industry is itself to blame, in not providing suitable products for domestic firms, the overall inefficiency and backwardness of much of Indian manufacturing must shoulder the most responsibility for this state of affairs. Again, one might argue that the government's failure to provide a policy environment in which business can function effectively is a major roadblock to development. If the major theme of a review of IT in India's economy is that the government must do better, the natural question is what role IT can play in that effort. This paper's penultimate section provided some thoughts on how IT can improve the functioning of government itself. Of course, technologies that enhance information flows and improve transparency and accountability are not guarantors of major positive change. Ultimately, what determines outcomes is the quality of ideas, not of the technology. IT is ultimately just a tool, but it is inherently powerful and extremely versatile. The final message of this paper is that using IT enhance many aspects of the Indian economy and the lives of ordinary people is both practical and sensible.

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