Is Growth in the ICT Sector Pro-Poor? The Case of India

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Abstract

This paper explores the linkages between the growth of the ICT sector and poverty within the Indian context. Given the early stages of expansion of the ICT sector in developing countries, the literature relating to its impact on poverty reduction is at a rudimentary stage. The paper identifies issues that are critical to examining the impact of investment in ICT in developing countries upon poverty reduction, drawing upon the Indian experience. The identified areas bear potential for further research into ICT growth and poverty reduction in line with the millennium development goals. The current literature on the growth of the ICT sector in India is reviewed followed by a discussion on who the poor are, and what, if any, is their interface with the local ICT sector. It is envisaged that profiling the ICT sector and the poor will lay the pre-requisites to enhanced benefits from the growth in the ICT in developing countries. The paper proposes possible channels and transmission mechanisms for increased benefit from the ICT growth to the poor in India.

Keywords

ICT; poverty; India and millennium development goals.

INTRODUCTION

Amidst growing evidence that ICT can play a constructive role in poverty reduction, this paper assesses the impact of ICT growth on poverty in India. The Indian economy is currently growing at an annual rate of 10% year-on-year and has experienced average annual growth of 6% for the last two decades (The Economist, 2004; p. 176; World Bank, 2001; p. 69). The ICT sector represents nearly 3 percent of the country's GDP (NASSCOM, 2002). The software development component of the ICT sector in particular has expanded at a significant pace in the last ten years. In 1990 India's software exports were $131 million and had reached almost $8 billion by 2001-02, comprising 16.3 % of the total exports (D'Costa, 2003). The software exports are increasingly becoming an important source of foreign exchange in the country. The National IT Task Force has set an annual export target of $50 billion and domestic target of $35 billion by 2008. To what extent are the poor in the country benefiting from this growth?

Poverty reduction in India will affect the 2015 Millennium Development Goals because no other country is home to more of the world's poor. More than a third (36%) - 433 million - of the world's dollar-a-day poor (1993 PPP line) reside in India (260 million on the national poverty line), a fifth of the world's children not in primary school are in India and India is home to a quarter of the world's under five year old deaths and a quarter of maternal deaths each year. Of India's poor the overwhelming majority - 75% are rural of which the overwhelming majority - 80% are dependent on agriculture (Deaton and Dreze, 2001; p.126; Datt and Ravallion, 2002; p.1; World Bank, 2001; p. 7, 9, 11, 35). The rural and urban adult literacy levels in 2001 census year were 57% (44% for

females) and 80% (73% for females) respectively with an overall average of 65% (GOI, 2002; p.186-188). Can growth in the ICT sector benefit a largely rural population with low literacy levels?

The growth of the ICT sector in India was given the impetus during the economic reforms that began in India in 1992. While achievement in some sectors, including the ICT sector have been noteworthy, India remains one of the most protected economies in the world using proxies such as average tariffs (World Bank, 2001; p. 14). In the last decade since reform began the country has experienced aggregate economic growth of 5-8% per year, and per capita income growth has been impressive at 3-5% a year leading to a doubling of GDP per capita over the period from US$882 to US$1780 (PPP, 1985 base year) (World Bank, 2001; p. 69; World Bank, 2002). Yet the country has a low human development index ranking of 127 with a HDI value of 0.59 (HDR, 2004; p. 141).

The 'digital-divide' underpins much of the ongoing discourse on whether ICT can be harnessed for mitigating poverty in developing countries. The 'digital-divide' debate owes its origins to sceptics like Bill Gates who argue that the poor living on less than $1 a day have no need for ICTs (McNamara, 2003; p.4). The proponents of ICTs (UNCTAD, 2003) on the other hand would consider ICTs as tools that can be used to provide the poor economic opportunity and improvement in human well-being (See for example Sen, 1985). The World Bank (WDR, 2001) identified three critical areas in poverty reduction efforts: opportunity, empowerment and security. Since then vast amounts of resources have been invested (UNCTAD, 2003; p. 1) in ICTs in many developing countries. The objective of this investment was: to enhance opportunities by improving access to market and health care, to empower the poor by expanding their use of public services and increase security by widening access to micro-finance.

To what extent are these objectives being met? Data and research on the economic consequences of ICT in developing countries is at its infancy. This paper reviews the available literature on the growth of the ICT sector in India. It looks at the application of ICT in poverty reduction programmes adopted across many states in India. The purpose is to identify issues that are critical to examining if investment in ICT in developing countries has implicit poverty reduction pathways based on the Indian experience. This has implications for further research into ICT growth and poverty reduction in line with the Millennium Development Goals.

The paper is divided into five sections. Section 2 traces the evolution of the ICT sector in India. The discussion focuses on the political and socio-economic factors underlying the ICT growth in India. It also explores the causes for the inter-state variations in the spread of ICT in India.

Section 3 draws linkages between the growth of the ICT sector and poverty within the Indian context. The current literature on the use of ICTs in poverty reduction programmes in India is reviewed. This is followed by a discussion on who the poor are and what is their interface if any with the local ICT sector. It is envisaged that profiling the ICT sector and the poor will lay the pre-requisites to benefit from the growth in the ICT in developing countries.

In section 4 the paper proposes possible conceptual channels and transmission mechanisms of benefit from the ICT growth to the poor in India. Section 5 presents the conclusions of the paper.

THE ICT SECTOR IN INDIA

The origin of the ICT sector in India and its rapid growth are situated in the culmination of multiple factors during the 1980s and the early 1990s. These were a combination of global market forces, changing political ideologies and the growing numbers of skilled English speaking labour in the country. Prior to the mid 1980s, the political regimes were inward looking and restrictive to the growth of the private sector (See for example Patnaik and Candrashekhar, 1998, Ghosh, 1998). By the mid 1980s the political ideology in the country was changing in favour of outward looking economic policies. The liberalisation and the economic reforms were well underway in India by the early 1990s. Two other events were taking place simultaneously.

By the late 1980s nearly 150,000 English speaking highly skilled engineers were graduating in India with limited domestic demand (Arora et al., 2001). The ICT revolution in the West especially in the United States was spreading and creating new opportunities around the same time. All three events resulted in the formation of a number of Indian firms that responded to this growing demand. The number of Indian software firms grew from just 38 in 1988 to over 545 in 1999 with employment figures rising from 90,000 to 250,000 in the same period (ibid, NASSCOM, 2002). The export revenue of the software industry has risen from $130 million in 1990 to almost $8 billion in 2001. The rapid pace of expansion has led the World Bank to identify it as the model for exhibiting the potential of the private sector in India (World Bank, 2001; p. 6).

The ICT sector in India comprises three main sub-sectors. These are the: the software industry – domestic[i] and exports, domestic computer maintenance services and business process outsourcing (BPO). The ICT sector as a whole represents 2.87% of the country's GDP while software exports make up over 16% of the total exports (NASSCOM, 2002). The unique feature of the software industry is the dominance of the export oriented strategy. 65% of the total software revenue is generated through exports (Arora, 2001). This is of particular significance given India's tradition of restrictive and inward looking stance on industry[ii].

The domestic and export markets exhibit distinct features in terms of the type of software and the stage of software development. Findings of a field study of the software industry (Arora et al. 2001; p. 1273) note that the domestic projects are larger[iii] and at times more challenging than the export projects. Development of Indian dialect word processing has not been very successful and is at a very rudimentary stage[iv]. The same study also notes that while the trend is rapidly changing, until recently the export package comprised products of low design, coding, testing and customised software for some developing countries. The industry serves a wide domain consisting of banking, warehousing, education, medical, manufacturing and transport to name a few (UNCTAD, 2003; p.141, Arora et al. 2001; p. 1273).

The mushrooming of business process outsourcing (BPO) services in developing countries is the outcome of globalisation of the world economy (See for example UNCTAD, 2003, D'Costa, 2002c, Correa, 1996). The opening of economies has facilitated the firms based in the US and Europe to not only tap into the pool of cheap skilled labour but also benefit from the much lower infrastructure costs (See for example Gartner, 2003)[v].

India has succeeded to date in capturing 80% of the international outsourcing market (UNCTAD, 2003; p.135). An English speaking skilled workforce and savings linked to lower wages are major factors contributing to the growth of BPO in India (See for example D'Costa, 2002c, Joseph, 2002). The bulk of the BPO clients are from the US and over a quarter from Europe – mainly the United Kingdom (UNCTAD, 2003; p.138). The revenue from BPO in India

in 2002 reached $2.3 billion (NASSCOM, 2003). The current workforce of 100, 000 in the BPO industry in India is expected to increase over ten times to 1.1 million by 2008 (Wipro, 2003).

What implications does the expansion of the ICT sector discussed above have for the country in terms of capital accumulation and human development? An important factor in exploring this question is the regional variation and the uneven spread of the ICT industry in India. The ICT sector is highly technical skill-intensive and requires command over English[vi]. It is therefore located in urban pockets that are situated in areas of 'regional advantage' as noted by (Saxenian, 1994).

The three southern states of Karnataka, Tamil Nadu and Andhra Pradesh continue to dominate the ICT industry in terms of the human capital[vii]. A recent World Bank study (World Bank, 2000; p. 47) found that with just 23.35% of the country's population, the three states are home to the largest proportion of the country's engineering institutions – 51% of degree level and 31% of diploma. All three states have around 80 percent urban adult literacy and all have above average HDI ranking amongst the 35 Indian states (GoI, 2001; p.188, 141, Dreze and Sen, 1998). The capitals of these states – Bangalore, Chennai and Hyderabad have emerged as the major ICT centres in the country. Maharashtra and to a lesser extent Gujarat, both western states, are the only other regions in the country to match the southern ICT clusters in terms of the total firms and revenue[viii] (World Bank, 2000, p.48). The northern and eastern regions remain sterile of any significant ICT clusters with the exception of the technology park around New Delhi (Arora, 2001; p.1272).

The divergent regional dimensions are rooted in a wide range of factors. These include: the traditional political urban bias, the upper class value system focused towards professional training, a more rigid and slow changing socio-cultural order in the northern states where modern higher education is slowly being made accessible by all. (See for example Bharadwaj, 1995, Bhalla, 1995).

The continuing concentration of ICT firms in the southern and western clusters may be viewed as reinforcing the regional economic imbalance in the country. D'Costa (2003) argues that the trend of some Indian firms them selves becoming MNCs while narrows the gap with their foreign counter parts, exacerbates the capital accumulation gap with other Indian firms. The success of the clusters has in turn provided a further impetus to expanding the technical education base in these states.

In short, the growth of the ICT sector in India is centred on selected urban clusters. The growth has been good for the economy though not without contention. The clustering of the industry has not only polarised rural India but also generated regional imbalances and uneven development (D'Costa, 2003). Can the growth in India's ICT sector, predicted to be a major player in the global ICT market, include the 433 million of her people living below one dollar a day in future?

The next section explores some of the ICT pathways that are being made integral to policies geared towards mitigating poverty in rural and urban India. Is this the beginning an era of a more inclusive development process in India in line with the Millennium Development Goals?

THE ICT GROWTH AND POVERTY: CAN THIS GROWTH BE PRO-POOR?

The digital divide is perhaps not as pronounced anywhere in the world as it is in India. While India aspires to capture a significant proportion of the ICT global market by 2008 (NASSCOM, 2002)[ix], 72% of the country's population with 56 % literacy (43% female literacy) continues to live in the rural sector. An overwhelming 80% of the rural population is dependent on agriculture for livelihood (GoI, 2001, p. 189, World Bank, 2001; p. 7, 9, 11, 35). Of the agricultural rural population 62 percent of households operate holdings under 2.0 hectares (1991) and the 22 percent rural households are landless (1991), in all 84 percent of the rural households can be characterised by a low non-labour and physical asset base (Tiwari, 2001). Although there are significant variations at inter state levels, low-income households with poor ownership bundles continue to dominate the population in rural India (See for example Ravallion and Datt, 2002, Dreze and Sen, 1989).

Four areas where the rural poor in India are most disadvantaged are: education, gender disparities, health and nutrition. Although literacy has improved in India[x], many countries including China and Indonesia have overtaken India in literacy rates (World Bank, 2001; p. 22)[xi]. At the current literacy rate of 2.75% per annum India will take 16 years to catch up with Sri Lanka's literacy rate of 90% (ibid.).

Gender inequalities in education are more visible in rural India than in urban India. For example rural female literacy is 46.5 % as compared with 73% urban female literacy. The primary school enrolment for girls in the rural sector is just 42% (GoI, 2001, p. 204-205).

While rural infant mortality had decreased from 123 (1981) to 84 by mid 1990s, access to primary health care remains scarce. On an average there is one primary health centre per 27,364 rural persons in India (GoI, 2001, p. 259). Malnutrition continues to be an acute problem in India despite the absence of severe epidemics, famines and war related adversities. 53% of children below 4 years continue to be severely malnourished (World Bank, 2001, p. 23).

A recent study of five remote villages in Andhra Pradesh, Uttar Pradesh and West Bengal (Pigato, 2001) concluded that radios are the only type of technology owned by most poor. Further more, the access to computer or the internet was rare. Informal networks through friends, family and local leaders were most relied for information.

In recognition of the existing gap between the skills of the rural population and those needed for benefiting from the ICTs, a national ICT strategy has been formulated (UNCTAD, 2003; p. 63-65). The purpose of national ICT programmes is a stocktake exercise geared towards identifying sectors that may benefit through ICTs. These then form the basis for policy and strategy formulation (UNCTAD, 2003, p. 65). In most developing countries, as in India the focus of the national strategies is to explore ways of using ICTs to reduce poverty in line with the Millennium Development Goals (UNCTAD, 2003; p. 63, Joseph, 2002) and become integral to the PRSPs.

Within the context of rural India ICTs are being extensively applied in numerous sectors to overcome the digital divide to reach the poor in mitigating poverty. The objective is to enhance opportunities for the poor by improving access to information and health care, to empower them by increasing their use of government services and to provide security through access to microfinance (PREM, 2002).

The World Bank's Poverty Reduction and Economic Management Network (World Bank, 2002) through its experiences in rural India has identified projects where ICTs are entwined in the programmes. The Gujarat computerized milk collection is an example of pro-

poor market development. This system ensures fair prices and immediate payments to small farmers. The small farmers could neither afford the 10-day lag in payments nor the hardship imposed through underpayments in the old system. The use of handheld computers provided by InfoDev sponsored India Health Care Delivery Project in Andhra Pradesh is intended to cut time spent on collecting and registering data. The freed time would allow the midwives[xii] to expand administering immunizations, offer advice on family planning and educate people on mother-child health programmes. Since January 2000, a government owned computer network – Gyandoot has been launched in Madhya Pradesh. The objective is to improve the accessibility and use of government services by the rural poor. This is done by reducing the time and money villagers spend in communicating with government officials through Intranet kiosks network. The kiosks are able to provide a wide range of documentation for a minimal fee. This not only saves time and effort in commuting to the nearest government office but also to avoid the practice of bribing the officials. The introduction of smart cards to facilitate microfinance to the poor is based on holding the credit profiles of the clients and reducing transaction costs. Swayam Krishi Sangam (SKS), a microfinance institution in Andhra Pradesh expects to lower the cost of delivering by eliminating paperwork, reducing errors and fraud.

These are but a few examples of the multiple ICT based projects being implemented in many states in India. Again there are significant regional variations (Bhatnagar, 2000). The results of these efforts are inconclusive primarily because such projects are still at very early stages and data on the impact of ICTs on poverty reduction is at infancy (McNamara, 2003; p. 3). Some recent fieldwork (Kumar, 2004) has been carried out to evaluate the financial sustainability of India's largest rural ICT initiative known as eChoupals. The eChoupals are distinct in their focus on the agricultural sector through providing the necessary crop and market related information to the farmers. The study concludes that eChoupals can be useful and financially viable providing these are viewed as tools to enable the exchange of information.

What can be expected as a consequence of integrating the ICTs in the poverty reduction strategies? Are there any mechanisms to enable the poor to benefit from this effort? The next section discusses some of these issues.

TRANSMISSION MECHANISMS

The aim of national ICT strategies is to reach the poor and make the development process an inclusive one (UNCTAD, 2003; p.63-65). The challenge is whether this can be achieved within the Indian context where in the past leakages and misappropriations of subsidies to the rich have tended to exclude the poor from the development process (Chelliah, 1999, World Bank, 1991, Bhalla, 1993). Many projects that provide Internet access in rural India end up benefiting the middle-class and educated men (World Bank, 2002). Women's restricted mobility, their lack of education and sometimes, male dominance over information has tended to exclude them from these projects. The development of software in the local dialects has been slow as pointed earlier. This has been a significant obstacle to the use of ICTs by the rural population (World Bank, 2002). The picture-based software is being adopted but a large number of user interface issues remain unresolved.

Some areas where further researches maybe useful to overcome the difficulties are: (1) development of a more user friendly interface combining the local dialect and the picture based software, (2) incorporating local knowledge and conditions. This may prevent outside control

and top-down approaches (Cecchini, 2004), factors that were attributed to the failure of the e-governance programme in Rajasthan. Two areas that appear to be critical in the success of these newly emerging programmes are rural literacy and inclusion of women.

What can be the conceptual framework for ICT growth to be good for poverty reduction? Some transmission pathways can be hypothesized. The model Sumner (2005, p. 6-8) for FDI-poverty linkages could be transposed to ICT-poverty linkages. For example, for ICT growth to be good for the overall economy there must be a positive net transfer to the macro-economic accounts. For ICT growth to be good for poverty reduction there needs to be net positive transfers at microeconomic levels. These can be through positive local spillovers to the indigenous economy. Evidence from the growth of the ICT sector in India discussed in section 2 suggests a positive outcome on the macro-economic accounts. What are the conditions for positive spillovers to the rural economy where 80% of India's poor live?

Transfers on the country's micro-economic account through ICT growth will also raise growth (ceteris paribus). More importantly, it can enhance the human capital and expand the skilled labour pool. For this to occur, local ICT firms and products must ensure that the technology can be used as a tool to facilitate a more inclusive development process. In particular, mainstreaming ICT to contribute in (1) the process of providing healthcare and education at lower cost and greater coverage (2) facilitating access to information and increase empowerment amongst the excluded groups (3) enhancing the use of public services (4) strengthening the capacities of local groups, local governance and decentralization (5) promoting the partnership between NGOs, government and the local communities to achieve poverty reduction.

Integration of ICT into the Poverty Reduction Strategy Papers (PRSPs) along the lines suggested above can have positive vertical and inter-sectoral linkages. These could include backward linkages between the economy and local communities through higher participation of the local skilled labour. Forward linkages between the economy and rural communities could be through outsourcing to the rural sector. The available pool of skilled labour has been a crucial factor in India's global competitive advantage in the ICT sector as noted in section 2. The expansion of skilled labour can exert a downward pressure on the costs and further reinforce India's position in the global ICT market. There might also be positive horizontal and intra-sectoral spillovers through increased competition and the adoption of new products and technologies. The local firms may further expand their capacities to export.

The above are dependent on whether ICT can be deployed to enable the improvement of the rural human capital and increase participation in market opportunities. In addition, for ICT to be good for (income) poverty reduction, ICT needs to have a positive impact on employment, income and wages, and income inequality. ICT can benefit the rural sector by creating jobs indirectly and directly. Indirectly: by improving the skill base of rural labour through higher literacy and better health care thus stimulating the economy to generate employment opportunities. It can create jobs directly through horizontal and vertical linkages with local ICT firms. By helping to increase participation and empowerment of excluded groups it has the potential to reduce income inequality.

The impact of ICT on income and wages, and income inequality in the rural economy is a function of its application in development policies. Its most unique feature is rooted in its ability to narrow the digital divide that is inherent in its interface with the rural population with low literacy and skills.

In short, many of the conceptual benefits of ICT to poverty reduction and inclusive development are linked to a variety of other factors. These include: the integration of ICT in the

PRSPs to achieve the identified target and harnessing the role of ICT as enabler of development as well as enhancer of capacity building at the individual, community and societal levels.

CONCLUSION

The emergence of ICT as a separate identity in the Indian economy since the 1990s is a significant achievement. The industry has not only generated the much needed export revenue but also contributed to India's healthy current account balance. The Indian ICT industry is arguably on its way to becoming a strong global player in the software and BPO sectors. It continues to provide employment opportunities for India's high-tech skilled labour. Just twenty years ago, the indigenous demand for this group was limited. So why question the impact of the ICT growth in India?

The need to examine the impact of ICT growth is two folds. Firstly, 72% of India's population with 56% literacy lives in the rural sector. It is important to understand the impact ICT growth has on the majority of the Indian population. Secondly, there a possibility that India's poorest groups would be excluded from the benefits of new technology for the third time since independence in 1947.[xiii] The extensive application of ICT in poverty reduction strategies in the country is encouraging. The process is at its infancy. There is potential to overcome the obstacles through research in the identified areas. Given the global interest and support in poverty reduction, India has an opportunity through ICT to make the development process an inclusive one.

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NOTES

[i] *Domestic export revenue totaled $2.5 billion in 2001-02 (NASSCOM, 2002)*

[ii] *Despite the opening up of the economy in the early 1990s, many sectors reflect the country's long legacy of heavy regulation and protection (World Bank, 2001: p. 14).*

[iii] *The screen based trading of the Bombay Stock Exchange and the Reservation system for Indian Railways are example of large scale projects served by the domestic software industry.*

[iv] *This is an important issue in considering the benefits of ICT technologies for the poor who can best communicate in the local dialect only. See next section for details. There are over 20 dialects spoken in India (Census of India, 1991).*

[v] *It is estimated that average salaries of IT workers in developing countries are lower by up to 80% of comparable workers in developed countries (UNCTAD, 2003, p. 135). D'Costa (2003, p. 218) notes that Indian salaries in various IT services are between 7-40 percent of the US industry figures. Arora et al. (2001) indicate that one person-year onsite work is billed at about $90,000-$100,000 while comparable offshore work is billed at about $25,000-$35,000.*

[vi] *In the absence of strong software development in the Indian dialects (Arora et al., 2001), English is used as a medium to operate the ICT sector in India.*

[vii] *36% of the ICT firms in the country are located in these three states and generate revenue of 36% (NASSOM, 1998).*

[viii] *30% of the ICT firms are in the western ICT cluster and generated approximately 41% of the revenue (NASSCOM, 1998).*

[ix] *Arora et al. note that according to Dataquest (31 July 1996, p.43-44) India has 16% of the global market in customised software development.*

[x] *From under 18% in 1951 to 65% in 2001 (World Bank, 2001, p. 22)*

[xi] *In the 1950s China had comparable low literacy levels. Dreze and Loh (1995) point out to the virtual elimination of illiteracy in the younger age groups in China. Indonesia has achieved 85% literacy with 80% female literacy as compared with just India's 54% female literacy in 2001 (World Bank, 2001, p. 23, GoI, 2001, p. 186).*

[xii] *Midwives provide most health services in rural India covering up to 5,000 per midwife across multiple villages (World Bank, 2001).*

[xiii] *The first being the post-independence industrialisation and planning process through the 1950 s to mid 1960s (See for example Rao, 1998) The second being the Green Revolution in the mid 1960s (See for example Ghosh, 1998).*

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