

---

# **Bridging the Social and Digital Divides in Andhra Pradesh and Kerala: A Capabilities Approach**

**Jayan Jose Thomas and Govindan Parayil**

---

## **ABSTRACT**

Combining empirical evidence with Amartya Sen's concept of capabilities, this article argues that the digital divide is not merely a problem of access to ICTs. It is part of a larger developmental problem in which vast sections of the world's population are deprived of the capabilities to use ICTs, acquire information and convert information into useful knowledge. Fieldwork research including sample surveys conducted in rural locations in Kerala and Andhra Pradesh in India shows that these capabilities can only be created through large-scale complementary interventions in economic and social development.

## **INTRODUCTION**

Information and communications technologies (ICTs) have been emerging as tools for development and change since the 1970s. As Evans (1995: 10–11) pointed out, developmental states with 'transformative aspirations' have been looking for ways to participate in this leading industrial sector because 'it is the sector most likely to spark a twenty-first century conspiracy in favour of development'. The rapid advances in computers and informatics triggered a new international division of labour beginning in the 1970s, ostensibly paving the way for the so-called Information Age (Castells, 1996). The transition to post-industrialism in the North went hand-in-hand with an aggressive process of outsourcing and offshoring of manufacturing industries to cheaper wage locations (Cohen, 1998). Even as labour suffered from the demise of manufacturing jobs, firms in developed countries continued to dominate global capitalism, especially in the 'sunrise' information and knowledge-based industrial sectors. In recent years, as the information revolution set in

---

The National University of Singapore (NUS) provided a research grant to carry out this study. V.K. Ramachandran, Anthony P. D'Costa, and several students and faculty at the Communications and New Media Programme of NUS made useful suggestions. N. Venugopala Rao and his colleagues, Sebastian K. Jose and J.K. Manjunath gave generous help in carrying out the survey. We are grateful to them all, and to two anonymous referees for their constructive and useful comments. Earlier versions of the paper were presented at the World Summit on Information Society, Tunis (November 2005) and at the Singapore Internet Research Centre, Nanyang Technological University, Singapore (May 2006).

*Development and Change* 39(3): 409–435 (2008). © Institute of Social Studies 2008. Published by Blackwell Publishing, 9600 Garsington Road, Oxford OX4 2DQ, UK and 350 Main St., Malden, MA 02148, USA

motion by ICTs gained further momentum, the phenomenon of offshoring has spread to the service sector as well. India is the favourite among a number of developing country destinations for offshoring of services.

ICTs and globalization have thus been shaping the political economy of capitalism for decades. The focus of this article, however, is on the recent flurry of interest in ICTs for development which has been shown by governments, multilateral organizations like the United Nations (UN) and the World Bank, international aid charities, and non-governmental organizations (NGOs). According to the UN, ICTs are a 'powerful enabler of development goals' (UN Millennium Project, 2005: 49); they are expected to bring about 'greater social freedoms, increased knowledge and more productive livelihoods' (UNDP, 2001: 1). ICTs facilitate easier communication, provide better access to information, and enhance production and utilization of knowledge. Information and knowledge aid the process of development in many ways. Information about prices and business opportunities is vital to the functioning of a fair market economy; information about people, politics and events is crucial to a vibrant democracy. It is, therefore, not surprising that the digital divide — the disparities in the level of technology diffusion, especially of ICTs — is understood to be a major reason for the wide differences in social and economic development across populations (UNDP, 2001). The very idea behind the much heralded UN World Summit on the Information Society (WSIS), held first in Geneva in 2003 and then in Tunis in 2005, was to find ways to unleash the enormous potential of ICTs for social and economic development by bridging the digital divide.

In the general policy consensus, the digital divide is more often seen as a mere technological access problem — poor telecom infrastructure, Internet connectivity, low computer availability, and so on (Parayil, 2005). We argue that this is a rather limited view of the digital divide discourse. Access to ICTs and access to the information that ICTs provide are necessary to bridge the digital divide, but they are not sufficient. More crucial are the capabilities — on the part of the individual and society at large — to use ICTs and to convert the information that ICTs provide into useful knowledge. The digital divide is part of a larger developmental problem in which vast sections of the world's population are deprived of these capabilities.

This article seeks to investigate the links between the digital divide and the larger social and economic divides. It draws on Amartya Sen's concept of capabilities in interpreting the results of empirical research carried out in Kerala and Andhra Pradesh. Field studies were conducted in July–August 2004 in two rural locations: Malappuram in Kerala and Kuppam in Andhra Pradesh. Community information centres providing villagers with access to digital technologies were operating in these locations as part of the Akshaya programme in Malappuram and the i-community project in Kuppam. India is an interesting case for research for a number of reasons. Here, fast growth of the information technology (IT) sector in recent years coexists with the much slower growth of the agricultural and industrial sectors as well as high levels

of impoverishment among the vast rural population. D'Costa (2003) refers to this Indian experience as a case of 'uneven and combined development'. The *Human Development Report 2005* described India as a 'globalization success story with a mixed record on human development' (UNDP, 2005: 30–1). However, as Sen (1996) notes, there are great internal diversities within India, and regions within India have many lessons to offer to each other. The truth of this will become clear from our fieldwork conducted in the two Indian states.

This article proceeds as follows. The next section looks at capabilities to use ICTs and information in the context of increasing inequalities in the 'new economy'; this is followed by a discussion on the Indian experience with respect to information technology and development, with a focus on Andhra Pradesh and Kerala. Details about the fieldwork research are then given. Using information gathered from a stratified sampling survey in the fieldwork locations, the following two sections analyse the capabilities to use ICTs, and the capabilities to use the information that ICTs provide. Finally, we offer a brief conclusion.

#### **INFORMATION TECHNOLOGY, GLOBALIZATION AND INEQUALITY: WHY ARE CAPABILITIES IMPORTANT?**

It is a widely prevalent view that rapid advances in ICTs along with the forces of globalization have the potential to reduce global inequalities (see Heeks, 2002). Thomas Friedman (2005), for example, argues that the 'world is flat' and attributes his optimism especially to the unprecedented opportunities opened up by ICTs to access, store and manipulate information. The claim that there is a level playing field for all in the new world of ICT-led globalization, however, contradicts the grounded realities of the contours of global capitalism.

To begin with, such a claim belies the hard struggles and difficult negotiations that developmental states like India, Brazil and South Korea had to undergo in developing their IT industry and finding a niche in the international division of labour (Evans, 1995). This is illustrated by the strategies employed by the US electronics and IT industry — with the backing of the US government — to regain its competitiveness, which was under immense threat from the 1970s on, due to competition from Japan and the newly-industrializing countries. These strategies involved denying a level playing field to the US's competitors. Schoonmaker (2002) offers a persuasive study of the struggles of the Brazilian computer industry against pressures, mainly from the US Trade Department, to open its market to US computer companies. The 1986 US–Japan Semiconductor Trade Agreement was another effort to insulate and protect the US computer and IT industry from external competition. Eventually, the rise of 'Wintelism', a *de facto* global computer industry standard involving Microsoft Corporation's Windows Operating Systems (software)

and Intel Corporation's micro-processors (hardware), boosted the prospects of the US economy (Hart and Kim, 2002). The international production networks that evolved within the Wintelism framework created new peripheral destinations for outsourcing of computer manufacturing in Asia, while enabling the US to maintain its dominant position in global capitalism (Borras and Zysman, 1997).

More importantly, and in contrast to any optimism about a 'flat' world, evidence suggests that global inequalities have increased in the last two decades, thus reversing the trend towards declining inequalities during the 'golden age' years from the 1950s until the late 1970s (Cornia et al., 2004; Parayil, 2005). Since the late 1970s, inequalities have widened between countries, as well as within many nations, both developed and developing (Parayil, 2005; Picketty and Saez, 2003). In the US between 2000 and 2005, mean real money earnings rose only for the highly educated, comprising just 3.4 per cent of the labour force (in 2005), while they fell for more than 96 per cent of the labour force (Scheve and Slaughter, 2007).

An important factor contributing to increases in global inequalities is the nature of technological and organizational changes characterizing the 'new economy', which are biased in favour of the skilled and educated worker. Skill-biased technological changes and the declining strength of trade unions worldwide have been especially detrimental to the welfare of less-skilled or unskilled workers (Parayil, 2005; Wood, 1995). It appears that activities in the new economy or 'informational economy' are characterized by increasing returns. Firms or individuals who manage to obtain control over knowledge resources will build on these and get further ahead, while those who do not have similar access to knowledge, or comparative cognitive skills to translate information into intellectual capital, lose out. In this way, the informational economy can be said to be a 'winner-take-all' or 'in or out' economy (Frank and Cook, 1995; Parayil, 2005).

### **Capabilities in the Age of Information Capitalism**

To understand certain features of the rise in inequalities in the age of information capitalism, it is appropriate to make use of the concept of capabilities. Amartya Sen recognized that the conventional analysis of poverty and inequality based on the ownership of commodities (viz. income or food) is inadequate. He argued that the focus of study should be on functioning, that is, on what a person 'manages to do or to be' as a result of his or her possession of a commodity. According to Sen (1985: 7), 'a functioning is an achievement of a person', such as, for example, 'being adequately nourished'. 'Living may be seen', in Sen's words, 'as consisting of a set of interrelated "functionings", consisting of beings and doings' (Sen, 1992: 39). Capability refers to 'the various combinations of functionings (beings and doings) that [a] person can achieve. . . a set of vectors of functionings,

reflecting the person's freedom to lead one type of life or another' (Sen, 1992: 40).<sup>1</sup>

A commodity has certain characteristics: bread, for example, has nutrition-giving characteristics. The conversion of characteristics of a commodity into a functioning for an individual depends on two conversion factors: personal characteristics (such as metabolism, physical condition) and social characteristics (such as infrastructure, social norms) (Sen, 1999: 74–6). Therefore, an individual's achievement of a certain functioning (of being healthy, for example) is determined not only by his/her command over commodities (food, in this case) but also by personal characteristics (whether, for instance, the person is able bodied or physically challenged) (Sen, 1985). This implies that two persons sharing exactly the same commodity bundle can have vastly different opportunities of quality of life owing to their individual differences in age, gender, (dis)ability, and so on (Sen, 1999: 69). Therefore, Sen argues that the appropriate instrument for evaluation of well-being (or the absence of it) is not utility comparisons based on real incomes or commodities but comparisons of the 'substantive freedoms — the capabilities — to choose a life one has reason to value' (Sen, 1999: 74).

Following from this, it can be shown that access to ICTs or access to information that ICTs provide does not automatically lead to positive development outcomes. More crucial are the personal attributes and social characteristics of the individual who uses ICTs and information.<sup>2</sup> An illiterate person can have access to computers and the Internet through a village information centre, but might not have the skills required to browse the Internet. Even if this hurdle can be crossed, and the person learns to use computers and the Internet, lack of education and specific skills might still prevent the individual from, for instance, applying for a job which is advertised there — in other words, from being able to use the information found on the web. Social norms that discourage women from venturing outside their homes would pose further obstacles to even an educated woman deriving benefits from a village information centre. Thus, command over commodities — in this case, access to computers and to the information that the Internet provides — does not as a matter of course result in achievement of functionings: of 'being able to browse the Internet' or 'being able to apply for jobs posted on the

- 
1. See discussions on Sen's capability approach in Gasper (1997), Martins (2006) and Robeyns (2000). It came to our attention just before this article went to press that Sen's functionings-based approach as an evaluative framework to explain the impact of the Internet on poverty in developing countries was also used by James (2006). James's findings, based on secondary sources of evidence of the differential benefits of the Internet on rural poor in Mozambique (foreign-aid tele-centres) and Sri Lanka (blending radio with the Internet), is similar to the evidence we have gathered in our field research in Kerala and Andhra Pradesh. James shows the inadequacy of the standard welfare economics-based approach in explaining the link between technology and poverty alleviation.
  2. See Parayil (1999) who argues that a clear understanding of the structural conditions of the society is important in order to induce meaningful diffusion of technology to the people.

Internet'. In a volume edited by Mansell and Wehn (1998), it was pointed out that the capabilities for producing software and information content that are relevant to people, and the capabilities required for converting information into useful knowledge, are equally important for realizing the opportunities promised by ICTs. As James (2006) argues, the specific context of the users of the Internet is the key to understanding the differential impact of ICTs on rural poverty.

At the same time, for an educated person belonging to a well-to-do household yet disadvantaged by his location in a village, access to the Internet would open up new opportunities. In other words, while the socially advantaged classes possess individual and social characteristics (such as better education and social connections) that enable them to convert access to the Internet into desirable functionings, the socially disadvantaged classes do not possess such characteristics. In such a situation, ICTs, rather than reducing the distance between the various social classes, would actually widen the existing inequalities — confirming the 'winner-take-all' tendency of information capitalism. In fact, UNDP (1999) reports that people who access the Internet are more often the better-educated and higher-income groups, men rather than women, and younger rather than older people. A study by Arun and Arun (2002) showed that ICTs may reproduce or even intensify many of the broader gender inequalities.

We thus begin with the hypothesis that the capabilities to use ICTs and the capabilities to use the information that ICTs provide will be greater, the higher the levels of social development. The reason for the choice of India, and more specifically Andhra Pradesh and Kerala, for the study of the relationship between ICTs and social development will be explained in the next section.

## **SOCIAL AND DIGITAL DIVIDES IN INDIA**

Contemporary Indian development presents a paradoxical picture: the growth of high technology industries and entrepreneurship in some cities, while poverty and deprivation haunts much of rural India. In many ways, the Indian experience is an extreme manifestation of the inequalities inherent in the 'new economy'. India's GDP has been growing at an annual rate of over 6 per cent since the early 1990s, and at over 8 per cent from 2005–06.<sup>3</sup> India is emerging as a favourite destination for offshoring of a range of service sector jobs, including jobs in knowledge-intensive fields such as software engineering, aircraft design, pharmaceuticals research and automobile manufacture. The combined revenues from IT (comprising software production and IT services) and information technology enabled services (ITES)

---

3. Calculations using *National Accounts Statistics* published by Central Statistical Organization (CSO), available from *Economic and Political Weekly* Research Foundation (EPWRF).

industries (including IT hardware) in India reached an estimated US\$ 47.8 billion in 2006–07, or 5.4 per cent of the country's GDP in that year.<sup>4</sup> In recent years, Indian executives have been receiving salary increases ranging between 10 and 14 per cent, the highest in the Asia-Pacific region (Kelly Services, 2006). At the same time, 70 per cent of India's population of over one billion lives in rural areas. Poverty head-count ratios for the year 1999–2000 are estimated to be at least 28.8 per cent for India's rural areas and 25.1 per cent for India's urban areas (Sen and Himanshu, 2004: 4254–5).<sup>5</sup> According to the Census of India 2001, 34.6 per cent of Indians were illiterate. Of India's total workforce of over 400 million, only 1.3 million work in the IT sector and 26.5 million in organized sector jobs, while the rest of the labour force is engaged in low value adding agricultural and informal sector jobs.<sup>6</sup>

Given this picture of contemporary India, can ICTs aid development, particularly development of rural areas, in India? There are several challenges in India for the growth of the IT industry itself. India's IT industry is extremely reliant on export markets, which discourages inter-firm linkages and innovation-led future growth of the industry (D'Costa, 2006). Limited employment generation, dominance of a few large firms, and dependence on less skill-intensive segments for revenues are some of the other growth concerns (Chandrasekhar, 2005; Saith and Vijayabaskar, 2005). India's IT industry has not developed extensive linkages with the domestic market and, therefore, its impact on productivity improvements in other sectors such as manufacturing is not very high (Joseph, 2006). With respect to diffusion of ICTs to rural areas, the most immediate constraints are deficient telecommunication infrastructure, low penetration of personal computers, and poor Internet connectivity. Although telecom reforms have been moving apace in India since the 1990s, resulting in very impressive overall expansion of the country's network, there are significant variations in telecom connectivity between different Indian states and between urban and rural areas. In December 2005, there were only eighteen telephone lines in India per 1000 rural population.<sup>7</sup> For effective diffusion of the Internet in rural areas, greater emphasis must be paid to the development of information content in the local languages (Thomas, 2006).

The challenges to development with the aid of ICTs are not limited to problems of physical infrastructure alone. Illiteracy and various forms of social exclusion based on caste and gender continue to prevail in several regions and states of India, and there will be no surprise if a person belonging to the scheduled castes is barred from using a village Internet kiosk in

---

4. Based on data from India's NASSCOM (National Association of Software and Service Companies) ([www.nasscom.org](http://www.nasscom.org)). See also Thomas (2005a, 2005c).

5. Poverty calculations are based on the 55<sup>th</sup> round of India's National Sample Survey.

6. Total workforce refers to the sum of 'main' and 'marginal' workers as reported in the Census of India 2001. Figures for IT sector jobs pertain to the year 2005–06 and for organized sector employment pertain to the year 2003–04. See Thomas (2005c) and data from NASSCOM.

7. World IT Report (2008); see also Thomas (2005a: Table 8.5).

some of these regions (Sreekumar, 2006). The record of the Indian state in ensuring basic education for the masses has been rather dismal; the country has still not achieved the goal of providing free and compulsory education to all children up to the age of fourteen (Drèze and Sen, 2002: 146–67). In many parts of rural India, landlessness among labouring households is a continuing feature. Relatively successful implementation of land reforms took place only in two Indian states, Kerala and West Bengal. The period of economic reforms in India since 1991 has been characterized by significant slowdown in public investment in agriculture and rural infrastructure (Ramachandran and Swaminathan, 2003). There has also been a decline in the volume of rural credit disbursed by banking institutions over this period (see Chavan, 2001 and articles in Ramachandran and Swaminathan, 2005). Against this background, it is relevant to ask whether ICTs will help resolve the fundamental obstacles to development of India's rural areas.

### **Andhra Pradesh and Kerala**

With respect to their record in the growth of high-tech industries and broad-based development, the two south Indian states of Andhra Pradesh and Kerala present a picture of some contrasts. Andhra Pradesh has been a pioneer among Indian states in informational development, especially in regard to building regional institutions for innovation and introducing state-sponsored programmes in e-governance (Eischen, 2006). Large numbers of software professionals from the state head to the USA every year: Andhra Pradesh accounted for 23 per cent of all Indian software professionals working in the USA in 1998 (Ramachandraiah, 2003). The state, and particularly its capital Hyderabad, has been a leader in software, ITES and pharmaceutical industries. Compared to Andhra Pradesh, Kerala is far behind in the growth of software and ITES industry. In 2003–04, Kerala accounted for only 0.5 per cent of total software exports from India, compared to the Andhra Pradesh's share of 9.7 per cent (see Table 1).

Despite the notable growth of the IT industry, Andhra Pradesh has been gripped by unprecedented rural crisis. Several cases of starvation deaths, distress migration of landless agricultural labourers, and suicides among farmers and handloom textile workers have been reported. The poverty level, measured by head-count ratio, is considerably higher in Andhra Pradesh than in Kerala. Average household per capita expenditure in Kerala was the highest among all the Indian states in 1999–2000, and much higher than the per capita expenditure in Andhra Pradesh (Drèze and Sen, 2002: Table A.3). In June 2005, per 1000 population, there were 97.4 telephone lines in rural Kerala compared to only 23.7 in rural Andhra Pradesh (see Table 1).

Differences in social achievements between Andhra Pradesh and Kerala are even more striking. Kerala has been widely fêted for its exceptional achievements in the social spheres, particularly in health and education. In



*Table 1. Selected Indicators of Development: Andhra Pradesh, Kerala and India*

Indicator	Andhra Pradesh	Kerala	India
Population, 2001 (millions)	76	39	1027
Life expectancy at birth for males, 1998–2002 (years)	62.0	70.8	61.6
Literacy rate for females age 7+, 2001 (%)	51.2	87.9	54.3
Average household expenditure per capita 1999–2000 (Rupees/month)	541	810	589
Telephones (per 1000 people), rural, June 2005	23.7	97.4	17.4
Share in total software exports from India, 2003–04 (%)	9.7	0.5	

*Sources:* For population and literacy rate: Census of India 2001, figures available at [www.censusindia.gov.in](http://www.censusindia.gov.in) (accessed 9 March 2006)

For life expectancy at birth: GOI (2006: Table 9.1)

For average household expenditure per capita: Drèze and Sen (2002: Table A.3)

For telephones per 1000 people: Lok Sabha Starred Question No 244, dated 10 August 2005, cited in [www.indiastat.com](http://www.indiastat.com) (accessed 10 March 2006)

For share in total software exports: Lok Sabha Unstarred Question No 3136, dated 13 August 2004, cited in [www.indiastat.org](http://www.indiastat.org) (accessed 9 March 2006).

2001, the female literacy rate in Kerala was 88 per cent; in Andhra Pradesh it was just 51 per cent. In 1998–2002, an average male could expect to live for 70.8 years in Kerala compared to 62 years in Andhra Pradesh (see Table 1). Kerala has had a relatively successful programme of land reforms, and displays relatively low levels of inequality between different castes and genders, and between people in urban and rural areas; in all these aspects, Andhra Pradesh's track record has been far less impressive.

Kerala's achievements in the social spheres have been the result of decades of public action. Kerala society displayed highly inequalitarian features during the nineteenth century, including some of the worst forms of caste-based oppression and dominance of landlordism in villages. The agents of change in Kerala's progressive transformation have been many, some of them long-standing. They include policies of the Travancore and Cochin administration, which were generally supportive of social and educational reforms; activities of Christian missionaries; and progressive attitudes in Kerala society towards women's survival, education and health. There were also important caste-based reform movements, notably the Ezhava social reform movement of the late nineteenth and early twentieth centuries. Kerala has a long history of agrarian struggles dating back to the 1830s. Left political parties have been active in Kerala since the 1930s, and they succeeded in mobilizing the many reform-minded forces into a powerful political movement. Successive elected state governments from 1957 onwards initiated a number of measures in health and education aimed at improving the general welfare of the population. Land reform measures implemented by state governments, including the Kerala Land Reforms Bill 1967, laid the foundations for a relatively successful redistribution programme (Ramachandran, 1996). From the mid-1990s, Kerala initiated an ambitious programme of decentralization and

devolution of greater administrative and financial powers to democratically elected local governments.

Public action of a similar nature is yet to take place in Andhra Pradesh and most other regions in India. Reddy (1989) argues that many of the policies of the colonial state and of governments in the post-independence period helped to maintain the dominance of the upper castes in Andhra society. The leaders of disadvantaged groups were accommodated through the distribution of patronage and reward, while the disadvantaged groups themselves continued to survive in a state of misery (*ibid.*: 265–6). In recent years, Andhra Pradesh has been passing through an acute agrarian crisis, and the policies of the state and central governments have been held largely responsible for this crisis. Studies have pointed to a sharp decline in the availability of institutional credit for farmers, inadequate and declining supply of water resources in the state, and a squeeze on resources for agricultural research, particularly for dry-land farming. Prices of agricultural commodities have been low and declining, and farmers' incomes have been vulnerable to market fluctuations (Government of Andhra Pradesh, 2004). Investigations in thirty-six villages spread over three districts of Andhra Pradesh, completed in early 2004, showed that people in the villages were falling into poverty due to high costs of health care, loans from private money lenders at usurious rates of interest, and droughts exacerbated by the absence of irrigational facilities (Krishna et al., 2004). For the Telengana region of Andhra Pradesh, Vakulabharanam's (2005) study showed that falling output prices of non-food crops, rising costs of agricultural inputs and electricity, stagnant growth of institutional credit, and the rise of market intermediaries in the peasant economy have contributed to agrarian distress.

Disenchantment with the policies of the previous state administration in Andhra Pradesh, which prioritized high-tech development mostly around Hyderabad while ignoring the livelihood crisis in rural areas, led to its rout in the elections held in May 2004. Armed struggle led by left extremists (known as 'Naxalites') demanding land reforms and other measures for greater equity in the countryside is currently being waged in Andhra Pradesh and in eleven other Indian states, including Bihar, Chattisgarh, Orissa and Madhya Pradesh.

Thus there are major differences between Andhra Pradesh and Kerala in historical patterns of development, current social and economic conditions, levels of informational development, and in the growth of the IT industry. How do these differences affect the capabilities to use ICTs and the capabilities to use the information provided by ICTs among rural populations of the two states?

## **THE FIELDWORK**

The fieldwork for this study was conducted in July–August 2004. The Andhra Pradesh government and the computer company Hewlett Packard (HP) had

jointly launched the 'inclusive community' (i-community) project in the Kuppam area in Chittoor District in April 2002. The government of Kerala inaugurated the Akshaya computer literacy training programme in Malappuram district in November 2002. The i-community centres in Kuppam and the Akshaya centres in Malappuram were both operated by local entrepreneurs, and both encouraged villagers to use computers and the Internet in a number of fields that affect their daily lives, including agriculture, health and education. While some of the services provided by the centres, especially those related to computer literacy, were given free of charge, a nominal fee was charged for some other services. Entrepreneurs operating these community information centres (CICs) received financial assistance from local governments or *panchayats* in Malappuram, and from the state government and HP in Kuppam.

As a background to the fieldwork, discussions were held with a number of officials and entrepreneurs involved in the Akshaya programme in Malappuram and the i-community project in Kuppam. These discussions were intended to ascertain the nature of the programme/project and to gain some preliminary idea about its relative success in the villages where it was implemented. Research data came from a stratified sample survey of households in selected areas in Kuppam and Malappuram.<sup>8</sup> The areas or hamlets selected for fieldwork in Kuppam and Malappuram lay within a 3 km radius of a community information centre. The location for research and the information centre in its vicinity were so chosen as to be representative of the larger region and programme/project under study.

The Kuppam area, which had a population of approximately 320,000 at the time of the study, was spread over five *mandals*, ninety-nine *grama panchayats* and 714 villages.<sup>9</sup> At the time the survey was conducted, thirteen community information centres were operating in different parts of Kuppam as part of the i-community project. Sample surveys were conducted in two villages belonging to two different *mandals*: Kadepalle and Venkatepalle, which had 141 and 168 households respectively.<sup>10</sup>

At the time the survey was conducted, a total of 582 Akshaya centres were operating in different parts of Malappuram district, which had a population of 3.6 million (according to the 2001 Census).<sup>11</sup> Malappuram district comprises six *taluks* (which are administrative subdivisions of a district in Kerala) and 135 villages. The sample survey was conducted in Karachal ward (a smaller

---

8. The methodology for this fieldwork research was motivated by studies conducted in Pais (2004), Ramakumar (2006), and Rawal (2001). It also benefited from an ongoing study conducted by V. Surjit of the Indian Statistical Institute, Kolkata.

9. In Andhra Pradesh, each district comprises several *mandals*, and each *mandal* comprises a number of *grama panchayats* or village councils, which are formed from a group of villages or habitations.

10. Kadepalle village was in Gudupalle mandal and Venkatepalle village was in Santipuram mandal.

11. See <http://www.akshaya.net/itmission/akshaya/vitem.asp> (accessed 5 October 2004).

Table 2. *Stratified Sample Survey in Kuppam and Malappuram, 2004*

	Kuppam, Andhra	Malappuram, Kerala
Number of sample households	45	45
Number of adults (age 7+) in the sample households	197	223
Females per 100 males	99	108
Number of landless labourer households	7	0
Number of households in which one or more members were migrant workers	2	12
Literacy rates among females/males (age 7+) in the sample households, in %	46.9/78.8	95.7/97.2

Source: Survey data, July–August 2004.

unit of a village) of Pullippadam village, located in Nilambur *taluk*. Karachal ward had 381 households and an Akshaya information centre was operating in this ward (Thomas, 2006).

A list of all 309 households in the two selected villages in Kuppam and 381 households in the selected ward in Malappuram was prepared. This list, containing names of heads of household and ownership of landholdings, formed the sampling frame for the survey. A representative sample of forty-five households each was then chosen from the sampling frame in Kuppam and Malappuram using stratified random sampling procedure, with stratification on the basis of the size of landholdings (Thomas, 2006). Size of landholdings owned gives an approximate indicator of income levels of households in the surveyed villages. However, this approach has many limitations, as it does not take into account variations in physical qualities of land or differences in socio-economic status of households (see Ramachandran, 1990: 74–7).

The total number of persons above the age of seven in the forty-five surveyed households in Kuppam was 197 (98 females and 99 males) and in Malappuram it was 223 (116 females and 107 males). With respect to literacy and educational levels, Malappuram was distinctly ahead of Kuppam: the literacy rate among females above age seven was 47 per cent in Kuppam and 96 per cent in Malappuram (see Table 2).

Agriculture was the major source of livelihood in the surveyed villages in both Kuppam and Malappuram. Cultivation or agricultural labour or both was the main source of income in twenty-eight out of the forty-five surveyed households in Kuppam and nineteen out of the forty-five surveyed households in Malappuram. Members of many sample households in Kuppam were engaged in low-paid jobs in the non-agricultural sector, mainly construction work in the village and in the nearby city of Bangalore. A railway station, located close to the surveyed villages, provided a small number of low-paid as well as a few better-paid jobs. Compared to Kuppam, there was greater diversification of employment opportunities in Malappuram. Many

household members were engaged in small businesses such as operating as intermediaries in land transactions, running grocery shops and selling books, as well as in jobs such as estate supervisor, postmaster and bus driver. In twelve out of the forty-five households in the sample in Malappuram, one or more family members worked in the Arabian Gulf countries, and remittances from the migrant family members made a substantial contribution to family incomes (Thomas, 2006).

Paddy, *ragi*, groundnut, tomatoes, *chamanthi* flower and vegetables are the major agricultural crops in Kuppam. Commercial crops, particularly rubber, coconut, areca nut, pepper and banana, are the major agricultural crops in Malappuram. It is worth noting that the samples did not contain any large cultivator or major landlord households in either Kuppam or Malappuram. The largest size of landholding owned by a household in the sample was 7.8 acres in Kuppam and 3.5 acres in Malappuram. Landlordism is a continuing feature of the agrarian situation in Andhra Pradesh, and it is possible that the sample in Kuppam did not capture the true extent of the inequalities that it generated.

At the time of the study, the surveyed village in Malappuram was separated from the nearby town by a river that could be crossed only by a ferry; furthermore, parts of the village were not electrified. Therefore, at least in terms of physical infrastructure, the surveyed village was less developed than most other villages in Kerala. Kuppam in Chittoor district falls within Rayalaseema region, which is a relatively less-developed region of Andhra Pradesh. At the same time, however, the state assembly constituency of Kuppam has witnessed a considerable amount of developmental activities in recent years. It has been returning Chandrababu Naidu, former Chief Minister of Andhra Pradesh, to the state Legislative Assembly continuously since 1989, including the elections held in 2004. The survey was conducted just two months after the May 2004 elections, and many families in the sample in Kuppam had visibly benefited from enhanced public spending before the elections, especially in the form of toilets built through food for work programmes.

#### **CAPABILITIES TO USE ICTS: WHO USES COMPUTERS IN VILLAGES?**

In the survey, questions were asked of the heads of the sample households regarding the awareness of every member in the household about computers and about the information centre in the village. There were also questions about the use of computers, television, radio, telephone and newspapers by each family member. Although every attempt was made to verify the responses with each family member present at the time of the survey, some amount of error is likely in the responses. It was found that the awareness and use of computers was greater among the younger family members. In the responses made by heads of sample households, awareness and use of computers could be underreported in cases when none of the younger family

members were present at the time of the survey, and when the head of the household had insufficient information regarding a family member's familiarity with computers. Therefore, it may be noted that the results reported below are derived from the responses made by heads of sample household subject to the information available to them at the time of the survey (see also Thomas, 2006).

As evident from Tables 3 and 4, awareness and use of computers was far more extensive among the sample households in Malappuram than in Kuppam. With respect to the proportion of sample household members who read newspapers, listened to radio, and operated a telephone, Malappuram was distinctly ahead of Kuppam (although with respect to the proportion of household members who watched television, Kuppam was marginally ahead of Malappuram) (see Table 5).

In Malappuram, at least one family member in 64.4 per cent of all households in the sample made use of the services of the local information centre (see Table 3). In fact, in many sample households, more than one household member took part in the e-literacy programme conducted by the information centre. Female members actively took part in the e-literacy programme: the computer instructor in the Akshaya centre in the surveyed village was a twenty-one-year old Muslim woman, a graduate in Arabic who completed training in computers. Members belonging to *Paniyar* community (a socially backward community of scheduled tribes) took part in the e-literacy programme in some of the Akshaya centres in Malappuram. Local entrepreneurs running Akshaya information centres in Malappuram worked in close association with and received support from officials of *panchayats* or local self-governments, local politicians and social activists, and this helped the better performance of the programme (Thomas, 2006).

Capabilities to use computers and other media show variations depending on the social and individual characteristics of users. Table 3 shows that in Kuppam and, to a limited degree, even in Malappuram, members of the 'less-educated' and 'poorer' households were less likely to have made use of the services of the local information centre. In Kuppam, awareness about computers and about the local information centre was much lower among the less-educated and poorer households compared to the whole sample (see Table 3).

As Table 4 shows, 84.6 per cent of all persons who used a computer in the sample in Kuppam belonged to the highest educated group (comprising persons who had completed more than ten years of schooling). None of the illiterates or persons with only primary education (one to four years of schooling) used a computer in Kuppam. At the same time, 59.2 per cent of all computer users in Malappuram had only five to ten years of schooling (see Table 4).

All the thirteen persons who used a computer in the sample in Kuppam were males. In Malappuram, although women actively took part in the e-literacy programme, they were marginally behind men in the use of

Table 3. Awareness and Use of Computers among Sample Households, Kuppam and Malappuram, 2004  
(Numbers of Households)

Sample households by their characteristics	Kuppam			Malappuram		
	Whole sample	Less-educated sample	Poorer sample	Whole sample	Less-educated sample	Poorer sample
Sample size	45	15	24	45	14	23
At least one member heard about computers	28	4	13	45	14	23
(% of sample size)	(62.2)	(26.7)	(54.2)	(100)	(100)	(100)
At least one member heard about the local information centre	18	3	6	41	12	21
(% of sample size)	(40.0)	(20.0)	(25.0)	(91.1)	(85.7)	(91.3)
At least one member made use of the services of the local information centre	8	1	3	29	8	13
(% of sample size)	(17.8)	(6.7)	(12.5)	(64.4)	(57.1)	(56.5)

Note: In Malappuram, 'less-educated' households are defined as households in which illiterates and persons having only one to four years of schooling account for one-third or more of all family members. In Kuppam, 'less-educated' households are households in which illiterates account for more than half of all family members. Different definitions were necessary as Malappuram was significantly ahead of Kuppam in educational achievements. In Kuppam and Malappuram, 'poorer' households are defined as households whose total landholding is less than or equal to median landholding for the whole sample.

Source: Survey data, July–August 2004.

*Table 4. Persons who Used a Computer: Distribution by Gender, Age and Years of Schooling, Kuppam and Malappuram, 2004 (Numbers of Persons)*

Persons who used a computer	Kuppam	Malappuram
<i>By gender</i>		
Females	0 (0.0)	32 (45.1)
Males	13 (100)	39 (54.9)
<i>By age</i>		
7–15	2 (15.4)	11 (15.5)
15–30	10 (76.9)	49 (69.0)
30–50	0 (0.0)	10 (14.1)
50 and above	1 (7.7)	1 (1.4)
<i>By Years of schooling</i>		
Illiterate	0 (0.0)	0 (0.0)
1–4 years	0 (0.0)	1 (1.4)
5–10 years	2 (15.4)	42 (59.2)
More than 10 years	11 (84.6)	28 (39.4)
All persons who used a computer	13	71
All persons who used a computer as % of all adults (age 7+) in sample	6.6%	31.8%

*Notes:* Figures in brackets indicate persons belonging to the specified category as percentage of all persons who used a computer.

*Source:* Survey data, July–August 2004.

*Table 5. Penetration of Media: Media Users as Proportion (in %) of All Females and Males above Age 7, Kuppam and Malappuram, 2004*

	Kuppam		Malappuram	
	Females	Males	Females	Males
Who read newspapers (%)	22.4	54.5	74.1	80.2
Who watched TV (%)	68.4	73.7	61.2	73.3
Who listened to radio (%)	42.9	60.6	72.4	66.4
Who operated a telephone (%)	37.8	58.6	76.7	82.8
All females and males above age 7 (numbers)	98	99	116	107

*Source:* Survey data, July–August 2004.

computers (see Table 4). A division along gender lines was clear with respect to the penetration of media (see Table 5). In Kuppam and, to a limited degree, in Malappuram, the proportions (of all females above age seven) of females who read newspapers, watched television and used a telephone were lower than the corresponding proportions for males (see Table 5). It is nonetheless noteworthy that in Malappuram 74.1 per cent and 72.4 per cent of all females above age seven read newspapers and listened to radio respectively. Writing on Kerala's development, scholars have made special mention of the association between relatively high female literacy, newspaper readership even among females, and the formation of progressive attitudes in Kerala society (Jeffrey, 1987). Persons in the age group of fifteen to thirty years accounted for the bulk of all computer users in the sample in both sites. Persons above



thirty years accounted for 15.5 per cent of all computer users in the sample in Malappuram and just 7.7 per cent in Kuppam (see Table 4).

It is clear from the above that *access* to computers or media technologies does not automatically translate to *capabilities to use* computers or media technologies. These capabilities were found to be higher among the better-educated and richer households in the villages studied. Within a household, the capabilities to use computers were found to be higher among males than among females and higher among the young than among the old. The disparities between different genders, the young and the old, and the better-educated and the less-educated were all highly pervasive in Kuppam. Such disparities existed in Malappuram as well, although to a considerably smaller degree. It needs to be highlighted that there were favourable social factors that enhanced the capabilities to use ICTs in Malappuram, including an environment generally encouraging of women's education and social participation, and active involvement of *panchayats* and local activists in the Akshaya programme.

#### **CAPABILITIES TO USE INFORMATION: WHO NEEDS COMPUTERS IN VILLAGES?**

During the time the fieldwork was conducted, programmes and projects were being implemented in Kuppam and Malappuram to make use of ICTs in a range of areas including agriculture, health and medical care, and education. There were projects that would provide information on new agricultural practices and agricultural markets; information about educational and vocational opportunities; and information about health-care facilities. The projects that were under various stages of implementation in Kuppam included 'farming information system', 'tele-agriculture', an 'expert system' for farmers, an electronic employment exchange, an electronic 'public grievance system', and 'Yojanalalu', a scheme for people to submit online applications for various government programmes.<sup>12</sup> The Akshaya information centres in Malappuram were trying to provide information content on education, jobs, agriculture, health and law, as well as devising modules on spoken English, vocational training, 'personality development', career planning and accounting (Thomas, 2006).<sup>13</sup>

Since the programmes were yet to be fully implemented, it was not possible to ask direct questions during the survey about their effectiveness. Instead, questions were asked to find out the potential demand for the information that they offered. These questions included whether household members were aware of agricultural prices, whether they had received loans from

---

12. Discussions with officials of the Kuppam i-community project; see also [www.hp.com/e-inclusion/en/project/kuppam.pdf](http://www.hp.com/e-inclusion/en/project/kuppam.pdf) (accessed 29 April 2004).

13. Information from Department of Information Technology, Government of Kerala.

formal sources, and whether any of the household members were looking for jobs and higher studies. Results from the responses to these questions from households belonging to different land owning categories are reported in Table 6.

The demand for information about agriculture was significantly higher in Malappuram compared to Kuppam, as was the demand for information about employment opportunities and about the outside world in general. In Malappuram, as Table 6 shows, 46.7 per cent of all sample households were aware of the prices of agricultural goods produced in their village; the corresponding proportion in Kuppam was 28.9 per cent. Farmers in Malappuram also showed keen interest in better agricultural practices and cultivation of new crops like vanilla. One or more household members were searching for jobs in 57.8 per cent of the sample of households in Malappuram compared to 26.7 per cent in Kuppam. The proportion of households whose members were interested in pursuing higher studies and had received loans from formal sources was also considerably higher in Malappuram than in Kuppam (see Table 6). One or more members in twelve (26.7 per cent) of the sample households in Malappuram were working in the Arabian Gulf countries. In comparison, one family member was working outside the village (but not outside the country) in just two (4.4 per cent) of the sample households in Kuppam (see Table 2). The demand for communication with migrant family members is an important factor that explains the higher proportion of telephone users in Malappuram compared to Kuppam (see Table 5). Many persons in the sample in Malappuram were aware that the Internet provides a cheaper means of communication with their relatives abroad: at least three persons expressed interest in Internet chatting and webcam (Thomas, 2006).

### **Capability Deprivation in the Use of Information Provided by ICTs**

It is clear from the above that the 'capability deprivation' (following Sen, 1999) in terms of the potential use of information provided by ICTs was greater in Kuppam than in Malappuram. Differences between the two regions in the nature of agricultural growth and extent of landlessness were behind this divergence. It was observed that there were many basic constraints to agricultural growth in Kuppam; consequently, the capabilities to use information on agricultural prices or agricultural practices that ICTs could provide were very restricted. There were seven households of landless labourers in the sample in Kuppam; these households did not produce agricultural crops to be sold in the market, nor did they have the bargaining power to convert an increase in agricultural prices into a corresponding increase in wages. Among the thirty-five land-owning households in the sample, fifteen households owned land that was not irrigated at all, another six households owned land that was only partially irrigated, and sixteen households owned land that was less than one acre in area. Indeed, in response to a question to identify

Table 6. Some Indicators of the Potential Demand for Information from Sample Households, Classified by Ownership of Landholdings, Kuppam and Malappuram, 2004

Households, by size of landholdings	Number of households in each category	Households which were aware of agricultural prices	Households whose members were searching for jobs	Households whose members were interested in higher studies	Households which had received loans from formal sector
<b>Kuppam</b>					
Landless labour	7	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Landless but employed <sup>a</sup>	3	1 (33.3)	1 (33.3)	0 (0.0)	2 (66.7)
< 1 acre	16	2 (12.5)	5 (31.3)	1 (6.3)	10 (62.5)
1 acre–2.5 acres	10	2 (40.0)	0 (0.0)	0 (0.0)	9 (90.0)
> 2.5 acres	9	8 (89.0)	6 (66.7)	2 (22.2)	7 (78.0)
All households	45	13 (28.9)	12 (26.7)	3 (6.7)	28 (62.2)
<b>Malappuram</b>					
< 0.1 acre	7	1 (14.3)	5 (71.4)	2 (28.6)	6 (85.7)
≥ 0.1 acre ≤ 0.3 acre	16	6 (37.5)	5 (31.3)	3 (18.8)	13 (81.3)
> 0.3 acre ≤ 1 acre	13	7 (53.8)	8 (61.5)	3 (30.8)	11 (84.6)
> 1 acre	9	7 (77.8)	8 (88.9)	8 (88.9)	8 (88.9)
All households	45	21 (46.7)	26 (57.8)	16 (35.6)	38 (84.4)

Notes: Figures in brackets represent the number of households as a percentage of the number of households within each land-holding category.

a: Family members were employed in relatively better paying jobs such as teacher and lab technician; therefore, these households could not be categorized along with households of landless labourers.

1 acre = 0.4 ha.

Source: Survey data, July–August 2004.

the *most* important problem to agricultural growth that the farmers faced, twenty-three households (accounting for 65.7 per cent of all land-owning households in the sample) in Kuppam pointed to the absence of irrigational facilities. For sixteen households, non-availability of credit was the most or second-most important constraint to agricultural growth. The absence of a proper mechanism for collection, storage, transport and marketing was another important hurdle in Kuppam, especially in the case of easily perishable produce such as tomatoes and flowers (Thomas, 2006).

The conditions for agricultural growth were more favourable in Malappuram and, as a result, the potential demand for information on agriculture was much higher. All households in the sample in Malappuram possessed at least a small plot of homestead land.<sup>14</sup> Giving ownership rights to homestead land occupied by the rural poor was an important component of land reform measures implemented in Kerala from 1957 onwards (Ramachandran, 1996: 294–300). Malappuram (and the rest of Kerala) receives plentiful rainfall from the south-west and north-east monsoons, and most households in the surveyed village had wells in their plot of land. Cultivation of vegetables or coconut was, therefore, possible even on as little as 5 cents of homestead land. In fact, a study in a village in North Kerala showed that incomes from homestead land were a substantial portion of the total incomes of agricultural labour households (Ramakumar, 2006). The prices of rubber, coconut and areca nut grown in Malappuram have generally been high. The sample households in Malappuram received credit from more than six different sources of institutional credit, including scheduled commercial banks and co-operative banks — another factor in its favour. The infrastructure for collection, transport and marketing of agricultural products was better in Malappuram than in Kuppam (Thomas, 2006).

### **‘Coupling of Disadvantages’ and Capability Deprivation**

In his study of poverty, Sen (1999: 88) writes about the coupling of disadvantages — income deprivation made severe by adversity in converting income into functionings. Our fieldwork research shows evidence of coupling of disadvantages in Kuppam, with disadvantages on account of landlessness or small size of landholdings being aggravated by low educational levels of household members. The Spearman’s rank correlation between size of landholdings owned and mean years of schooling of household members (above age seven) in the sample of households in Kuppam is positive (0.3403) and statistically significant at less than 5 per cent level. In contrast, the corresponding correlation coefficient estimated for Malappuram is not statistically significant (Table 7). This statistical exercise implied that there

---

14. Among the sample of households in Malappuram, the area of homestead land was a minimum of 5 cents (one-twentieth of an acre).

*Table 7. Spearman's Rank Correlation between Size of Landholdings Owned and Mean Years of Schooling, Sample Households, Kuppam and Malappuram, 2004 (n = 45)*

	Kuppam, Andhra	Malappuram, Kerala
Correlation coefficient	0.3403	0.0557
p value	0.0222*	0.7164

\* Significant at less than 5% level.

Source: Survey data, July–August 2004.

is a possibility of finding better-educated family members in poorer (in terms of ownership of landholdings) households in the sample in Malappuram, but not in Kuppam, where educational achievements and land ownership went hand in hand.

A consequence of the coupling of disadvantages of the type observed in Kuppam is that the capability deprivation in terms of the use of information will be all the more severe. This can be seen from the data on potential demand for information across households classified by size of landholdings owned (see Table 6). In Kuppam, those who were deprived of the capabilities to use information related to agriculture were also less able to use information on jobs or higher studies, as a result of the association between landlessness and low educational achievements. Among the seven landless labourer households in Kuppam, demand for information about agricultural prices was non-existent. None of the members in these households were in search of jobs or higher studies, and none of the seven households received loans from formal sources of credit (see Table 6). On the other hand, survey data show that all the persons who ever used a computer in Kuppam belonged to another seven households (out of the forty-five households in the sample). Median landholding for these seven households was 3.04 acres whereas the median landholding for the whole sample in Kuppam was only 0.71 acres. These seven households accounted for sixteen of the twenty-two persons in the whole sample in Kuppam who were educated for more than ten years, thirteen of the eighteen persons who were looking for jobs, and all the seven persons in the whole sample who were interested in higher studies (survey data; also see Table 6). In fact, our fieldwork notes show that the person who was the most frequent user of computers in the whole sample in Kuppam was a twenty-three-year old male, post-graduate in business administration, and belonging to the household owning the largest plot of land in the sample; he used the Internet in his search for a better job.

Table 6 shows that in Malappuram too, awareness about agricultural prices and members looking for jobs and higher studies were, in general, higher among households owning bigger plots of land. There are, however, certain notable observations. First, there were a number of agricultural labourers in Malappuram who owned only small homestead lands but were still aware of

the fluctuations in the price of rubber (see Table 6). Agricultural workers in Malappuram, like agricultural workers in the rest of Kerala, are unionized, and with their organizational strength they are able to convert an increase in prices of agricultural crops into an increase in wages (Thomas, 2006). Secondly, as Table 6 shows, the proportions of households who received loans from formal sources of credit were roughly the same across different land owning categories in Malappuram. The demand for information about jobs and higher studies was significant from households possessing less than 0.1 acre of land (see Table 6). Thirdly, of the forty-seven persons in the whole sample in Malappuram who were educated for more than ten years, twenty-nine (or 62 per cent) were females, more than half of them belonging to relatively poor households (with landholdings less than 0.3 acre) (survey data). A majority of these educated females from relatively poor households were knowledgeable in the use of computers and the Internet, and there were many among them who wanted to use the Internet in their job search.

The sample in Kuppam thus exhibited, to a considerable degree, the 'winner take all' tendency of information capitalism. While the coupling of disadvantages arising from landlessness and low educational achievements denied the capabilities to use ICTs and information to a large section of the population, the combination of assets and good education enhanced these capabilities for a few others. On the other hand, in Malappuram, educational achievements cut across divisions of gender and land ownership. As a result, the capabilities to benefit from ICTs and to benefit from the information that ICTs provide were more broadly distributed there. It is important to recognize that in Kerala the capabilities that facilitate the easy diffusion of the new technology were not built by a short-term, accelerated programme of spending on ICTs. These capabilities are the result of a number of favourable factors such as mass education, land reforms, and progressive gender relations, which, in turn, have been created by decades of public action through popular mobilization (Ramachandran, 1996; Parayil and Sreekumar, 2003).

### **Kerala and Andhra Pradesh: Lessons for Each Other**

After its success in Malappuram district, the Akshaya programme is now being implemented in other districts of Kerala with the objective of making at least one person in each of the 6.5 million families in Kerala e-literate.<sup>15</sup> Compared to Andhra Pradesh and most other Indian states, Kerala is one region where ICTs can be effectively deployed even in rural areas for employment generation and participatory economic growth. There are, however, many areas of concern. First, like many other Indian states, Kerala too has been witnessing, in recent years, a fall in prices of its agricultural commodities and a decline in agricultural incomes. Disturbing

---

15. See *The Hindu* (2006); also see [www.akshaya.net](http://www.akshaya.net)

reports of farmer suicides have been coming in from many districts in the state.<sup>16</sup> Secondly, Kerala is far behind Andhra Pradesh and the other two south Indian states, Karnataka and Tamil Nadu, in the growth of knowledge-intensive industries.<sup>17</sup> Knowledge-based industries exhibit a tendency towards clustering, and cities such as Bangalore, Hyderabad and Chennai provide a favourable environment for the growth of such industries. Kerala can hope to emerge as a leading centre for knowledge-based industries only with more active intervention by the government, backed by a broad political consensus with respect to investments in technology-intensive industries and research institutions.

For Andhra Pradesh, the advanced state of its software and ITES industrial base as well as the relatively better e-governance structure it had set in motion are big assets. However, it faces enormous challenges with respect to creating conditions for equitable growth in rural areas. Thus, while Kerala can learn from Andhra Pradesh's success in building knowledge-intensive industries, Andhra Pradesh can learn from Kerala's remarkable achievements in social spheres.

## CONCLUSIONS

The case for the digital divide as simply an access issue has been overstated. The evidence presented in this article shows that bridging the digital divide alone will not bridge the existing social and economic divides. A crucial aspect missing from the digital divide discourse relates to the capabilities to use ICTs and to convert the information that ICTs provide into useful knowledge. The conversion of commodities (in this case, access to information on the Internet) into desirable functionings or capabilities (of being able to sell agricultural produce in the market, making the best use of the regular updates on agricultural prices available on the Internet, and so forth) depends on the personal abilities of the individual as well as the social environment within which the individual operates. Social structures that tolerate illiteracy, landlessness and other inequities among large sections of the population deprive the individual of the capabilities to use ICTs and to benefit from the information that ICTs provide.

Evidence from fieldwork presented here confirms this hypothesis. Kerala is significantly ahead of Andhra Pradesh with respect to most indicators of social development. The capabilities to use ICTs and the capabilities to convert information into useful knowledge were found to be higher among the sample households in Malappuram in Kerala compared to Kuppam in Andhra

- 
16. See the articles by P. Sainath on the agrarian crisis in Kerala, which appeared in *The Hindu* newspaper in December 2004 ([www.hinduonnet.com](http://www.hinduonnet.com)). See also Parayil and Sreekumar (2003).
  17. See Parayil (2000) and Thomas (2005b) for certain aspects of economic growth and development in Kerala.

Pradesh. In Kuppam, these capabilities were found to be higher among males than among females, higher among the young than among the old, and higher among the relatively rich and better-educated households. Some of these divisions were also evident in Malappuram, but to a significantly smaller degree. It is clear that social divisions are mirrored in the digital divide.

The difference between Kerala and Andhra Pradesh with respect to broad-basing the capabilities to use ICTs and information is due to a number of factors. Notable among them are Kerala's educational achievements that cut across class and gender divisions, and redistributive reforms in the countryside that improved standards of living for all. Public action lasting many decades has been the cornerstone of Kerala's past and present achievements. It is these achievements, which have not been the result of any fast-paced investment programme in ICTs, that provide a good platform for harnessing ICTs as well as other new technologies for equitable growth.

It follows, therefore, that to bridge the digital divide, complementary social interventions are required — policy interventions that promote greater equity and ensure access to primary education, public health, drinking water, electricity, functioning roads, and employment opportunities. Such interventions are crucial in a country like India where social divisions are deeply rooted in history, and new divisions are being created by the workings of the emerging economic conditions. A technological determinist policy of providing access to ICTs through rural kiosks alone will not bring about development and change.

## REFERENCES

- Arun, S. and T. Arun (2002) 'ICTs, Gender and Development: Women in Software Production in Kerala', *Journal of International Development* 14(1): 39–50.
- Borras, M. and J. Zysman (1997) 'Globalization with Borders: The Rise of Wintelism as the Future of Global Competition', *Industry and Innovation* 4(2): 141–66.
- Castells, M. (1996) *The Rise of the Network Society. Vol I. The Information Age: Economy, Society and Culture*. Oxford: Blackwell.
- Chandrasekhar, C.P. (2005) 'Who Needs a "Knowledge Economy"? Information, Knowledge and Flexible Labour', *Indian Journal of Labour Economics* 48(4): 763–76.
- Chavan, P. (2001) 'Some Features of Rural Credit in India with Special Reference to Tamil Nadu: A Study of the Period after Bank Nationalization'. MPhil Thesis, Indira Gandhi Institute of Development Research, Mumbai.
- Cohen, D. (1998) *The Wealth of the World and the Poverty of Nations*. Cambridge, MA: MIT Press.
- Cornia, G.A., T. Addison and S. Kiiski (2004) 'Income Distribution Changes and their Impact in the Post-Second World War Period', in G.A. Cornia (ed.) *Inequality, Growth, and Poverty in an Era of Liberalization and Globalization*, pp. 26–55. New York: Oxford University Press.
- D'Costa, A.P. (2003) 'Uneven and Combined Development: Understanding India's Software Exports', *World Development* 31(1): 211–26.
- D'Costa, A.P. (2006) 'Exports, Institutional Architecture, and Innovation Challenges in Bangalore's (and India's) IT Industry'. Paper presented at the Conference on New Asian Dynamics in Science, Technology and Innovation, Gilleleje, Denmark (27–29 September).



- Drèze, J. and A. Sen (2002) *India: Development and Participation*. New Delhi: Oxford University Press.
- Eischen, K. (2006) 'Building a "Soft" Region on Hard Legacies: The Informational Economy in Andhra Pradesh, India', in G. Parayil (ed.) *Political Economy and Information Capitalism in India: Digital Divide, Development and Equity*, pp. 133–52. Basingstoke: Palgrave Macmillan.
- Evans, P. (1995) *Embedded Autonomy: States and Industrial Transformation*. Princeton, NJ: Princeton University Press.
- Frank, R.H. and P.J. Cook (1995) *The Winner-Take-All-Society*. New York: The Free Press.
- Friedman, T.L. (2005) *The World Is Flat: A Brief History of the Twenty-First Century*. New York: Farrar, Strauss and Giroux.
- Gasper, D. (1997) 'Sen's Capability Approach and Nussbaum's Capabilities Ethic', *Journal of International Development* 9(2): 281–302.
- GOI (2006) *Economic Survey 2005–06*. New Delhi: Ministry of Finance, Government of India.
- Government of Andhra Pradesh (2004) 'Report of the Commission on Farmers' Welfare'. [http://www.networkideas.org/alt/apr2005/Farmers\\_Welfare\\_Exe\\_Sum.pdf](http://www.networkideas.org/alt/apr2005/Farmers_Welfare_Exe_Sum.pdf) (accessed 15 January 2006).
- Hart, J.A. and S. Kim (2002) 'Explaining the Resurgence of U.S. Competitiveness: The Rise of Wintelism', *The Information Society* 18(1): 1–12.
- Heeks, R. (2002) 'i-Development not e-Development: Special Issue on ICTs and Development'. *Journal of International Development* 14(1): 1–11.
- The Hindu* (2006) 'Akshaya: A Silent Revolution', *The Hindu* 28 June.
- James, J. (2006) 'The Internet and Poverty in Developing Countries: Welfare Economics Versus a Functionings-based Approach', *Futures* 38(3): 337–49.
- Jeffrey, R. (1987) 'Culture and Governments: How Women Made Kerala Literate', *Pacific Affairs* 60(3): 447–72.
- Joseph, K.J. (2006) *Information Technology, Innovation System and Trade Regime in Developing Countries*. Basingstoke: Palgrave Macmillan.
- Kelly Services (2006) 'India Salary Guide 2006'. Gurgaon, India: Kelly Services India Pvt. Ltd. [http://www.onrec.com/content2/newsimages/kellysalary\\_guide.pdf](http://www.onrec.com/content2/newsimages/kellysalary_guide.pdf) (accessed 16 June 2007).
- Krishna, A., M. Kapila, S. Pathak, M. Porwal, K. Singh and V. Singh (2004) 'Falling into Poverty in Villages of Andhra Pradesh: Why Poverty Avoidance Policies are Needed', *Economic and Political Weekly* 39(29): 3249–56.
- Mansell, R. and U. Wehn (eds) (1998) *Knowledge Societies: Information Technology for Sustainable Development*. New York: Oxford University Press for United Nations Commission on Science and Technology for Development.
- Martins, N. (2006) 'Capabilities as Causal Powers', *Cambridge Journal of Economics* 30(5): 671–85.
- Pais, J. (2004) 'Production Units and the Workforce in the Urban Informal Sector: A Case Study from Mumbai'. PhD dissertation, Indira Gandhi Institute of Development Research, Mumbai.
- Parayil, G. (1999) *Conceptualizing Technological Change*. Lanham, MD: Rowman & Littlefield.
- Parayil, G. (ed.) (2000) *Kerala – The Development Experience: Reflections on Sustainability and Replicability*. London: Zed Books.
- Parayil, G. (2005) 'The Digital Divide and Increasing Returns: Contradictions of Informational Capitalism', *The Information Society* 21(1): 41–51.
- Parayil, G. and T.T. Sreekumar (2003) 'Kerala's Experience of Development and Change', *Journal of Contemporary Asia* 33(4): 465–92.
- Picketty, T. and E. Saez (2003) 'Income Inequality in the United States, 1913–1998', *Quarterly Journal of Economics* 118(1): 1–39.
- Ramachandraiah, C. (2003) 'Information Technology and Social Development', *Economic and Political Weekly* 38(12–13): 1192–7.
- Ramachandran, V.K. (1990) *Wage Labour and Unfreedom in Agriculture: An Indian Case Study*. Oxford: Clarendon Press.

- Ramachandran, V.K. (1996) 'On Kerala's Development Achievements', in J. Drèze and A. Sen (eds) *Indian Development: Selected Regional Perspectives*, pp. 205–356. New Delhi: Oxford University Press.
- Ramachandran, V.K. and M. Swaminathan (2003) 'Introduction', in V.K. Ramachandran and M. Swaminathan (eds) *Agrarian Studies: Essays on Agrarian Relations in Less-Developed Countries*, pp. xiii–xxviii. New Delhi: Tulika; London and New York: Zed Books.
- Ramachandran, V.K. and M. Swaminathan (eds) (2005) *Financial Liberalization and Rural Credit in India*. New Delhi: Tulika.
- Ramakumar, R. (2006) 'Public Action, Agrarian Change and the Standard of Living of Agricultural Workers: A Study of a Village in Kerala', *Journal of Agrarian Change* 6(3): 306–45.
- Rawal, V. (2001) 'Agrarian Reform and Land Markets: A Study of Land Transactions in Two Villages of West Bengal, 1977–1995', *Economic Development and Cultural Change* 49(3): 2537–44.
- Reddy, G. R. (1989) 'The Politics of Accommodation: Caste, Class and Dominance in Andhra Pradesh', in F.R. Frankel and M.S.A. Rao (eds) *Dominance and State Power in Modern India: Decline of a Social Order. Vol I*, pp. 265–321. New Delhi: Oxford University Press.
- Robeyns, I. (2000) 'An Unworkable Idea or a Promising Alternative? Sen's Capability Approach Re-examined'. Wolfson College, Cambridge. <http://www.ingridrobeyns.nl/Downloads/unworkable.pdf> (accessed 16 October 2006).
- Saith, A. and M. Vijayabaskar (2005) 'ICTs and Indian Economic Development: Trends, Issues, Options', in A. Saith and M. Vijayabaskar (eds) *ICTs and Indian Economic Development: Economy, Work, Regulation*, pp. 17–39. New Delhi: Sage Publications.
- Scheve, K.F. and M.J. Slaughter (2007) 'A New Deal for Globalization', *Foreign Affairs* 86(4): 34–47.
- Schoonmaker, S. (2002) *High-Tech Trade Wars: US Brazilian Conflicts in the Global Economy*. Pittsburg, PA: University of Pittsburg Press.
- Sen, A. (1985) *Commodities and Capabilities*. Amsterdam: North-Holland.
- Sen, A. (1992) *Inequality Re-examined*. Oxford: Clarendon Press.
- Sen, A. (1996) 'Radical Needs and Moderate Reforms', in J. Drèze and A. Sen (eds) *Indian Development: Selected Regional Perspectives*, pp. 1–32. New Delhi: Oxford University Press.
- Sen, A. (1999) *Development as Freedom*. New Delhi: Oxford University Press.
- Sen, A. and Himanshu (2004) 'Poverty and Inequality in India – I', *Economic and Political Weekly* 39(38): 4247–63.
- Sreekumar, T.T. (2006) 'ICTs for the Rural Poor: Civil Society and Cyber-Libertarian Developmentalism in India', in G. Parayil (ed.) *Political Economy and Information Capitalism in India: Digital Divide, Development and Equity*, pp. 61–87. Basingstoke: Palgrave Macmillan.
- Thomas, J.J. (2005a) 'New Technologies for India's Development', in K.S. Parikh and R. Radhakrishna (eds) *India Development Report 2004–05*, pp. 126–40. New Delhi: Oxford University Press.
- Thomas, J.J. (2005b) 'Kerala's Industrial Backwardness: A Case of Path Dependence in Industrialization?', *World Development* 33(5): 763–83.
- Thomas, J.J. (2005c) 'Labour in the New Economy: An Indian Perspective', *Indian Journal of Labour Economics* 48(4): 821–35.
- Thomas, J.J. (2006) 'Informational Development in Rural Areas: Some Evidence from Andhra Pradesh and Kerala', in G. Parayil (ed.) *Political Economy and Information Capitalism in India: Digital Divide, Development and Equity*, pp. 109–132. Basingstoke: Palgrave Macmillan.
- UNDP (1999) *Human Development Report 1999: Globalization with a Human Face*. New York: Oxford University Press.
- UNDP (2001) *Human Development Report 2001: Making New Technologies Work for Human Development*. New York: Oxford University Press.
- UNDP (2005) *Human Development Report 2005: International Cooperation at a Crossroads. Aid, Trade and Security in an Unequal World*. United Nations Development Programme. <http://hdr.undp.org/reports/global/2005/> (accessed 16 December 2006).

- UN Millennium Project (2005) *Innovation: Applying Knowledge in Development*. Task Force on Science, Technology and Innovation. London and Sterling, VA: Earthscan.
- Vakulabharanam, V. (2005) 'Growth and Distress in a South Indian Peasant Economy During the Era of Economic Liberalisation', *Journal of Development Studies* 41(6): 971–97.
- Wood, A. (1995) 'How Trade Hurts Unskilled Workers', *Journal of Economic Perspectives* 9(3): 57–80.
- World IT Report (2008) 'India: Rural Teledensity Up'. World IT Report 27 February 2008. [www.worlditreport.com/India/96780-India\\_Rural\\_teledensity\\_up.htm](http://www.worlditreport.com/India/96780-India_Rural_teledensity_up.htm) (accessed 9 March 2006).

**Jayan Jose Thomas** is a Visiting Scientist at the Sociological Research Unit, Indian Statistical Institute, Kolkata. He has wide research interests in development economics and political economy. His current work focuses on issues of labour, capital and technology in Indian industrialization. He can be contacted by e-mail at: [jayanjthomas@gmail.com](mailto:jayanjthomas@gmail.com)

**Govindan Parayil** is Professor of Science, Technology and Innovation at the Centre for Technology, Innovation and Culture, University of Oslo, Norway; e-mail: [govindan.parayil@tik.uo.no](mailto:govindan.parayil@tik.uo.no). He studies development and change within the science–technology–society interface. His publications include *Conceptualizing Technological Change* (Rowman & Littlefield, 1999) and the edited volumes *Political Economy and Information Capitalism in India* (Palgrave, 2006), *Kerala: The Development Experience* (Zed, 2000), and *The New Asian Innovation Dynamics: China and India in Perspective*, with Anthony D'Costa (Palgrave Macmillan, forthcoming).