Computers and the Promise of Development: Aspiration, Neoliberalism and 'Technolity' in India's ICTD enterprise

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"When I work here in the village, I bring people hope. I am not the guy working on water problems but has access to bottled water. This is not about haves and have-nots, this is about can-bes, and they can be like us."

ICTD Social Worker in Rural India

ICTD as a term has gone beyond the acronym to developing a life of its own. Whether it stands for Information & Communications Technology *for* Development or Information Communications Technology *in* Development or *within* or *and* or any range of conjunctions and prepositions may be a sartorial detail, because save for agreement on what 'technologies' as a term should include, scholars are moving towards a broad agreement on the scope of the term. ICTD refers to the information technologies and their relationship with social and economic development. The use of this term in specific relation to deployments, referred to as 'ICTD projects' is the more important definition for my purposes. I define an *ICTD project' broadly as a technology project designed with intended welfare outcomes for the users. The domain of such use either refers to the individual user, or the service itself, that currently uses less technology than is typically used in a more advanced setting due to market factors. Thus, this definition both includes the individual citizen excluded from access due to being unable to afford technology, telecenters being an example, and likewise includes services that are excluded from access to similar marginalized populations because of a barriers that can be surpassed through technology use, telemedicine being an example.* Thus, ICTD projects can be of two broad types based on the interface of the user with the technology itself. In one case, the intended beneficiaries directly interface with the technology intervention – thus public computer centers, computer-aided learning centers would broadly fit here. In the alternate case, the intended beneficiaries do not directly interact with the system, but the intervention works at the overall infrastructural level to improve the quality of a welfare service. Health informatics, microfinance facilitation systems typically fall within the latter type.

The term ICTD started appearing in academia and industry with minor alphabetical variances such as ICT4D, ICT4B (billions), IT4D and so on by the mid 1990s. The years preceding this were formative in the growth of interest in the subject around the world. The opening up of Eastern European economies coincided with phenomenal periods of growth in China and India. The technology boom in the United States featured a large pool of engineers from various parts of the developing world. The spillover economic effects of this international technology workforce ranged from remittances to home countries to the creation of new small and medium-scale engineering companies. (Saxenian 1999) (Vertovec 2002) The public discourse of technology as being an engine of macroeconomic growth grew in strength rapidly as the early impacts of globalization in the tech industry manifested itself first in the West, and soon thereafter in many parts of the developing world. The international faces of this phenomenon were frequently transnational expatriate technologists, frequently faces from the developing world.

International agencies had started a discussion on ICTD by the early 1990s. Several UN agencies and the World Bank released policy documents and working papers discussing the importance of technology in development (Hanna 1994; Wehn and Mansell 1998; Nulens and Van Audenhove 1999) and by the mid-1990s there were a number of actual field deployments of ICTD, usually telecenters, supported by the agencies in North Africa, Latin

America, and South Asia. This period also saw the ageing of the first generation of graphical user interfaced desktop computers in large corporations. These, unlike machines from command-line generations, could be re-used by a wider general non-technical population. Such PCs often made it down the chain into the NGO sector, and sometimes directly into public computer centers in the developing world (James 2001; Ferraz, Fonseca et al. 2004) The idea of technology as a public good grew quickly in Latin America which became a global leader with massive investments in the public access movement through telecenter schemes in Brazil, Peru, Chile, and Ecuador, and initiatives to create a 'popular computers' for use by low-income populations.(Proenza, Bastidas-Buch et al. 2001)

In the 90s, developing nations of all sizes and rankings in international development statistics started setting up ICTD policy groups. To name a few these included China, India, Indonesia, Ghana, Trinidad & Tobago, and Laos. Governments in developed regions also established aid or policy groups that supported ICTD work in developing nations through their aid agencies such as Canada's IDRC, Britain's DFID, and Australia's ACIAR. At the 2000 G8 summit in Okinawa, the Digital Opportunities Taskforce was created with a program called Digital Opportunities for All, and once its mandate expired, it was extended through the creation of the United Nations ICT Taskforce. The international enthusiasm for ICTD is best explained through a quote from the former UN Secretary General Kofi Annan at the G77 South Summit in Havana, Cuba:

> *This (information) technology is far less capital-intensive than old industrial technology, and therefore may enable poor countries to leapfrog some of the long and painful stages of development that others had to go through. …many developing countries are already showing the way..."*

1. The Discourse of ICTD

Kofi Annan's use of the term 'leapfrog' in his discussion was an evocative idea which summarized an important part of the discourse around technology in the 1990s and 2000s. Of course, there were many competing discourses of technology around this time – most of them were enthusiastic given the apparent win-win situation in technology stocks in share markets worldwide (Wilson 2003), but there were also fears affecting interest groups across the entire spectrum from people concerned about Y2K (Tapia 2000) to those concerned about the impacts of technology on tightening control of corporations on international economies (Castells 2000). Yet, the idea of leapfrogging emerged as particularly strong and I would argue has been fundamental in contributing to the funding of ICTD projects in this period. (Castells 1999).

The discourse of optimism is particularly interesting by the apparent lack of empirical evidence supporting the idea that technology projects had any past record in creating kinds of economic outcomes expected. While this may offer little shock to scholars looking at empirical evidence of outcomes with the continued propensity of international agencies to fund development projects (Easterly 2001), the rage of expectation from ICTD still stands out as somewhat spectacular. The discourse spread well beyond the agencies into the public sphere, not just in the centers of supply, but within the realms of the demand zones as well. India, received particular attention as the country where leapfrog had the most potential (Miller 2001) and this was espoused enthusiastically by the state the media alike (Mir and Mir 2005).

I contend that an examination of both the media and politics in the public sphere since the late 1990s tells us a lot about the discourse of technology in India, and much of this is strongly supported by the two research projects whose results I use in building theory. The first was a 1750 household survey of the use of telecenters in Kerala, and the second was an interview-based study of 240 parents of children from villages that had recently been donated computers as part of the Karnataka government's Computer Aided Learning (CAL) projects. Detailed results of this research are published elsewhere. (Pal 2007) (Pal 2007)

Let us begin then by discussing ICTs in the public sphere, specifically Indian cinema.

1.1 Cinema

During a field visit to a village with a CAL center in early 2005, I got an interesting insight on computers and the workplace from a 21-year old teacher at a village computer center. Both her parents were illiterate casual laborers from Dalit castes.

> *"I want to move out of the village. I am looking for a job with computers because my parents will let me move to Udupi or even Bangalore if the work is in computers. For any other job, they won't let me leave the village."*
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> **Geetha, CAL Teacher, Rural Udupi, Karnataka**

During continuing research in the neighboring state of Tamil Nadu, similar thoughts were echoed, this time by a father..

> *"Both my daughters work in Chennai in computers. In the early days, we would never let our (referring to the Thevar caste) women travel to the city to work, but if they work for computers that is good. There are good facilities with only ladies housing, and many other families from our village have sent their daughters to work in Chennai now."*
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> **Selvaraghavan, taxi driver Coimbatore District, Tamil Nadu**

There is already a growing corpus of work on female technology workers in Indian call centers which probes this issue more closely, (Radhakrishnan 2008) but to get an understanding of the public discourse of technology in the changing conception of women, the local movie theatre is a good starting point.

The working woman in Indian cinema, especially Southern cinema has traditionally required a male power figure as a foil for the otherwise unpleasant experience of working. Thus the lower-class villany of exploitative building contractors where female characters worked as bricklayers like in *Deewar* (Chopra 1975) or *Thee* (Krishnamurthy 1981) was complemented by the suave white-collar bourgeois rogue harassing the female office worker like in *Secretary* (Prakash Rao 1976) and *Avargal* (Balachander 1977). Respectable women either had no jobs or were forced into working either due to a critical failure in a male figure, such as a father or husband's death or disablement like in *Mother India* (Khan 1957) or *Arangetram* (Balachander 1973), and frequently such a woman would be rescued from her temporal participation in the work-force by the benevolent male protagonist like in *Anbe Vaa* (Trilogchander 1966). In the worst case scenario, a female character was reduced either through malevolent intent or unwillingly desperation to dancing in a bar or working as a double-agent for the arch antagonist.

While alternative cinema has frequently challenged these stereotypes, popular cinema has rarely done so with nonchalance. In the year 2000, a box office superhit, *Kandukondain Kandukondain* (Menon 2000), took a gentle step in a different direction. In this film, the female protagonist, a Brahmin girl, Sowmya, played by actress Tabu, is reduced to penury because of being evicted from home. She proceeds to move from the village to the city, where she rectifies her family's situation by learning to use computers and getting a job as a software engineer. The actress not only lifts her entire family out of poverty, but emerges as the most valuable technologist in her firm and almost makes flies out to the US to work as an engineer before better sense prevails and she marries her wooing admirer. A small step indeed, but a step nonetheless.

Kandukondain was followed by a number of other films with female characters working in technology. Many such female characters followed the same path as that of Tabu in the film by trysts with technology in successful marriages. The trend of female technologist characters is also somewhat more prevalent in South Indian cinema than in Hindi films. When female characters who used computers in Hindi films, they have more frequently tended to be upper class characters like Preity Zinta in *Koi Mil Gaya* (Roshan 2003) rather than the middle class protagonists like Tabu or Navya Nair in the Malayalam *Kunjikkoonnan* (Shankar 2002) representing aspirational characters who are empowered by their access to technology. This distinction can partly be attributed to the comparatively larger population of women in engineering in the south of India, and their prominence in the public sphere especially with the boom of technology jobs in cities like Bangalore and Hyderabad.

While the gendered dimensions of the depiction of computers in films deserve a larger inquiry into the subject, even the male characters using computers in Indian films tell a story about the discourse of technology. Male leads in Indian films rarely have run-of-the mill jobs, they typically either play larger than ordinary occupations (such as industrial magnates, police officers, soldiers, doctors, benevolent thugs) or the oppressed proletariat (farmers, taxi-drivers, low-level mafia operatives). Rarely is the male lead in an Indian film working in an office. In the 2000 blockbuster hit *Alai Payuthey* (Rathnam 2000), Madhavan plays a young man disowned by his parents for marrying against their wishes, the young couple start life from scratch and get back on their feet by starting a small software company with their band of friends. In Madhavan's next venture the very next year, *Minnale* (Menon 2001) he plays a middle-class home-grown computer engineer, lobbying for the romantic relationship with a Chennai girl in a love-triangle, the last link of which is Madhavan's rival Abbas, an upper-class engineer who lives and works in the United states. Computer-use became part of the characterization of several stars, not just those with an urban fan following like Madhavan or Surya, but even movie stars like Vijaykanth with a more rural fan following established their tech savvy on screen. The circle was completed when the unparalleled superstar in the South, Rajnikanth, used computers to combat evil in his record-breaking 2007 superhit – *Sivaji* (Shankar 2007). Interestingly, Hindi films featured far fewer of the middle-class engineer stereotype, instead we have metrosexual hackers like Fardeen Khan in *Fida* (Ghosh 2004) and Rahul Khanna in *Raqeeb* (Singh 2007).

This screen portrayal of computers and computer users becomes an important part of the rural discourse of computers. In this research, not a single parent interviewee had seen a computer from the front, so most knowledge of computers came from secondary sources such as watching computers in use at banks, bus stations, and village council offices. Even

though the sense of myth around computers was often taken with some caveats, children and adults alike nonetheless had a strong sense of idea formation about technology from movies. In the words of an 11-year old in Dakshin Kannada, a coastal district of Karnataka and large contributor of technology professionals in the Bangalore boom:

> *"With computers nowadays people can do anything. Hritik Roshan used computers in Krissh to become like a superman. We can use computer to build buildings and also to protect ourselves from attacks from neighbors."*

1.2 Technolity

Indian politician and chief minister of the state of Andhra Pradesh speaking at the Chamber of Commerce in Coimbatore on June 30, 2000 said the following about himself as a politician.

> *"I prefer to be called a CEO. Politicians look only for 'today'. A CEO looks for today, tomorrow and the future. As a CEO I would get re-elected as Chief Minister"*[1]

N. Chandrababu Naidu was frequently photographed within proximity of a laptop and renamed his own capital city of Hyderabad to a futuristic sounding Cyberabad. He came to symbolize the Technolity in India more perhaps than any other industrialist, commentator, or politician of the 1990s. Naidu became a symbol for ICTD, much in the same way that Manmohan Singh and P.Chidambaram became icons of economic liberalization (Rudolph 2001) (Pani 2006). Naidu's iconic status is not a unique phenomenon, market economies worldwide, especially those with sharp trajectories of growth out of relative poverty have had champions, heroes of East Asian capitalism being the most recent precursors to Naidu (Ong 1999) (Pinches 1999)

I define the Technolity as a political manifestation of the discourse of computer technology in India. The Technolity comprises such an amorphous group that presents political discourse of IT as a vanguard of positive socio-economic change in India. In essence, the Technolity sees the idea of technology as beneficial for the society as a whole as being an unassailable holy grail. In this definition, Naidu represents an individual face of the Technolity, and NASSCOM (the National Association of Software and Services Companies), especially when it speaks for economic development in India as a whole, represents a communal face. NASSCOM while being a prominent example due to its policy stances on technology and development is one institutional case in point. A different functional example of the Technolity in action would be the confederation of village councils in Kerala that voted to rural development funds towards computer literacy for its citizens.

As individual actors go, Chandrababu Naidu and his contemporary from neighboring Karnataka – S.M. Krisshna were on the Technolity end of the spectrum, whereas politicians in states with like Bihar and Uttar Pradesh were closer to the other end, running through most of the 1990s and 2000s with little or no explicit presence of technology in the public sphere, with the politics of progress being more explicitly centered around ethnic group affiliations more than around economic prosperity. Chief Ministers in several other states such as Digvijay Singh in Madhya Pradesh, Naveen Pattnaik in Orissa, and even the

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[1] "'CEO' Naidu charms industrialists" The Hindu, July 1, 2000

communist Chief Minister in West Bengal Jyoti Basu (and his successor Buddhadeb) and his counterpart E.K.Nayanar in Kerala (and subsequently Congress' A.K. Antony) positioned themselves as technology-friendly, inviting both investment from international technology companies and promoting technology parks in state. The reasons for the schism between some states where the presence of such a Technolity is more perceptible against those states where this is not the case need deeper investigation, but some potential causes come to mind.

First, the capital region and the southern states clearly are vested much more in technology sector industries, and the states' need for a political leadership friendly to the urban economy is much greater. Not surprisingly, Y. Rajashekhar Reddy, the chief minister who dethroned Chandrababu Naidu on a pro-poor plank, has never been explicitly anti-technology outside of his criticism of Naidu, and has been reasonably popular with the technology lobby. In Karnataka, H.D.Kumarasawamy won elections on heralded by a strong Gowda vote by cultivating a son-of-the-soil image, but at the same time maintained a tech-savvy face.[2] In Tamil Nadu, while legislative elections have never featured technology or high economic growth as an important electoral issue, it has supplied some of the most important figures of the Technolity including the former Minister of Information Technology in Delhi, Dayanidhi Maran, Chief Minister Karunanidhi's nephew. Massive cutouts of Dayanidhi Maran once lined the streets of Chennai, not far from those of M.K. Stalin, Karunanidhi's son and heir apparent prominently holding a cellular phone. Thus politicians, especially those with an urban base or those with broader appeal groups as party leaders, have continued to use ethnic and other issues in electoral politics as the primary driver of group affiliation, using technology savvy as more of a legitimacy tool for a broader-based appeal.

It is in Kerala though that we see what I feel is the strongest example of the Technolity in action. Malappuram, in northern Kerala, is the state's only Muslim-majority district and has traditionally been a Muslim League constituency. Despite a very large population of international migrants working in the Persian Gulf region, the district has remained among the economically most backward in the state. On overall human development indicators, the district lags behind other districts significantly partly due to comparatively lesser education and workforce participation of women. The state legislator from Malappuram, P. Kunhalikutty, was included in the cabinet of the state in A.K.Antony's government and he strategically chose the IT ministry berth. Kunhalikutty went on to propose and engineer the Akshaya project, a mass computer literacy and telecenter project. What makes this a particularly unique case was the funding of Akshaya through village councils, which came together, with significant influence of Kunhalikutty himself, to vote for spending a large part of their annual funds towards paying for computer literacy for at least one member of every single family in the entire district. The project was the largest of its kind funded anywhere in India, and Kunhalikutty became an iconic figure in the ICTD world. This is an interesting case on multiple levels, because Kunhalikutty is from the Muslim League, a party whose electoral vote bank is strongly drawn on religious lines. The discourse surrounding the Akshaya project was not only oriented towards the development of Kerala, but made specific mention about the empowerment of Muslim women though the use of computers

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[2] Incidentally, both Kumaraswamy and his chief rival B.S.Yeduriyappa have online websites devoted to informing the voting public about their political achievements
(http://www.nammavideo.com/kumaraswamy)

and internet. Ironically, Kunhalikutty eventually succumbed to a sex scandal right around the time he peaked as an ICT champion in the state.

Bureaucrats have played an important supporting role to politicians in the Technolity. A number of the key civil service officers who managed technology projects for the state gained widespread recognition outside of government circles for their work. Rajiv Chawla, the civil service officer who implemented Bhoomi, the e-governance service in Karnataka won the Prime Minister's award for civil servants, and earned the distinction of being the e-governance secretary for almost a decade, an unusually long period for a civil servant to continue untransferred in a single department. Aruna Sundararajan, the Kerala state secretary who led the Akshaya project moved on to heading the UN Global Education Initiative (GESCI) in Dublin, Ireland and eventually ended up heading Infrastructure Leasing and Financial Services (IL&FS) a massive infrastructure corporation. Likewise, affiliation with technology new opportunities opened up outside the government for Vivek Kulkarni, the former IT secretary of Karnataka, and Rajendra Nimje, the champion of the West Godavari telecenter project, who spent time in Stanford, California, as a Digital Vision Fellow. The Technolity plays in importantly here because the political and public image of technology deployments had made departments that handled these comparatively more insulated from political and financial strangleholds. Thus, in the instance of Akshaya, for the implementation of the pilot project, the highest official in the district of Malappuram was replaced with a transfer appointment from the state technology mission. The officers who headed such projects often got reputations as visionary IT-friendly officers who were frequently courted by opportunities outside of the government. In much the same vein, Chandrababu Naidu made it a point of presenting his government as free of bureaucracy and political-interference, with technology facilitating several one-stop shops for citizen services.

The role of the media in building the Technolity has been important. The urban skew of concerns related to technology meant that ministers like Chandrababu Naidu whose work concerned the frontline of the growing Indian economy in the 1990s got a lot more national coverage in financial news than even their contemporaries in larger states. ICTD projects were given significant media coverage, and the idea of technology solving the problems of poverty was endorsed as vigorously in the Indian media as anywhere in the west. When Bill Clinton made his visit to India, the news prominently carried pictures of his visit to a village in Rajasthan where an older local woman greeted the American President from her desk at a village computer center, to his amusement. The computer center had actually been set up briefly before Clinton's visit, and in fact shut shop almost immediately after his departure (Pal 2003).

That the media portrayed a positive image of ICTD projects was not terribly surprising given the overall atmosphere of economic optimism across India, but that the failures of several ICTD initiatives was repeatedly overseen was cause for concern. Several state-supported projects around the late 1990s, started providing agricultural information for rural farmers using the internet, most of these began with much media enthusiasm on their potential for broad based change. And yet, the failures of these projects did not much critical analysis in on the development monies spent (Kumar 2004). It is quite arguable that this may have been a key factor in practically the same experiments being repeated over and over with often comparable results.

In 2004, the International Institute of Information Technology in Bangalore created a draft report that made certain criticisms of implementation of the Bhoomi project of electronic land records initiated by the government of Karnataka, and discussed some of its negative impacts for small land-holders (Benjamin 2006). Instead of a public debate on the report, the concerned department blocked the report from public release. Similarly, regional media declared Malappuram district 100% e-literate, meaning every household had at least one computer literate (Bhowmick 2005), at the end of the initial phase of the Akshaya project. Surprisingly, there was no publicized social audit of the project, and as research reports emerged, the actual reach of the project was shown to be closer to 30% of the household. This remains unreported in the Indian media as Akshaya continues on to its next phases.

And yet, no shock to the technology enthusiastic media was greater than the drubbing of Chandrababu Naidu in the Andhra Pradesh state elections in 2004. In the immediate aftermath of the election, veteran rural development reporter, P. Sainath published a scathing criticism of the Naidu government and its pro-technology stance. His piece was titled:

"'Take That, Tom Friedman' Indian Elites' Neoliberal Idol Shattered Yet Again: Urban Masses Stubbornly Reject NYT's Hero" (Sainath 2005)

2. ICTD and Neoliberalism
Sainath's comment is a good segue to asking whether ICTD qualifies as a neoliberal idea. On one hand, several of the key commentators who played an important formative role in developing some of the ideas that led to the increase in ICTD projects are what one may refer to as neoliberal commentators. Thus business strategy author C.K. Prahalad, reform economists Jeffrey Sachs and Hernando de Soto, and public commentators like Thomas Friedman were all important ideologues in the early ICTD discussions, and several of them played institutional roles in the ICTD-bodies. Prahalad led up the World Resources Institute and the Poverty Profit Initiative that was a strong proponent of using ICTs for Development. Sachs participated in the UN ICT Taskforce, and an important advisor to governments like Rwanda where ICTs were seen to play an important part of nation-building. Prahalad's 'Fortune at the Bottom of the Pyramid' (Prahalad 2006) Sachs' 'End of Poverty' (Sachs 2008) and Friedman's 'The World is Flat' (Friedman 2002) were prominent reading in many ICTD courses around the world.

However, the neoliberal connection probably got its greatest endorsement with the entry of Nicholas Negroponte into the discourse. Negroponte was a leading management theorist through the Silicon Valley boom, and his work 'Being Digital' (Negroponte 1995) had already established him as a futurist of repute. In the World Economic Forum in 2003, Negroponte unveiled his idea for the $100 Laptop, which thereafter got renamed the OLPC (One Laptop Per Child) and eventually the XO Laptop. The basic idea behind this was to create a laptop computer cheap enough and with an easy enough interface that one such laptop could be given to every child in schools of the developing world, perhaps with the funds from a few wars[3], and that through technology, children can be introduced to a constructivist mode of learning. Such computers were to be purchased by governments,

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[3] . In several public speeches, OLPC foundation chairman and former Media Lab CEO Walter Bender referred to the cost of OLPC in comparative terms to the cost of the US war on Iraq.

presumably through taxpayer funds, and donated to children in poor families. Notwithstanding the technological determinisms involved, from an economic standpoint, few redistributive ideas have been more radical.

The idea that computers should be funded by the state first came from not from market economists, but from librarians. In the early 1990s librarians, initially in the US, and thereafter in several other parts of the world, pushed for state spending in computers but as a way of increasing equity to information. In this early digital divide conception, information was seen as a right, and thus public expenditure on information as a means of social welfare.(Mossberger, Tolbert et al. 2003) The term 'digital divide' transitioned from the United States in the early 1990s where the term looked at the connected and the poor within inner cities, considering questions of public access through libraries, later to the comparison between the developed and the developing world, and finally to the inequalities in access between the rich worldwide and the poor in the developing world. This circle back to a 'space of flows' type of argument has itself been symbolic of the evolution of discourse in ICTD.

Negroponte's 'social investment' view of subsidized computers was a very different one than that of the librarians arguing for more public access terminals. In his mind, the computers would be used as a means of human resource development, which would eventually contribute to greater better market outcomes from a more productive labour force.[4] This idea in 'social investment' ICTD projects as a means of welfare is an unusual contradiction, since we find far fewer comparable public-private investments in welfare-based projects in the more traditional development fields. There are not, for instance, a lot of projects in water, healthcare, or basic education, which promote the idea of investment in physically healthier poor as more able participants in the economy, or in literate unskilled laborers as more productive workers.[5]

This is what I see as a neoliberal paradox in ICTD. On one hand, the ideologues are thinkers who one would typically consider market-oriented, though a large number of the ICTD projects are state-funded in part or whole. While it is not entirely clear that an investment in free computers necessitates a reduced state investment in social programs – but if we were to follow the strict trend of what several of the key commentators would suggest in their overall prescriptions for development, this would certainly seem the case.

An explanation for this apparent paradox may lie in the changing face and composition of development thinking. In the 1990s, capacity building emerged as an important idea in international development thinking, as did sustainability. In the early ICTD projects, 'economic sustainability' was a major part of program design much in the same way that 'capacity building' was. Thus ICTD projects were designed initially not as pure developmental aid, but as projects that would eventually find ways of paying for themselves, and in the process 'teach people to fish'. This is a useful lens through which to consider the remarkable boom in development funding for telecenters around the late 1990s. These telecenters, which were arguably no more than public cybercafés, were designed as multi-

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[4] http://laptop.org/en/vision/mission/index.shtml
[5] However, given the general trend of capacity-building and output-based aid, this may well be the direction of the future.

purpose information centers for populations without typical market access to technology. However, telecenters were often not envisioned as entirely free public utility locations, instead the general idea was that they would pay for themselves through information needs that existed within villages, needs that were not adequately served by existing market economies. Thus e-governance and agricultural information, two important 'developmental justifications' for early telecenters, were both seen as service domains afflicted by market inefficiencies that would resolve themselves once the initial capital push of establishing the telecenters happened. Market outcomes of 'for-profit' telecenters would seem to indicate that these expectations were misinformed.

The last aspect of the ICTD age that makes the discussion of neoliberalism important was the entrance of new actors into the development realm. The 1990s and early 2000s were marked by one major shift in international funding, the growth of Corporate Social Responsibility (CSR) as a component of international development funding (Jenkins 2005) (Fox 2004). CSR funding tended to come from companies with an interest in spending some of their revenues on community initiatives. In the 1990s, many companies with such funding were technology firms, consequently, much development funding in this period went towards initiatives that had a technology component. (Wulfson 2001) Microsoft, Intel, Cisco, Hewlett Packard and IBM each had large CSR budgets, and whether by explicit design or due to networks of individuals in these programs, tech companies' initiatives have shown a propensity towards supporting computer donations or other technology projects as their social initiatives (Hess 2002). Each of the companies mentioned had active ICTD projects in the 1990s in various parts of the developing world. This is an area that needs closer examination, especially given that funding for development initiatives has already had seen some shift away from state and international agency sources towards a more dispersed corpus of funding from private sources(Atkinson 2005).[6]

3. ICTD and the Information Society
The issues of the changing nature of development funding that we look at here are part of a larger set of questions that scholars of information society issues have been concerned about for several years. Within Information Society studies, there is are broadly two strands of thought – one which looks at the information age as having created an upheaval and fundamentally changed society and societal relations (Castells 2000) (Bell 1973) whereas another looks at information networks as had an important impact on global social change, but society has reinvented itself in much the same structural terms (Webster 2002). The Information Society debate offers us a useful frame through which to examine the issues of ICTD.

It is in these sections that I return most to the outcomes of the field research that this work is based on. Much of the findings in both the studies seems to suggest that despite significant changes in the economy and society of India and certainly in the international standing of some sectors of the country, the information age offers no parallel in India to the sweeping changes for the population at large that the Industrial Revolution did. We see

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[6] The changing structure of international funding has also led to a changing human face. CSR initiatives like many large foundations like the Gates Foundation for instance, tend to hire not out of the more traditional pools of development workers such as grassroots workers or development academics, but from people with a background in business or consulting.

no parallel of a mass conversion of an agrarian population to a service sector or manufacturing sector labor force, and even where the information sector directly affects the occupational composition, the immediate economic impact is very limited.

In the Kerala case, I was more interested in sizing technology adoption, whereas in Karnataka, my goal was to get a deeper qualitative understanding of the discourse issues that impact technology adoption. In Kerala, despite a state claim of having completed 100% e-literacy for villagers in Malappuram, our survey of 1250 households across Malappuram showed an effective reach of less than 30% of the households -- and even within that 30%, more people had dropped out after the first hour of e-literacy training than had stayed through the entire 15 hours. However, what is fascinating is that almost all of the respondents, even a majority of those that voluntarily did not take the e-literacy course still felt that the investment was worthwhile and given the option of actually voting to have their council funds assigned to it, they would.

To understand this seeming contradiction between retroactively stated preferences on technology use and recorded behavior, I turn to interviews of parents in Karnataka around questions of what they think about computers. The Karnataka interviews of parents around CAL centers were conducted with a prior knowledge of Kerala's unusual survey results. The goal therefore in Karnataka was to attempt an understanding of how people understood the use of computers in their families' lives.

In 240 interviews, all with village residents who had never used computers themselves before, two statements were repeated in conversation in over 50 interviews with regards to the role of technology in today's world. The first statement was '*Computers are needed for everything*' and the second was '*Computers can do anything.*' In the information society literature, much as there is significant interest in the nature of changing relationships between labour, production, and space, but little about expectation, and how that may impact these relationships.

There is a vital distinction between the two notions about the need for computers. The second, seeing the computer as being able to do 'anything', tended to come more often from people with a relatively limited conception of what a computer is, and what it does, whereas the former tended to come from village residents with a slightly higher conceptual understanding of technology. This near mystical view of the computer as an omnipotent device was a deeply embedded notion and often pervaded past the poorest and least educated to a number of families with a reasonably high level of awareness of issues. This notion of technology is translanted in aspirational terms in peoples' own lives, as the interviews showed:

> *"If she (her daughter) learns computer, she can do anything. The computer can teach her English. They don't need the teachers."*
> **Daily wage laborer in Bangalore Rural**

> *"Children become can become intelligent by using computers"*
> **Coffee estate worker in Kodagu**

Looking at the two statements above, it is probably true that an analysis of the notions about computers elsewhere in the world including in much of the west some years ago may well have elicited the same responses of wonder. However, what makes these statements of expectation particularly concerning is the larger environment of economic anxiety in which they were said. A recurrent theme that emerged in the interviews was of fears around the economic fortunes of agriculture sector employment.

Of the interviewed families that had their primary source of income in agriculture, less than 2 per cent wanted their children to continue working in agriculture. Furthermore, over 85 per cent of the agrarian parents not only wanted their children to quit agriculture, but specifically wanted their children (primarily male) to leave the village altogether. This is a particularly concerning finding, since separation from land and out-migration in most of the villages visited was not frequently looked at as a particularly desirable option among farming families. In villages that had diversified economies and were not primarily agrarian, the same desire for children to migrate out was lower, close to 65 per cent. In the minds of most interviewees, the agrarian economy was in dire risk, and anything, especially computers, which allowed the opportunity to move to cities was to be embraced swiftly and efficiently.

Despite the several physical, social, cultural distances between these villages and what Castells would refer to as 'Technopoles' clearly, a citizen of the electronics city is closer to the Silicon Valley than to the village ten miles away, nonetheless, several connections are deeply relevant as the discourse discussion has already elaborated. The villages in this sample that were within real estate reach of Bangalore city were impacted physically in many important ways. On one hand, the value of the land, even when not permissible for sale outside of agrarian purposes, had risen dramatically. This of course brought little joy to landless laborers, and if anything, pushed the need for skill acquisition even further. However, mobility of rural populations to the urban service sectors was not trivial, most of the interviewees in this sample stated that they expected to be stuck with undesirable casual labor jobs were they to attempt moving to the city. Thus, for most parents, technology represented not opportunities for themselves, but for their succeeding generations.

> *"Our lives are finished, but things should be better for our children."*
> **Lingaraja, Small farmer, Bangalore Rural**

It was surprising how many parents repeated the *exact same* phrase, not just in Karnataka, but even in other states where this research was conducted. In spite of the extremely high proportion of parents who wanted their children to migrate, not a *single* parent in the entire sample of 240, except 20 parents in Kodagu, who were already migrant laborers, expressed any interest in migrating to Bangalore in the short term. This indeed may be an outcome of itinerant laborers being left out of the sample, and furthermore of outward migration often being a response to a critical economic situation rather than a planned choice, but it nonetheless underlines a sense of resignation with the regional and sectoral economic boundaries.

A drive out of Bangalore into the hinterland is indeed an interesting experience in observing contrasts. Dramatic inequality is not something entirely new to India, but the accumulation of wealth in the 'information sectors' is particularly visible. Urban affluence has grown

multifold in the recent decades and while this has clearly contributed to a growing fiscal pocket, it is unclear how much better things have become for those outside the realms of the information society. Irrespective of whether there is an actual difference in inequality (despite varying estimations, it is generally agreed that inequality has risen (Wade 1990)), what matters as far as the discourse of ICTD is concerned, is the visibility of this inequality.

I argue that ICTD projects have found such a widespread appeal precisely because of their entry into this complex ecology of change, and it is this that explains the unusual contradictions between their estimated demand and actual use in deployment. Given this, I find that to effectively situate ICTD within the information society literature, we need to understand peoples' hopes related to technology and this requires the skills not just of economists, but of a range of social science literatures and methods. I propose a closer look at aspiration as an interesting construct to consider in this discourse.

4. ICTD and Aspiration
In 2002, the World Bank held a short conference on 'Culture and Public Action' where anthropologist Arjun Appadurai discussed the importance of aspiration in development. Appadurai's 'Capacity to Aspire' (Appadurai 2004) and its subsequent 'economist's rejoinder' by development economist Debraj Ray (Ray 2006) are part of an interesting discussion that is of particular significance to ICTD. Appadurai's argued for the strengthening of the capacity to aspire among the poor as a means of development. From the perspective of ICTD both the determinants of aspiration and their impacts on individual behavior are important.

Ray in his response to Appadurai comes up with five ways of thinking of the determinants of aspiration – first – individuals' comparisons with other individuals in their peers, second – individuals' observations of others within their physical contacts but outside of their peer networks, third – individuals' consumption of statistical information, fourth – individuals' perception of mobility within their communities, and finally, the aspiration of emulating peers who were able to change their conditions to one more desirable. While overlap exists between some of these, the one thing Ray misses mentioning as a determinant of aspiration despite referring in part in several of his classifications is that of a social discourse. Both the empirical evidence from this research and the larger body of work within ICTD suggests that just viewing these movements from the perspective of the individual's direct contact with peers or networks is a fundamentally incomplete approach. Take for instance, this statement from a parent:

> "*If they (the children) learn computers then in the future they will earn a good salary, have good work positions, and earn a lot of respect from everyone in the village. Everyone in the government needs to know computers, it is most important in today's world,*"
> **Srikanthaiyah, a marginal farmer, Shimoga**

Srikanthaiyah was a reasonably well-to-do farmer had never used a computer before, and had not a single person in close personal relations who used computers. In conversation, he stated that his information about computers was almost entirely constructed from seeing computers in action at public places such as bus stations, the village council office and banks. He could not recall ever having seen a computer perform any specific actions – his experiences mainly involved seeing a computer from behind the monitor – ie, looking at the

person using the computer rather than at what was happening on the screen. On the issue of what computers could do, he stated, *"Computers can do anything nowadays"* much like several others in our study. He however could not name a single application of computers.

In 240 interviews in 2007 primarily in rural Karnataka (selected randomly through registers at the local primary schools) but also in some other states, not a single person had ever actually used a computer him or herself, and only 6 per cent had a conceptual understanding of computers and applications[7] and the most commonly understood use of a computer was for financial transactions such as billing. And yet, Srikanthaiyah was not an exception within the sample – his own enthusiasm about his children being able to learn computers was in no vacuum. It reflected the aspiration of his own surroundings, but not in the Ray's demonstrational sense, since none of the neighborhood had succeeded in using technology.

More interestingly, Srikanthaiyah's expectation from his own son's prospects once he had completed computer education in the school were in contrast to what he felt the 'typical' educated rural migrant did when he or she moved to the city. His expectation from the 'general' migrant was that he or she would end up working in construction, which interestingly is the most common response throughout the interviews on the 'prospects' of migrants to urban areas. Ironically, however, 60% of the parents interviewed said it was better to be a rural landless worker than to be an urban construction laborer. No counter to Srikanthaiyah's expectation was more scathing than that of the teacher in a different school implementing the same CAL program in which his son was enrolled:

> *"For these children this is all a big waste. They will anyways end up as daily laborers"*
> **Saroja, Primary School Teacher, Bangalore Rural**

Two factors emerge – clearly the 'capacity to aspire' has grown, but before we use this as a 'first-step indicator' for ICTD projects within this information society context, we need to examine the obvious but tricky question of how grounded the aspirations are. In the CAL study, parents were asked what they felt were their career expectations for their children after getting the CAL training. In general, parents were keenest that their children got jobs with the government, and in this process, knowledge of computers was seen as giving an important enough boost to prospects – even if the jobs were not explicitly 'computer jobs.' Parents rarely had a clear idea of the steps or costs involved in a college education. The actual costs of college were frequently beyond the parents' stated estimations of what they would be willing/able to pay for college education once their children had grown up.

Thus, the more provocative following question for scholars of ICTD is whether the rural aspirational environment we observe here is a transplant of urban middle class aspirations. I would argue that growth of engineering jobs in India throughout the 1990s and more specifically the migration of a new class of Indians to the West has had an important impact on the aspirational environment of the middle classes, and this in turn has trickled down to what we now see as the 'ICTD discourse'. To explain my argument, I turn briefly to ICTD and the Indian middle classes.

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[7] Measured by the user accurately coming up with more than 3 specific uses for a computer in their own words – such as accounting, typing a letter, drawing a picture and so on

The voluntary outward migration of Indians in the post-colonial period has been of various kinds, but there are two categories that encompass a large majority of Indians who move abroad. First, there are the economic migrants that have gone abroad in search of better opportunities than available at home. These broadly include people who have traditionally migrated out of India in search of better economic prospects, and typically ended up in the service sectors worldwide. Thus I would categorize both the Gulf region day laborers and the relatives of small business owners in the West migrating on family connections in roughly this same category. The second important category of migration has been broadly professional. This would include Indian professionals who have taken up positions in various parts of the world, or graduate students who have gone abroad for continuing studies and ended up staying as professionals. The Indians who have studied abroad have also traditionally included a significant population of very wealthy Indians, sometimes with multi-generational histories of studying abroad. Access to the latter category has generally been very restricted either by access to the top universities in India, or simply by family affluence. In the 1990s, the professional migrant class saw a significant numerical expansion because of the international technology boom, taking several new groups of Indians to the west.

This expansion saw some important demographic shifts on access to international opportunities. First, students from outside of the elite academic institutions or urban agglomerations that have traditionally supplied international migrants found access to jobs in the West, primarily around the US Tech Industry. Second, the vacuum left behind by significant out-migration of 'cream' of tech labour in this period opened up substantial opportunity within India, demand that outpaced the country's production of engineers. Thus, a sizeable number of professionals who had no engineering college degrees, but had completed short private courses in computer technology, moved on to work in the technology industry.

In the larger scheme of things, this was indeed a very small portion of the Indian white-collar class, but certainly a non-trivial part of the trendsetting vanguard of aspiration - young metropolitan educated working population. In the late 1990s, the physical manifestation of technology sector jobs as something to aspire to quickly solidified with the urban artifacts of huge software company buildings and technology parks that appeared throughout major urban centers, especially Bangalore and Hyderabad.

It is thus telling that several entrepreneurs with successful careers in the Silicon Valley grew to become middle-class icons around this period. Indeed there were the Narayan Murthys and Azim Premjis who catapulted to being billionaires by the early 2000s, but few compared in iconic status to a middle-class Sindhi boy from Mumbai – Sabeer Bhatia. Bhatia went to the US for his graduate studies and ended up founding Hotmail, the web-based mail service. Bhatia became a media darling as he publicly wooed Aishwarya Rai , the film star, and swiftly turned into a media darling. Many smaller Bhatia stories were recreated in the hinterland, as small towns from Andhra Pradesh and Tamil Nadu saw young heroes and heroines travel out for jobs in the technology sector and returning with rich. Entrepreneurs from the Silicon Valley, long disinterested in working with India due to its association with a bureaucratic business environment began to actively engage with local industry (Saxenian 1999). Even the Indian government made strong overtures through events such as a 'Pravasi Divas' for Non-Resident Indians (NRIs) and offers of dual citizenship for NRIs in Western nations.

Following the Silicon Valley bubble burst, the discourse acquired a new actor, the transnational software professional. Cities like Bangalore and Chennai acquired new populations of expatriates and US-returned Indian engineers. This new breed of transnationals were unlike the NRIs in that they personified the fact that India did not have to move abroad to be modern. From a visible spike in the 'international Indian' in Indian cinema to a rise in dowry prospects for male software engineers (Krishna and Brihmadesam 2006) (D'Mello 2005) (Shenk 2007), the transnational became a symbol of India Rising.

It is the transnational that brings my argument back full circle. No greater archetype for Kofi Annan's leapfrog than the middle class Indian transnational software professional. Despite the near complete lack of day-to-day connection between the transnational software professional and Srikanthaiyah, the middle class discourse filters through and is extremely present in rural India through cinema, politics, and a changing development agenda. The connection between technology and poverty has been translated in the frame of the quantum leap that technology offered to the life of the middle-class small-town resident turned transnational software professional, and the same frame as the struggling country turned India Rising.

It is also here that I feel taking further Appadurai's conception of aspiration in development is much needed. Anyone who has worked with ICTD projects is well aware of the important role played by aspirations, but there is almost no literature on how far these aspirations are translated down from the Indian middle-classes and the growing notions of resurgent nationhood.

5. Conclusion
To conclude, I return to an important conception of aspirational power in the rural interviews. When asked what their children needed to succeed in the future, parents almost unanimously turned to two things – the first was computers, the second was the English language. It is useful here to consider technology in contrast to another imagined source of social power.

I found that residents of agrarian villages thought of computers as much more important in the success of their children than knowledge of English, whereas factory workers, even when poorer than farmers, felt the real power derived from the English language. This was an unusual finding, two quotes from my interviewees emphasize the nuanced differences:

> *"I have seen the security guards using the computers. Even coolies can use computers nowadays,"*
> **Mohammad Hashim, factory worker, Bellary**

In the case of rural factory workers, there was a sense of homophily with computer users – given that they had seen people from their own classes using computers. For these workers, it was possible to know to use a computer and still continue to be disempowered English on the other hand, was something that one needed very unique access to. Ironically, on the other side of the fence was another father who had never seen a computer in use before, but was a lot more optimistic of his child's ability to empower himself through computers, whose use he saw in a binary 'know computers' or 'don't know computers' mode.

My child knows computers. I have seen my son working on the computer, making designs. He knows how to use it in less than one year. You see all these boys in the 7th standard, after three years of learning English if you ask them for a glass of water in English they will run away. Even the English teacher will not talk to you in English,"

Bedappa, marginal farmer, Bangalore Rural

Tragically, this father's reasoning came from an affirmation of the inaccessibility of other means of power, such as English. Computers on the other hand were something he saw as binary, difficult to aspire to, but not impossible.

Considering some of these arguments helps us place in perspective some of the reasons why ICTD has come to take on such an important place in the development discussion in India at various levels. It also helps explain the unusual trajectory of ICTD projects in practice, which seem to perform much differently than expectations based on peoples' initial reception of such projects may seem to belie.

I believe it would be a fallacy to assume that the ICTD age is seeing the same form of social change as the proletarization of agrarian populations of the industrial revolution. Few expect children from the hinterland to become software engineers, or 'symbolic analysts' of the information society as Robert Reich may call it. (Reich 1991), but it is precisely the nebulous nature of what exactly technology is expected to do for the rural poor that makes it open to the kinds of aspiration we see in this research.

ICTD projects are going to continue to be funded, and in fact in all probability grow at rates even higher than in the last two decades. To comprehend both our mixed experiences with ICTD projects in the field over the recent past and develop appropriate frames of reference for studying these in the future, it is essential to consider the overall discourse of technology, for which I hope to have presented an adequate case in the Indian context.

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