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Information and Communication Technologies for Development: The Bottom of the Pyramid Model in Practice

Renee Kuriyan, Isha Ray and Kentaro Toyama

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Information and Communication Technologies for Development: The Bottom of the Pyramid Model in Practice

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The currently influential model for information and communication technologies for development (ICT4D) is based on increasing the well-being of the poor through market-based solutions, by using low-cost but advanced technologies. Using ethnographic methods, we chart out the contradictions that could arise when such a development-through-entrepreneurship model is implemented. We examine the Akshaya project, a franchise of computer-service kiosks in Kerala, India, which strives simultaneously for social development through access to computers and financial viability through cost recovery and entrepreneurship. We show that tensions within the state and among entrepreneurs and perceptions of public versus private among consumers make it challenging to meet the twin goals of commercial profitability and social development.

Keywords India, information technology, Kerala, kiosks, rural development

Can the private sector, while pursuing its core business objectives, deliver "development" benefits? This was the question that brought together more than 1000 people from 60-plus countries and groups as diverse as the United Nations, the World Bank, nongovernmental organizations (NGOs), governments, and multinational corporations at the World Resources Institute's "Eradicating Poverty through Profit: Making Business Work for the Poor" conference in December 2004. The conference explored the potentially symbiotic relationship between business activity and economic development for the poor. Information and communication technologies (ICTs) such as Internet-enabled computers and mobile phones were lauded as inexpensive ways to establish marketing and distribution channels to those in need of development services. At the United Nations World Summit on the Information Society (WSIS), 174 countries adopted the Tunis Commitment[1] to bridge the digital divide and to promote ICTs as instruments of sustainable development. ICTs are now being used to assist in social development and poverty alleviation in several developing countries, through "ICT for development" (ICT4D) projects (Kenny, 2002; Blattman, Jenson, & Roman, 2003; Kaushik & Singh, 2004). The hope is that these technologies can be used to support health, e-governance, and agricultural applications for rural populations and simultaneously create new business opportunities.

Several case studies highlight the potential development benefits of ICT-enabled systems. For example, providing market price information in the fisheries or agricultural sectors creates better functioning markets and gets rid of intermediaries (Eggleston, 2002; Abraham, 2006) Health workers use ICTs to collect data on malaria, child mortality, and river blindness in order to provide more cost-effective health care. Low-cost computing is also being integrated into rural and low-income urban schooling in order to improve educational outcomes through multimedia applications (Brewer et al., 2005). These and similar

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studies evaluate the economic and social impacts of ICTs, as well as their usage patterns.

The ICT4D model is, in general, sympathetic to market-led initiatives and disillusioned with state-led ones. Over the last 6 years, financial sustainability as not only necessary to, but as proof of, success has taken hold in the discourse around ICT4D projects (Toyama et al., 2004). This discourse strongly encourages financial solvency within a growth environment that is "bureaucracy free." The defining phrase for this development-through-entrepreneurship model is the "Bottom of the Pyramid," referred to in business circles, and increasingly in government circles, as BOP[2] (Prahalad & Hammond, 2002; Prahalad & Hart, 2002; London & Hart, 2004; UNDP, 2004; Hart, 2005). The core argument is that the private sector should target the vast untapped rural markets in developing countries with low-cost services and appropriate business models. Increasing the well-being of the poor while increasing the profits of the private sector is thus thought to provide win–win opportunities (Prahalad, 2005, p. 3; UNDP, 2004, p. 8).

In the BOP framework, a sound business strategy can simultaneously be a sound development strategy. Prahalad writes, "Poverty alleviation will become a business development task shared among the large private sector firms and local BOP entrepreneurs" (Prahalad, 2005, p. 5). This perspective suggests that the development of business models for rural markets should lead to poverty alleviation not through subsidies but through the generation of opportunity and wealth. The BOP model accordingly assumes that the world's poor are willing to pay for high-quality services using advanced technologies (London & Hart, 2004; UNDP, 2004; Hart, 2005).

BOP principles have had enormous influence throughout the ICT world, and substantial investment is being channeled into ICT4D by multilateral organizations, corporations, and governments of developing countries. Strong versions of the model claim that good business models will lead naturally to poverty alleviation (Prahalad & Hammond, 2002), while weaker versions argue that development and entrepreneurship should be pursued simultaneously.[3] Much has been written about the BOP model, and many institutions have adopted it for the implementation of ICT4D (and other) projects, but there is surprisingly little research on how, and for whom, development-through-entrepreneurship works *in practice*. There are few empirical studies examining what actually happens on the ground when these ideas are implemented. Using ethnographic methods, we chart out the contradictions and problems that could arise when the BOP model is implemented and scaled up. In particular we ask: How do the interactions among state, market and society—the context within which the model is implemented—influence its success on the ground? How could the perceptions and dilemmas of multiple actors shape the development impacts of ICT4D?

We examine these questions by focusing on one of the most popular channels for the mass delivery of social and educational ICT enabled services: shared computers in rural kiosks. In theory, kiosks can be used by members of any income group, especially those who cannot afford to own a computer but who need access to these services. We investigate the practice of development-through-entrepreneurship via the Akshaya project in the southern Indian state of Kerala. The Akshaya project deploys kiosks (also known as telecenters) that are equipped with one or more Internet-enabled computers and are owned and run by independent entrepreneurs.[4] In common with many ICT4D initiatives, Akshaya is a public–private sector collaboration, and strives both for rural development (through increased access to information and computer literacy) and financial viability (through sustainable business models). This article presents our research findings on the challenges and trade-offs of implementing the Akshaya project and draws conclusions that may be relevant to ICT4D projects more generally. We analyze the business strategies of the entrepreneurs who operate Akshaya franchises, the tensions felt within the public sector around partnering with the private sector, and the perceptions and priorities of the intended beneficiaries (consumers).

ICT FOR DEVELOPMENT IN INDIA

The success of India's export-oriented software industry and ICT-enabled business services is by now well known. The ICT industry has emerged as one of the country's fastest growing industrial segments (Arora et al., 2001; Lal, 2001; Heeks & Nicholson, 2004; Kaushik & Singh, 2004; Government of India, 2005). The Indian software and services industry grew from $12.8 billion in 2003 to $17.2 billion in 2005—a 34% increase (Government of India, 2005). The industry is thought to be so successful because it developed in a bureaucracy-free environment for investors, thus marking a shift from the era of state-planned industry to a new ideology of local ownership, private initiative, and a pro-business environment for national and foreign companies (Nayar, 1998).

However, the state continues to play an important role in the ICT industry despite this more market-focused approach (Evans, 1992). Both central and state governments have made a concerted effort to bring low-cost connectivity and ICT enabled services to the "rural masses" for development purposes (Pohjola, 2002). By some estimates, there are as many as 150 rural personal computer (PC)-kiosk projects across India, which could provide the first computing experience for as many as 700 million people (Toyama et al., 2004). These efforts have typically been accompanied by positive images of poor rural people

who leapfrog traditional development problems such as poverty, illiteracy and social inequalities, and who overcome the "digital divide" (Arunchalam, 2002; Eggleston et al., 2002, Keniston, 2002). Empowerment, economic growth, skills development, and ease of service delivery are routinely cited as the goals of ICT4D projects.

Kerala, the state where Akshaya has been implemented, is a particularly interesting state in which to investigate ICT and development. It is well known for the strength of the Communist Party of India–Marxist (CPM) in the state government, and for sustained social mobilization tied to high levels of social development (Ratcliffe, 1978; Parayil, 1992; Rammohan, 2000).[5] The state government maintains strong ties with civil society, particularly since peasants and workers played an active role in shaping the structures and institutions of modern capitalism within the state (Heller, 1999). The state has also been known for its past economic problems, in particular for poor industrial development and persistent unemployment (Heller, 1999; Rammohan, 2000; Veron, 2001). The annual gross domestic product (GDP) growth rate between 1994–1995 and 2001–2002 in Kerala averaged 5%, compared with the all-India annual GDP growth rate of 6%. The average annual growth rate in per capita GDP during this period was 3.89% in Kerala, compared to the all-India average of 4.26% (Subrahmanian, 2006).

Over the last decade, the state government has worked hard to combat the paradoxical image of Kerala as a socially vibrant but economically stagnant state (Subrahmanian, 2006). In recent years the economy has improved, and, according to the Economic Review presented in the State Assembly, Kerala's GDP grew by 9.2% in 2004–2005—the same as the percentage growth rate for the country as a whole.[6] Since the late 1990s, changes in Kerala's social and economic policies have reshaped the development agenda, partly in response to India's neoliberal economic reforms and partly in response to the state's "redistribution-without-growth" image. The state has engaged in a set of policy measures to "modernize the government"[7] with support from the Asian Development Bank. The CPM has been more open both to the private sector and to foreign direct investment. In the words of a recent report on an international conference on the Kerala economy, the leaders of the CPM have shown a "new found pragmatism in adapting an alternative agenda for Kerala's development by accepting neo-liberal economics" (Singh, 2005). At the same time, there has been criticism that these market-driven policies could negate some of the social successes of the state (Nayar, 2004). Although social development is now seen as compatible with more market-oriented goals, many remain conflicted about this relationship. This history helps to explain the state's enthusiastic embrace of the two-pronged strategy for its technology projects—that of combining the goal of greater public access to ICTs with a private-sector orientation to achieve financial sustainability.

THE AKSHAYA PROJECT

Akshaya was initiated in Kerala's Malappuram district as a pilot project with the plan of eventually rolling it out to the 13 other districts. Malappuram is unique in Kerala because it has the largest population of nonresident Indians in the state, many of whom are Muslims working in the Middle East as laborers. Therefore, the Akshaya project envisioned communication as a potentially large application of ICTs, so as to connect people with their relatives in the Gulf. As can be seen in Table 1, Malappuram district's levels of social development are below other districts in Kerala in terms of educational levels (literacy) and health (infant mortality). However, these indicators have improved in recent years. The "roll out" period officially started in July 2005. The goal is eventually to create the first 100% e-literate state in India.[8]

The Kerala IT Mission states the aim of the Akshaya project as "IT dissemination to the masses." Thus, it is seen as a development initiative with equity goals. Akshaya labels itself a "project implemented by the IT Department, Government of Kerala, with participation of the private sector."[9] With this label, the government emphasizes that private sector actors are participants in a large-scale development project rather than just owners of computer-kiosk businesses. But with this label come many links to past social programs that limit the state's ability to achieve the business goals of the project, as we demonstrate later.

When Akshaya was first implemented, 630 Internet-enabled computer centers, each serving 1000 households,

TABLE 1
Malappuram and Kerala statistics

Characteristic	Malappuram	Kerala
Area (km^2)	3550	38,863
Population (millions)	3.63	31.8
Per capita income (USD) (2002–2003 estimates)[a]	$306	$573
Sex ratio (females/1000)	1066	1058
Literacy rate	91%	91%
Male literacy	93%	94%
Female literacy	86%	88%
Infant mortality rate (deaths/1000 live births)	32	14

Note. Sources: Government of Kerala (2006), state overview, Malappuram district overview; UNDP Kerala fact sheet (based on 2001 census data).[10]

[a]Used conversion of $1 = 45 Rs.

and each run by individual entrepreneurs selected and trained by the state, were established. At present, 430 remain in operation in Malappuram. The state solicited applications for kiosk entrepreneurs through a widespread advertising campaign that included information on initial investment costs and the service requirements of centers. In the course of our interviews, state actors indicated that convincing potential entrepreneurs about the importance of financial sustainability was the biggest challenge in the selection process. At the outset, there were 2000 applicants for the designated 630 centers. Many of the applicants thought that Akshaya was going to be a government-funded project with "no risk." After people realized there was financial risk involved, there was a significant decline in interest among applicants.[11]

The state government in collaboration with individuals from the Town Planning Commission and local *panchayat*[12] members selected the entrepreneurs through an interview process. At a minimum, entrepreneurs had to be 18 years of age and have completed 2 years of secondary school. Selection criteria included a rating system of individuals' experience in business, technical and educational backgrounds, recommendations from local government representatives, financial situation, and home location. The IT Mission initially envisioned that entrepreneurs would come from the areas where they would implement their kiosks. The government required the selected entrepreneurs to have a commitment to development and a willingness to act as social entrepreneurs. The early selection process was fraught with local politics given that Akshaya had no proven track record or standardized systems in place for entrepreneur selection.[13] The current selection process has become more streamlined, as we discuss later.

The project began with a 6-month e-literacy phase with the goal of training one member from each household in a basic 15-hour computer training course. During this period, the centers were to focus only on e-literacy and the entrepreneurs engaged in door-to-door awareness campaigns. The state selected the "decision maker" of each household to attend the computer-training program. Many of the participants in the e-literacy program were housewives and elderly people, since a large portion of the male population worked abroad in the Gulf countries. For each person who attended the e-literacy course at the Akshaya centers, the local government subsidized the costs of the user to the entrepreneur. The local government paid $2.80 per person trained to each kiosk entrepreneur, while each trainee paid $.50. By the end of the e-literacy phase in 2003, approximately 500,000 people had been trained in the Malappuram District. After the first phase, the subsidies ended and each center was supposed to use sound business strategies to achieve financial sustainability as well as continue to provide development services. These services included government-issued birth and death certificates, electronic payment of bills, general education, and access to information on health, agriculture, and legal issues.[14]

The Akshaya project was thus a public–private partnership from the start. We note, though, that the private sector in this case comprises small-scale home-grown entrepreneurs, and not the corporate giants of the technology sector with whom such partnerships are often associated. The state's role is to subsidize the e-literacy training, provide training for entrepreneurs for economic sustainability, facilitate loans for entrepreneurs, establish the network and connectivity, develop curricula, provide e-governance services, and oversee logistics. The entrepreneurs' role is to leverage the e-literacy training phase in creating awareness and attracting customers, to provide ongoing social services, and to maintain the financial sustainability of the business.[15] However, ideological divisions within the state, consumers' perceptions of the state and of entrepreneurs, entrepreneurs' perceptions of the state, and the ways in which each group defines and prioritizes social development and financial sustainability have complicated the implementation of the Akshaya project.

METHODS

In order to understand the strategies of Akshaya entrepreneurs who were trying to address both market and societal goals, and the perceptions of the users and nonusers of the Akshaya centers, we combined open-ended interviews with participant observation. We approached our interviewees not as a way to get "the true story," but rather, to understand what they thought and how they interpreted events. Our questions were flexibly designed to give our respondents the chance to organize their answers in their own frameworks. This method recognizes and takes seriously the diverse "knowledges" of different actors, reflecting their particular positions and their social situations (Burawoy, 1999). We believe that our open-ended approach is the most useful one for generating preliminary hypotheses about the implementation of ICT4D. We used systematic transcription procedures and coding for our analysis using interview analysis software.

In total, 141 interviews were conducted in the Malappuram district and in Thiruvanthapuram, the state's capital, where the IT Mission of Kerala is located. These included 65 interviews with households in the areas served by 6 Akshaya centers.[16] The study centers were purposively selected based on whether they were financially successful or weak and on whether they were located in rural or urban areas. The Akshaya office in Malappuram recommended a list of centers that fit these criteria. We selected one rural center and one peri-urban center that were financially weak, one peri-urban center and one urban center that were financially breaking even, and one urban center

and one rural center that were financially successful.[17] Nineteen interviews were conducted with local and state officials.[18] Fifty-seven interviews were conducted with entrepreneurs, including "failed" entrepreneurs who eventually closed their centers, entrepreneurs whose centers were doing well financially, and entrepreneurs who were having financial problems and were planning to close their centers.

CHALLENGE FOR THE STATE: POLITICAL CRITICISM

In this section we examine the conflicts arising from the practice of development-through-entrepreneurship from the perspectives of the state. Following Gramsci, we conceptualize the state not as a monolithic entity, but as dynamic, contradictory, and encompassing government as well as civil society (Gramsci, 1998). The language and goals of the Akshaya project reflect the BOP model with "win–win" objectives, emphasizing cost recovery, viable business plans, and also serving the poor. On the one hand, the state is expected to address equity and social goals in bringing ICTs to the rural population. On the other hand, the market-oriented regime in which ICTs have flourished and the state's financial difficulties steer the state toward emphasizing profitability. The challenge for the state is to recruit and help to establish private-sector partners who can create profitable kiosks that also meet development goals, without being criticized for simply subsidizing private sector interests. Promoting even BOP-oriented kiosks as public–private partnerships requires a delicate balance in a state like Kerala, with its history of state-led development and internal ideological divisions.

The conflict between promoting social goals "versus" promoting profitability within the state government is reflected in the politics of the Akshaya project at the local level. Our interview data indicate that some *panchayat* members opposed the Akshaya project for a variety of reasons, including their (stated) belief that private entrepreneurs are the ones benefiting most from the project and not the "masses of people." It appears that if the state promotes an entrepreneur-driven model of development, it invites political criticism from ongoing class-based movements that the project does not serve the broader public. In the words of one *panchayat* leader:

> "I support the project, but I oppose the type of implementation and style. I mean that financial benefits go to a few, particularly the entrepreneurs, like in the e-literacy training phase. I suggest that the entrepreneur selection and all Akshaya centers in each *panchayat* should be more supportive of local people. Furthermore, the *panchayat* should own the Akshaya centers, not the entrepreneurs. I think that is a better way... I don't think that the technology itself brings inequalities—but the implementation does."

Other *panchayat* members also suggested that the benefits of the program may not reach all groups equally and that that was a problem. These concerns regarding social inclusion reflect Kerala's history, in which the state has traditionally mediated class relations. The *panchayat* leader's comment that the "state should own the kiosks" demonstrates the continuing legitimacy of public institutions, particularly state-owned enterprises.

On the other hand, representatives of the same local government argued that the project will not be sustainable unless based on market principles. These individuals supported the traditional critique that the government has unnecessarily involved itself in many sections of the state's economy. Several *panchayat* members insisted that the private sector is more efficient than the government in the delivery of even development services. One stated,

> "All should go private. If you go to a government office you will never get information, you will never get services. But now at the government, they are implementing Akshaya with the private sector and that is more efficient."

On a broader level, these conflicts echo old and new debates about the respective roles of states and markets in development. Some scholars have underscored the strategic role of the state[19] in guiding the processes of development and industrialization (Bates, 1981; Evans, 1995; Kohli, 2005), while others attributed economic success to (largely) unconstrained market forces (Little, 1982; Lal, 1985). Under the current wave of liberalization and decentralization, this debate about state and market has forcefully reemerged (Cerny, 1995; Held et al., 2000). In particular, accusations of state inefficiency have lent weight to the idea of businesses as efficient providers of high quality and low cost services to the poor (Hart, 2005). More contemporary (and less polarized) approaches in political economy draw on Polanyi's (1944) work on the embeddedness of markets in society. They emphasize not just the relative importance of state, market and civil society, but the ways in which they shape one another (Evans, 1997; O Riain, 2000). The promoters and the detractors of Akshaya, and of private–public partnerships overall, in the Kerala state government reflect the range of positions within this broader debate. The differences and synergies between the state and the market are similarly reflected in the perceptions of computer-kiosk entrepreneurs, to whom we now turn.

CHALLENGE FOR THE ENTREPRENEURS: MARKETING AND BRANDING

The tension between social development and financial sustainability is most evident at the level of the individual entrepreneur. The people in need of development services are often distinct from the people who are ongoing paying

kiosk customers, so entrepreneurs face branding and marketing challenges in attracting both groups of people. On the one hand, cost recovery requires selling to wealthier clients who are more experienced in computer use, who may expect a state-of-the-art facility with high-end services, and who are interested in more advanced courses than those who participate in the e-literacy phase. On the other hand, entrepreneurs are also being asked to serve the poor, who may learn basic computer skills, yet often cannot afford to continue using the centers or do not find applications they are willing to pay for on an ongoing basis. In trying to meet the dual goals of the Akshaya project, entrepreneurs thus face a trade-off between social development and financial sustainability. We found that negotiating this trade-off resulted in a range of entrepreneur strategies and financial outcomes.

Based on interviews with 57 entrepreneurs, we have categorized these entrepreneurs into three broad types: socially driven, business-driven, and balance-driven. We discuss these categories next, in particular highlighting our extended conversations with three individuals whom we call Moosa, Ram, and Henna. We find that the social, geographic, and economic contexts within which these entrepreneurs operate interact with particular entrepreneurial strategies, and together contribute to the viability of development-through-entrepreneurship.

Socially Driven Entrepreneurs

Because Akshaya is a government initiated "development" program in collaboration with the private sector, some of the entrepreneurs whom the state selected as franchisees were more committed to the social development aspects than to running a business per se. These socially driven entrepreneurs tended to work hard on providing universal access or e-literacy and e-governance services for people in rural areas. These entrepreneurs were, in general, not financially successful; nor did they implement conventional business-oriented strategies.

One such entrepreneur, whom we call Moosa,[20] ran a center in a peri-urban area outside a large town. He was in his mid-thirties and had completed high school as well as a diploma course in computer applications. His *panchayat* had a population of approximately 13,800 people with a literacy rate of 93%.[21] When we talked to Moosa, he had been running a computer center in the area for 9 years. He converted his existing center into an Akshaya center by joining the project in 2003. The kiosk primarily offered educational services to customers, such as basic computer courses in Microsoft Word and Excel, as well as educational content in the local language developed by Akshaya. Moosa stated that his net earnings ranged from $57/month to a loss of $54/month,[22] and that he considered his business to be "doing really badly." (His center later closed down and Moosa moved to the Gulf countries in search of a job.) But Moosa said:

> "Even though my center closed down, I was successful—because many rural people got an awareness of computers—and that is good enough. Next time the project should be planned so that the government pays for the initial equipment. Then afterwards the entrepreneur can run the center. Otherwise he will be in debt."

Another socially driven entrepreneur indicated that she decided to become an entrepreneur because she thought Akshaya was a social welfare program. She emphasized that she had been successful in creating widespread awareness about ICTs in her area during the e-literacy training phase, particularly among housewives and elderly people. However, she had no prior experience either with business or computers, and had not realized that she would have to incur so much debt and "ruin (her) standing" with the bank. Thus she wanted the government to pay for her losses and said, "If the government could provide subsidies for our loans and waive the tariff for our electricity, we could get discounts. It would be more helpful for the success of entrepreneurs." She, too, eventually closed her center and (at the time of our interview) was trying to sell her equipment to pay off the loans.

The socially driven entrepreneurs took seriously the development goals of Akshaya, and felt that their primary responsibility as Akshaya franchisees was to help rural and low-income people learn about computers and benefit from them. More than one entrepreneur interviewed had expected that the government would be involved in all aspects of the running of the center, would provide subsidies throughout the project, would provide ideas, applications, and customers, and, if the entrepreneur was not doing well financially, would pay the debts.

The socially driven entrepreneurs clearly brand their centers as Akshaya—as government-initiated centers that provided e-governance services and subsidized e-literacy training. Moosa, however, suggested that using the name "Akshaya" and the affiliation with a government-sponsored program could confuse customers. Moosa's view was that the Akshaya name had been a detriment to his business and that after the introduction of Akshaya, people started to associate his (hitherto private) center with free government programs for low-income rural people. He explained:

> "First I had a monopoly in the area. Before Akshaya there were only two centers in the *panchayat*. After this project started, another Akshaya center was established nearby—very close to mine. Before Akshaya, people used to come to my center and pay $75 for a [month-long advanced] course. Then Akshaya came and I gave almost free courses and the fees for the [other Akshaya] courses I provided were [also] too low at $10. Then the people were not willing to pay such high fees again. And just like that my whole business was gone

> and Akshaya wasn't successful. I am considering in terms of monetary benefits—my business [was] not a success. Socially I think the project was good—and it was good for people and good for the area—but it is not good for the entrepreneur."

Moosa was arguing that before his center became part of the Akshaya franchise, it was considered a computer center where users had to pay high fees for courses. But post-Akshaya, potentially paying households associated the name "Akshaya" with a rural-area program serving poor people. Thus he feared that if one relied heavily on the Akshaya brand, the customers would be limited to the rural population who tend to be poor, and the kiosk would not be profitable. Moosa concluded:

> "People are ready to pay a good amount of money to go to town to take courses . . . Because of Akshaya[23] studying a computer package in this area versus studying a computer package in a town is a huge difference, and is like drinking water versus a bottle of cola."

Moosa felt that Akshaya changed the possibilities for low-income rural people to access computers. Now higher income people would prefer to take classes in "town areas." Moosa's assessment was echoed by several of the kiosk operators interviewed for this study. Entrepreneurs' perceptions of consumer views of government versus private and of urban versus rural appeared to exacerbate the tensions they already faced in attracting two differentiated groups of consumers. These perceptions make it difficult for the state and the entrepreneurs to provide access for all while convincing the better off that the quality of that access is high.

Business-Driven Entrepreneurs

The business-driven entrepreneurs avoided some of the confusion related to development-through-entrepreneurship, and tried first and foremost to make their kiosks profitable. They accepted users from any class of society, but targeted those that could help them generate a profit. One such entrepreneur, whom we call Ram, operated in a large urban municipality with a population of 49,000 people and an area of 17 km^2. The population has a literacy rate of 91%.[24] Ram had a bachelor's degree in commerce, a diploma in computers, and a teacher-training certificate. He started his telecenter in 2001 and then joined Akshaya in 2003. Ram's kiosk was part of a chain of computer education centers that his brother had started in 1998. There were 605 households in Ram's ward and he conducted the e-literacy training for 501 of them. His services included basic and high-level computer education courses and browsing. His average profit was between $233 and $345 per month.[25]

Ram indicated that, in general, the Akshaya brand was not his main revenue earner and that he did not cater to the poor. He thought that the e-literacy training process was a good idea because it was the first time that many of the people had seen a computer, and he had been happy to provide social services for everyone. About 150 people from the e-literacy training course returned to his center afterward to do a continuing "Akshaya course" for $10. This is a course that the state developed in the local language that further teaches people the basics of computers. Ram admitted, however, that not that many of those people are attending his center now.

Ram's ongoing users were mostly students, not the poor or older people. Ram thought that more people did not come for the continuing $10 course because the price was much higher compared to the first e-literacy course, which was almost free. Thus, most of the people could not afford to come back. But he was happy with the way that he could use Akshaya to leverage his business with students. Most of his students came from middle-class backgrounds and were in the process of completing their education, and taking basic and advanced computer courses, or working toward higher degrees. Ram said:

> "What does it mean that I am running an Akshaya center? It just means I offer one Akshaya course since the e-literacy period is over. Most of the students come for the private courses, however, not Akshaya courses. Askshaya just means that I do some data entry work, computerization of *panchayat*—giving birth certificate and death certificates for the government. The aged and other people just take the e-literacy course and then say they will never use a computer again. Most don't use computers."

We found that business-driven entrepreneurs such as Ram tended to publicize their centers primarily as independent private centers that incidentally provided Akshaya services (such as e-governance). Ram was clear about the fact that Akshaya's services were a very minor part of his business and did not bring in much revenue. In general, the business-driven entrepreneurs interviewed were not committed to Akshaya as a development project, but saw it as a minimal way to assist their ongoing businesses.

Simply being "business-driven" in orientation, however, did not translate to financial success. In our interviews with entrepreneurs who had closed down their centers, several complained that although they were focused on the business aspects of their kiosks, they could not turn a profit. Of the 630 original Akshaya centers, 200 had closed down by the end of 2006, and not all were run by the socially motivated. Strategies targeting the middle class rather than the "masses" are often not sufficient for financial viability, and individual motivations do not overcome consumer preferences for private over public and urban over rural. Our interviews indicated that social and geographical contexts such as village population size, entrepreneur educational backgrounds and computer training, individual family situations, and geographic areas within which they operate combined

with entrepreneur strategies influence financial success of kiosks.

The state of Kerala, however, as a consequence of the kiosk bankruptcies in Malappuram, has redesigned its method of entrepreneur selection for the roll out of Akshaya to other districts. More emphasis is being given to selecting entrepreneurs in financially strong positions, and who have past business experience and computer skills. With the subsequent round of selection, the state was able to attract far stronger applicants than it did in Malappuram, and 98% of selected entrepreneurs had computer backgrounds and past business experience. The state's preferred entrepreneur profile is now closer to that of Ram than that of Moosa. This is an example of how, despite Kerala's commitment to social development and financial sustainability, the state is steered toward emphasizing profitability on account of actual implementation challenges.

Balance-Driven Entrepreneur

We found a few cases of entrepreneurs who appeared to be successful in combining the two goals of social development and financial sustainability. Based on our interviews, we surmise that these comprised fewer than 10% of all entrepreneurs. These entrepreneurs subsidized their poorest users but also employed strategies to maximize their profits from higher-income users. The presence of this category highlights the potential of a combined development and business strategy, but few can maintain the hybrid approach because it appears genuinely difficult to attain this balance.

One such entrepreneur, Henna, had a center in an area she called "peri-urban," with a population of 35,000 and an approximate area of 57 km^2. The literacy rate for the area was 89%.[26] Henna was 28 years old, had three young children, and had completed her 10th-grade education.[27] She had also taken a few computer courses. Henna stated that her average profit from the kiosk was $55 to $122/month. During the e-literacy phase, her center trained 364 men and 418 women out of a total of 925 households in her service area. She offered business services, photocopying, basic computer education courses, bill payment for government services, and desktop publishing. Henna saw the Akshaya initiative as more of a partnership with the government and, as compared to Moosa, had fewer expectations that the government would be responsible for keeping afloat the business side of the project. In her words, "In this Akshaya project, it is half government and half entrepreneur. All entrepreneurs must have a business sense. All entrepreneurs must be businessmen—otherwise they cannot succeed. Sometimes, however, I give discounts for absolutely poor people."

As a financially successful entrepreneur, Henna expected the government to provide some assistance to Akshaya centers, but argued that she needed to use her own business skills to attract customers. She attracted lower income customers such as auto rickshaw drivers and electricians and helped them to pay their bills, to download government forms, and to type and print papers required for their businesses. She also attracted middle-class students and housewives who could take courses on computer programming. She suggested that she was able to cultivate people of different backgrounds by acting like a "government help desk":

> "People want a mediator instead of directly dealing with the government... Nowadays, people think this is a government help desk. Most newspapers and radio say it is a government place and offers government services. Once they come here they ask a question about a government procedure and I help them to search for whatever they need by Internet. If I can't get the information from the Internet, I call the government offices and get information from them. Most people will come back the next time and will pay for these services."

Henna also pointed out that she had prior experience with business and the ICT industry as well as good communication skills, and that she was able to assess what sorts of services the local people would need and thus pay for.

With respect to branding her center, however, Henna raised the same point as the socially driven entrepreneur, Moosa—that users associate town areas with better services and that the "peri-urban" location was beneficial for her center.[28] It is also worth noting that even Henna felt some of the tensions of development-through-entrepreneurship, particularly with respect to the local government actors and their critiques of the project. For example:

> "A *panchayat* member had to sign off on our [the entrepreneur's] work but he said he would not sign it.[29] He said to me, 'There is no water connection—no house, no value, and at this time you want people to study computer literacy? I cannot sign this."

The perceptions of entrepreneurs regarding their strategies, their expectations of the government, and their views on consumer perceptions also recall ongoing debates about states and markets. Most of the entrepreneurs interviewed for this research simultaneously expected help from and were disillusioned with the state. Socially driven entrepreneurs expected the state to facilitate their businesses and provide them with loans, yet had to negotiate potentially negative connotations associated with state-led enterprises. Business-driven entrepreneurs saw the state as a source that helped to produce the market for their businesses, but did not emphasize this source in their branding strategies. Balance-driven entrepreneurs acted as mediators between civil society and the state. The range of entrepreneur perceptions and strategies corroborates

contemporary political economy approaches that do not treat the state and the market as binaries but rather as entities that are continually being constructed by their interactions with one another (Evans, 1997; O Riain, 2000).

PERCEPTIONS OF THE CONSUMERS: GOVERNMENT VERSUS PRIVATE

Confirming the views of the entrepreneurs, consumers that we interviewed indicated that middle-class customers were skeptical of the state and of the quality of its services. Specifically, they perceived state provided "development" services as free or subsidized, targeted toward the rural poor, and of low quality. Consumers therefore tended to self-select out of Akshaya, with the relatively better off using privately run computer centers in urban areas (or what they think are "private" centers).

Both regular users and nonusers of Akshaya services indicated that the Akshaya project was a government program that offered free computer courses for the rural poor. Some saw it as a government-sponsored development project to create a widespread awareness of computers. Those who saw Akshaya as a development project asserted that the government would pay the fees for attending the course, and that it was a great social project because it provided opportunities to get jobs, to collect information quickly, and to pay bills from rural areas. Several people also thought (as it turns out, incorrectly) that these centers were more successful in rural areas because they catered to poor consumers. One of our interviewees thought that:

> "People are more likely to use Akshaya centers in rural areas. I think more people in town use computers. But rural area people are interested in computers. In rural areas, people would use Akshaya centers because the fees collected are low so village people can afford them."

Household perceptions of the quality of the centers varied. Some middle-income households were convinced that Akshaya centers had poor quality instruction compared to private centers and that they only taught the bare basics of computer use. One user claimed that "A town computer center is better than a rural area Akshaya computer center. The facilities are more in town areas. So most of the people here will travel to town to take a computer course." Consumers also indicated that the certificate received after completing a computer course from rural centers was not as valuable as certificates from urban centers, and that since computer-training certificates were important credentials for employment, it was preferable to show employers certificates from urban areas. Lower income and rural households, however, said they had heard that one could get a government-issued certificate from Akshaya, and the value given to that certificate seemed high among them.

Perceptions drive possibilities in the implementation of Akshaya. Consumer perceptions, and entrepreneurs' perceptions of these perceptions, feed back into the way that entrepreneurs brand their centers. Entrepreneurs such as Moosa and Ram thought that the association of Akshaya with assistance for low-income people would be detrimental to the profitability of their centers, and that students who could afford to pay would go to private schools, or to town areas. Hence Ram's center was not branded with the Akshaya name as such; he used two other brands of privately offered courses to attract customers. One woman at Ram's center when asked about the Akshaya project thought it was mostly for villagers in rural areas. Even though this student was actually at an Akshaya center in an urban area, she did not associate the center where she was taking courses with the Akshaya brand.

Our study shows that state–market relationships and tensions are also salient at the level of the consumer. Like entrepreneurs, consumers whom we interviewed simultaneously have expectations as well as critiques of the state. Middle-income consumers agreed that the state was performing an important role by providing universal computer education for all classes of people, particularly the poor. At the same time, these consumers are looking for "better" courses for themselves. Low-income consumers feel that there is a real value to taking the Akshaya courses, particularly because it enables them to learn about computers and overcome their fears of technologies. However, these individuals are not willing to return to the kiosks as ongoing customers.

CONCLUSIONS

The model underlying the enthusiastic, multisectoral and international support for ICT4D projects is development-through-entrepreneurship or the closely related "bottom of the pyramid." This model assumes that market-based solutions, private enterprise, and advanced technologies can increase the well-being of the poor and concurrently increase the profits of the private sector. Bridging the digital divide through these principles is thus seen as a huge opportunity for development. However, BOP advocacy often underemphasizes the influence of history and context in implementing the twin goals.

Through a case study of the Akshaya project, we examined the mechanisms and practices through which BOP principles are being implemented in Kerala, India. The model indicates that if the poor are treated as consumers, this will lead to positive development outcomes through the generation of opportunity and of wealth (Hart, 2005). Yet our research found that the poor are not the primary customers of ICT kiosks except for a one-time, subsidized Akshaya course. The main consumers are those in the middle class, who can afford to pay for relevant applications on

an ongoing basis. These findings confirm Karnani (2006), who indicates that the profit margins are modest when targeting the BOP compared to the middle class. Strong versions of BOP assume that businesses, whether large companies or rural micro-entrepreneurs, can act in their own self-interest to improve the lives of the poor (Prahalad & Hammond, 2002, p. 5). Our research found that the business-driven entrepreneurs acting in their self-interest cater to middle-class customers in urban areas and that development for the poor does not factor into their business strategies. Our research also indicates that kiosks operating in urban areas with large populations of people are more financially successful than rural or even peri-urban kiosks with smaller populations.[30] Yet ICT4D projects are not being launched in the name of the urban middle classes, but are in fact intended to help the rural poor. While it may well be valuable to give urban and peri-urban middle-income households access to ICTs and to the opportunities that ICTs can provide, states, corporations, and donors need realistic expectations of who in fact can be served and can benefit from the for-profit dissemination of ICTs.

This research shows that the broader political economy significantly influences the practices of technology promotion and access, and thus the actual promise of any dissemination "model". We find that in a state with an interventionist history, such as Kerala, the contradictions in trying to implement both the social and financial goals of ICT4D can make it difficult to run a financially self-sustaining kiosk that also meets broader development objectives. If entrepreneurs cannot generate revenue because they are providing services for the poor (the so-called BOP), the state may have to finance them in order to continue the project. But if the state emphasizes financial self-sustainability, entrepreneurs may preferentially cater to a wealthier clientele with a more professionalized set of services. This could, however, compromise the program of social development that motivated the state to establish the project in the first place. At present, when evaluated against its stated goals, the Akshaya project straddles both goals, yet is not fully achieving either in its implementation.

Our field research suggests, however, that it is possible to serve both low-income and better off customers. A balance-driven strategy could emphasize a range of services, including acting as a "mediator" between the consumer and the government, rather than focusing on basic and advanced educational content. Henna in particular illustrates the importance of accurately gauging the low-income market, and tapping into existing effective demand by serving people's immediate and felt needs. But it remains a challenge to develop a grounded sense of the low-income population's needs and willingness to pay for those needs, since there is limited precedent of their participation in these market activities.

Our study is based on the Akshaya project in Kerala, but these findings are relevant to ICT4D more generally. On the basis of our analysis thus far, we also suggest two important questions that future research on ICT4D must address. First, under what conditions might the two-pronged strategy (of serving the BOP as well as businesses) perform better or worse than it does in Kerala? Given the widespread belief that financial and social sustainability are desirable and compatible for ICT-led development, more empirical research is needed to understand the enabling conditions for these dual goals. Second, and more provocatively, it remains unclear in what way "social development" is being served, or can be served, by these kiosks. Despite several respondents' views that "awareness of computers" was a good thing, the step from awareness to development is hardly automatic. Empirically grounded research that can explain the pathways by which e-literacy and e-governance—if achieved—can be leveraged into meaningful development indicators is critical for the implementation and refinement of ICTs for development.

NOTES

1. http://www.itu.int/wsis/docs2/tunis/off/7.html

2. "The distribution of wealth and capacity to generate income" forms an economic pyramid, with 4 billion people living at the bottom on less than $2/day (Prahalad, 4, 2005).

3. Interview with multiple officials from the Government of India, Ministry of Communications and Information Technology, March 2006.

4. The term "entrepreneur" is used in many different ways in the context of ICTs and the knowledge-based economy. These include: a person serving a particular function in an economy (such as innovation); a new business startup; a small business owner or a person with a set of personal sociopsychological ("entrepreneurial") characteristics and/or a form of behavior (McQuaid 2002). In order to understand entrepreneurship in our analysis, we focus on the psychological, social, and cultural characteristics of individuals who own and/or operate kiosks. In particular, we situate these individual characteristics within the larger social and economic contexts in which they operate.

5. The average literacy rate in Kerala is 91%, compared to 65% in India. The female literacy is 91% in Kerala, compared to 65% in India. Life expectancy at birth is 73 years in Kerala, compared to 61 years in India.

6. Kerala statistics as stated in the February 9, 2006, Hindu article "9.2 p.c. growth rate in 2004–05: Review." National statistics found at World Bank (http://devdata.worldbank.org/external/CPProfile.asp?PTYPE=CP&CCODE=IND).

7. Modernizing Government Programme (MGP) www. keralamgp.org.

8. Interview with Kerala IT Mission project official, February 2006.

9. (www.akshaya.net).

10. Data sources for table: http://www.undp.org.in/programme/undpini/factsheet/Kerala.pdf; http://www.mlp.kerala.gov.in/barefacts.htm; http://www.kerala.gov.in/

11. Interview with Kerala IT Mission project official, February 2006.

12. *Panchayat* is an Indian political system that groups five villages together for administration. "Panchayat" literally means assembly of wise and respected elders chosen and accepted by the village community. Traditionally, these assemblies settle disputes between individuals and villages.

13. Interview with Kerala IT Mission project official, February 2006.

14. Interview with Kerala IT Mission project official, June 2004.

15. (www.akshaya.net).

16. For the 65 interviews with households, we created a stratified nonrandom sample by speaking with both males and females and with individuals of different religions and income levels: 46% percent of the individuals interviewed were female and 56% were male; 57% of the sample was Muslim, 40% was Hindu, and 3% was Christian. Of the households interviewed, 5% identified themselves as part of a high-income class, 35% as middle-income, 26% as low-income, and 34% did not identify with any income class. Our sample included users of the centers, nonusers, and some individuals who had participated only in the e-literacy phase: 34% of the sampled households had used the Akshaya centers for some type of service; 26% had attended the e-literacy training; and 9% of the individuals paid their bills through the Akshaya e-pay service.

17. The population size of the rural and urban areas varied with some peri-urban areas included.

18. Interviews were conducted with *panchayat* members, municipal council members, Akshaya project office staff in Malappuram, and officials in the Information Technology Mission of Kerala in Thiruvanthapuram.

19. This is often referred to as the developmental state, which uses state power to direct economic growth and a development agenda. Kerala is known as a developmental state (Evans, 1995).

20. All names have been changed to protect the identities of the respondents.

21. Government Of Kerala. 2001. http://www.kerala.gov.in/statistical/

22. This is based on an exchange rate of 45 Rs/$1. The average per capita income in Malappuram is $306. Operating expenses of a center typically include rent, phone, electricity, and staff salaries. Revenue per month generally comes from computer classes, browsing, e-pay, printing, and desktop publishing.

23. Moosa meant that because there used to be a scarcity of computer courses in general, people would have been willing to attend a course in a rural area 2 years ago. However, now with the prevalence of courses in town areas and the fact that Akshaya created opportunities for rural people to also study computers in these areas, higher income people prefer the town, where they perceive there to be higher quality courses.

24. Government of Kerala. 2001. http://www.kerala.gov.in/ statistical/.

25. In addition to the profits made through the kiosk, he also has an additional source of income through teaching computer classes in a college. (This income is not included in these figures).

26. http://www.kerala.gov.in/statistical/

27. Henna's father paid for her daughters' education in a private school. Her husband is a shop owner and he pays for all the other family expenses. So Henna's income from her center is not her only source of income to support her livelihood.

28. Although consumers often perceive Akshaya to be rural and aimed at villagers, many kiosks are not located in truly rural areas. But as the Moosa case indicates, simply locating a kiosk in a peri urban or urban area is no guarantee of success.

29. *Panchayat* members had to sign off on the lists the entrepreneurs provided on the numbers of people who had attended the e-literacy program in order to sanction the funds for each person trained.

30. One concrete example can be seen from the financial success of Ram's kiosk (which had a population of 49,000 people) and operated in an urban center compared to kiosk of an entrepreneur like Moosa and operated in a peri-urban areas. Kiosks in areas that are considered rural (less than 5000 people) were generally not feasible.

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