

Research Article

ICTD in the Popular Press: Media Discourse Around Aakash, the “World’s Cheapest Tablet”

Preeti Mudliar

Xerox Research Centre India

Joyojeet Pal

University of Michigan, Ann Arbor

Abstract

The quest for a low-cost computer has been among the primary motivations of innovation and practice in the ICTD world. We discuss developments using the case of the low-cost Indian tablet, Aakash, publicized as the world’s cheapest tablet, and situate these within a history of India’s quest for development through technology in the last two decades. We analyzed 212 articles on Aakash and found four dominant themes in the popular media: the cult of a technocratic leadership, the discourse of indigenous technology, the re-creation of the Silicon Valley dream, and the face of the marginal user. We argue that Aakash has gone from being a technology artifact to a device representative of Indian aspirations on several levels: as a forward-thinking state, as an ingenious entrepreneurial class, and as an energetic population whose success would primarily depend on access to technology.

Introduction

As a low-priced state-sponsored ICT solution, Aakash is presented as a tool to fix India’s educational deficit. Advertised as the world’s cheapest tablet computer, it is tagged with an introductory price of US\$35. The first-generation Aakash had WiFi connectivity, but Aakash 2 entered a market quickly moving to mobile broadband and came equipped with a slot for a SIM card. Unlike its predecessor, the second-generation Aakash boasts a front-facing VGA camera for video streaming. It makes up for its lack of external speakers by offering a 3.5-mm jack for earphones and supporting voice input with an in-built microphone. With all these features and weighing just 350 grams, the 7-inch Aakash 2 appears to fit the market standard and yet costs a fraction of its competitors. This combination of technology innovation and production economics rests cannily on a state subsidy to present a potent mix that the technology blog Venture Beat compared to a time-tested Indian metaphor, “The Aakash tablet is jugaad in a very high tech way” (Chima, 2011, para. 5).

Jugaad is an integral motif of everyday life in India, and while the term suggests resourcefulness under scarcity, the management and business disciplines celebrate and champion jugaad as the imaginative work ethic of ordinary Indians that inspires innovation by offering quick-fix remedies. The practice of jugaad is often viewed as a bottom-up innovation that is at once empowering, ad hoc, and reactive to sociotechnical change (Birtchnell, 2011). Its induction into the vocabulary of global business practices is thus celebrated as a validation of the Indian penchant for innovating a quick fix.

However, the practice of jugaad is illustrative of temporarily coping with systemic risk rather than measuring real innovation. Far from representing technological innovation that allows the grassroots to evolve upward, jugaad is said to expose people to real harm. India’s desire to become a strong economic player on the international stage and its intense aspirations for sociotechnical change have contributed to the perpetuation

To cite this article: Mudliar, P., & Pal, J. (2015). ICTD in the popular press: Media discourse around Aakash, the “world’s cheapest tablet” [ICTD2013 Special Issue]. *Information Technologies & International Development*, 11(1), 41–55.

ICTD IN THE POPULAR PRESS

of a grand narrative in which *jugaad* is perceived and approved of as an indigenous way of life that belies real dangers that challenge India's development (Birtchnell, 2011).

What does it mean to label Aakash as a high-tech *jugaad*? Aakash hit the news in October 2011 and was repeatedly featured in discussions among politicians, industry leaders, and bureaucrats. By April 2013, the government had raised serious questions about the viability and relevance of the project, suggesting that it sought to focus on a more holistic way for students to access quality content. Although Science and Technology Minister Kapil Sibal, who first championed the project, continued to wave its flag, his successor, M. M. Pallam Raju, was openly dismissive of the project (Press Trust of India, 2013). Over the next several months, individuals from the mainstream and independent media and the government offered a range of contradictory messages on the status of the Aakash project. Its status as the device that would change India flagged and eventually drooped. By mid-2014, Aakash had virtually disappeared from the news, and many of the leaders who had championed Aakash were out of government. Sandwiched in a period when laptops gave way to tablets as the device of choice, Aakash was neither the first nor would it be the last initiative to bring low-cost computing to the people of India. The Aakash project is comparable to a range of ICTD-related projects on many fronts. As with the *Simputer* (a simple and low-cost computer that was designed to expand access to technology), it proposed the need for rethinking human infrastructure by putting low-cost devices in the hands of service providers. As with the *One Laptop Per Child (OLPC)* project, it suggested the need for rethinking education and the abilities of excluded populations. And as with the *Computador Popular*, it suggests state responsibility for underwriting the cost of such technology.

However, what makes Aakash truly unique is the way it was tied to a broader national aspiration. Similar to science and technology projects with grand nationalistic rhetorics, Aakash was invoked as a device that not only stood for its objective abilities but symbolized the ability of the Indian political apparatus to engineer its evolution, and the project brought together a range of political, commercial, and academic actors who captured the imagination of a nation with the promise of indigenously manufacturing a technology-driven global ascendance.

In this article, we study the discourse of news media surrounding Aakash. We build on Michel Foucault's (1972) construction of a discourse as spoken or written statements that "belong to the same discursive formation" (p. 117) and have the function of representing the knowledge of a certain domain. We also build on Habermas' idea of the public sphere as a deliberative space. We do not look at the public space (and specifically the mediascape) as a place of explicit rational-critical democratic negotiation, but rather as the means through which a national discourse of development and social participation is constructed. In their study of the nuclear discourse during the Cold War era, Mehan, Nathanson, and Skelly (1990) observe that the different voices that populate the public sphere in a public-political discourse are similar to a conversation in which the actions and movements of one organization invoke responses from others. Thus, the public sphere, as we see it, is the broad set of media channels through which the idea of technology and development is debated and discussed. The discourse is the outcome of these mediations on the public sphere in the form of a general set of discursive formations that suggests a strong positive relationship between technology and socioeconomic development.

We turn to news media texts to illuminate the discourse that swirled around Aakash's ascension as a news-maker. Fairclough (1992) argues for greater attention to texts in discourse studies and demonstrates their value as important repositories of theory, methodology, history, and politics. Owing to the social and ideological markers embedded in language and its use, texts function as a form of social action because of their ability to produce, reproduce, mediate, and transform social structures. The inherent materiality of language and reasoning that comprise texts also provides fertile ground to measure and root historic claims about relations between social structures and processes. Texts also serve an important political means of both exerting and subverting social control and domination. Thus, our work is guided by Fairclough's arguments about the need to examine relevant texts and examine them as a body of discourse to connect seemingly disparate themes surrounding events, objects, actions, and even inactions. Subjecting Aakash reportage to the rigors of discourse analysis allows us to analyze and record the dialectical relations and tensions between technology and development.

At the center of our analysis is the placement of technology as both an object and a means of economic

development. A deep reading of the media surrounding Aakash accompanied by a close look at the various actors involved in the story help us arrive at three frames of examination: the enlightened government, as symbolized by the technocrat who sees technology as development; the supply chain, as observed in the discussions over localization of the technology production; and the ascendant object, as described in the poor consumer of technologies aspiring to a better life. The Aakash case gives us a unique look into all three elements to scrutinize ways in which the positive discourse of technology as a means to economic development pervades the Indian public sphere.

Examining News

As a device that claimed the reinvention of education by promising technological inclusion, Aakash probably invited more media commentary than any comparable initiative. Although technology blogs extensively covered the specs and innovation of the tablet, news and business dailies were occupied with concerns ranging from the economics and location of its production to how it figured as a trope in the political one-upmanship between rival political parties—for instance, Sibal was challenged by the chief minister of Gujarat, Narendra Modi (now prime minister of India), on the very existence of the tablet. The media's interest in Aakash is not new for an enterprise of its kind. Since the turn of the millennium a number of projects in the ICTD space, including low-cost computing ventures and e-governance initiatives, have been prominently covered by the press. This coverage of ICTD in the news media is by no means restricted to India, and images of technology juxtaposed against poverty have inundated the ICTD world from major global to small regional news sources.

Media texts are routinely interrogated in disciplines such as political communication, film studies, and advertising as recognition that texts are essentially an organized way of signifying elements that not only argue for or against certain ideas but encourage the processing of the texts by the audience in a certain way (Pan & Kosicki, 1993). This, in turn, leads to the construction of social reality (Fairclough, 1995). The use of discourse analysis to examine ICTD projects is not without precedent. Mark Thompson (2005) has examined the ways technology became central to the discussions around development by international agencies by the turn of the millennium. Robin Mansell (2006) has offered a critique of low-cost networking technology touted in development terms. And Payal Arora (2010) has examined hole-in-the-wall computing efforts. An important common thread in these works is their critical examination of a broader discourse of technical devices' ability to overcome persistent development challenges.

However, studies of the mainstream news media and their role in ICTD have been remarkably few. One of the earliest calls for the critical examination of media's role in information technology (to the best of our knowledge) argues that media discourse on technology has important implications for the way society understands and reacts to the technology imperative (Cukier, Ngwenyama, Bauer, & Middleton, 2009). As a follow-up, an explicit ICTD examination analyzed the media coverage surrounding an education project in South Africa; the analysis revealed that the media paid little attention to the real challenges and limitations of the project (Chigona & Mooketsi, 2011).

Through an examination of 212 news articles as well as publicly available government documents, we traced the story of India's attempt to produce a low-cost computing technology device. Our analysis represents content from four English dailies, four business dailies, one English news website from India, two major U.S.-based news dailies, and three leading technology websites (see Table 1). The analysis spans news coverage from February 2009, when India's Ministry of Human Resources Development (MHRD) claimed to have produced a prototype of a \$10 laptop, to April 2013, when Aakash 2 was introduced.

The articles, which consisted of reports, interviews, reviews, columns, editorials, and op-eds, were collected by retrieving content from archives using search terms such as "Aakash," "tablets," "Kapil Sibal," and "Datawind" on websites of popular news publications.

Because Aakash was a developing story during the time data were being collected for this article, extensive Internet searches using the same search tags were conducted on Google and Twitter to monitor additional breaking news articles. The articles were analyzed through a careful reading and re-reading of each piece to identify general themes of reportage, guided by the constant comparative method analysis (Strauss & Corbin, 1998), and were coded using Dedoose, an online data analysis software. Each article was coded according to

ICTD IN THE POPULAR PRESS

Table 1. Analyzed Content.

Publication	Country	Type	Number of Articles
<i>The Indian Express</i>	India	News daily	56
<i>The Hindu</i>	India	News daily	48
<i>Hindustan Times</i>	India	News daily	36
<i>The Times of India</i>	India	News daily	5
<i>The Pioneer</i>	India	News daily	1
<i>The Telegraph</i>	India	News daily	1
<i>First Post</i>	India	News website	6
<i>The Economic Times</i>	India	Business daily	7
<i>Business Standard</i>	India	Business daily	8
<i>Mint</i>	India	Business daily	16
<i>Think Digit</i>	India	Tech blog	1
<i>India Ink, The New York Times</i>	United States	News blog	9
<i>The New York Times</i>	United States	News daily	2
<i>The Washington Post</i>	United States	News daily	4
<i>Engadget</i>	United States	Tech blog	3
<i>TechCrunch</i>	United States	Tech blog	6
<i>Fast Company</i>	United States	Magazine	1
<i>BBC Tech Blog</i>	United Kingdom	Blog	1
<i>Financial Times</i>	United Kingdom	Business daily	1
			212

Table 2. Frequency of Top Themes Observed in News Media.

Theme	Frequency in Reports
Made in India, China controversy, and national pride	104
Government of India and Aakash	88
Aakash review and specs	39
Kapil Sibal	39
Aakash price point	39
Suneet Tuli/Datawind	48
Technology in India	25
State of education in India	13

the themes it addressed, with the initial analysis yielding 65 themes that appeared in Indian as well as the international media. The themes were analyzed and classified into three broad categories: nation, production of Aakash, and key people. These themes were employed to present the analysis in this article. Some of the most frequent themes appear in Table 2.

The Discourse of the Indian Technocrat

On May 12, 1998, India awoke with a surge of nationalistic pride as the nation conducted a series of nuclear tests. The Bombay Stock Exchange registered short gains on national exuberance, to be followed by falls in the

value of the rupee compared to the dollar as the reality of sanctions sank in. Regardless, celebrations on the streets continued. The newly formed coalition government of the Bharatiya Janata Party, with its squabbling partners and an aging prime minister, suddenly emerged as powerful and tech-savvy.

The connections among technology, development, and national pride are not new to India. Symbolized in the construction of material artifacts such as dams, factories, and engineering institutions, technology was invested with the means to signal a fundamental change in a country seeking to establish its identity in a postcolonial world (Abraham, 1998). In India, much like elsewhere in the global North, national security was a driver of innovation in technologies such as nuclear power, electronics, and the Internet—all of which influenced the advancement of technologies for civilian use (MacKenzie & Wajcman, 1999).

In 1998, India was stepping into an exciting world of technology, with its slowly growing and increasingly visible technology sector. The time was ripe for new national technocrat icon A. P. J. Abdul Kalam, the publicly anointed architect of the country's nuclear tests and its chief scientific adviser. Kalam moved from the relative obscurity of the typical scientific adviser to eventually becoming the president of India. The act of testing a nuclear bomb was a show of national defiance against a powerful international community, but, more importantly, it was a show of indigenous scientific prowess. It was evidence that India was not just a home for low-end software work; it was at the forefront of technological development.

Kalam's transition to the presidency of India was a natural continuum of the enthusiastic vision of technology reaching every corner of India. Several other political figures—including Chandrababu Naidu of Andhra Pradesh, S. M. Krishna of Karnataka, and J. Jayalalitha of Tamil Nadu—had carefully built reputations as tech-savvy figures, proposing various ICT-for-development projects ranging from land grants for technology firms to free computers for poor people. As Kalam became president, this discourse went national. Unlike previous presidents, Kalam was a regular at conventions, colleges, and public events, pointedly giving talks using PowerPoint slides. His own life's path from coastal Tamil Nadu to the presidency was by way of science and technology, and consequently he came to epitomize aspirations of ascendance, through technology. In 2003, he was nominated for MTV India's Youth Icon of the year.

In 2004, Kalam was called on to introduce the Simputer, an indigenously designed simple and low-cost computer that was to expand computer access to populations typically excluded from such technology (Harichandran, 2004). The Simputer was by no means new at this point—it had been discussed since the late 1990s and was touted in the news media by government officials as a device to bring technology to the common man (Miller, 2001). The Simputer did have elements of innovation on the overall interface, but it emerged too late to be a personal digital assistant and too early to catch the tablet bandwagon. It did not make any serious dent in the market.

By 2012, several attempts to build low-cost computers for rural India had come and gone, and President Kalam had his name attached to a tablet computer—the Kalam-Raju tablet for health care monitoring (Sai Gopal, 2012). The same year, the new president of India, Pranab Mukherjee, would launch yet another low-cost computer—the Aakash. The state has been at the center of Aakash since its inception in 2009. According to the website of the National Mission on Education Through Information and Communication Technology (NME-ICT), the idea of developing a low-cost device was seeded in February 2009, when Arjun Singh, then minister of human resources development, formally launched NME-ICT. The initial design idea was intended for college students. A document on the website that details the history of Aakash states:

Statistics revealed that a large number of college-going students spent two hours or more in travelling to the place of study every day. The NME-ICT team believed that a lot could be done in the educational arena with the powerful educational technologies available in the IT and the communication industry. (NME-ICT, 2011a, p. 2)

In another government note titled "FAQs for the Aakash Tablet," the device is said to be motivated by the need for a computing device with a low cost but rich in features. The document notes that the NME-ICT wanted to utilize ICTs in "providing high-quality, personalized and interactive knowledge modules over the internet in an any-time, any-where mode" (NME-ICT, 2011b, p. 1). Regardless of the emphasis on innovation, the Ministry of Human Resources Development does acknowledge that the idea of building a technology

ICTD IN THE POPULAR PRESS

device for education was not a wholly original idea. Efforts to make a low-end educational laptop had been around for some time. For instance, the beginnings of the One Laptop Per Child project can be traced to 1982, when Nicholas Negroponte distributed microcomputers to school children in Dakar, Senegal, although the idea gained traction only after 2005 (NME-ICT, 2011a). The key for the MHRD was never the claim that the innovation per se was possible, but that it was possible indigenously and at a specific price point. This price point fed into the idea of low-cost appropriate innovation, and it added to the prominent discourse, mainly from the technology services industry, that India was a key destination for low-cost, high-quality technology work.

A section in the FAQ says that the idea took hold after *an organization* (emphasis in original) approached the government of India with an offer to sell a *laptop* (emphasis in original) targeted at school children at a price that ultimately totaled US\$150 from an initial offer price of US\$100. The ministry first tried to bargain with the organization. The document states:

Since requirements in India were of very large numbers, the MHRD felt that the device should be ideally priced at under US\$50/device with the ultimate goal of reaching \$10 per device much later. They were told this was impossible. This was the genesis of the program that was set up by MHRD under the NME-ICT, with the objective of designing and productionising a functional computing device at an ex-factory cost that was around US\$35/device. (NME-ICT, 2011a, p. 1)

Thus, the price point of the device quickly became the impossible dare that the MHRD took upon itself to execute.

Although the MHRD is credited with the initial formulation of ideas around Aakash, the science and technology minister soon emerged as the public champion of the project within the government. Kapil Sibal, a Harvard-trained lawyer, was a charismatic speaker and had aligned himself with a number of technology and development causes from early in his tenure. He was a prominent face at technology events (including the opening of the Microsoft research office in India).

Sibal served as the chief evangelist for Aakash and was featured multiple times in press conferences related to Aakash. He described it as a milestone in history because of its made-in-India label (Raina & Li, 2012).

The loss of President Kalam from the Bharatiya Janata Party government was in some ways filled by the technocrat in Kapil Sibal. However, unlike Kalam, a hugely popular youth icon, Sibal would try to censor the Internet and his website would be hacked by “Anonymous.” Nonetheless, no single figure in the Congress government in the last decade has been as consistently associated with technology. After heading the Ministries of Science and Technology and Human Resources Development, Sibal eventually led the Ministry of Communications and Information Technology, effectively helming the technology and telecommunications sectors of the country. Sibal was the globe-trotting face of the government from the World Economic Forum to meetings of the Internet Governance Forum. Aakash could not have found a more appropriate champion. As a technology columnist writing for the *Hindustan Times* noted, “Move over Mr. Negroponte—we have a new rock star” (Makhni, 2011, para. 6).

Made in India—or Not

Unlike the typical technology product that emerges from a standard market development and production cycle, Aakash was conceived out of a government tender. Datawind, a virtually unknown company founded by Canadian brothers of Indian origin, Suneet and Raja Tuli, won the bid to produce the first 100,000 devices in India through a local manufacturer called Quad Electronics in Andhra Pradesh. At the time of the first announcement, Quad had never built tablets, and Datawind had never sold computers at this scale. Cost was the key factor that led to Datawind’s winning bid.

Many initiatives that have promised a low-end computer have done so in two ways: first, by stripping a machine to the most basic hardware configurations and getting rid of operating system costs by replacing Windows with a free distribution of Linux; second, by including in the published price of a low-cost computer the assumption of a state subsidy and very large sales volumes. This approach is not new; the Computador Popular project in Brazil in the early 2000s stripped down assembly and threw in state subsidies to offer its low-cost computer for the masses in the early 2000s (Fonesca & Pal, 2006).

This creation of a technology around a price point, rather than an emphasis on innovation first and market questions later, has been repeatedly critiqued in the market. As Ranganathan wrote in *Mint*,

My problem isn't as much with the notion of a low-cost laptop computer as it is with the number. A \$100 laptop computer, to my mind, is a possibility (and there is a very high probability that someone will develop one in the next few years). This will be a real laptop computer, with a working keyboard, screen, battery, maybe even a drive, and come with pre-loaded software that will enable the user access the Internet, send and receive e-mail, write, and watch movies (or educational videos, if you'd rather have me say that). I don't see a \$35 laptop computer doing most of this. I believe that by focusing on the number, the government, which sees the low-cost laptop computer as the culmination of its efforts to bridge the digital divide, is doing a disservice to underprivileged people, especially children in government schools. (2011, para. 3)

Speculations aside, even with the steady flow of critiques of the government's techno-optimism, the first public blow to the Aakash story came when it was revealed that the device was manufactured in China. *The Hindustan Times* in November 2012 investigated Aakash's antecedents in a report titled "Conned: Aakash 2 Made in China?" (Sinha, 2012). According to the story, the Aakash 2 tablets unveiled with their "Made in India" stamps were little more than devices purchased off the shelf from manufacturers in China. Not only did this puncture the made-in-India discourse, but it came with the stigma of being from the neighborhood rival. Aakash, after all, had been conceived as a "nationalistic dare" to the OLPC ("Datawind Wants Made in India Aakash," 2012), and Datawind CEO Suneet Tuli himself called it a story of global innovation led by India (Press Trust of India, 2012a). In fact, after releasing Aakash 1, Tuli was reported to have asked the MHRD to include a made-in-India clause to encourage indigenous production ("Datawind Wants," 2012). *The Indian Express* published this quote by Tuli before the bidding for Aakash 2's tenders began:

It is the money of Indian taxpayers and is to be used for Indian students. It is for the government to decide whether they want to spend it for Indian jobs or they want to spend it on Chinese jobs. Irrespective of the final decision, I guarantee you that it will be won by company that will make product in India. ("Datawind Wants," 2012, para. 7)

Given the nationalistic fervor with which Tuli approached Aakash 2, he soon found himself in the line of fire; Tuli then swung from initial defensiveness about the need for sourcing the tablets from Datawind's Chinese subcontractors for expediency's sake to drawing fine distinctions between the geographies of where Aakash was conceptualized to where it was designed, assembled, and manufactured.

Aakash was an important element in the government's underlining of a discourse of technological supremacy not just within India but globally, and through very formal mechanisms. This is most visible in the government's unveiling of Aakash at the United Nations headquarters in the presence of Secretary General Ban Ki-moon. When India assumed the rotating presidency of the UN Security Council in November, the event was used to showcase Aakash to the international diplomatic community. It was classified as a "frugal innovation" according to UN terminology and was praised by Ban Ki-moon for "being a super-power on the information highway" (Press Trust of India, 2012b, para. 1). At the time, India was still smarting from fresh negative international press about the well-publicized failure in the unveiling of the earlier low-cost computer Sakshat. The made-in-China claims were likewise an embarrassment that needed to be controlled. Tuli's position was that, irrespective of the negative publicity, Aakash was not just an important innovation in itself but a valid indicator of the country's ability to innovate; he said that "People who doubt that this can be done in India should not have an inferiority complex" (Press Trust of India, 2012a, para. 12).

Did Datawind fool India with its made-in-India claims? The irony of the product being touted as representing the superior innovation of China quickly clouded the fact that most high-technology computing devices were produced there anyway. As an editorial in *The Indian Express* observed,

Aakash, then, has unwittingly become an object lesson in globalisation and comparative advantage. It makes sense all around, and drives down costs for consumers, for nations to specialise in areas where they have an edge. If China is a more efficient electronics manufacturing hub, India can chip in with something else. The goal of providing an entry-level computing device is best kept separate from chest-puffing about Indian inventiveness. ("Indi-genius," 2012, para. 3)

ICTD IN THE POPULAR PRESS

Culpability for the impending failure to domestically produce the Aakash was difficult to tag on to a single entity, because a complex web of actors was involved in the project. The government was keen to showcase research and development within the state-led higher education system, and a newly set up Indian Institute of Technology (IIT) in Jodhpur, headed by Prem Kalra, was entrusted with the job of managing the technical specs of the device.

Counter to hopes that this would highlight a collaborative relationship between a new, quality higher education institute and the technology industry, much in the vein of a Silicon Valley–style research–industry synergy, the experience was perhaps more indicative of a broken relationship. Things almost immediately soured once the test Aakash devices were provided to IIT Jodhpur, with reports claiming that the tablets were low-quality devices lacking adequate functionality and durability. In turn, both Datawind and government officials made counter claims that the research institutions were either too exacting in their requirements or out of touch with the realities of the production process. A *Hindustan Times* report quoted an anonymous senior government official as saying that “IITs are research organizations and have no clue how to handle logistics” (Chauhan, 2012, para. 10).

IIT Jodhpur was removed from the contract, which then passed on to the older and more established IIT Bombay. There, Aakash was tested as well as equipped with apps that were being developed for it. This relationship, too, started on a bad note when Datawind missed deadlines. This was followed by a series of back-and-forth status reports. Tuli had first announced that Datawind would set up three new factories in Cochin, Noida, and Hyderabad to assemble the tablet in addition to the sole unit it had with one of its vendors in Hyderabad to meet the high volume of preorders for Aakash 1 (Dhapola, 2012). Later, with the Aakash 2 China fiasco, Tuli acknowledged that it was the lack of suitable manufacturing facilities coupled with the labyrinth of paperwork to clear customs in India that had made him look to China to expedite Aakash’s production (Chang, 2012). With the IIT Bombay relationship in question, reports emerged that the next version, Aakash 3, would be spearheaded by yet another IIT—IIT Madras (Chappia, 2012).

The reported failures with the production process dampened the initial euphoria over the idea of a global leader technology device and opened the gates for a slew of new critiques. Media commentators questioned the validity of various underlying premises of Aakash—from the validity of a computer-aided learning model for Indian schools to the ability of the existing infrastructure to support the connectivity needed for the devices (Singh, 2012).

The Rickshaw Wallah, the Watchman, and the Maid

One of the most powerful ways in which Aakash is situated within the discourse of technology and improvement emerges from the way the use of a laptop is defined from a view of marginality. In his public talks about Aakash, Tuli repeatedly evoked the image of the rickshaw *wallah*—the driver of the ubiquitous three-wheeled *tuktuks* used for cheap transport in Indian towns. In a discussion with *The Indian Express* team, Tuli said,

My team laughs at me every time I start discussions with the rickshaw wallah and they ask, “Will you sell an Internet device to the rickshaw wallah?” But if I can convince the rickshaw wallah, everybody else is easy game. . . . Five years ago, we would have been surprised if we saw a rickshaw wallah with a mobile phone. . . . Tomorrow we will be surprised if we see him with a website. Just watch—he will take advantage of the Internet as a commerce tool. (Rajan, 2011, para. 7)

The image of Tuli’s laptop-toting rickshaw driver should not be new to anyone working in ICTD. Pictures of South Asian or African women holding technology as though that were an anomaly has become a common part of the dominant ICTD discourse. *New York Times* columnist Thomas Friedman (2011) gave a nod to the marginal Indian worker when he recounted a conversation with the wife of IIT Jodhpur professor Prem Kalra, who was in charge of the technical specifications of the original Aakash:

In terms of hope, I was struck by a story that Kalra’s wife, Urmila, told about a chat she had had with their maid after Aakash was unveiled on October 5. Her maid, who has two young children, said she had heard “from the night watchman that Mr. Kalra has made a computer that is very cheap, and is so cheap even she

can afford to buy it. The watchman had given her a picture from the paper, and she asked me if it was true." Urmila told her it was true and that the machine was meant for people who could not afford a big computer. "What can you do on it?" she asked me. I said, "If your daughter goes to school, she can use it to download videos of class lessons," just like she had seen my son download physics lectures every week from MIT. She just kept getting wider- and wider-eyed. Then she asked me will her kids be able to learn English on it. I said, "Yes, they will definitely be able to learn English. . . . It will be so cheap you will be able to buy one for your son and one for your daughter!" That conversation is the sound of history changing. (paras. 8–9)

The assumption of voice and the intentionality in the rickshaw wallah, maid, or night watchman summarize the popular story of technology and aspiration attributed to the Indian underclasses. That neither Tuli nor Friedman based their ideas on any significant exploration of the histories or hopes of their target unfortunates is irrelevant in the making of a good story. The targeted beneficiary of the low-cost technology has undergone little reimagining in the minds of the manufacturers since the early days of the bottom-of-the-pyramid wave that brought into focus low-income consumers. The imagination of the indigent Aakash customer is a necessary part of the nation-building force it represents. Without the absurdity of a tablet computer in the hands of a rickshaw wallah, or the inspiring image of the child of a maid using the computer, there is no story to sell. What has been critical is that the constructed user of Aakash is not just a marginal economic agent but represents an individual separated by his or her life's circumstances from the prototypical technology user.

Although surprisingly little primary research has examined the assumed target populations of these technologies, earlier iterations of low-cost computing tell a familiar story. Many of the same observations that Fonseca and Pal (2006) made with regard to India's Simputer and Brazil's Computador Popular are repeated in the case of Aakash. Just as it was unclear whether the Simputer was a tool for empowerment from the mere use of the device or from the information accessed through it, the landing of Aakash into the hands of the end beneficiary is the assumed endgame in itself.

There is much to be said about technology getting cheaper. Everywhere in the world, computing technology becomes a domestic artifact only after the price hits a certain affordable point. But these devices entered various societies at points when much of other human infrastructure was already in place. To use a metaphor proposed by Kentaro Toyama, the computers arrived as amplifiers for human capacity. It is this that makes the assumption of a price point for Aakash as the giant leap toward development particularly concerning. In this imagination, the user exists as being just one device away from transforming into an entrepreneur who in turn enables his or her children to learn English and physics through videos. Little, if anything, is known about how or for what these devices are ever used. In a discussion with *The Indian Express*, Tuli summarized the ease of computing for people who had never used a computer:

The idea of training people to use it is, I think, misplaced in the market. . . . The kind of applications today, especially in a touch user interface, don't require a lot of training. You don't need to use a manual. You turn it on, you press a button and you are there. The user interface, the application software is already there. (Rajan, 2011, para. 5)

The Indian media have pushed back on some of these claims, particularly in the last year, as the state of Aakash's development has been increasingly unclear. Yet the MHRD's original idea of a low-cost computer for India's schoolchildren was where Aakash began and from where it continues to draw its legitimacy. Still, little attention has been devoted to the specifics of the user interface and applications—unlike the OLPC, which from the start was specific about being a constructionist learning device on the Sugar desktop environment. Instead, the politics of building a low-cost tablet in a developing country like India have meant that the characteristics of the Aakash user extend beyond schoolchildren to envelop a larger sociopolitical discourse about low-income users in an emerging economy. Implicit in the commentary offered by the U.S.-based tech websites is the premise that consumers outside the sphere of Western civilization are a less discerning lot with qualitatively different needs. A review in *Engadget* reads:

Are we rushing to put the Aakash 2 on our Christmas lists? No. We expect more from our tablets. We're demanding westerners that want to play Grand Theft Auto and compose entire albums on our devices. But . . .

ICTD IN THE POPULAR PRESS

the DataWind device seems like the best bet to get the internet into the hands of millions students in developing nations. And that's where technology has a chance to make a real difference. (O'Brien, 2012, para. 5)

The patronizing 'othering' in O'Brien's review echoes the traditional bottom-of-the-pyramid consumer view evangelized by C. K. Prahalad (2010) that calls upon manufacturers to practice inclusive capitalism that will benefit the millions of poor at the bottom of the pyramid. Casting the poor in the mold of consumers seems to imply that, as active consumer agents, the emerging market client cares most for goods that would deliver basic functionality at a low price (Kuriyan, Nafus, & Mainwaring, 2012). The reimagining of poor people as consumers not only shifts the development discourse to the marketplace but elevates ICTs to a messianic status that is expected to usher the poor out of poverty when it comes calling with the benefits of a smoother and faster delivery platform of goods and services.

The Indian American Dream

In the information technology sector, the two well-known categories of goods are hardware—the stuff you can hold in your hands—and software—the bits that have no weight. The third category is termed vaporware: hardware that exists only in the fevered imagination of their promoters, and which will never hit the stores. (Dey, 2011, para. 2)

Economist Atanu Dey's scathing critique of Aakash in *The Indian Express* in 2011 came at a time when a section of the Indian media had already started questioning Aakash as a technology fix to the complex problem of quality education. Academics had already proved to be early skeptics of the idea of low-cost computing as panacea, and in India education commentators soon joined the fray. This included two particularly important figures: Anurag Behar of the Azim Premji Foundation, one of the largest providers of digital learning resources (DLRs), and Madhav Chavan, head of Pratham and adviser to Sonia Gandhi. In a self-reflexive essay, Behar categorized DLR efforts as a failure, and the Azim Premji Foundation moved away from computer-aided learning to investing more in the human elements of the education system (Behar, 2010).

Such dismissal of computer-aided learning led to an unusual drawing of battle lines between positions of the state and its detractors. The Indian diaspora, in particular the Silicon Valley entrepreneurs, allied with the official line on Aakash. An article by Valley entrepreneur Vivek Wadhwa emphasizes the discourse of technology and development and hints at the powerful relationship between the tech diaspora and the government. This nexus underlines a state-sanctioned aspiration for middle-class advancement through technology as exemplified by the engineer or entrepreneur who achieves the American dream but stays true to his or her Indian roots by pushing for development goals. Wadhwa's take on Aakash was unique in that he found the Indian media's unenthusiastic response to Aakash to be symptomatic of an inherent inferiority complex and petty politics in India. Just before Aakash 2 was launched, Wadhwa (2012), in his column, claimed that it was on his advice that Kapil Sibal proceeded with a second iteration of Aakash.

Wadhwa continued with his evangelization of Aakash by touting the device to U.S. tech websites. Writing for *The Washington Post*, Wadhwa noted that a *Hindustan Times* correspondent even wrote about his role in revitalizing Aakash by quoting this line: "Wadhwa might have indeed saved the device from a premature demise" (Raj, 2012, para. 12).

Owing to its shiny successes in Silicon Valley, the Indian diaspora has had little difficulty emerging as triumphant in the technology development discourse for the homeland. Far away from the country of origin, their compatriots—those of the developing world status are viewed through the lens of technology—the domain in which the diaspora is firmly entrenched as the great American success story. Aakash drew the tech diaspora to discuss the problematic country they left behind, and common ground was found. The same *Hindustan Times* reporter also interviewed Tuli, who mentions his interaction with Wadhwa:

But [Wadhwa] also feared for the future of Aakash 2. "Indians have an inferiority complex about their ability to produce anything of this standard and they would have finished off the device by rubbishing it," he said. So his strategy of getting it tested by leading experts in the U.S. If the reviews were good, Indian reviewers and critics would look silly going the other way. (Raj, 2012, para. 9)

As well-intentioned as Wadhwa may have been, contrary to his claims, we found that the international media did not demonstrate any exceptional support for Aakash. U.S.-based technology websites frequently conveyed skepticism that sometimes bordered on mockery. Reporting on the first whispers of the Indian government's efforts to produce a \$20 laptop that was called Sakshat, a post dated February 3, 2009, on *Engadget* (Miller, 2009, para. 1) stated, "As expected, India's government unveiled the jointly developed '\$10 laptop' today, now priced at \$20. Unfortunately dubbed Sakshat, which ironically translates as 'before your eyes,' the laptop is slated to ship in six months."

A year later, when Sakshat became the \$35 laptop Aakash, *TechCrunch* shared a video from the Indian news channel NDTV demonstrating Aakash with the following commentary:

Bear in mind that the \$35 price on this tablet, which we heard about a couple weeks back, is a fantasy until it is actually in production and releasing with that price. . . . I'll believe it when I see it—but if I do see it, I'll be pleasantly surprised. (Coldewey, 2010, para. 1)

Wadhwa's belief that the U.S. news media would rescue Aakash from the Indian media's death grip found little resonance. Some argue that it is exactly this Western-centric imagination that India needs to be liberated from. In an op-ed for *The Hindu*, Srivas (2013, para. 10) wrote, "If every American child has an iPad, then our children must have the Aakash—surely that will bring our educational and developmental process up to speed? This is a deeply flawed logic."

By the time Aakash 2 was released in November 2012, both *Engadget* and *TechCrunch* had taken a more encouraging stance. Reporting on the preordering of Aakash 2, *TechCrunch* (Coldewey, 2012, paras. 7–8) closed his post with the following lines:

India's Aakash experiment has been a long and strange one, and may yet prove to be a success or failure. . . . And either result is respectable, because the entire idea is respectable, and the rocky road upon which it has traveled was more or less expected. It's the entrepreneurial spirit moving within the government, and has its roots in a desire to better their population's lot and to try something new.

Might the steadfast evangelism of immigrants who symbolized the American dream through their academic and entrepreneurial acumen lend a veneer of respectability to Aakash for the U.S. news media? Long exoticized for cultural exports such as the *bindi* and Bollywood, the Indian immigrant could now add the prestige of technology to the armor and engage in nation building from afar. Technological prowess allows them to shape their country's narrative in the adopted country's media while picking holes in the version from the home country. The Indian American, after all, would know better than the Indian.

Conclusion

That the social, political, and economic context in which technologies are produced and consumed are almost as important as the technologies themselves is well established (Winner, 1999). In analyzing the discourse, we discerned what was of consequence to India and how it reacted when confronted with a piece of homegrown technology. We see how the implications of Aakash resonated differently among different classes and nations as it was put through the rigors of examination by both the Indian and the international (mostly U.S.) media that reported on it.

The Context

If for carping critics, Aakash is an idea best erased from the educational slate, for its enthusiasts, the final inscription on the tablet has yet to be etched. Suspended between these two verdicts is a nation's experiment with development and its claim of being an innovator of global repute—all at once. A fitting denouement to the Aakash story would rest on evaluating how well it fared when propelled by state subsidies—whether it made its way into the school bags of the students who were its primary beneficiaries. For that, however, we must wait. For the moment, Aakash struggles for a smooth takeoff.

Meanwhile, India's education sector continues to reel from a barrage of infrastructural woes, finding little relief in the techno-optimism of its leaders. It was only in 2010 that India made education a fundamental right

ICTD IN THE POPULAR PRESS

of every child ages 6 to 14 years, and schools continue to remain woefully understaffed. In all this, Aakash is set to cost the government US\$140 million. For Aakash critics, the task of fixing the education system is not something that can be outsourced to a tablet. If Aakash is really a high-tech jugaad, then following Birtchnell's (2011) arguments, quick-fix projects such as these create more obstacles. It is in this context that the discourse around Aakash needs to be read.

The Leader

As contested as the idea of Aakash is, it is yet another link in a long chain of India's aspirations of nation building, in which leaders increasingly view the country through the technology lens in a bid to showcase developmental initiatives. Kalam championed the PowerPoint in his public presentations, and by the time 2011 rolled around as the touchscreen age, Sibal appropriated the tablet. Aakash represents the evolution in the way technology is used to legitimize development, build a nation, and grow leadership all at the same time. Here, the leader is largely technologically deterministic, viewing ICTs as a causal agent of change, and accordingly invests the nation's resources in bringing it to fruition.

India Innovates; Diaspora Advocates

In the recent past, innovation in India has been firmly rooted in the ethos of affordability and being the world's cheapest. In terms of products, Aakash was not the first to claim the dual attraction of being made in India and of being the cheapest of its kind. Nano—the car made by Tata—debuted in 2009 to as much fanfare and critiques similar to Aakash. The traditional Indian fascination with all products Western found itself a little blunted. Not only was the globe-trotting Indian becoming more commonplace, but the forces of globalization meant that the coveted made-in-America label was fast being replaced by “Made in China,” even as the products themselves were becoming more accessible.

If earlier Indians lamented stories of the patenting of the native basmati and turmeric by Americans as proof of the inherent superiority of Indian products that failed to materialize in the country's own consciousness until the West appropriated it, India's technology status was now an invitation to tread newer ground. It was an opportunity to prove that innovation could begin at home. Gift-wrapped as a developmental initiative, it could even prove that the Indians could save themselves—sans any trace of Western charity. However, Aakash as an innovation was critiqued on two fronts. Even while its fundamental purpose was disputed, its dubious Chinese origins earned it derision in the face of the government's nationalistic claims. As the tablet began losing popular support in India, the diaspora took up its cause and in turn critiqued Indians who disowned it. This is notable for what it reveals about the successful Indian immigrant who swears by technology.

The emergence of a Silicon Valley call to support Aakash is an important indicator of the way the successful technology diaspora is imagined as holding the key to middle-class aspiration. The idea of the formerly middle-class Indian technologist as the face of secular modernity has been a critical piece of the neoliberal discourse of technology as the key to India's development. Thus, the voice of enlightenment missing in the Indian media's dismissal of Aakash is restored through one of the nation's most successful exports.

The Poor as Consumers

Finally, we have the rickshaw wallah as the ubiquitous yet silent face of Aakash's potential. Tuli's and Friedman's choices of the rickshaw wallah, maid, and watchman are important representations of Indian marginality, because they are among the classes of poor Indians most visible to affluent classes. The construction of a convenient, proximate urban poor in the popular media around Aakash helps propagate a discourse of attainable aspiration. The flattening of class and networks inherent in the construction of the domestic maid's potential to reframe her children's future is a dangerous but critical part of why Aakash is so compelling. It tells a human story of possibility.

The narrative of Aakash allows the leader and the successful immigrant a chance to steer the story of Indian innovation and development at regular intervals. As the targeted beneficiary, the poor consumers remain marginalized, perhaps even unaware of the story being scripted in their name. In the discourse, at least, Aakash retains everything that would stamp it as quintessentially made in India. ■

Preeti Mudliar, Research Scientist, Xerox Research Centre India in Bangalore. preeti.mudliar@xerox.com

Joyojeet Pal, Assistant Professor, School of Information at the University of Michigan, Ann Arbor.
joyojeet@umich.edu

References

- Abraham, I. (1998). *The making of the Indian atomic bomb: Science, secrecy, and the atomic state*. London, UK: Zed Books.
- Arora, P. (2010). Hope-in-the-wall? A digital promise for free learning. *British Journal of Educational Technology*, 41(5), 689–702.
- Behar, A. (2010, December 16). Limits of ICT in education. *Mint*. Retrieved from <http://www.livemint.com/Opinion/Y3Rhb5CXmkGuUlyg4nrc3l/Limits-of-ICT-in-education.html>
- Birchnell, T. (2011). Jugaad as systemic risk and disruptive innovation in India. *Contemporary South Asia*, 19, 357–372.
- Chang, A. (2012, November 27). Govt paid for specs not Chinese parts in Aakash 2: Datawind. *First Post*. Retrieved from <http://www.firstpost.com/tech/govt-paid-for-specs-not-chinese-parts-in-aakash-2-datawind-536625.html>
- Chappia, H. (2012, December 1). IIT-Bombay to power up Aakash 2 tablets for Indian classrooms. *The Economic Times*. Retrieved from <http://economictimes.indiatimes.com/tech/hardware/iit-bombay-to-power-up-aakash-2-tablets-for-indian-classrooms/articleshow/17437423.cms>
- Chauhan, C. (2012, February 16). IIT-HRD tussle stalls Aakash tablet distribution. *Hindustan Times*. Retrieved from <http://www.hindustantimes.com/News-Feed/Chunk-HT-UI-Print-Delhi-MainNews-Nation/IIT-HRD-tussle-stalls-Aakash-tablet-distribution/Article1-812537.aspx>
- Chigona, W., & Mooketsi, B. (2011). In the eyes of the media: Discourse of an ICT4D project in a developing country. *Electronic Journal on Information Systems in Developing Countries*, 46, 1–16.
- Chima, C. (2011, October 26). Hands on: India's \$35 Aakash Android tablet lands in America (exclusive). *Venture Beat*. Retrieved from <http://venturebeat.com/2011/10/26/aakash-android-tablet-exclusive/>
- Coldewey, D. (2010, August 15). \$35 Indian tablet demonstrated on video. *Techcrunch*. Retrieved from <http://techcrunch.com/2010/08/15/35-indian-tablet-demonstrated-on-video/>
- Coldewey, D. (2012, January 3). India's low-cost Aakash tablets pre-orders hit 1.4 million. *Techcrunch*. Retrieved from <http://techcrunch.com/2012/01/03/indias-low-cost-aakash-tablet-pre-orders-hit-1-4-million/>
- Cukier, W., Ngwenyama, O., Bauer, R., & Middleton, C. (2009). A critical analysis of media discourse on information technology: Preliminary results of a proposed method for critical discourse analysis. *Information Systems Journal*, 19, 175–196.
- Datawind wants made in India Aakash. (2012, January 22). *The Indian Express*. Retrieved from <http://www.indianexpress.com/news/datawind-wants-made-in-india-aakash/902619/0>
- Dey, A. (2011, October 8). Swiping without reading. *The Indian Express*. Retrieved from <http://www.indianexpress.com/olympics/news/swiping-without-reading/857206/0>
- Dhapola, S. (2012, January 4). Move over iPad, Aakash has 1.4 million pre-orders. *First Post*. Retrieved from <http://www.firstpost.com/tech/move-over-ipad-aakash-has-1-4-million-pre-orders-171814.html>
- Fairclough, N. (1992). Discourse and text: Linguistic and intertextual analysis within discourse analysis. *Discourse & Society*, 3(2), 193–217.

ICTD IN THE POPULAR PRESS

- Fairclough, N. (1995). *Media discourse*. London, UK: Hodder Arnold.
- Fonseca, R., & Pal, J. (2006). Computing devices for all: Creating and selling the low cost computer. In *Information and Communication Technologies and Development, 2006. ICTD'06. International Conference on IEEE* (pp. 11–20). doi:10.1109/ICTD.2006.301831
- Foucault, M. (1972). *Archaeology of knowledge*. New York, NY: Pantheon.
- Friedman, T. (2011, November 12). The last person. *The New York Times*. Retrieved from http://www.nytimes.com/2011/11/13/opinion/sunday/friedman-the-last-person.html?_r=0
- Habermas, J. (1991). *The structural transformation of the public sphere: An inquiry into a category of bourgeois society*. Cambridge, MA: MIT Press.
- Harichandran, A. (2004, March 27). More than a common man's computer. *The Hindu*. Retrieved from <http://www.thehindu.com/2004/03/27/stories/2004032703422200.htm>
- Indi-genius. (2012, December 3). *The Indian Express*. Retrieved from <http://www.indianexpress.com/news/indigenius/1039540/>
- Kuriyan, R., Nafus, D., & Mainwaring, S. (2012). Consumption, technology, and development. *Information Technologies & International Development, 8*(1), 1–12.
- MacKenzie, D., & Wajcman, J. (1999). *The social shaping of technology*. Buckingham, PA: Open University Press.
- Makhni, R. (2011, October 8). Of \$35 tablets and more . . . *Hindustan Times*. Retrieved from <http://www.hindustantimes.com/technology/IndustryTrends/Of-35-Tablets-and-more/SP-Article1-755054.aspx>
- Mansell, R. (2006). Ambiguous connections: Entitlements and responsibilities of global networking. *Journal of International Development, 18*(6), 901–913.
- Mehan, H., Nathanson, C. E., & Skelly, J. M. (1990). Nuclear discourse in the 1980s: The unravelling conventions of the cold war. *Discourse & Society, 1*(2), 133–165.
- Miller, P. (2009, February 3). India "unveils" \$20 laptop, the Sakshat. *Engadget*. Retrieved from <http://www.engadget.com/2009/02/03/india-unveils-20-laptop-the-sakshat/>
- Miller, S. (2001, July 9). Handheld PC bridges digital divide. *The Guardian*. Retrieved from <http://www.theguardian.com/technology/2001/jul/09/internetnews.uknews>
- National Mission on Education in ICT. (2011a). *Background note on Aakash*. Retrieved from http://www.sakshat.ac.in/pdf/Final_Note_Aakash.pdf
- National Mission on Education in ICT. (2011b). *FAQs for the Aakash tablet*. Retrieved from http://www.sakshat.ac.in/pdf/Final_FAQ_Aakash.pdf
- O'Brien, T. (2012, November 28). Aakash 2 hands-on: The \$40 educational slate with revolution on its mind. *Engadget*. Retrieved from <http://www.engadget.com/2012/11/28/aakash-2-hands-on/>
- Pan, Z., & Kosicki, G. M. (1993). Framing analysis: An approach to news discourse. *Political communication, 10*(1), 55–75.
- Prahalad, C. K. (2010). *Fortune at the bottom of the pyramid: Eradicating poverty through profits*. Upper Saddle River, NJ: Pearson Education.
- Press Trust of India. (2012a, November 29). Aakash maker dismisses made in China controversy. *The Hindu*. Retrieved from <http://www.thehindu.com/business/aakash-maker-dismisses-madeinchina-controversy/article4146438.ece>

- Press Trust of India. (2012b, November 29). Aakash tablet unveiled at UN. *The Hindu*. Retrieved from <http://www.thehindu.com/sci-tech/gadgets/aakash-tablet-unveiled-at-un/article4146496.ece>
- Press Trust of India. (2013, March 28). Aakash tablet is alive and kicking: Kapil Sibal. *The Indian Express*. Retrieved from <http://m.indianexpress.com/news/aakash-is-alive-and-kicking-kapil-sibal/1092392/>
- Raina, P., & Li, M. (2012, November 26). India's "Aakash" now made in China [Web log post]. Retrieved from <http://india.blogs.nytimes.com/2012/11/26/india%E2%80%99s-super-cheap-tablet-now-made-in-china/>
- Raj, Y. (2012, September 19). The Aakash is back, and shines in sneak peeks. *Hindustan Times*. Retrieved from <http://www.hindustantimes.com/technology/PersonalTech-Updates/The-Aakash-is-back-and-shines-in-sneak-peeks/SP-Article1-932630.aspx>
- Rajan, N. (2011, October 30). If Aakash can help level the playing field for the poor, that's the biggest motivator. *The Indian Express*. Retrieved from <http://www.indianexpress.com/news/if-aakash-can-help-level-the-playing-field-for-the-poor-that-s-the-biggest-motivator/867596/0>
- Ranganathan, S. (2011, August 5). The futile quest for a 35 dollar computer. *Mint*. Retrieved from <http://www.livemint.com/Opinion/3EFq8fZorOkKLLWibVGm4O/The-futile-quest-for-a-35-dollar-computer.html>
- Sai Gopal, M. (2012, March 22). Now, "Kalam-Raju tablet" for healthcare workers. *The Hindu*. Retrieved from <http://www.thehindu.com/news/cities/Hyderabad/now-kalamraju-tablet-for-healthcare-workers/article3025860.ece>
- Singh, A. K. (2012, June 10). Bridging knowledge gap through online learning. *The Hindu*. Retrieved from <http://www.thehindu.com/todays-paper/tp-national/tp-karnataka/bridging-knowledge-gap-through-online-learning/article3510962.ece>
- Sinha, V. (2012, November 24). Conned: Aakash 2 made in China? *Hindustan Times*. Retrieved from <http://www.hindustantimes.com/technology/PersonalTech-Updates/Conned-Aakash-2-made-in-China/SP-Article1-963600.aspx>
- Srivas, A. (2013, June 6). India, cargo cults and the Aakash tablet. *The Hindu*. Retrieved from <http://www.thehindu.com/opinion/blogs/blog-hypertext/article4547229.ece>
- Strauss, A., & Corbin, J. (1998). *Basics of qualitative research: Techniques and procedures for developing grounded theory*. Thousand Oaks, CA: SAGE Publications.
- Thompson, M. P. (2005). ICT, power and developmental discourse: A critical analysis. *Electronic Journal of Information Systems in Developing Countries*, 20(4), 1–26.
- Wadhwa, V. (2012, September 20). How the Aakash tablet bounced back. *The Washington Post*. Retrieved from http://www.washingtonpost.com/national/on-innovations/how-the-aakash-tablet-bounced-back/2012/09/20/96f42406-034f-11e2-8102-ebee9c66e190_story.html
- Winner, L. (1999). Do artifacts have politics? In D. MacKenzie & J. Wajcman (Eds.), *The social shaping of technology* (pp. 28–40). Philadelphia, PA: Open University Press.

