ICTD in the Popular Press: Media Discourse around Aakash, the 'World's Cheapest Tablet'

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ABSTRACT
The quest for the low-cost computer has been among the primal motivations of innovation and practice in the ICTD world from its very beginnings. We discuss continuing developments in case of the low-cost Indian tablet, Aakash, publicized as the world's cheapest computer, and situate these within a history of India's quest for development through technology in the past two decades. We analyze 212 articles on Aakash and find four dominant themes in the way the device has been discussed in the popular media. These include the cult of a technocratic leadership, the discourse of indigenous technology, the recreation of the Silicon Valley dream, and the face of the marginal user. We argue that Aakash has gone beyond being a technology artifact to a device that represents Indian aspirations at several levels – as a forward thinking state, an ingenious entrepreneurial class, and an energetic population that needs nothing but access to technology to succeed.

Categories and Subject Descriptors
Check: K.4.m [**Computers and Society**]: Miscellaneous

General Terms
Languages, Documentation

Keywords
India, low-cost tablet, Aakash, ICTD discourse

1 INTRODUCTION
As a low-priced, high-quality, state-sponsored ICT solution, Aakash presents itself as a tool to fix India's educational deficit. Aakash, advertised as the world's cheapest tablet computer, is tagged with an introductory price of US $35. It comes equipped with a RAM of 256 MB, a memory of 4GB, and a battery that when fully charged runs close to 3 hours. The first generation Aakash only had Wi-Fi connectivity, but Aakash 2 entered a market quickly moving to mobile broadband as a standard, 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 that allows for the plugging of stereo earphones and supports voice input with an in-built microphone. With all of these features and weighing a light 350 grams, the 7-inch Aakash 2 appears as a product that fits the market standard, and yet costs a fraction of its competitors. This combination of technology innovation and production economics rests cannily on state-subsidy to present a potent mix which 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

The notion of *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 an imaginative work ethic of the ordinary Indian that inspires innovation by offering quick fix remedies. The practice of *jugaad* is often viewed as a form of bottom-up innovation that is at once both empowering, ad hoc, and reactive to socio-technical change [5]. 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, this very practice of *jugaad* is actually illustrative of temporarily coping with systemic risk rather than a measure of any real kind of innovation. It is critiqued that far from representing technological innovation that allows the grassroots to evolve upwards, *jugaad* actually exposes people to real harm. Instead, it is India's desire to become a strong economic player on the international stage and its intense aspirations for socio-technical change that have contributed to the perpetuation of a grand narrative where *jugaad* is fast acquiring the reputation for an indigenous way of life that belies the very real dangers that stand in the way of India's development [5]

So what does the labeling of Aakash as a *jugaad* of the high tech kind really mean? Aakash first hit the news in October 2011 and over time was repeatedly featured in discussions by politicians, industry-leaders, and bureaucrats, but by April 2013, the government itself raised serious questions on both the viability and relevance of the project, suggesting that it had started looking at ways of focusing on a more holistic enabling of student access to quality content. While the Science and Technology Minister Kapil Sibal, who first championed the project continued to wave its flag, his own successor (Sibal was promoted to Human

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Resources Development Minister), MM Pallam Raju was openly dismissive of the project [49].

Over the next several months, various individuals from the government, the mainstream and independent media, and the government itself would offer a range of often contradictory messages on the status.

2 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 in the past. While technology blogs extensively covered the specs of the tablet and innovation on the technical side, news and business dailies were occupied with concerns ranging from the economics and location of its production and reporting on how it figured as a trope in the political one-upmanship between rival political parties - Sibal was challenged by the chief minister of Gujarat, Narendra Modi on the 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, various telecenter projects, egovernance initiatives have been prominently covered by the regional and national press alike. This coverage of ICTD in the media is by no means restricted to India. Images of technology juxtaposed against poverty in the media have inundated the ICTD world from major global news sources and publications of international agencies all the way to small regional news and commentary media throughout the global South.

Media texts are routinely interrogated in a variety of disciplines such as political communication, film studies, and advertising. The underlying motive of studying content is the recognition that texts are essentially an organized way of signifying elements that not only argue for or against certain ideas, but also encourage the processing of the texts by the audience in a certain way [41] that in turn leads to the construction of social reality [21].

Studies of the 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 the information technology argues that media discourses on technology have important implications for the way society understands and reacts to the technology imperative [18]. As a follow up, an explicit ICTD examination was presented with an analysis of the media coverage surrounding an education project in South Africa. The paper noted that the media paid little attention to the real challenges and limitations of the project, which could result in schools harboring unreal expectations of success [12].

Through an examination of 212 articles as well as publicly available government documents we attempt to trace the story of India's tryst with producing a low computing technology device. Our analysis represents content from four English dailies, four business dailies, one English news website from India, two major US-based news dailies, and three leading technology websites (table 1). We date our earliest analysis to February 2009 when India's ministry of Human Resources Development claimed to have produced a prototype of the a $10 laptop. We then work our way to April 2013 when Aakash has now assumed the avatar of Aakash 2.

The articles which consisted of reports, interviews, reviews, columns, editorials, and op-eds were collected by retrieving

Table 1. Analyzed content

	Publication	Country	Type	Articles
1	The Indian Express	India	News Daily	56
2	The Hindu	India	News Daily	48
3	Hindustan Times	India	News Daily	36
4	The Times of India	India	News Daily	5
5	The Pioneer	India	News Daily	1
6	The Telegraph	India	News Daily	1
7	First Post	India	News website	6
8	The Economic Times	India	Business Daily	7
9	Business Standard	India	Business Daily	8
10	Mint	India	Business Daily	16
11	Think Digit	India	Tech Blog	1
12	The New York Times India Ink	USA	News Blog	9
13	The New York Times	USA	News Daily	2
14	The Washington Post	USA	News Daily	4
15	Engadget	USA	Tech Blog	3
16	TechCrunch	USA	Tech Blog	6
17	FastCompany	USA	Magazine	1
18	BBC Tech Blog	UK	Blog	1
19	Financial Times	UK	Business Daily	1
TOTAL				**212**

content from search tag archives such as 'Aakash' 'tablets' 'Kapil Sibal' 'Datawind' on websites of popular news publications. Since Aakash was a developing story during the time data was being collected for this paper, extensive Internet searches using the same tags were also 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 [59] and were coded using Dedoose an online data analysis software. Each article was coded according to the themes that it was addressing with the initial analysis yielding 65 themes that appeared in both Indian as well as the international media. The themes were again analyzed and classified into three broad categories of 'Nation', 'Production of Aakash', and 'Key People', which was then employed to present

the analysis in this paper. Some of the most frequent themes that were observed appear below in Table 2. While the primary aim of this paper was not to compare the coverage between the Indian and the international media, most of the news related to Aakash appearing in the international media was limited to reviews of the tablet. An exception to this was the India Ink 'blog' that forms part of the New York Times coverage on India. Reportage on the India Ink featured a broader coverage of Aakash beyond commentary on the tablet's performance and specs.

Table 2. Frequency of themes

	Theme	Frequency
1.	Made in India, China controversy, and national pride	104
2.	Government of India and Aakash	88
3.	Aakash review and specs	39
4.	Kapil Sibal	39
5.	Aakash price point	39
6.	Suneet Tuli/Datawind	48
7.	Technology in India	25
8.	State of education in India	13

3 THE DISCOURSE OF THE INDIAN TECHNOCRAT

> *State-owned Air India put up a billboard outside its Bombay headquarters that showed the airline's mascot, a turbaned maharajah, standing smugly with head high and arms folded in front of the mushroom clouds of two nuclear explosions. A stern Uncle Sam points his finger and preaches: "Do as I say, not as I do!"*
>
> *Jonathan Karp, reporting in the aftermath of the 1998 nuclear tests (Karp, 1998)*

On May 12, 1998 India awoke with an incredible surge of nationalistic pride at conducting 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. Irrespective, celebrations on the streets continued. The newly formed coalition government of the BJP, struggling at the edge with squabbling partners and an ageing prime minister, suddenly emerged as powerful and tech-savvy.

The connection between technology, development and national pride is not new to India. The country's first prime minister, Jawaharlal Nehru famously called dams the 'temples of modern India'. Personalized 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 own identity in a post-colonial world [1]. The precursor to the 1998 tests, the 1974 nuclear tests under Indira Gandhi, had built a sense of national pride around indigenous technology and made national icons of the scientists who led it. 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 [33].

The state was concerned with not only using technology to remake the post-colonial landscape of the country as a scientific space with productive economic activities, but also with populating these spaces with individuals who bore the temperaments of modern rational Indian men [1]. In 1998, India was just stepping into an exciting world of technology, with its slowly growing and increasingly visible technology sector. The time was ripe for two new rational technocrat icons – the prime minister, and the publicly anointed architect of the nuclear tests. APJ Abdul Kalam was then the country's Chief Scientific Advisor. Kalam went overnight from the relative obscurity of the typical scientific advisor to being a symbol of the country's secular nature. The act of testing a nuclear bomb was at once an act of national defiance against a powerful international community, but more importantly 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 went from being a nuclear scientist to a bestselling social commentator on technology, development, and modernity [27]. By the turn of the millennium, the then prime minister Atal Behari Vajpayee himself stated in his Independence Day address that he wanted to see computers and the Internet in every single village of India (Reuters 2000). Kalam's transition to the presidency was a natural continuum of the enthusiastic vision of technology reaching every corner of India. At his inauguration, the president mentioned technology five times in his brief speech, ending with a poem to the youth on technology:

> *As a young citizen of India, armed with technology, knowledge and love for my nation, I realize, small aim is a crime. ...I will work and sweat for a great vision, the vision of transforming India into a developed nation, powered by economic strength with value system*
>
> *APJ Abdul Kalam, Inaugural Speech, 2002*

Several others political figures including Chandrababu Naidu of Andhra Pradesh, SM 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 the poor. With Kalam turning president, this discourse went national. Unlike previous presidents, Kalam was a regular face at conventions, colleges, public events, pointedly giving talks with PowerPoint slides. He regularly spoke on the importance of widespread access to computers and technology among the poor of India. His own life leading up from rural Tamil Nadu to the presidency was through the pathway of science and technology, and consequently came to epitomize aspirations of ascendancy through technology. By 2003, he was nominated for MTV's Youth Icon for the year.

In 2004, Kalam was called on to introduce the Simputer, an indigenously designed 'simple low-cost computer' which was to expand access to computing to populations typically excluded from access to technology [25]. The Simputer was by no means new at this point – it had been in discussion since the late 1990s, and talked about multiple times in the media by some of the top people in the government, including Minister of Human Resource Development (MHRD) Murli Manohar Joshi who talked of it as a device to bring technology to the common man [46], Information Technology Minister Pramod Mahajan who introduced it to the international community at the 2002 Milan fair [16].

The Simputer was talked about by cabinet ministers of successive governments for a range of purposes serving developmental goals from assisting foot soldiers [42] and survey-taking [7] to health care [55] and crop management [17]. Despite the massive media blitz for the Simputer, it never made any serious dent into the consumer market outside of its small shipments to institutional buyers. The Simputer did in fact have elements of innovation on the overall interface, but it was too late to be a PDA, and too early to jump onto the tablet bandwagon. Yet state governments and politicians alike talked about it repeatedly, even when the device did not exist yet, even after it was clear the device would never really see the market. Such was the power of an indigenous computer.

By 2012, several attempts of building low-cost computers for rural India had come and gone, President Kalam himself had his name attached to a tablet computer, the Kalam-Raju Tablet for healthcare monitoring [55]. The same year, the new President of India, Pranab Mukherjee, would launch yet another low-cost computer – the Aakash.

The idea of Kalam as the technocrat who represented a new India is a starting point in the discourse that feeds directly into the idea of Aakash as symbolic of the country's ability to innovate, its peoples' potential for positive change, and the image of a progressive state. In the past decade, the range of projects and ideas in the broader ICTD space in India have almost immediately found media mind space, often before scientific examination of their soundness or a public discussion on the legitimacy of the approach to development these have presented. The link between technology and social change in India has in recent years captured the popular imagination on development powerfully enough that the idea is deemed reliably newsworthy.

The state has been at the center of the idea of Aakash, right from the origins of its current avatar 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 first seeded in February 2009 when Arjun Singh, the then Minister of the Human Resource Development (MHRD), formally launched NME-ICT. At the time, the initial design idea was intended for college students, and rooted rather curiously on commute times. A document on the website that details the history of Aakash [37] says,

> *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, 2011*

In another government note titled "FAQs for the Aakash tablet" the device is said to be motivated by the need for a computing device that was 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." (sic) [38]. Regardless of the emphasis on innovation, the MHRD does acknowledge that the idea of building a technology device for education was not a wholly original idea. Efforts for a low-end educational laptop have been around for some time now. For instance, the beginnings of the One Laptop Per Child (OLPC) project can be traced to as early as 1982 when Nicholas Negroponte distributed microcomputers to school children in Dakar, Senegal, though the idea gained traction only after 2005 [37]. 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 in not only to the idea of low-cost appropriate innovation, but also 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 original) approached the government of India with an offer to sell a "laptop" (emphasis original) targeted at school children at 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 says,

> *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 $10 per device much later. They were told this was impossible. This was the genesis of the program that was set up by MHRD under the NME-ICT, with the objective of designing and productionising (sic) a functional computing device at an ex-factory cost that was around US$ 35/device.*

Thus the price point of the device, quickly become the 'impossible dare' that the MHRD took upon itself to execute. It wasn't long before the state declared its intention to design and produce the world's cheapest laptop.

Although it was the MHRD, which 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 lawyer by training and somewhat outsider to the Science and Technology ministry, was a charismatic speaker and had aligned himself with a number of technology and development causes from very early in his tenure. He was a prominent face in technology venues (including the opening of the Microsoft Research office in India which hosted their Technology in Emerging Markets group), and used his media savvy to highlight the government's involvement in a number of low-cost tech projects.

Sibal carried with himself the position as the chief evangelist for Aakash through his moves within the government from heading up Science and Technology to the more prestigious cabinet rank as head of the MHRD. His advocacy was critical on two points – first, while the MHRD had indeed been the initial promoter of the device, Sibal's incorporation to head the ministry was an important symbolic move, that of a prominent technocrat whose reputation had come to be synonymous with high technology during his cabinet stint, now heading the human resource development for the country. Secondly, for the MHRD, the creation of low-cost computer evolved not only to a symbol of national pride, but a primary device that could engineer human resource development, that could radically transform the education system.

Sibal was featured multiple times in press conferences related to Aakash, even when the device was still in very early stages of conceptualization. He described it as a "milestone in history" because of its 'Made in India label' [53]. In August 2012, when

technical and production details of Aakash were relatively nebulous, Sibal discussed it eloquently [61] at a college convocation,

> *We have realised a dream that was germinated a few years ago. We have been able to tell the world that through our frugal innovation system we can conquer the world and that's exactly what we need to do for India as a country.*
>
> *The Indian Express, August 12, 2012*

The loss of President Kalam from the BJP government was in some ways filled up by the technocrat in Kapil Sibal. Unlike Kalam, a hugely popular youth icon, Sibal was the man who would try to censor the Internet and have his website hacked by 'Anonymous.' Nonetheless, no single figure in the Congress government in the last decade has been as consistently associated with technology. After heading both Science and Technology and MHRD, Sibal eventually was brought to lead the Ministry of Communications and Information Technology effectively helming the technology and telecommunications sectors of the country. As a Harvard educated lawyer, Sibal was the globetrotting 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 rockstar." [34].

4 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 before, and DataWind had never sold computers at this scale before. Cost was the key factor that led to DataWind's winning bid.

Sibal's enthusiasm aside, one thing distinguished Aakash from past iterations of low-cost computers. While it was still easy to get the attention of the national and regional press, there were also enough false alarms from the recent past that the enthusiasm was not entirely unconditional. The most important failure included a much touted $10 laptop which famously bombed at an embarrassing public press conference in which it was revealed to be something of a "souped-up memory stick"[52]

The key takeaway from several of these news reports about Aakash has been the continuing lack of perfect clarity on its final form factor. Right from the start, the machinery behind Aakash has repeatedly emphasized that the device stands up to tests on scientific and engineering innovation that is not just a gimmick unlike many other comparable recent technologies that came and disappeared swiftly, or failed to even make it to production.

Many of the initiatives that have promised a low-end computer have done so primarily in two fundamental ways. First, this was done by stripping down a machine to the most basic hardware configurations and getting rid of OS costs by replacing Windows with a free distribution of Linux. Second, to add to this, the published price of a low-cost computer often included in it the assumption of state subsidy and very large volumes. The 'Computador Popular' project in Brazil in the early 2000s took both the stripped down assembly and state subsidy approach to offer a low-cost computer for the people in Brazil [23]. The discourse of massive adoption as a means to lower costs and engineer broad-based development was famously used by the OLPC project, in which Nicholas Negroponte initially required nation states to place orders of 1 million or more as a basic requirement for interested nation states [31]

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, particularly as having the potential to repeat the well-documented fizzles of the past.

> *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 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.*
>
> *Ranganathan 2011*

Speculations aside, even with the steady flow of critiques of the government's techno-optimism the first public blow to the rosy Aakash story came when it was revealed that it was manufactured in China. Shortly after Aakash 2 was officially launched, a report by the Hindustan Times in November 2012 investigated Aakash's antecedents in a report titled: "Conned: Aakash 2 Made in China?" [56]. According to the story, the Aakash 2 tablets unveiled with their Made in India stamps were little more than devices that were purchased off the shelf from manufacturers in China. Not only did this puncture the "Made in India" discourse, but it also came with the stigma of being from the neighborhood rival. Aakash, after all, had been conceived as a "nationalistic dare" to the OLPC [62] and the DataWind CEO Tuli himself called it a story of global innovation led by India [47]. 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 [2]. 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 (sic)"*
>
> *Suneet Tuli, CEO, DataWind.*

Thus, given the nationalistic fervor with which Tuli approached Aakash 2, he soon found himself in the line of fire, Tuli's response swung from initial defensiveness about the need for

sourcing the tablets from Datawind's Chinese subcontractors for expediency's sake, to drawing painfully fine distinctions pinpointing the geographies where the idea for Aakash was first conceptualized to where it was designed, assembled, and manufactured.

Aakash was an important element for 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 praised by Ban Ki-moon, for "being a super-power on the information highway" [47]. At the time, India was still smarting from both the fresh recent experience of the negative international press from the well-publicized fail in the unveiling of the earlier low-cost computer Sakshaat. The Made in China claims were likewise an embarrassment that needed to be controlled given the tag of national pride being attached to its formal presentation at an international forum. The DataWind CEO had make public statements noting that though the units were 'kitted' in China at various manufacturers while the final assembly and programming happened in India and that "too much" was being made of the China outsourcing. Tuli's position was that irrespective of the negative publicity, Aakash was not just an important innovation in itself, but valid indicator of the country's ability to do it and that, "People who doubt that this can be done in India should not have an inferiority complex" [47].

So, did Datawind "fool" India with its Made in India claims as many in the media questioned? The irony of the product so touted as representing superior innovation being produced in China quickly clouded the fact that most of the high technology computing devices are produced there anyway. Tuli was prompted to say, "The idea and innovation is Indian, final assembling is in India. One report says only embellishing is done in India. Ask Apple and Microsoft what that means." [22] Questions were raised on India's ability to ever compete on world-class production and an ignominious reputation on quality of low-cost Chinese products in consumer products quickly raised clouds on whether Aakash would be a worthy product. The idea of the product as an outcome of the progressive, technocratic Indian state was fundamentally driven by its indigenous face. Arguably, this discourse was irreversibly punctured.

> *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. [62]*
>
> *The Indian Express Editorial (2012)*

The attribution of 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 were involved in various stages of 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 newly created, 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. Reports first emerged with IIT Jodhpur claiming that the tablets were low-quality devices that lacked adequate functionalities 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 quotes an anonymous senior government official as saying, "IITs are research organizations and have no clue how to handle logistics." [10].

IIT-Jodhpur was removed from the contract, which then passed on to the older and more established IIT Bombay. Here, Aakash would be both tested as well as equipped with apps that were being developed for it. This relationship too started on a bad note when DataWind missed the deadlines for supplying the first batch of tablets. 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 that it had with one of its vendors in Hyderabad to meet the high volume of pre-orders coming in for Aakash 1 [20]. Later with the Aakash 2 China fiasco, Tuli admitted how it was the lack of suitable manufacturing facilities coupled with the labyrinth paperwork to clear customs in India that had made him look China-wards to expedite Aakash's production [8]. With the IIT Bombay relationship in question, reports started emerging that the next version, Aakash 3, would be spearheaded by yet another IIT – IIT-Madras under the leadership of Ashok Jhunjhunwala, a prominent leader of a research group specializing on ICT and Development projects [9].

The reported failures with the production process dampened the initial euphoria over the idea of a global leader technology device and opened up 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. Analyzing the conditions for the success of Aakash as an education tool, a columnist for the Hindu wrote, "A major hindrance in taking the online education programme to the remotest of places is lack of infrastructure. Two things that are prerequisite for the programme's success are affordable computer devices and availability of adequate Internet speed." [56].

5 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 laptop is defined from a view of marginality. In his public talks about Aakash, Tuli repeatedly evokes the image of the "rickshaw wallah" – the driver of the ubiquitous three-wheeled tuktuks used for cheap transport in Indian towns.

> *"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. Today, we are surprised if we see him with a business card. 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).*

The image of Tuli's laptop-toting rickshaw driver should not be new to anyone working in ICTD. From the numerous pictures of random South Asian or African women holding technology to cameras as though that were an anomaly or a shocking sight has become a common part of the dominant ICTD discourse. New York Times columnist Thomas Friedman also made 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 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.*
>
> *Friedman, 2011*

The assumption of voice and 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 base their ideas on any significant exploration of the histories or hopes of their target unfortunates is irrelevant in the making of a good, fetishistic story. The targeted beneficiary of the low cost technology has undergone little re-imagination in the minds of the manufacturers since the early days of the Bottom of the Pyramid wave. 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 endearing quaintness of the child of a maid using the computer, there isn't a story to sell. What has been critical is that the so constructed user of Aakash is not just a marginal economic agent, but represents an individual separated in values from the prototypical technology user.

Although there has been surprisingly little primary research with the assumed target populations of these technologies, earlier iterations of low-cost computing tell a familiar story. We can see much of the same observations that Fonseca and Pal [23]) make with regard to India's Simputer and Brazil's Computador Popular repeated in the case of Aakash. Just like it was unclear if the Simputer was a tool for empowerment due to the mere use of the device or the information that one could access through it, the landing of the Aakash into the hands of the end beneficiary is the assumed endgame in itself.

There is indeed much to be said about technology getting cheaper. Arguably everywhere in the world, computing technology became a domestic artifact only after the price point hit a certain affordable point. But these devices entered various societies at points when much other human infrastructure was 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 towards development particularly concerning. In this imagination, the users exists as being just one device away from transforming into entrepreneurs who in turn will enable their children into learning English and Physics through videos. Little if anything is known about how or what use the device will really be for the user who sometimes has nothing more than a picture or hearsay to aid in sensemaking. Price indeed becomes the only barrier in this imagination, one that is often supported by both the transformative bombast of OLPC and the exaggerated enthusiasm for the learnability of the computing metaphor proposed by the Hole-in-the-Wall computer. Tuli himself summarizes the ease of computing for people who had never used a computer before in a discussion with the Indian Express. [51]

> *The idea of training people to use it is, I think, misplaced in the market. Let me explain why. 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.*

The Indian media has pushed back on some of these claims particularly in the past 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 school children was where the Aakash began and continues to draw its legitimacy. And yet, there has been little attention to the specifics of the user interface and applications, much unlike the OLPC, which right from the start was very specific about being a constructionist learning device on the Sugar platform. Most of the reports and commentary was directed towards the logistics of supplying the device to school children and the larger role of technology in education rather than explicitly understanding of how the children stood to benefit. Instead, the politics of building a low-cost tablet in a developing country like India meant that the characteristics of the Aakash user extended beyond school children to envelope a larger socio-political discourse about a low-income user in an emerging economy. Implicit in the commentary offered by the US-based tech websites is the premise that consumers outside the sphere of the western civilization are a less discerning lot with qualitatively different needs. A review in Engadget, [40] 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, unless ASUS, Samsung or Apple suddenly decide to start taking a serious loss on hardware sales, 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*

The supercilious othering in O'Brien's review echoes the traditional BoP consumer view evangelized by C.K. Prahalad [44] 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 seemed to imply that as active consumer agents, the emerging market client cared most for goods that would deliver basic functionality at a low price [32]. Reimagining the poor as consumers not only shifted the development discourse to the marketplace, but also elevated ICTs to a messianic status that was expected to usher the poor out of poverty when it came calling with the benefits of a smoother and faster delivery platform of goods and services.

6 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 vapourware: hardware that exists only in the fevered imagination of their promoters, and which will never hit the stores.*
>
> *Atanu Dey, 2011*

Economist Atanu Dey's scathing critique of Aakash in 2011 [19] came at a time when a section of the Indian media had already started questioning Aakash as yet another one in a row of attempted technology fixes to the complex problem of quality education. Academics had already proven to be early skeptics on 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 (APF), one of the largest providers of Digital Learning Resources (DLR), and Madhav Chavan, head of Pratham and advisor to Sonia Gandhi. In a self-reflexive essay, Behar categorized their DLR efforts as a failure, and the APF itself moved away from computer aided learning to investing more into the human elements of the education system [4].

Such dismissal of computer aided learning led to an unusual drawing of battle lines between the state position and those of 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 also 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 / entrepreneur who hits the American dream, but stays true to his Indian roots by pushing for development goals through often through all-inclusive public-private partnerships.

Wadhwa's take on Aakash was unique in that he found the Indian media's unenthusiastic response to Aakash allegedly symptomatic of an inherent sense of inferiority complex and petty politics in India. Just before Aakash 2 was launched, Wadhwa [64], in his column claimed that it was on his advice that Kapil Sibal proceeded with a second iteration of Aakash. Wadhwa writes,

> *But I was all but certain that, after reading Indian newspapers and extensive criticism from Indians on Twitter that, no matter how good this device was, Indian politics would triumph and the device would die a fast death. Based on my previous experience, I was convinced that no Indian reviewer would have the courage to say anything nice, and the negative publicity would build on itself.*

Wadhwa continued with his evangelization of Aakash. In an article in Mint in March 2013 [65], he singles out the petty politics that embroil Aakash. He claimed that he personally handed out the tablet to tech websites in the US. Here, Aakash triumphed, passing the test of the superior western world far away from the murky politics of India. Writing for the Washington Post, Wadhwa notes 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." [50]

Owing to their shiny successes on the shores of Silicon Valley, the Indian diaspora has little difficulty emerging as the messiah in the technology-development discourse for their brethren back home. 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 they found common ground. The same Hindustan Times report [50] also interviews Tuli who mentions his interaction with Wadhwa,

> *But he (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 US. If the reviews were good, Indian reviewers and critics would look silly going the other way.*

As well intentioned as Wadhwa may have been, contrary to his claims, we find that the international media did not demonstrate any exceptional support for India's experiments with Aakash. The reactions of US-based technology websites frequently conveyed outright disbelief and skepticism that sometimes even bordered on mockery. Reporting on the very 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 said:

> *"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…"*
>
> *Miller, 2009*

A year later, when Sakshat progressed to become the $35 laptop Aakash, TechCrunch shared a video from the Indian news channel NDTV that was demonstrating Aakash with the following commentary [14]

> *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.*

Wadhwa's belief that the US press would rescue Aakash from the Indian media's death grip finds little resonance in the Indian media itself. 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) writes, "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 considerably expanded their coverage of the Indian government's efforts with a more encouraging stance. Reporting on the pre-ordering of Aakash 2, TechCrunch [15] 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. Either result would be limited, however: a success would be minor as they must still struggle to justify and produce the device in the face of increasing competition, and failure would mean mainly that they would have to scrap the current model and try again fresh for a 2012 launch. 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 American media? Besides Wadhwa, a number of other forums among Indian Americans embraced the idea of Aakash and development. At the prestigious TiECon conference of Indian American entrepreneurs, a venue dominated by technology and venture capital, Aakash was featured in a panel called 'Transforming Innovation for Masses' in which Tuli himself was introduced as the Indian Steve Jobs. Long exoticized for cultural exports such as the *bindi* and Bollywood, the Indian immigrant could now add the prestige of technology to the armor. It is the tool that permits immigrants to engage in their own version of nation building even from afar. Technological prowess even allows them to shape the construction of their country's narrative in the adopted country's media while picking holes in the version that is closer to the ebb and flow of everyday life in the home country. Disagreement by the 'natives' with their own carefully co-constructed narrative is generally treated with disdain. The Indian-American after all would know better than the non-hyphenated Indian.

7 CONCLUSION

For the ICTD community, the discourse around Aakash assumes significance for the opportunity to examine the array of reactions and interpretations of a country to the very real presence of a computing product that was conceptualized both as a symbol of progress and a hope for future development. 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 [66]. What this paper allows us to do is fragment and identify the competing interests that found themselves invested in the Aakash commentary. In the process, we discern what was of consequence to India and how it reacted when confronted with a piece of 'homegrown' technology. We see the notion of 'interpretive flexibility' [30] unfold as Aakash was put through the rigors of examination by both the Indian and the international (mostly American) media that reported on it.

7.1 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, it made its way into the schoolbags of the students who were its purported 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 litany of infrastructural woes that finds little relief in the techno-optimism of its leaders. It was only in 2010 that India made education a fundamental right of every child between the ages of 6-14 and schools continue to remain woefully understaffed with both teachers and basic resources. In all of this, Aakash is set to cost the government approximately Rs. 750 Crore, approximately US$140 Million. For Aakash critics, the more urgent task of fixing the education system is not something that can be outsourced to a tablet. If Akaash is really a *jugaad* of the high tech kind, then following Birtchnell's arguments [5], projects such as these that are hoping for a quick fix, create more obstacles. It is in this context that the discourse around Aakash needs to be read.

7.2 The Leader

As contested as the idea of Aakash is, it is just yet another chain in a long loop in India's aspirations of nation building where leaders increasingly view the country through the technology lens in a bid to showcase developmental initiatives. The discourse of scientific zeal that was started by Kalam was continued under Sibal, a lawyer by training, emerged as a tech enthusiast moving on a range of issues from cutting edge technology to getting scientists to work on everyday problems [63]

If Kalam championed the Powerpoint in his public presentations that made him popular with young India during his presidential term, by the time 2011 rolled around as the touchscreen age, Sibal appropriated the tablet. The Aakash symbolized the homegrown *jugaad*, a classic case of Indian ingenuity to deal with the wicked and persistent education deficit. Aakash represents the evolution in the way technology is used to legitimize development, nation building, and 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 in various forms.

7.3 India Innovates; Diaspora Advocates

In the recent past, innovation in India has been firmly rooted in the ethos of not only affordability, but also for 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 in 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 coveted labels of "Made in America" was fast being replaced by those "Made in China" even as the products themselves were becoming more accessible.

If earlier, the Indian lamented stories of the patenting of the native basmati and the turmeric by the 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 grounds. 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 it's 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 enthusiasm of the diaspora in taking up its cause and in turn critiquing the Indian who was ready to disown it 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 a section of the Indian media's dismissal of Aakash is restored through one of the nation's most successful exports.

7.4 The Poor as Consumer

Finally, we have the rickshaw-wallah as the ubiquitous, yet silent, face of Aakash's potential. Tuli and Friedman's choices of the rickshaw-wallah, maid, and watchman are important representations of Indian marginality, since they are among the classes of poor Indians most visible for the affluent classes. They are the objects of the development gaze, and in them is represented a populace that is alien, but still has a future, that can talk to the enlightened. This is after all the population that had the foresight to invest in mobile phones.

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.

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