How a $20 tablet from India could blindside PC makers, educate billions and transform computing as we know it

Suneet Tuli, the 44-year-old CEO of UK/Canadian/Indian startup Datawind, is having a taxing day. “I’m underwater,” he says as he struggles to find a cell signal outside a restaurant in Mumbai. Two days from then, on Sunday Nov. 11, the president of India, Pranab Mukherjee, will have unveiled the seven-inch Aakash 2 tablet computer Tuli’s company is selling to the government for distribution to 100,000 university students and professors. (If things go well, the government plans to order as many as 5.86 million.) In the meantime, Tuli is deluged with calls from reporters, and every day his company receives thousands of new orders for the commercial version of the Aakash 2. Already, he’s facing a backlog of four million unfulfilled pre-orders.

We’re speaking over the same overtaxed cellular networks that he hopes will enable Datawind to educate every schoolchild in India through the world’s cheapest functional tablet computer. But it’s a losing battle, as his connection to one of the 13 separate cell carriers in Mumbai buckles under too much competing traffic. He has to repeat himself when he tells me the ultimate price university students will pay for his tablet, after half its cost has been subsidized by the Indian government.

It’s $20.

In India, that’s a quarter the cost of competing tablets with identical specifications. Similar tablets in China, the world champion in low-cost components and manufacturing, go for $45 and up, wholesale. Which means the Aakash 2 isn’t just the cheapest fully functional tablet PC on the planet because the Indian government has decided it should be—it’s the cheapest, period.

In the developing world, and especially in India, a country where one billion people have a monthly income less than $200, every rupee matters. Aakash means “blue sky” in Hindi, and that’s a fair description of Datawind’s goals for the tablet. Ultimately, says Tuli, the government would like to distribute one to each of India’s 220 million students. India has 900 million cell phone subscriptions, but in a country where smartphones are rare, 95% of Indians have no computing device. Which means the Aakash, or something like it, could become the sole computer for hundreds of millions of people in India, not to mention elsewhere in the developing world.

Unlike the failed Aakash 1, which was supposed to roll out in 2011 but which was so under-powered that it was virtually unusable, the Aakash 2 is no toy. Even jaded US gadget reviewers have found it as usable as tablets costing many times more. It has a processor as powerful as the first iPad and twice as much RAM memory. It uses Google’s Android operating system, which now runs on three out of four smartphonesand four out of 10 tablets shipped worldwide. Its LCD touchscreen displays full-screen video without hiccups, it browses the web, and it even holds up when playing videogames. If you’re a student with no other computing device, attaching a keyboard to it transforms it into a serviceable replacement for a traditional PC.

Disrupting the world's largest tech companies

"The revolution will come from the developing world to the US," says Vivek Wadhwa, an entrepreneur and academic. "These tablets will kill the markets for high-end players—for Microsoft in particular."

Wadhwa knows Tuli and has become the Aakash 2's champion stateside,writing about the device and getting it into the hands of executives. He believes that the $40 price of the tablet could drop to $25 within a year. "I showed a Google executive [this] tablet. He suddenly realized that his $99 tablet isn't going to stand up to the $25 tablet from India."

Many in Silicon Valley are suddenly fixated on cheap tablets. "I see a lot of the PC makers and hardware companies here [in the US] are going to build a tablet strategy," says Jay Goldberg, a financial analyst who was surprised to discover on his last trip to China just how cheap functional 7″ tablets have become. "But if there are already $45 tablets out there, even that second-tier strategy [of replacing lost PC sales with tablets] is going to fail."

Everyone I interviewed for this piece thought that Apple, as a company that differentiates itself by being a high-end brand, would survive the coming of cheap tablets. But Goldberg and Wadhwa agreed that other manufacturers of Android-based tablets, even Samsung, would have a hard time staying in the hardware market.

Educating the "ignored billion"

"Our effort in all of this," says Tuli, "Was to use technology to fight poverty. What happens when you try to make it affordable at this level?"

Every year, the Indian government spends $13 per student just to ship them textbooks. In primary schools, all texts are based on a standardized, public domain curriculum that is easily transformed into free ebooks. The government is considering paying the full cost of the tablet when handing them out to primary-school-age children. In that case, the $40 the government pays Datawind for each tablet could be recouped over the projected three-year life of one of these tablets, says Tuli.

But the Aakash 2 isn't just about replacing textbooks: It's about bringing the full-fledged Internet to users who have never touched it before. In India, competition for wireless connectivity is so cutthroat that it's possible to get an unlimited prepaid mobile data plan for $2 a month. The basic Aakash 2 has wifi, but an upgraded model, available commercially for 3,500 rupees, or about $70, includes SIM cards and the radio required to communicate with a cellphone network. As costs fall the company will incorporate these features into the base model.

In India there is little 3G wireless connectivity, and data speeds are slow, using on an older technology, GPRS. Normally, browsing the web over GPRS would be nearly impossible. So Datawind developed a compression and acceleration technology that, it says, makes web pages load in three seconds instead of 15 to 20.

The Indian government is already connecting 600 universities and 1,200 colleges with broadband and wifi, in addition to an effort toconnect 250,000 villages with fiber-optic internet in the next two years, at a cost of $4.5 billion. Even so, says Tuli, almost all connectivity to individual devices—the so called "last mile" connection of the internet—will be achieved through cellphone networks.

The world's isolated, rural and impoverished places are just the sort of locations where Tuli sees tablets acting as an educational supplement. In a recent experiment in Ethiopia, Nicholas Negroponte, founder of the original "One Laptop Per Child" project, gave Android-powered tabletsto children in an isolated village. Despite having never had any previous contact with high technology, within months children had used the tablets to teach themselves the English alphabet. Negroponte's ultimate goal is to see whether or not the children, who have no teachers, can use the tablets to learn to read.

There are a number of reasons Aakash 2 could succeed where the original OLPC project failed. For one, Aakash is for the most part a home-grown solution to problems identified in advance by the Indian government, where the OLPC was initiated by western funders wholacked sufficient knowledge of local conditions and needs. At a price that never fell below $100, OLPC devices were also significantly more expensive than the Aakash 2, limiting its reach. And as a mature ecosystem, Android has many orders of magnitude more apps available for it than the OLPC could ever

command–consumers are much more likely to embrace devices that can already run huge catalogs of videogames, media and other applications.

Free tablets and ubiquitous computing

"[In the US,] you will see tablets everywhere," says Wadhwa. "They will become disposable, and you will see thousands of new applications within a short period of time."
Tuli thinks he can eventually bring the Aakash 2 to the US at a $50 retail price, and if trends continue, that price will continue to fall.

It doesn't take much imagination to think of applications for devices that cheap. "If I were to start a company today, I'd say what kind of a business can I build if the hardware is almost disposable?" says Goldberg. "In a restaurant, if every waiter or maitre d' has a tablet, now someone can go build a good restaurant automation tool that links tablets to the chef station."

At some point, too, any company that can squeeze enough ads onto this class of tablets will start giving the tablet away for free. (Remember when USB thumb drives became inescapable promotional giveaways?) The commercial version of the Aakash 2, the $70 Ubislate, affords Datawind almost no profit margin at all. But, like Amazon and Google, which have adopted a business model of selling their hardware at cost and making money on content instead (Amazon by selling e-books, and Google by selling ads), Datawind is using Yahoo's ad marketplace to sell advertisements on the toolbar of apps on the Ubislate.

At home, there are plenty of reasons tablets could end up in every room. They might control the thermostat or a home energy management system. Stuck on a fridge, they could help keep track of the contents, saving on food buying and trips to the grocery store. (Samsung already offers a refrigerator with a built-in touchscreen tablet.)

The too-many-tablets problem would accelerate the trend of people keeping all their personal data "in the cloud", accessed the same way from any screen. That's the vision of Google's web-based operating system, Chrome OS; Amazon's streaming video and music libraries; and Apple's iCloud, which lets you use the same music, films and apps across multiple Apple devices. People

might find themselves dedicating tablets to specific functions or locations, and seamlessly continuing tasks on one screen that were begun on another.

“I was at Intel this week, and like other companies in the Valley, they’re trying to figure out what consumers really use tablets for,” says Goldberg. “I think most people agree we’re not going to have three laptops at home in the future. We’re going to have a bunch of tablets and one desktop or media server.”

From the poor in the developing world, to the poor everywhere

“Over the weekend I was at a cocktail party,” says Goldberg. “Someone said, ‘I was just on the Silk Road in China, in a no-name restaurant, and everyone had tablets. No menus, just tablets. What we may see is, it comes from emerging markets first.”

One of the reasons these tablets are so cheap in China and India, where they are made, is that production costs have now fallen so far that shipping, distribution and customs duties have become a significant part of their price in the rich world. (Devices comparable to the Aakash 2 or the generic 7″ tablets of China cost $99 and up in the US.)

This means that to make technology disposable, manufacturing needs to move. The Aakash 2, for example, is currently assembled in Amritsar, a city in the far north of India, near the border with Pakistan. But, says Tuli, “We don’t rule out assembly done in the US. Labor is not a big component to this, so if it costs me $1.50 extra and I can put a ‘made in USA’ label on it, then it’s something we will seriously consider.”

Inevitably, tablets will become ubiquitous in education. Already, wealthy schools are abandoning textbooks in favor of iPads. “I get school boards and schools from the US and Canada regularly calling us up, asking for devices,” says Tuli. “Inner-city schools say to us, ‘It’s not just a problem over there—40% of our kids don’t have access to PCs and the internet.”

Why poor countries might take up tablets even faster than rich ones

In the US, smartphone adoption has only just crossed the 50% mark. Some of that has to do with price–even “free” smartphones are attached to plans with recurring monthly charges–but it’s also behavioral. Meanwhile, China is projected to overtake the US by the end of 2012 by share of smartphones purchased, and by 2016 India will be in third place.

“It’s taken the [digital video recorder] 13 years to reach about 50% penetration,” says Rakesh Agrawal, who advises technology companies on product strategy. “Consumer behavior just takes a long time to change. Even if the price point is there, it will take a while unless something is completely revolutionary.”

In other words, people will start buying something in large numbers if it solves a big problem for them. But most first-world problems—needing an easier way to record your favorite TV programs or keep track of what’s in your fridge—just aren’t that pressing. In developing countries, on the other hand, technology can transform lives.

For example, to avoid racking up cellphone charges, the poorest communicate with one another by calling and allowing the recipient’s phone to ring a given number of times–one ring for “come home” and two for “I’m fine,” for example. Cell phones help husbands and wives, separated by the migration to cities for work, keep in touch.

“Now, not only can they hear each other, they could Skype each other,” says Wadhwa. “They could send money electronically. There’s ecommerce developing in India. They can go online to check the price of products, the weather forecast, local newspapers. This is going to be revolutionary for the developing world. We don’t understand in the West what a dramatic change lies ahead because of this connectivity. It’s going to boost the growth of the developing countries for sure.”
Enabling that revolution will require many more manufacturers than Datawind. The company is scrambling to meet its current obligations, and Tuli says that in six to nine months Datawind will be making 500,000 tablets per month—half again as many units as Google’s hit Nexus 7 tablet has been shipping every month. China’s unbranded 7-inch tablets are widely available, but bringing them

to other countries at a price comparable to the Aakash will require setting up factories and supply chains in every country in which tablets will be sold.

"You will see regional tablets," says Wadhwa. "There's no magic here—you can buy components all over world and build locally, and *voilà*, you have a tablet." Eventually, in other words, we might think as much about the maker of our tablets as we think about the printers of our books or the manufacturers of our paper. As a medium, tablets and their successors could become the ultimate commodity.

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