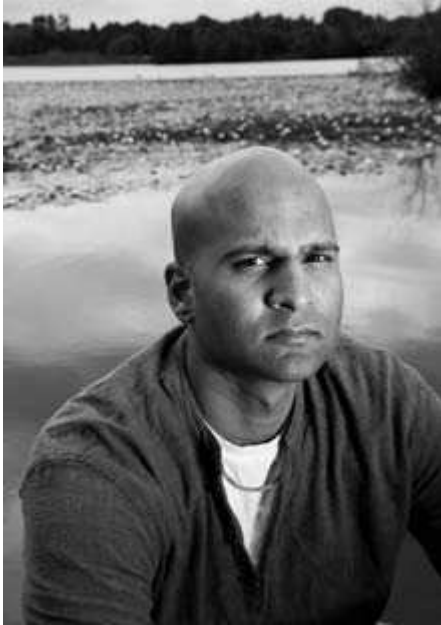


Tapan Parikh, 33

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Simple, powerful mobile tools for developing economies



Credit: Brian Smale

Multimedia

When fishermen from the Indian state of Kerala are done fishing each day, they have to decide which of an array of ports they should sail for in order to sell their catch. Traditionally, the fishermen have made the decision at random--or, to put it more charitably, by instinct. Then they got mobile phones. That allowed them to call each port and discover where different fishes were poorly stocked, and therefore where they would be likely to get the best price for their goods. That helped the fishermen reap a profit, but it also meant that instead of one port's being stuck with more fish than could be sold while other ports ran short, there was a better chance that supply would be closer to demand at all the ports. The fishermen became more productive, markets became more efficient, and the Keralan economy as a whole got stronger.

This story demonstrates an easily forgotten idea: relatively simple improvements in information and communication technologies can have a dramatic effect on the way businesses and markets work. That idea is central to the work of Tapan Parikh, a doctoral student in computer science and the founder of a company called Ekgaon - Technologies. Parikh has created information systems tailored for small-business people in the developing world--systems with the mobile phone, rather than the PC, at their core. His goal is to make it easier for these business owners to manage their own operations in an efficient and transparent way, and to build connections both

with established financial institutions and with consumers in the developed world. This will help them--they'll be able to get money to expand their operations and, ideally, find better prices for what they sell--and it should be a boon to development as well.



Credit: Tapan Parikh

Tapan Parikh demonstrates his mobile-phone-based software to members of a microfinance group in India.

In the developing world, working with mobile phones has obvious advantages: they're ubiquitous even in poorer countries (there are 185 million cell-phone subscribers in India and more than 200 million in Africa); they're relatively affordable; and with the right software, they're easy to use. So Parikh developed Cam (so called because the phone's camera plays a key role in the user interface), a toolkit that makes it simple to use phones to capture images and scan documents, enter and process data, and run interactive audio and video. The Keralan fishermen had been able to improve their business simply by making phone calls. Cam would

carry the process a step further, by taking advantage of modern phones' computing capabilities.

Parikh's most important project with Cam has focused on perhaps the trendiest field in economic development: microfinance, in which lending groups grant tiny loans--on the order of \$25--to people in the developing world, usually to fund small-business ventures. (Muhammad Yunus, the founder of the best-known microfinance institution, the Grameen Bank, won the Nobel Peace Prize last year for his work in establishing the field.) The best-publicized version of microfinance involves a solo entrepreneur getting a small loan from a well-financed bank. But Parikh is collaborating with organizations that are more representative of the way it usually works. A big chunk of the microfinance business in India, for example, is conducted by self-help groups, in which 15 to 20 people (usually women) pool their capital and then meet weekly or monthly to make collective decisions about loans to members of the group. They also use their collective borrowing power to obtain loans from nongovernmental aid organizations or from financial institutions, and then lend that money to their members.

Parikh built a software system on top of Cam to assist self-help groups in managing their information and their operations. Unglamorously called SHG MIS (for "self-help group management and information system"), it includes a Cam-based application for entering and processing data, a text-messaging tool for uploading data to online databases, and a package of Web-based software for managing data and reporting it to any institution that has lent money to the self-help group. Such groups have traditionally relied on paper documentation, however, and because their members still trust paper, the software also includes a bar-code-based system. Loan applications, grants, receipts, and other documents are printed with identifying bar codes; the software enables the phone to scan the code, identify the document, photograph it, process the data it contains, and associate that data with the code. The result is a system that facilitates a quick and accurate flow of data from small villages to bigger cities, and vice versa.

In addition to providing a more efficient way for self-help groups to manage their finances, SHG MIS allows such groups to overcome two major challenges. First, it enables them to run their internal operations in a fair and transparent way, while ensuring that their loans make economic sense. "In these groups, things are often done in a somewhat ad hoc manner, using informal documentation," Parikh says, "which can lead to instability and impermanence and contribute to the kinds of tensions that lead small groups to fall apart." His software gives groups a more systematic method of documenting decisions, tracking financial performance over time, and collecting information on which kinds of loans work and which don't. These advantages should help groups make better decisions and reduce internal political tensions.

The software could also improve the flow of information between self-help groups and the formal financial sector, which should enable them to get capital at better rates. As things stand right now, Parikh says, bankers' interest in microfinance is so high that the supply of capital more than meets demand. But because it's difficult to track so many small, scattered loans, banks tend to offer the same deal to every

business, regardless of performance, ability to repay, and so on. If self-help groups could document their performance in a formal, auditable system that banks could access quickly and reliably, the groups would be more likely to get fair prices. They would have access to more capital, too.

Two things are striking about Parikh's invention. The first is how unremarkable it seems, and yet how consequential it is in practice. Parikh did not radically reimagine computing, nor did he make a major break with the way financial data is managed in the developed world. Instead, he focused on something whose benefits we take for granted--reliable, instant access to financial data--and figured out an easy, affordable way to bring it to people who need it. The second thing is that instead of forcing small-business people to discard all their old ways and embrace an entirely new paradigm, Parikh's work attempts to meet them, as it were, where they live, in order to enhance their existing abilities and resources. Other engineers might insist that the self-help groups need to do away with paper, since it's less efficient than simply using digital entry devices, or develop PC-centered systems, since mobile phones (whatever their virtues) are limited in their power and capacity. Cam, though, relies on a different strategy, one that emerges from the bottom rather than being imposed from the top.

This strategy runs counter to the way computer science has traditionally been done. Many computer scientists tend to think more about making machines faster and more powerful than they do about making sure they meet people's needs. What's distinctive about Parikh's approach is that he's spent so much of the past seven years working not in front of a computer but in the field, talking with the people he hopes will eventually be his customers. It's a way of life that seems more characteristic of an anthropologist than a coder, but it's responsible for much of what Cam has become. In fact, Parikh says, "all of my ideas are really just rehashes of ideas that local people have come up with."

Parikh has adopted the same approach in his work with fair-trade coffee farmers in Guatemala. In recent years, the "fair trade" and "organic" designations have come to have real economic value: fair-trade farmers are guaranteed a minimum price for their crop, and organic farmers can often charge higher prices. But these labels also cause problems. Because they're one-size-fits-all, they reduce the incentive for farmers to improve their growing methods or the quality of their crops above the general minimum. And they create incentives for cheating, which in turn reduces the value of the label to consumers: are you really sure how that organic coffee you bought at Starbucks or Peet's was grown? So Parikh devised a Cam system called Randi, for "representation and inspection tool." It allows farm inspectors to use mobile phones to systematically photograph and document farms in order to ensure their compliance with quality and production standards, and to put that data online so that it's easily found by certifying agencies, wholesalers, and consumers.

In other words, if you wanted to know how that organic coffee was grown and whether a fair price was paid for it, Randi would let you find out. In the long run, the system would allow today's simple labels to become more nuanced, and in the process it would allow prices to more accurately reflect what consumers really value. "At the moment, prices are good at transmitting the value of goods in strict economic terms," Parikh says. "But they're not so good at transmitting other kinds of

information, like what the production of a good has taken away from the environment, or the experience of the workers producing that good. One of the things technologies allow us to do is actually convey more of that information."

It would be a mistake to see Cam and technologies like it as a panacea for the problem of underdevelopment. While it's easy to become infatuated with the promise of microfinance and small-scale entrepreneurship, it's also easy to overestimate how much influence these things can exert on developing economies, which often face structural problems that won't be solved by making local markets more efficient. And it's also the case that, in the short run at least, the arrival of new technologies can widen the gap between the prosperous and the struggling: if you're buying more from the Cam-equipped farmers, you'll probably buy less from the non-Cam-equipped ones. In other words, not everyone will win.

Parikh seems well aware of the limits of technology in general and Cam in particular. But he is also convinced that mobile phones have the capability to become far more powerful tools, which is why he has other applications in mind for Cam--such as tracking disease outbreaks and improving the coordination of relief after disasters. In each case, one can observe Parikh's respect for the virtues of decentralized organization and the conviction that bringing more information and more transparency to social systems is better. Parikh is focused more on solving real problems than on developing complex technologies. "I think oftentimes with formal and well-established disciplines like computer science, you run into the problem of inertia, a kind of hesitancy to accept new ideas about what should count as important," he says. "But I'm cautiously optimistic that within academia as a whole, there's a broad sense that the real-world impact of someone's work is an important criterion by which to judge it. Ultimately, I think that's what counts: how can the work we do have a practical impact? How can it make a difference in the way people live?"