

Fertilizer by Phone

Esoko Enhances African Farmers' Livelihoods through Innovations in Data Access

Innovations Case Narrative: Esoko

An impossibly large demographic—some 600 million people,¹ or more than half of Africa's population²—relies on agriculture for its livelihood. Recently, rising food prices, increasing meat consumption, a growing global population, and climate change are all factors that have created unprecedented pressure on the global food supply and thrust agriculture back to the top of the Global Agenda. Despite years of effort and renewed focus, the agricultural sector remains one of the most dysfunctional on the continent.

I am not an agronomist. I studied social anthropology, and my career has been built around the design and application of information products and services. I am currently the CEO of Esoko, a mobile information service and communications company that I founded in 2006 under the name TradeNet. At Esoko, we are navigating the convergence of mobile data services with Africa's enormous and inefficient agricultural sector.

My simple conviction—and the belief that has driven me over the years—is that 99 percent of what makes any business successful is having a competitive advantage in information. Africa's agricultural sector is no different. People involved in agriculture understand how to grow things, but they also need certain information to access markets and guarantee incomes: Who wants to buy our products? At what price? Are buyers trustworthy? These are the risk constraints in agriculture. I believe that if basic market intelligence were readily available on who is buying, what their reputation is, and where they are located, there would be a transformation in African agriculture—one that would pull people out of poverty through opportunity rather than push them out through sympathy.

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The astronomical growth of mobile communications across the continent has made that sort of information more accessible than ever before. Suddenly, rural Africans have a pocket-sized device that can store and retrieve data that is critical to their livelihoods. Imagine the leap for a person who has barely any information—and probably no evidence—to real-time customized information on a personal handset and you'll begin to grasp the source of our excitement—as well as our challenges!

I view gaining access to data via mobile in Africa as the final frontier of the Internet revolution that started in the 1990s. The availability of cheap information services has caused a global transformation between individuals and companies over the last decade. Products from eBay to Amazon, Twitter to Facebook haven't created anything inherently new, but they have provided links that enable people to share information more easily. The information revolution in Africa's agricultural sector may involve less sexy content than its predecessors—not everyone can get excited about the variety of seeds or the price of maize—but the potential impact is phenomenal. Although Africa has 60 percent of the world's uncultivated arable land,³ it produces only 6 percent of the global food supply.⁴ Mobile communication offers one of the keys to unlock this potential, a challenge Esoko has been struggling with for more than five years.

THE INSPIRATION

In 1995, I was fortunate enough to start a dotcom in New York. Metrobeat was later sold and subsequently went public. After that, two friends and I started a match-making business in London for Internet startups, which was also sold. By 2001, I felt I had been lucky and wanted to give something back. I decided to spend 30 percent of my wealth doing something I cared about—a kind of self-imposed wealth tax—and later that year I moved to Accra, Ghana, to set up a technology incubator. After a few demanding and exciting years, that incubator and technology center, BusyInternet, had made its mark. I had an outstanding manager and team to run operations, and I wasn't needed any more. I began to think about attempting something new, a disruptive, transformative innovation, and started talking to people.

In May 2004, I asked a friend who ran the agri-business NGO Technoserve if I could talk to his team. I remember saying to them as we sat in a circle, "Forget that I'm into software and technology, just tell me what you're observing in the field . . . tell me what you think is needed." It didn't take two seconds to get the first answer: "Farmers need price information." We continued to discuss other ideas, but nothing resonated with me in the same way. It was such a simple concept—providing critical and much needed insights into the value of your assets—and, with the advent of mobile phones, clearly a new opportunity.

I'd read about other services that were pioneering prices over SMS, and though it was already happening, it was still in the early phases and not well understood. I was intrigued, and put the idea aside to percolate for a while. That's how I devel-

oped my previous ideas—I would have a few in play at any given time and would see which one gained momentum. I mentioned the SMS idea to a few friends and colleagues, including Stephen Rudyard from the UN Food and Agriculture Organization. “Go build it!” he urged. I had developers and a small staff at hand, so it wasn’t out of the question. “I’ll send you to Uganda if you want,” he said. “There’s a guy down there doing this. Go see what they’re doing and see if you can help them.” I jumped at the chance to take a trip to the Pearl of Africa.

Foodnet, which is located in Kampala, Uganda, was the brainchild of Shaun Ferris, an engaging, irresistible force for innovation in agriculture. Ferris had dreamed up the whole SMS price service and convinced his team they could build it—and they did. He worked the same magic on me. However, during my visit I recognized the inadequacy of their software. At that point I didn’t really understand the scope or impact of such a service on farmers—I got the idea that if you give them market prices they’re more likely to negotiate better prices for themselves, but that was mostly hypothetical. As a tech and design person, I was more interested in Foodnet’s rudimentary Excel sheets. They had one for email, one for MTN (the mobile operator), one for mobile numbers. It was a manual process that caused them to duplicate data and struggle to keep up. I immediately saw the opportunity: I could build a platform that could be used to deliver prices not only in Uganda but in other countries as well. I assumed all of Africa would want to empower farmers by providing this type of market intelligence. Not only could I build a simple, focused, and effective product, I could license it to create revenue and, most importantly, have a social impact, which was my interest from the start. I thanked Shaun and his team for their time and company and raced back to Accra to pester my developers.

Puoza Gamaliel and Michael Ocansey, two self-taught but excellent and occasionally rogue Ghanaian software engineers, were working down the hall from BusyInternet with a company doing offshore data processing for American firms. I was able to engage them as part-time developers on the new project, and we were off.

MODEL 1: MARKET PRICES OVER SMS

We started to map out a product and to think deeply about how we could drive SMS messages from a Web interface to a cloud-hosted system. It was clear that Shaun and his team didn’t want to manage any sophisticated software or hardware; they just wanted a few key things: to enter prices into an easy-to-fill-out form, to send prices to farmers over SMS, and to have a website where they could post news stories. I’d been in this sort of situation before while building Metrobeat in New York, when I created specifications for entirely new concepts. We got to work building our new product, and just as we began perfecting the initial ideas and talking to agricultural specialists in Accra, we realized that posting prices was going to be just the beginning. Farmers, the experts told us, needed not only access to prices but also to advertise what they were selling, and traders wanted to adver-

tise what they wanted to buy. So we started building in the ability to post sell and buy offers, creating a simple “eBay style” matchmaking service. We should have seen this as a sign of things to come, as there is always something new to construct, a new direction to go. We kept on building.

MODEL 2: MARKET INTELLIGENCE VIA SMS

We were rapidly developing the ColdFusion platform—I designed screens and interfaces, Michael would build them, while Puoza focused on the SMS gateway functionality. Thus far the business model was simple: projects or governments throughout Africa would license and use our system to collect and publish the national market prices, and bids and offers. It seemed to us to be one big homogeneous market with actors across all of the value chains.

At this point we had our first glimpse into the content problem—or, more specifically, the government content problem. I knew that market prices were nothing new and that governments across Africa had been collecting them diligently for years. However, while talking to traders, the message became increasingly clear: they didn’t trust the data. The prices they received were sometimes inaccurate and mostly out of date. This was our first inkling that many of the services being provided weren’t in sync with the market, a theme that would broaden as the market dynamics became clearer. Prices needed to be collected on the market floor in real time and be sent out almost instantly. This was commerce, and yesterday’s prices were no good. Bringing that lesson into our technology development process meant that we needed to give market actors the ability to develop and share their own information, not just to receive government or project data. We began building in the ability to send prices via SMS from anywhere. However, issues related to content—trust, consistency, and timeliness—would show up again in the near future.

At about this time, it was announced that USAID would be funding a five-year project called Market Information Systems and Traders Organizations in West Africa, or MISTOWA. The project would seek to increase trade volume in 13 West African countries by supporting regional trade organizations. The parties bidding for participation in the project had heard about the market information systems we were building in Accra and came to visit. They included our product in their bid to USAID, stating that a modern market information system was needed to empower regional trade deals. Although government data-collection activities were already planned, MISTOWA particularly liked our focus on the private trading of bids and offers (not just market prices) as it complemented their strategy to drive trade.

I remember one critical conversation I had with Patrice Annequin of IFDC, who was a key member of the MISTOWA team, as we started to work together and shared prototype screens for the web platform. “Of course you know groups will be key,” he said. When I pushed him further, he explained:

Trading isn't about one big public market in the sense you've been working. It's a maze of private networks and groups, all sharing different bits of information with different actors. They may all be covering the same commodities, but there will be multiple public *and* private prices. That's where the power will be.

It made so much sense: if we could allow people to create groups, they could share information among their own market networks. This was a complete game-changer. At about the same time, Facebook was an emerging online force, and within that context we saw the power of social networks. As an anthropologist by training and having spent five years in Ghana, I could see the power of social networks at play every day in Accra. Social capital was everything—whom you knew, whom you were connected to, news of funerals, christenings, parties, neighborhoods, families—Africa has a “we” culture, not the “I” culture I was used to in New York or London. When I considered the value of social capital in Africa and saw the rise of social networking in the West, I wondered what would happen if you could combine them online in commerce.

MODEL 3: FACEBOOK FOR FARMERS

“Facebook for Farmers” was a trite name, but it got the message across. Our model remained clear—we would build the software and license it to others. The mobile services would be hosted and managed on the Web in a cloud-based environment over any Web-enabled PC. We wanted anyone to be able to access Esoko anywhere—on any SMS phone, in any cyber café—to send in market data. By now we had MISTOWA up and running and had licensed the platform back to our friends in Uganda, who were using it to enter and disseminate prices.

Whereas Foodnet in Uganda was diligently uploading data into the system, the same could not be said of MISTOWA. The latter was relying on associations and individuals to do the work for them—people over whom they had little control. In Ghana, we were never able to finalize a deal with the local Ministry of Agriculture (MOFA) to join the project. Although I'm not sure why we didn't get anywhere with Ghana's government and it puzzles me that they didn't jump at the opportunity, I realize that most of the ministry's activities were designed around policy planning, research, production and analysis. The Ministry didn't see its role as a commercial partner to active traders, so whether prices came in today or in two weeks didn't really matter. MISTOWA hired various “agri-NGOs” to provide Esoko with market data, but this effort had mixed results.

We quickly realized that it was all well and good to create a great software platform, but if you couldn't attract the right content it would be useless. We also realized that MISTOWA was working hard to facilitate the content and to use the platform, but it had no advertising budget. Unfortunately, this is not uncommon for development projects across Africa. Thus we found ourselves in quite a predicament: for one thing, if the content was late or poor, no one would benefit, and even

if we had great content, if no one knew about the service, no one would get the benefits.

MODEL 4: BUILD AND DEPLOY

The problem of content is what I had feared all along. The model would have worked perfectly if our focus had remained exclusively on the technology and there had been a ready market, but nobody wanted to create the content, and fewer still wanted actually to go out into the market and drive usage, which is time-consuming, expensive, and was not one of our organizational strengths at the time. What we learned about content at that point remains an essential lesson, one that has stumped Google and many other companies that release great software but don't create content on the African continent, where there is little existing digital content to leverage. Market knowledge is unstructured and uninformed in many ways. The idea of creating a network of people to go out and count prices, get offers, and profile people—in other words, to create meaningful content for Esoko—was a strategy most startups could not even consider. But, in a different life in a different place, I had worked with a team to do exactly that. In New York, after hearing time and time again that it would be impossible to cover every music, arts, sports, and theater event in the city, we did just that. We structured the data and its collection in an efficient way with a digital-ready format. In fact, that was the secret of our success and why Microsoft, CitySearch, and Capital Cities had all offered to buy our firm—not because of our technology but for our methodology.

I was convinced we could do the same, at least in Ghana. And so, leveraging the MISTOWA contract, we convinced MISTOWA to pay us to collect data in Ghana and set up a network of market price watchers in 25 markets throughout the country. At first we tried to use the government market watchers, paying them something extra so we could manage them and hold them accountable for the prices they sent in. We quickly realized, however, that although these civil servants were comfortable (and talented) with observing prices, only half could transform themselves into more active market and technology roles. So we started hiring young people, teachers—people connected to and living in the market who were comfortable with the technology and keen to have a role in an exciting project.

MODEL 5: WELCOME CLIENTS OF ALL SHAPES AND SIZES

By 2007, we started to develop our own clients in Ghana outside the MISTOWA contract. Two key clients—both much smaller in scale than the development projects we were already working with—emerged at this time and taught us important lessons.

The first was SEND, an NGO based in northern Ghana. Sponsored by International Institute for Communication and Development in the Netherlands, the group had been working with farming communities to build people's skills and capacity and to provide them with microfinance loans. They approached us to provide market prices as part of their intervention. Soon after, we worked with SEND's

field officers to profile the local farmers so we could deliver prices to them. We already had built in the ability to set up automated SMS alerts for individuals, which were customized to arrive on their phones on the day they wanted, in the language they wanted, and in the currency they wanted.

We had adapted our trainings over time, and the charismatic Mohammed Mumuni, the SEND project manager, had aptly implemented them. It clearly was important to enter communities through trusted agents, NGOs, and local opinion leaders like Mohammed. Children also needed to attend the trainings so they could help their parents read the messages, and it was critical to ensure that the training groups represented women adequately, as about 52 percent of all farmers in Ghana are women.

A year later, I went to visit these communities and met with three different groups. The program was not without challenges. Some people struggled with using their phones, accessing messages, or ensuring that credit was available, and some didn't realize that SMS messages could come from other providers. One person told me he didn't understand one of our messages and I asked him to show it to me: it read, "Interested in unlimited introductions to the opposite sex? Text XXX." I had to explain that not all messages came from our service . . .

Nevertheless, when I sat talking with those farmers, the impact was clear. Again and again they told stories about how they had benefited from the service, which broke down into three main ways. First, they were able to negotiate a better price with visiting traders. This probably was not only because they were receiving better information, although that was evident too; it was also due to the format of the information. It was written down in the form of an SMS message that could be viewed and shared—proven, if you like. With that evidence at hand, the farmers had gained confidence, which changed the dynamic between farmer and trader. Second, some farmers said they avoided the local traders altogether and sent their produce directly to markets like Kumasi and Accra, which were hundreds of miles away. Again, it wasn't that they couldn't do this before, but now they had a constant source of reliable price data. They were perfectly aware that they might not get exactly the same prices but that this was generally the price of the market.

The final way they were able to improve their business taught me a lesson about literacy. I tiptoed around the issue at first. "I've been warned," I started, "that some people in your communities have difficulty reading . . . would you prefer it if the phone spoke the message to you?" They all shook their head vehemently. "Why?" I asked, totally perplexed. "Then it wouldn't be written down," they responded. "We can save the messages, and we refer to last week and the week before to see how the prices are moving. It helps us determine when we should go to market." At that point I realized that the actual written nature of these SMS messages was an advantage, and that these farmers were using the messages to analyse prices and determine trends.

There clearly was no lack of business acumen among this group of farmers. They knew exactly what they needed to do; they had just needed the right information. Their experience was a confirmation of everything we had been working

for, and I raced back to Accra full of energy and excited about sharing it with the team. We have seen the same outcome over and over again: having access to market prices can help farmers improve their revenues. Some farmers can't convert metric measures into local measures, as they're used to counting sacks or bowls, and in some cases the prices aren't useful because the rains didn't come, but it's a clear and obvious intervention for which anecdotal evidence abounded. "I've bought a fridge," one said. "We bought more animals for my family," offered another, "and I'm sending my kids to school for the first time."

Based on the few data points we could extract, we estimated that these farmers were realizing about a 20 percent revenue improvement. This was reinforced by an independent study conducted in 2010 by CIRAD, a French organization that tackles international agricultural and development issues, among cassava, maize, and peanut growers, which confirmed a 10 percent improvement in revenues. Another study of 1,000 households by New York University was started in 2011 with results due out in 2013, and is even more thorough. We believe that this will be the first rigorous study to demonstrate the impact on farmers of having access to market information via mobile, which represents a major step forward after decades of failed efforts by organizations around the world.

Another important lesson came from Agribusiness in Sustainable African Plant Products (ASNAPP), which was to transform our thinking about how market information tools could be used by businesses. ASNAPP is an association of producers and traders that focuses on natural plant products—mostly those that grow in the wild and are collected by the community. One such plant is *voacanga africana*, a tree whose bark and seeds are used as a stimulant, among other uses. We worked with ASNAPP selling them a group license to Esoko in 2008. Larry Amekuse was in charge, and he diligently profiled his producers and traders in the system and sent out SMS messages on behalf of the association. At one point, an exporter asked Larry to enquire among the association members to help him source voacanga. Larry sent out SMS messages quoting the offer and the price, and the results were telling: the exporter was able to source the required product in 30 days rather than the usual 60. He also worked through one middleman instead of three, and he increased his share of the export price by 20 percent while the producers increased theirs by 5 percent. We suddenly realized that Esoko was not just a consumer product farmers used to get prices and a few messages, but that it was a business tool anyone could use to improve the efficiency of their supply chain. This proof of concept came at the same time we were talking to organizations and businesses about our farmer price service, and they were all asking for similar business tools they could use themselves.

MODEL 6: APPS FOR AGRIBUSINESS

Developing a suite of tools that met the needs of businesses solved two key problems that were emerging for us: deployment and sustainability. As we had evolved into collecting content and distributing the service, rather than just building a soft-

ware platform, our costs increased substantially. We also had difficulty scaling the service. We clearly were having an impact on the SEND farmers, but the service didn't seem to be spreading from farmer to farmer. It was difficult and expensive for us to profile farmers and train them how to access and manage messages on their phones, and there also was no easy way for them to pay us—mobile payments were not yet in place (they still aren't in every market), and the organizations we worked with didn't want to chase after farmers to collect pennies. We felt that if we could build a suite of tools for businesses, the business owners could pay for everyone in their value chain and then spread the technology and provide training to suppliers with whom they had existing commercial relationships. In other words, it would be in the self-interest of business owners to train their suppliers and get them to use the service. Furthermore, they would primarily be uploading their own content.

At this stage, our technology had already grown to include prices, bids and offers, and the ability to send out free-form messages. User profiles were classified according to their location, markets, and commodities, and we recently had introduced ways of grouping users on the system into specific networks — so that people could share only certain information with certain people. Again, in the African context, commercial capital was intricately tied to social capital.

Our team had grown to about 10 people. I'd been able to attract an Italian software expert and American deployment specialist, another American entrepreneur, and we had a great group of Ghanaian, Senegalese, Nigerian, and Beninese who were driving administration, testing, and programming. It was an exciting time, and we were beginning to burst at the seams. We started taking over more offices at BusyInternet and our revenues were healthy. I was surprised that the Esoko idea had moved so quickly and attracted so much attention in so little time. We definitely had momentum, and we soon were offering the product and services to clients across Africa. We also won an award from the World Summit on the Information Society for the most innovative e-content program.

Two key meetings we held in Ghana drove a critical business evolution. One was with a lively Lebanese-Ghanaian trader, Raj Najar, who had a tilapia farm. He was working with another USAID project to look at locally sourcing maize feed for his fish, and he had set up some demonstration farms where he was trying to increase farmers' yields. His heart was in driving the local Ghanaian's maize production so he could buy locally, but he couldn't rely on them. "I don't know what's planted or what the crop will be like this year, so I just buy from Argentina: fixed date, fixed quantity, fixed quality—I can actually drive my business off that," he explained. "I cannot skip a day feeding my fish!" Raj asked if there were any way we could use our SMS system in reverse:

Instead of pushing information to the farmers, can't we get them to tell us stuff? I can't scale my demo farms and interventions by visiting them, so I need to use something fast and cheap to check that they're doing what

they're supposed to be doing at the right time in the crop cycle. I want to ask them a question by SMS and have them respond yes or no.

He needed a way to check whether farmers had planted on time, or if they'd weeded or applied fertilizers according to schedule. It was a fascinating conversation—and a game-changer for Esoko. I suddenly realized that it wasn't so much about pushing information out to farmers as it was to get information from them. The concept was confirmed at a different meeting, this one with Stallion Group in Ghana,⁵ at which we discussed its desire to build a rice mill in Ghana. The Stallion Group said it “couldn't take the risk of leaving the factory idle for a day or a week—there's no transparency on the market here, there's no security of supply.” This conversation echoed Raj's problems about sourcing maize, and for me it went to the heart of the dysfunction in Africa's agricultural sector. I even discussed the ‘buyer risk issue’ with Archer Daniels Midland who were keen to enter the African market but examining the risks. If we could create more transparent value chains in agriculture to help larger businesses identify a more constant and predictable supply of raw materials, there would be much stronger motivation for farmers to produce and less risk to all parties involved. This would improve production, yields, and revenues at both ends of the value chain—an exciting thought. After a few more meetings with Raj and one of our most talented developers, Xose Ahlijah, we had the outline of our first critical business app innovation—a form of crowd-sourcing/polling via SMS. Sure, there were questions—about incentives, whether farmers would respond, if we could ask the right questions, whether the heuristics in the system could interpret the answers and map results—but I was convinced that the value of the information flow would lead us to develop an appropriate system.

It was now late 2008, and Esoko had clients in Sudan, Tanzania, Madagascar, Afghanistan, Burkina, Ghana, Cote D'Ivoire, and Mali. It became clear that we needed a more powerful and scalable software architecture to support all of this growth. Esoko had been through so many modifications that it was beginning to suffer and bugs were all too frequent, so the team was tasked with building a new system. It was no surprise—innovation requires iteration, and iteration in software has to be managed carefully. The new Web application was built under Andrea Biardi's leadership, and we also built a powerful, and open, application programming interface that we envisioned third parties accessing to add new applications. And, finally, the new Web interface was built around networks of people, not around countries or multiregional programs—an important shift for the product that was based on what we'd learned in the market.

At the same time, we recognized that Esoko itself had changed and that we were now dealing with farmers, traders, governments, projects, NGOs, and agribusinesses. Therefore, we decided not just to rebuild the platform but also to relaunch the brand. Up to that time we were branded as TradeNet, which we now felt was too English and too focused on literal trade. While traveling with one of my colleagues, Sarah Bartlett, in Tanzania, we learned that *soko* means market

in Swahili; we liked how it sounded so we registered *esoko*. It rolled off the tongue and actually had a meaning, and to anyone who didn't speak Swahili it was one of those fun names that worked well and we hoped would grow into a brand. By 2010 we had formally launched Esoko.

MODEL 7: CONSULTING AND FRANCHISING TO SCALE

We continued to hire senior managers, and by late 2010 we were up to about 40 people and suffering all the challenges encountered by young companies that have grown quickly.⁶ Moreover, we were a complex business whose activities cut across deployment, technology, and support in multiple languages and countries, with value propositions for a varied number of clients. The key challenges we faced were keeping our focus, delivering on our product, and staying financed. Despite the early indications that we were onto something that would have a significant impact on farmers, results were disappointing. The service was difficult and expensive to deploy and we were struggling to scale it. Moreover, with the focus shifting from market prices to business apps, we had simply tried to run faster than we could. Being too ambitious caused us to build a lot of functionality that didn't serve anyone well.

We began to license the technology platform to partners around Africa, who would then deploy it themselves as franchises or by selling subscriptions to individuals and organizations in their local markets. Prices ranged from \$18 per year for an individual to \$8,000 for a large organization. This was the best method we could come up with to be able to remain consistent in each market, rather than to come and go as development projects seemed to do. Each individual franchise was to be responsible for seeding the platform with basic content and then selling licences and consulting services to clients. We came up with a detailed financial model and business plan that assumed each country franchise could become profitable after three years.

As noted above, Esoko at this point was offering not only a sophisticated cloud-based mobile platform but also, under Laura Drewett's leadership of the partner support team, a suite of consulting services and support and a business model for sustainability. The consulting revenue ended up being 75 percent of our global revenue, something we would never have expected in the earlier days. However, as we learned about deployment—data collection, negotiations with mobile operators, sales to different clients, trainings, etc.—we realized that we were one of the only organizations with this capacity. We decided to host an annual partner conference in Accra where our deployment partners could come together and learn from each other. Although the new mobile technology was exciting, it was also filled with unknowns, and these gatherings were (and still are) invaluable to each partner.

Despite technical hiccups and some overreaching, the potential impact of our innovation was clear to several investors. Back in 2009, we'd been lucky enough to attract a large angel investment from an imaginative philanthropist, Jim Forster,

who had been seeking interesting for-profit models with the potential to have a significant social impact. In 2011 we were able to attract an additional \$2.5 million in financing from the International Finance Corporation (IFC) and the Soros Economic Development Fund (SEDF). We weren't at all a typical investment for these two, but Jason Downes of IFC and Ben Matranga of SEDF both saw the potential intervention that an Esoko platform could provide across value chains in Africa. They recognized the difference between the hype and the reality about mobile, and they saw the foundations the Esoko team had been laying to deliver a great product with appropriate support that could have an impact on a massive scale, reaching millions across the continent and perhaps beyond.

Currently, in mid-2012, we have around 90 people in Ghana working on technology, supporting clients, providing strategic consulting, and project planning. We're collecting data around the country and, through partners, all over the continent. We're in nearly 900 markets and carrying almost a million prices in the system. Our product focus and technical capacity have never been stronger.

The new variable we're struggling with today—and what may well end up being Model 8 in this story—is voice services. Farmers have indicated that they need a phone number to call to support the service, but we don't know whether it should be merely a customer support line to help subscribers with their configuration or service, or whether it should provide market information and agricultural advisory services that can't be delivered easily over SMS or for people who are challenged by SMS messaging. Finding the right strategy for a company often is defined by what it has the strength to leave out rather than what it includes. For Esoko, the challenge going forward will be to find the right balance between tools and content for our many types of clients.

LESSONS LEARNED

We have learned countless lessons through this journey that are worth sharing. Here are three of the most important.

Building software anywhere is difficult, but particularly in Africa.

I've been involved in building innovative software products since popular use of the Internet began, around 1995, and have had the pleasure of working with great teams of engineers, thinkers, and enthusiasts in New York, Los Angeles, London, and Accra. We defined and built our products around ideas that were highly iterative as the industry and markets were maturing. Wherever you are, you need to involve your team every step of the way. They need to understand and have a role in the product development process, and they need to know who your customers are and why they will want what you're building.

In Ghana, it's difficult to find great software talent, but we were lucky to start with some talented developers and to build an outstanding team over time. We had to work hard to retain talented individuals, as their abilities were in short supply and they were constantly being approached by people from the burgeoning bank-

ing and telecom sectors, and some went abroad to find other work. Adding to this was the fact that in Ghana, both informal and formal education teaches students to respect authority and elders, which has the effect of discouraging young people from questioning as much as they should. That's a serious disadvantage in software development, where the best developers are people who see things differently and question everything. The acceleration of software development in Africa, particularly in Kenya, is relatively recent and can largely be attributed to the ascendance of mobile communications and the emergence of mobile apps. The landscape is changing rapidly, and it won't be long before we see some game-changing innovations that are home grown and can be scaled successfully.

The public sector is a difficult but necessary partner.

It's been a difficult journey, particular in dealing with governments and development partners and projects. Before starting Esoko, I had worked exclusively in business and the private sector, and I entered this new space thinking naively that there would be a clearly defined market and motives that could be understood. I found, however, that the public sector isn't really subject to a traditional market in the way we understand it and it is not simply building products that the market will accept or reject or reward with revenue. Development projects across Africa are driven by a different set of factors, largely political or moral, and are seeking to address needs that the market has failed. It's truly an undemocratic process. Most of the individuals I've come across in this sector are well intentioned and smart, but few of them have run a business or been subject to the rigors of the market. It's been unpredictable, expensive, and confusing. To be sure, these organizations represent public money and require complex bureaucratic processes to safeguard those funds and demonstrate their impact. Thus they compel their partners to adhere to strict deliverables and not waiver—which is nothing less than a death wish in a fast-paced, iterative industry like software innovation, where change is more often than not the required path to success. I believe disruptive technologies are born in iterative and adaptive organizations—the very thing the development world is scared of (or even prevented from) funding. It does appear that the tide may be turning, however, as USAID and others are now trying to attract private-sector innovation in development.

Aside from these criticisms, we certainly acknowledge that the involvement of the public sector in projects like Esoko is critical, and we're learning how to describe and structure those engagements more effectively. Although private businesses throughout Africa are intrigued by the Esoko model, it often is hard for them to commit significant resources and push a product to scale when the business model remains unproven and they're busy operationalizing their existing models. This is where patient capital and pump priming is essential. With a shared vision of where this market is going, the public sector can be convinced to support projects, but to get it on board, innovators will need to learn the language of

engagement: matching funds, gender policies, sustainability, private/public partnerships. There really is a whole language out there, a whole world.

Keep it simple, go slowly, stay focused.

In contrast to the heady days of the dotcom bubble, there is no such frenzy in this sector. Agriculture has struggled to spark the compelling engagement that has characterized health development interventions; it's easy, for example, to relate and respond to such problems as infant mortality. Agriculture is more complex, harder to reach, and calls for a longer engagement. I've had the luxury of time to work with my team and my partners and to try different approaches, to experiment, and to come back to try something new. This article, for example, describes several different models of Esoko that evolved over just five years! Time has been on our side and we've survived, but I believe we were too ambitious in building such a complex technology, too ambitious in sequencing business applications, too ambitious in thinking our service would spread virally among farmers and projects and businesses. Our focus now, and always has been, is to continue to determine where the energy and direction of the community lies and where results can be demonstrated.

IMPACT

Esoko's impact started with the farmers and remains with them. Our goal always has been to see more money in their pockets. We have witnessed farmers improving their revenues and changing how and where they access markets, which we believe is of global consequence now more than ever, given the pressure on the global food supply. We also have seen the interesting but unintended impact disruptive technologies always brings, with small hints that transparent market pricing can minimize domestic disputes. More broadly, studies are expected to be released in the coming year that will demonstrate improvements in revenue for farmers who have accessed prices via SMS. Over time, we'll see more sophisticated content services such as weather reports, bids and offers, and agricultural tips all demonstrating some impact. We estimate that there could be a one-time jump in revenues of about 20 percent. Across 600 million people in Africa, that's enormous.

There also will be an impact on the entire agricultural value chain. We've already seen an exporter who got a 20 percent improvement in his final export price and reduced time to delivery by 50 percent. This result has been echoed in Malawi, where traders are using SMS to send out messages to farmers, saving them the costs of advertising, calling, or visiting, and also improving the speed with which they can use their capital to source, sell, and buy new product in the market. In Malawi, an early study of a midsized trading business that was using Esoko suggests that an increase in revenue of \$350,000 over five years is possible. For a small agri-business in Africa, that's enormous.

Fertilizer by Phone

Another of Esoko's goals is to have an impact on the information and communications landscape of Africa. Widespread deployments of technology that are conceived of and built and coded entirely on the continent will soon emerge. Esoko is one of the first, and it hopes to inspire many across Africa by demonstrating that innovations can be rolled out cost effectively across multiple countries and can change people's lives. I'm also optimistic about the impact our example could have on how the rest of the world perceives Africa—showcasing a brilliant team in Accra and successful franchisees around the continent are just the kind of stories Brand Africa will thrive on.

Finally, we hope to have an impact on our development partners and to reward our brave early investors, SEDF and IFC. We hope that, through engagements like Esoko, our development partners will take a more commercial approach to market interventions, seeking payments and revenues, and thus listening more intently to the voices of those who they seek to serve. I can't help but think of the powerful role information played in the Arab Spring. I see the same thing happening in African agriculture—greater transparency, greater empowerment, a voice for all. That's the promise of technology and innovation. It just takes some dreamers to give it a go.

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1. International Food Policy Research Institute. Available at <http://www.ifpri.org/publication/agriculture-s-critical-role-africa-s-development>.
 2. Population Reference Bureau. Available at <http://www.prb.org/DataFinder/Geography/Data.aspx?loc=246>.
 3. McKinsey. Available at http://www.mckinseyquarterly.com/Sizing_Africas_business_opportunities_2633.
 4. FAO. Available at <http://www.fao.org/news/story/en/item/74192/icode/>.
 5. Stallion Group is one of West Africa's largest business conglomerates.
 6. Our team included Laura Drewett to head our partners team, Ernest Osei-Poku to lead the product team, Patrice Aye to lead international sales, and Nana Kofi Bobbie-Sarfo to lead engineering.