

TECHONOMY

TECHONOMY 2012 • NOVEMBER 11 – 13 • TUCSON, AZ

The Forest for the Trees: The Meanings of Data

Speakers:

Lars Björk, QlikTech International
Gil Elbaz, Factual
Vivek Ranadivé, TIBCO Software, Inc.
Rick Smolan, Against All Odds Productions

Moderator:

Justin Fox, Harvard Business Review Group

Video:

<http://techonomy.com/2012/11/the-forest-for-the-trees-the-meanings-of-data>

Fox: This is the data panel. And here is Rick and I with our little book. He with his big book and I with my little book.

You've met Rick already. The other panelists that we have here—first of all, to my left is Lars—and he says everybody in the U.S. calls him Björk, but I wanted him to say in if Swedish.

Björk: Björk.

Fox: Lars is CEO of QlikTech. Gil Elbaz—is it said any differently anywhere else?

Elbaz: You said it perfectly.

Fox: CEO and Founder of Factual. Vivek Ranadivé', CEO and founder of TIBCO.

And we all have different ways of understanding big and complex things. For some, it's visually. For me, it's always I want to know the history. Since I'm the moderator, humor me for a moment or two.

I want to start with you, Vivek. It's 1986. You start a company that gets you into this whole data world. What was going on? What problems were you trying to solve?

Ranadivé: Well, I came up with this notion of a software bus, and we were kind of the first big data company. At that point in time, the place where people made money from big data was on trading floors. And so I was trying to allow people on Wall Street to capture large amounts of data and find patterns in that data and hopefully make money from finding those patterns.

So that's kind of where it all started for me.

Fox: And just what is a software bus? I know half the crowd will know this, but ...

Ranadivé: The way that software was built in the old days, every time you built an application, you built bridges to connect applications and systems together. So if you had N systems, you had basically had N squared back and forth bridges to make it connect.

I'm a hardware engineer. If you look at your computer, the top of your PC there's a back plate or bus, and you plug cards into, and through a single interface things can communicate.

So I created a software version of that where you could tie systems and applications together through a single software back plate. So that's the way you could move large amounts of data in real-time and get that data to the right place.

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Fox: Lars, QuikTech, you weren't there in the beginning, but it was across the street from AstraZeneca in Stockholm? It started doing what, exactly, for the pharma industry?

Björk: So the whole idea behind QlikView, which is the piece of software that we developed over the last 20 years is that what if you put all your emphasis on the user of the software?

We're sitting here today, great conference, thank you, David, for hosting us here and the team.

We talk about consumerrization, we talk about mobility, we talk about convenience, but I think we need to step back and look. That's not been the case for a lot of people, and I still don't think it's the case.

So the whole idea behind QlikView was what if we put all the emphasis on the user of the software. All the other things that happened behind the scenes is not really relevant to them. You hardly open the hood of a car nowadays. You just make sure you know how to drive it and you like it.

But there were two things that went into developing QlikView. The first one is what if you make a piece of software that works the same way as your brain works?

Brains don't work in hierarchies, which a lot of softwares in this space have been. Your brain works associatively. As I sit here and speak, you might form the next question in your head, so we built a software around that.

Another piece that's interesting is human beings have a very interesting way of recognizing colors as patterns in a data set or information set. That's built into QlikView, too. We call it the "power of gray." There are three colors you have to remember. You click on something, you make a selection, it turns green. Everything that's associated to that turns white. The green comes from stoplight, and then everything that's not associated to what you selected is also shown, and that's what is grayed out, which we're used to from drop-down menus in so many other types of software. That was the going-in assumption around QlikView, the colors.

Fox: So, Gil, you were a database engineer, and then you and a college friend started the company with the awesome name of Oingo. What was that about?

Elbaz: Well, it started out with an interest in understanding information and seeing how there was a wealth—the web, it was 1998 when we started thinking about this and information was exploding. And there were different avenues towards organizing this.

You saw the Yahoo directory and you saw the search engine. These were different sides of the same spectrum.

So we were interested in figuring out how could we automatically process unstructured information? So we had to take a crash course on natural language processing. That got me interested in data and algorithms.

Fox: So you were initially sort of thinking you were in the search space?

Elbaz: We did. We thought we were in the search space. We thought the more you can automatically understand a page of text, the better you will be positioned to do search.

Fox: So how did that lead to developing this thing called AdSense?

Elbaz: So I'm definitely a fan of the business strategy known as "the pivot." We had to pivot. I was friendly with some of the early—the Google folks, and they were gaining steam faster than we were.

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Nobody was using Oingo search. But we realized that we could apply the same technology, and it turned out that understanding a page of text was critical to what became known as contextual ads. And we created a product called AdSense, which essentially became part of Google.

Fox: In between, you got rid of the Oingo name. Why is that?

Elbaz: It was 2002, and we started moving into selling this page categorization technology to large newspapers, like USA Today. Somehow the name "Oingo" didn't seem like the right marketing vehicle, so Applied Semantics.

Fox: That was the history. You've humored me. Thank you.

It's now. Why are we all sudden—it's not suddenly, but it's definitely the last year, two, it's this big data moment.

And, Rick, I'll start with you. Why—I mean, other than you talked to some people at EMC and some people at EMC talked to you and funded a book—but, I mean, clearly you thought that this was an interesting moment.

Smolan: You know, when I started hearing about all this—I sort of live in the world of analogies, as you all probably gathered. It's a way for me to take complex things and understand them better.

It's almost like—imagine you touched your finger to the stove and it wasn't until six months later that the stove burned your finger. A million things happen in-between those two data points. It seems like this is the first time in human history where we've had the ability to touch our finger to the stove and get the information while our finger is still on the stove.

I think the implications of that are so dramatic. So much of our information—it's like you're going to cross the street and your knowledge of where the cars are is five minutes out of date. That's incredibly dangerous.

Well, what if it's six months or six years or completely wrong?

So that cause and effect is suddenly getting connected in a way that I think it's just the right tool at the right time to help us address these enormous problems we're facing as a species.

That all sounds very grandiose, but what we were trying to do with in this project was try to look at little early indicators across this whole spectrum of human behavior. It's so obvious when you see it. But we haven't had this ability or it hasn't been affordable or technologically possible. The Internet needed to be there before any of this would work.

The Internet is incredible. But Esther Dyson told me that was just one stage. This is so much bigger now, what we're about to see.

Ranadivé: I wanted to completely agree with all of that, because I think that when you can expect real-time information with historical—and you can find patterns, then you can—and I wrote a book about this called "The Two Second Advantage," where a little bit of the right information beforehand is more valuable than all the information in the world six months after. So I want to make you the offer before you leave the aisle of the store; not six months after you leave the store. What is the point of knowing that fraud is going to be committed after you've lost the money?

If you can connect up real-time events with historical patterns, then you can take advantage of opportunities or prevent threats. And so I think that is really the turning point.

Fox: And Vivek was up here on this stage last year talking about this book, and I remember sitting there in the back row going ooh, ooh. He was talking with such forceful terms about how this is great. And we had so much data we didn't need science anymore. We didn't need the scientific method. We'd just look at what had happened and we'd know the future.

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Did you really mean that?

Ranadivé: I was exaggerating a little bit to make the point. But even since I said that, there are all kinds of examples of that. And so I'd like to say that math is starting to trump science. You don't need to know the why, you just need to know the what. Like if A and B happens, then C will happen.

So for years AIDS researchers were trying to find how the AIDS virus mutated and they couldn't. So about a year ago they converted it into a math problem, put it into a game called Foldit, and then within one week, gamers found the solution to the problem.

On a simpler level, I have a customer, a big retailer in Europe—remember, they were trying to find who was using fraudulent credit cards. And they tried and they tried and they tried and they couldn't.

And they came to us, and we found a very simple pattern. If you buy champagne, razor blades and diapers, it's probably a stolen credit card.

Now, you can go back and try to explain it and say, well, why? Well, it makes sense because champagne, razor blades, big ticket items, easy to pawn off.

Well, then why diapers?

Actually, diapers are easy to pawn off too. The guy was trying to look like he's a dad, he's a good guy, he's probably not using a stolen credit card.

Fox: Now, you have a theory. You're doing science.

Ranadivé: After the fact. After the fact. There is no way that I could have sat down and figured out that this was a stolen credit card. You found the pattern the way that Lars was describing it. You look at the data and you find the pattern.

Fox: You must be seeing that in your --

Björk: Yes, we have a great story. You all remember the tragic incident—not this past summer, the previous summer in Norway where a lunatic killed almost 90 people. The year before this was a similar story in Sweden. A sniper was out shooting at people randomly. At least that's what the people believed and the police believed.

The police is a customer to us in Sweden. By using enormous amounts of information from ten years of records and a client database, whatever the client is, criminals, they managed to pull together and see that pattern in the data set in 30 minutes, what would have otherwise have taken them three months to do. And they nailed the guy. And he's being prosecuted, put away for life.

And the whole story was—I was back home in Sweden at that time. He was randomly shooting at colored people, immigrants. But if you're there in November, everyone looks dark walking outside. So it was a pretty scary moment.

They attribute all of this to the fact that by technology, in this case QlikView, you could see the forest for the trees.

Ranadivé: I thought it was the Lady with the Dragon Tattoo that figured that out.

(Laughter)

Björk: No, she didn't work for the police.

Fox: So this was all data the police was collecting, and it was a matter of bringing it together.

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Björk: Absolutely.

Fox: Gil, you're involved with one of the world's great fishing expeditions, it seems like, at Factual. Describe it to me, like a day in the life of your company, going out and finding another data source to plum.

Elbaz: So that's certainly the framework that I live in is that a key thing—the key opportunity is better decisions. And increasingly these better decisions are automated, they are happening in real-time, as Vivek mentioned, under two seconds.

And when it comes to like—take an example like display advertising. A lot of times these decisions have to be made in 10 to 50 milliseconds.

Now, what we're seeing is that these automated systems, we are trusting them with more and more of our lives. The better—the more data you have, the better the model that you will be able to build.

There's been a lot of discussions around what is more important, is it the data or the algorithm? And time and time again, of course the algorithm is important, but usually whoever has the most data will win.

Factual, one of the things we can do, we're getting interest is we can provide additional data in certain verticals, specifically places and product data. And our customers use this in order to build better Business Intelligence, better predictive modeling.

Björk: Tying that on to what I said about the police, that's exactly what they do now. So by combining people information and geospatial information, they can predict up to 90 percent when and what crime is going to happen in certain territories over their client base.

Fox: We've just been through this financial crisis, though, where one of the big things that happened was a lot of people believing that past patterns in mortgage markets would continue to repeat themselves.

Whenever I think about this topic, there is a famous paper by David Leinweber, Lawrence Livermore Labs, where he found the best correlation from S&P 500 performance from 1983 through 1993 was the price of butter in Bangladesh.

So I'm just kind of curious, what—obviously, it's this constant—how do you fight that? Any of you can take that on.

Ranadivé: I think there's patterns, and you can combined those with real-time advance.

One of the things that—one of my pet peeves—and I've written papers on this subject—is just the way the Fed runs. I've advocated, somewhat tongue in cheek, but quite seriously, we need to replace those guys with a computer program.

So the world is, as you said, running in real-time. When you put your hand on the stove, you know it, doesn't take three months to know it. But for the Fed, it takes three months to know it.

So for my software you know if there's a store that is not selling shoes. You know it right away, and the factory in China knows that.

Now, what the Fed does, their job is to keep things comfortable. If you kept your house comfortable the way they do, then every three months you would turn the heater on and off. And you would be continuously overheating and underheating your house, which is what they've done in the economy. And they've only had one so-called "soft landing" since World War II.

So what we really need is to move to a real-time world where you're able to look at data, make tiny adjustments and make the closed loop going.

Fox: I guess the issue with the closed loop in a really big thing like the economy is there's—and I think on a month-to-month basis—I get that. What about the moments where the paradigm shifts, as it sort of has with the Fed over the last five years?

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For 25 years their job was, oh, we've got to keep inflation under a certain amount.

They've taken this leap of faith over the past two or three years, and it seems like the data, as it comes in, is starting to back them up, that by looking back at a much farther back data is that the 1930s, actually that was the wrong—we shouldn't be sitting here focused just on inflation. I mean, how do you get those two to work together? Because I get the thermostat analogy.

Ranadivé: The data now exists, and you can get it in real-time. You can set the parameters that you want and you can keep making adjustments continuously. So if you see something that's falling outside the band of what you want to achieve, you can adjust it. If you make a mistake, that's okay because you adjust it very quickly.

I believe that is how the future will work. That's how you fly a Boeing 747 or a 777, it's a closed-loop mechanism. You're making adjustments and it's about the data.

Björk: I would agree with that. No model is perfect, and it's never going to be finished. You will add data streams and filter out things.

I think an important thing in this big data discussion is most of the information for you at that point is noise. How do you filter out the stuff that's not relevant to the decision you want to make right now? That's equally important.

Elbaz: I think transparency is also part of the story. I mean, I don't think mainstream media covered the degree to which these loan applications were changing character dramatically during this period of time.

There's always going to be those who say you can't have these workflows be transparent because of all the privacy issues. But there's always ways if you care about it and if you want there to be transparency.

Fox: Right. There were a lot of people in those transactions that didn't want them to be all that transparent.

But this is bringing me to this thought of where is the balance in thinking about big data between—and thinking about how to get useful things out of it between actual domain expertise in medicine or whatever else, and just being a good data scientist?

First of all, Rick, you've been out there looking at all of these different things. How many of them—are the coolest things coming from people who are already in the field and went looking, oh, how can data help me? Or was it much more people who were just into the data and cool stuff started to show up?

Smolan: I was thinking before—no one has actually asked me this. But I was thinking if someone said if there was one story in the whole book, in the whole project that you sort of learned about that—they have this great expression in Australia, gobsmacked, where you go, wow.

I heard Francis Collins from the NIH talking at TEDMED last year. And he was talking about the fact that drug companies spend of billions of dollars looking for cures to the biggest diseases facing humanity.

Along the way, as they test these drugs, they get to a point where they do clinical trials, and, unfortunately, very often some of these drugs have serious harmful or deadly side effects. So .001 percent of the people taking the drugs will die, therefore, the drug is never released.

And one of the points he was making is that now because we are able to actually do generic sequencing, right, and decode individual DNA at a level, that soon will be pretty affordable. He's saying in five years you go to your local drugstore and for \$40 they will basically tell you which drugs will work for you and which once won't.

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The fact that all these drugs are potentially sitting there on the shelves gathering dust that could save millions of lives, to me, that was one of the most dramatic things that I saw.

I don't know how you tell that story in photographs, but when I think about the potential of that, alone, to take this unlocked resource, and because of—again, because of big data being able to go in and give each of us an individual blueprint about what will work for us and what won't work for us, that is just stunning to me.

Ranadivé: We're already doing a lot with drugs where basically they're using our analytic tools to find out what kinds of drugs will work on what kinds of people, in what combinations. And we also now have the State of California doing that, where they look at every person born, and based on their genetics and ethnic background, they can determine in advance.

So we're getting to a point where we're going to have extremely personalized medicine.

Smolan: Right.

Ranadivé: The state of California is already doing that with a lot of our software. We're approaching that.

Smolan: I just think it's real exciting. There is a scary point of all this, too. If somebody out there ten years ago said to, Gil, could I plan a tracking device on you so I would know where you were every moment of the day, 24 hours a day, who you were with, what you bought, I mean, we would say, are you kidding? No way.

Now we line up to pay \$800, to implant the new—I love my iPhone. I'm not complaining about it. But this idea that—we're now comfortable with this idea that you can't unplug anymore.

Ranadivé: I think people, once they decide to opt in, there's all kinds of value that flows through.

Fox: But that is the question. I'm going to start with this one on, Gil. All this data that's out there, how do you—or should we think about ownership, who owns it?

Elbaz: Yeah, certainly ownership is important. The dimension of it that I think is very important, from a business standpoint, is how much of it do you want to own?

Too often a company sees all of their data as their asset. But it turns out that ownership comes with a price. In many cases, that's a price of huge costs for maintenance.

And if you're spending a lot on maintenance—and, also, by the way, this data isn't unique. Other people have similar data—and that data isn't differentiated, you should outsource it.

In software we learned you can do that in two main ways: You can get involved in something open source. You can license, outsource to third-party software developers.

I don't see that happening enough in data. Where people examine their data, decide I'm going to differentiate here, put my resources here. Here, just get rid of it. Get rid of the ownership.

Fox: That's from the side of the companies gathering this data. What about the person with the iPhone who is being tracked everywhere?

I mean, there have been interesting—there are the privacy zealots who think this is horrible. There is this interesting middle ground of people like Doc Searls, who are pushing the idea, that, yeah, if somebody can collect stuff about me that turns out to be really useful, that's great. But shouldn't it be my decision? Shouldn't I own it?

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Elbaz: I think the contrarian view would be that people will make a living in the future just selling their data exhaust. I think that's a direction we'll get to.

I threw out an idea at one conference, where it's a pity—people proactively will make sure they are donating their body to science, but their body of data is probably worth much more to the health community.

Fox: Any other thoughts on that?

Smolan: There was a gentleman in one of the photographs—and I skipped over the picture, but it's a picture of a guy sitting there with a computer in front of him showing his chest and data coming out of it. He actually has a defibrillator, and it actually transmits wireless to his doctor throughout the day. So he wanted to correlate his exercise and data when his defibrillator kicked in.

So he called the company and said, can I get a copy of the data of my heart over the last six months?

They said, sorry, that's our data, not yours.

He said, wait. This is my heart. You are collecting the data.

That really poses—everyone—now they are making money off our data. It seems like we need to have a discussion about the idea that—I mean, I at least want to be able to opt in. And maybe if I got—if I benefited, if I got 10 percent of what Google is selling my, you know, browser history for, I would be happy with it.

But the fact that everyone else is trading in our data except for us and we have no control of it, it's sort of unsettling. Especially as it looks like data is becoming more and more valuable and important.

Elbaz: You did opt in. You didn't read the terms of service.

Fox: It's only 12 pages in.

I would love to go pretty soon to comments and questions from the audience, just because I think on this topic a lot of you folks out there are going to have much smarter things to ask than me.

There's somebody over there with mic—I'll go ahead—who has got her hand up. We'll there's lots of people with their hands up. Well, let's just—okay. We'll go here because he's got the first mic.

Sprague: Steven Sprague, Wave Systems. So I think one of the interesting questions in big data comes in the context of ownership and also integrity. The security conversation around this is not discussed enough. We think of it in the context of big brother, but it's the—the question is how can this data be used maliciously? And we have so many fantastic examples where people have manipulated the—oh, Google search results would be a perfect example, in order to create economic benefit.

If we all of sudden we automate all the systems, the concept of integrity and security and control and when do I pull the plug when it looks like it's going out of control? I would love to hear your thoughts on it.

Fox: I think Vivek gets that one first.

Ranadivé: I am sympathetic to what you're saying. But I think we will find our way around all these things. I remember 10 or 15 years ago I was having lunch with somebody, and they said nobody would ever buy anything on the web.

And then after we finished lunch, they took their credit card and gave it to the waiter.

I was like, wait, you just gave your credit card to some person you don't know. He went off to the back room somewhere.

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So I see it the same way. I just see that we will get past—those are all issues, but I think we'll get past them.

Fox: That's the first hand I saw, so I think that gets something.

Westby: Jody Westby, Global Cyber Risk. One of the things I do is work with engineering teams about legal issues in development of products, and I'm a little troubled knowing the variety of privacy laws around the globe and disparities between them. That we are so cavalierly talking about big data in ways that it's cool, it's products, but not can thinking about when you go to the ownership question skipping over to the fact that this is data about real people that are having legal protections that are being enforced by protection authorities all around the world.

Fox: Which is a similar—

Björk: No, I think you raise—as Vivek said before, I think you raised a question that is very, very valid. And we probably don't have an answer to it. But I think we need to bring it back, too.

You're touching on one point of big data. Most of the things that we solve in this area has nothing to do with personalized information. Most people don't even have access to relevant data in their day-to-day life to make a good decision.

I'm not shying away from your question. I think it's a very important one, and there needs to be a lot of people at the table to discuss this one, including regulators, I think, at least. But we will figure it out in some way.

Elbaz: Well, we haven't yet seen the ground swell of consumer concern here. And when we do, tools will address this. I mean, today's people don't read their privacy policies and they don't ask other people for help examining those privacy policies. At some point when enough people have been burned, that will become the norm and things will be improved.

Ranadivé: And, also, the new generation is actually much more comfortable with this than older generations are.

Björk: Or they are happily unaware.

Ranadivé: Well, I think they're aware. I think that's just kind of their way of life.

Smolan: The other thing you see over and over again, people are concerned about privacy, and I am. But you're offered something convenient, and it's amazing how fast people will give up their privacy—I mean, I use Facebook Connect, and it says you agree to let me post as you.

So, wait, I'm agreeing to let you post as me, and I say, yeah, because I don't want to spend five minutes filling out a form. I know it's stupid. I agree with your concerns.

My concern is people are not having this conversation. By the time we have it, there will be things set in stone. That's one of the things we're trying to do.

There is a whole chapter in the book called The Dark Side of Data, which is talking about some of the more troubling aspects of this. Maybe in the United States we don't worry so much about who knows where we are and what it's being used for, but in other places in the world it would be incredibly dangerous if the government knew where everybody was all the time.

Ranadivé: I would say for every one of those, there are 10 where it can be used for good.

Smolan: I think the majority is good, but we do have to think about the bad before it gets sort of ahead of us.

Speiser: Frank Speiser from SocialFlow. Basically we've gotten here through some sort of consensual contractual revolution. So we've opted in because it's been convenient, we've gotten what we want—but to your point, you know, I don't know if a government fix is in order, because we got here by a bunch of individuals opting in.

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Doesn't the rise of big data and this privacy problem actually, by economic law, give us a situation where there's a market for big obstruction? Isn't there an antithesis to the contractual opt-in that people will start to pay for when they start to feel the pain of opting in?

Fox: Like a business model for companies that come in to—I don't know, what would their role be?

Speiser: Or some sort of open source style revolution to break away from it?

Elbaz: There are technologies out there. There's personal.com. It's a personal data locker where you have complete control of the information. And once it's there, they are guaranteeing that you get to authorize any third party that uses it.

But these things are—they are emerging, but they're a little complicated and we have to really want them. We have to want to go to build another network together that emphasizes greater control.

Ranadvivé: I have a basketball team and I launched some applications for my team. And once you opt in to the Fan Zone, then I basically know everything about you. And if you're sitting in my—

Fox: Everything about you, or everything about you when you're at Oracle arena.

Ranadvivé: Well, when you're at Oracle area and beyond. Like I know what your house looks like. I know what you like, what you don't like. I even pick up—if you're sitting there and you tweet that you're pissed off because you had cold pizza—and this is a real example. I know it. So I make it up to you. I know that you like it when the Lakers are in town. You have kids, there is a game. Or I have extra VIP parking. I'll make it up to you. But you opted in, and you want the goodies, the good deals, the good offers.

Fox: What does the opt-in look like? Right at the beginning?

Ranadvivé: Yeah, there's a Fan Zone. It's kind of like being in a hotel. You come into the lobby. There is a lot of good free stuff. The ambiance, chandeliers, the music. If you want to opt in, you go into the Fan Zone where you give us your e-mail. We know who you are. At that point it's like going to the special room for the VIPs. At that point you can get special offers, you can get special content. You can be interacting with the players, and people are choosing to do that. They want the good stuff.

McManus: Hi. Mickey McManus from MAYA. So it seems we're at 6 or 7 billion cell phones. Everyone is talking about mobile is the new revolution. It's amazing, sensors and connectivity. And yet analysts are saying we're going to have trillions of devices in the next five years, which is a lot different than 5 or 6 billion. How will big data change when all atoms and bits, or when a lot more of them are connected? What will happen then?

Ranadvivé: I think we have the potential to make the world a really amazing place. We can eliminate airplane crashes, we can eliminate drought. We can eliminate disease. I think—I started my company with the notion that if you get the right information to the right place at the right time and you put it in the right context, you can make the world a better place. Your lawn will know where the water needs to go because there is a sensor that will tell you, this is dry.

So you have the potential to create a truly amazing world. A lot of the data, you're right. It will be coming not from people, but from things.

Fox: There's got to be a dystopian version of that future, though, too. This probably is the wrong panel to ask about that future, too.

Ranadvivé: Things like airplane crashes. Like the plane that crashed off the coast of Brazil. All of that data was available that would have told you there was a faulty sensor. Didn't have to happen. Pandemics, we can prevent them. Power outages, a lot of them can be prevented.

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Fox: Somebody back here.

Collins: Hello. Steve Collins from Valid. We've heard that the amount of data and the sort of technological revolution has increased exponentially in the last 10 years. At the same time, there's more malnourished in the world than there were 10 years ago, and even actually a lot of countries have this equivalent proportion of malnourished.

So what I'm hearing is that, yeah, this great big data and this technology is a tool, but it's insufficient by itself. We've actually got to have models to apply it to the welfare of poor people. It won't just happen by itself. What is your perspective on that?

Björk: So I agree with you. One of the efforts that we've put out, there is a big corporate social responsibility program. So any organization in the world that wants to help the less fortunate ones get our software for free. Because we've set out a target. Not only do we want to drive sales to a certain level; we want to touch the lives of a billion people in some way. And we recognize not everyone is going to have a mobile phone and maybe have access to the software. But they can still be beneficiary of it through another organization.

And I'm not sure your stats are right. Do we actually have more malnutrition in the world? That's not what my fellow Swede Hannes Rosin (phonetic) is saying.

Ranadivé: Well, I think that I agree with Lars. With data we have the potential, and we're working with the World Economic Forum to eliminate food storages, because a lot of it has to do with distribution, a lot with data. It is a little bit of big data problem, so we think that the potential exists to eliminate a lot of those problems.

I agree with you. We've spent a lot of money on technology, and now you know what Shaq had for lunch, and you still have food shortages. You still have airplane crashes. You still have disease.

Fox: How can that be, when we know what Shaq ate for lunch? Why can't we send a man to Mars?

Elbaz: One comment about that. There is a tremendous amount of data about that. The entrepreneur that could be inspired to solve that problem probably does not have access to the data that they need to solve it. Yet.

Rasiej: Andrew Rasiej, Personal Democracy Media. I want to return quickly to what Rick mentioned, because I think it's really important. How many people in this audience have actually read a terms of service all the way through before you actually got your service or your device?

Fox: We got somebody right here.

Rasiej: So one of the big problems is that the language is not only written by lawyers who were trained in the 20th century, but the language is so archaic that we don't understand what it means. Imagine a site where we had—basically beforeyouagree.com. Where you could actually put up terms of service. People could crowd source turning that language into language you could understand so that we could actually take more personal responsibility for our role in the big data revolution and maybe take our data back.

Björk: I think you have a great business idea there. Absolutely.

Fox: Richard Thaler, the economist, calls this "choice engines," the idea that there's a big business opportunity out there for a middleman, basically, between consumers and all of these people who want our data. And I mean, to me it's immediately very attractive because then there would be someone with an incentive to make these things clear.

Do we have another one? We've just got a couple minutes left here. Up in the front row here.

Vander Auwera: Thank you. Peter Van from SWIFT.

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Most of the discussions about big data are about big organizations sitting on lots of data. I would like to hear your view on what happens with small data when we evolve towards much more peer-to-peer communication between individuals and even devices. What happens then?

Fox: Gil, do you want to try that?

Elbaz: So there's many problems in data, and big is the one that seems to have its day right now. But when people are asked the definition for big data, I think the popular description is around not just volume but also variability and velocity. So there are those two other issues. Variability in terms of the structure.

So even when you're talking about small data, if you can't automate pattern matching and figure out some way to extract some sort of common structure from the data—and if it's happening at real-time and you need to be able to react, those are equally important in this day.

Fox: I'm also just curious with all three of you, are you finding that—especially Vivek and Lars—that your businesses started dealing with really big corporate clients and have moved down to smaller?

Björk: No, we started at the other end. Big data, again, is it a relative term, or an absolute term? For most people it's relative, it's big to them. That's what we deal with. We have 26,000 customers. There isn't that many Fortune 500 companies, let's be honest. That's why they're called Fortune 500. We deal with a lot of small and medium sized companies. We have exactly that challenge. How do we make it relevant and easy for them to access data?

That's why the big data discussion needs to be put in some kind of perspective. They still don't have access to that. It might be small data in the total scheme.

Fox: I have to wind this up now. Thank you all very much for the great questions. Thank you panel.

And David, are you coming back up, or what is the plan?

Kirkpatrick: I'm coming back up.

Fox: All right. Thank you, panel. Let's give them a hand.