

Part of PPG's *Impact of Social Sciences* project focuses on how academic research in the social sciences influences decision-makers in business, government and civil society. We will cover a series of salient viewpoints emerging from this interview programme on the blog over the next three months. To launch the series **Rebecca Mann** talked to **Prabhakar Raghavan** (<http://blogs.lse.ac.uk/impactofsocialsciences/?p=7739#author>), who is Vice President of Strategic Technologies at Google, and Consulting Professor of Computer Science at Stanford. He explains the role that social scientists are already playing in the development of the tech sector in Silicon Valley, and discusses the opportunities for impact and some remaining obstacles to collaboration.



### What is the opportunity for social scientists in the high tech sector?

Industry, and especially tech firms, now has a view into the lives of billions of people and their daily actions, at a scale and granularity that we did not historically have. There is a huge opportunity to take the 'big data'

([http://www.mckinsey.com/insights/mgi/research/technology\\_and\\_innovation/big\\_data\\_the\\_next\\_frontier\\_for\\_innovation](http://www.mckinsey.com/insights/mgi/research/technology_and_innovation/big_data_the_next_frontier_for_innovation)) that the computer scientists have access to and then combine it with the big problems that the social scientists contemplate. The opportunity here is the confluence of the two, to get to really interesting social insights that are statistically robust. Inevitably, these opportunities must be approached with the utmost regard for individual privacy, with analyses restricted to anonymised ensembles of data.

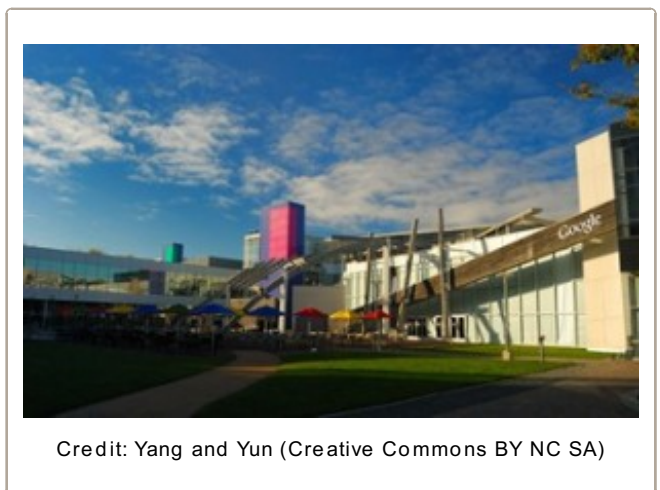


Computer science has traditionally been the custodian of big data. When an ethnographer, sociologist or cognitive psychologist works with us, they can address questions about the essence of human behaviour, such as what drives people to interact with the artefacts we're building with modern technology. Academics can advance our understanding of behaviour and motivation and companies are deeply interested in the commercial application of those insights.

### Where can we count successes so far?

The primary success in the collaboration between social science and the tech industry to date has been at intersection of microeconomics and computer science. If you look at game theory, auction design and pricing theory –it's the foundation of the economics of internet. For example, the pricing of advertising and subscriptions involves a lot of game theory. And auction design work has materially and directly impacted search firms.

This success has come relatively easily to us and there is a reason why. Economists and computer scientists have a common language to capture knowledge, and that language is mathematics. In other words, when I have hired both academic economists and computer scientists and put them together at Google or Yahoo! they can relatively quickly get talking to each other, because they speak the same language. They are able to talk about models and theorems and equilibrium, designing the systems and code that has mattered to the tune of hundreds of billions of dollars in the advertising industry. This is a fairly direct, massive impact from collaboration between a traditional social science discipline, namely microeconomics, and computer science.



Credit: Yang and Yun (Creative Commons BY NC SA)

### What about the other social sciences?

Web companies have already enjoyed the successes brought by the economists and now they're interested in what they can get from other social scientists too. The interaction between computer science and many

of the other disciplines – such as ethnography, anthropology, sociology – has been a little more challenging. I believe it is going to happen but it's been slower going – chiefly because of absence of the commonality of mathematics as the default language for reasoning. Also, computer scientists are not used to contemplating big social problems, and traditionally social scientists haven't had access to big data. A social scientist is not content to know that someone clicked on a page. They want to know why: what were the background and cultural factors that played a role in that choice? And you have the computer scientist saying 'Sorry, I don't do that. I don't sit and ask my users, I just measure clicks or page loads. I know how many people read the story or loaded it in their browser. I have no idea why'.

So if you're at Facebook or Google, you instantly have data on hundreds of millions of people. It's just not at the level of depth and granularity that a social scientist is used to. It's been routine in ethnography or sociology to study fifty people in great detail, understand everything about their lives over two or three years and then write a book or a thesis (this is a caricature, just to make the point). What they are used to is datasets that are small but very deep. At first blush they find terabytes of data voluminous, but equally, shallow. However, the influence of the social science in the tech sector is still nascent. No doubt it will continue to grow. It's important to recognise that it is early days still.

### **Where are you seeing social scientists making an impact in the tech sector?**

At least some of the work I've been tracking has been performed collaboratively between companies and universities. Most of the work I've seen so far has been in the United States, but I'm starting to see vestiges of it elsewhere. Recently I've been at the University of Padova lecturing on this topic. And I was at a workshop organised by the US government that drew experts from all over the world who are interested in exactly these questions. These workshops now attract more academics than industry people.

Part of the reason why much of the work in this area has been in the USA to date is that the federal government has a lot of interest in this field. The biggest funders of this research in America are the Departments of Homeland Security, Defence and Energy, and academics in the US are capitalising on this.

### **What constraints are limiting collaboration between academic social scientists and tech firms?**

There are both demand and supply side issues that we will need to surmount to increase and intensify partnerships between the tech sector and social science disciplines. In terms of the supply of social science researchers, my biggest obstacle in growing the social sciences group at Yahoo [where Prabhakar was previously head of Yahoo Labs] and here at Google is that we can't find enough people who are trained and interested in these issues. We need people who can straddle the disciplines. At a university, straddling disciplines and creating new disciplines is a matter of decades. In industry we run in quarters and years at the most, so we can't afford to wait for that. Getting people trained was my biggest issue – it's a supply chain problem. If I could find twenty more social scientists to hire, I would.

In terms of demand for social science researchers, the obstacle is having the right leader in the product group realising that the so-called algorithmic problem they're solving is not an algorithm problem, it's a microeconomic problem – and so you have to go ask someone else. Once that connection was made, things flowed naturally because the monetary imperative is powerful. Once you go to a CEO and say, 'Here's how you can make another billion dollars', they jump at it.

### **What advice do you have for social science academics who want to increase their impact in the tech sector?**

Don't expect too much too soon. If you want billions of dollars' worth of impact in multiple instances, you're not going to find that many. However, there's no doubt that these interactions can be encouraged and promoted and I think a lot of this is about finding a commonality of language which doesn't exist today. In order to get good at this way of working over the next 20 years, we have to start bridging these extremes – so we can start to answer the big and deep questions that social scientists ask, with the statistical rigour of large datasets from computer science.

When I was building the Yahoo! Labs and was involved in more of these efforts at Google, one of the things that I would do is hold up the success between economists and computer scientists as a kind of poster child for other social scientists to emulate. We have a workshop where we say 'This is what economics and computer social has been able to do so far, and there's even more excitement ahead – come join us'.

*Note: This article gives the views of the author(s), and not the position of the Impact of Social Sciences blog, nor of the London School of Economics.*

**About the author:**

**Prabhakar Raghavan** is Vice President of Strategic Technologies at Google, and Consulting Professor of Computer Science at Stanford. Previously, at Yahoo! he was Chief Strategy Officer, Executive Vice President, and Head of Yahoo! Labs. He has worked at IBM Research and enterprise search vendor Verity.

**About the interviewer:**

**Rebecca Mann** is a researcher with the LSE Public Policy Group. She holds a Master of Public Administration from the LSE and degrees in Law and Economics from the University of Sydney. Previously, she was a lawyer at Herbert Smith LLP in London and an adviser in the Innovation & Strategy Unit at the Department of Justice in Melbourne, Australia.

Related posts:

1. Five minutes with Andrew Miller MP: "It's important that people handle information in an intelligent way, and social science has a huge role in this."  
(<http://blogs.lse.ac.uk/impactofsocialsciences/2011/12/09/five-minutes-with-andrew-miller-mp-%e2%80%99s-important-that-people-handle-information-in-an-intelligent-way-and-social-science-has-a-huge-role-in-this%e2%80%9d/>)
2. Five Minutes with Nicholas Lemann: "Incorporating academic research adds value to the social mission of journalism." (<http://blogs.lse.ac.uk/impactofsocialsciences/2011/12/30/5-minutes-with-nicholas-lemann/>)
3. Political scientists are limited by their reliance on existing data sets, and there is not enough emphasis on creating new data. (<http://blogs.lse.ac.uk/impactofsocialsciences/2012/04/26/political-finances-scientists-unmasked/>)
4. Examination of digital technologies must become central to social science research  
(<http://blogs.lse.ac.uk/impactofsocialsciences/2012/07/31/digital-technologies-social-science-research/>)
5. Five minutes with Mark Blyth: "Turn it into things people can understand, let go of the academese, and people will engage" (<http://blogs.lse.ac.uk/impactofsocialsciences/2012/03/09/five-minutes-with-mark-blyth/>)