Food Ethics Council

Data to the rescue?

Exploring the potential for Big Data and Open Data in food and farming

A report of the Business Forum meeting on Tuesday 29th September 2015

Contents

About the Business Forum

Ethical questions around climate change, obesity, food security, people and animal welfare, and new technologies are becoming core concerns for food businesses. The Business Forum is a seminar series intended to help senior executives learn about these issues. Membership is by invitation only and numbers are strictly limited.

The Business Forum meets six times a year for an in-depth discussion over an early dinner at a London restaurant.

To read reports of previous meetings, visit foodethicscouncil.org/businessforum.

For further information contact:

Dan Crossley, Food Ethics Council

Phone: +44 (0)333 012 4147

dan@foodethicscouncil.org

www.foodethicscouncil.org

Introduction

"Data is the new science. Big Data holds the answers. Are you asking the right questions?"[1] (Gelsinger)

We are experiencing today an explosion of data generation, which is predicted to reach a 4,300% annual increase by 2020[1]. Beyond the practicalities of storing such a large amount of data, we are faced with the enormous challenge of processing this "Big Data". Ahead lies an array of possibilities, but without an ethical framework, how will we ensure these are used fairly?

A new UK Agri-Tech Big Data centre – the re-named Agrimetrics [2] – has now been set up. Liz Truss, Environment Secretary, also recently announced that Defra is making 8,000 datasets publicly available "in the biggest data giveaway that Britain has ever seen". Some large datasets are already being used, whether to study customer behaviour via supermarket loyalty cards, or DNA sequencing in breeding crops and livestock.

The September 2015 meeting of the Business Forum explored what challenges exist in food and farming that this data may be able to address; the nature and challenges of Big Data and Open data; some of the opportunities that exist for food and farming; and whether there was a need for an ethical framework.

We are grateful to our keynote speakers, Francine Bennett, data scientist, CEO and co-founder of Mastodon C, and Ed Dowding, systems analyst and founder of FoodTrade. The meeting was chaired by Jon Alexander, Director and Founder of the New Citizenship Project and Member **of** the Food Ethics Council.

The report was prepared by Liz Barling, Dan Crossley and Anna Cura, and outlines points raised during the meeting. The report does not necessarily represent the views of the Food Ethics Council, the Business Forum, or its members.

Key Points

- Big and open data is pervasive across society, and is having many impacts on our lives – positive and negative, seen and unseen. Citizens give away data all the time, not always knowingly. Whoever controls data has power and therefore responsibility.
- Open data can be a driver of innovation. Across the world farmers are using open data to improve yields and get better prices for their produce. The combination of growing availability of cheap raw data, enormous computing power and sophisticated frameworks opens up new opportunities, which can be put to solving food and farming challenges.
- Owning data and knowledge sets can give a business a competitive advantage, putting it in a position of power over competitors. This can lead to it being less inclined to share the data with others.
- What gets measured tends to get managed. In food and agriculture, one could argue that the wrong things get measured. Traditionally we have measured how cheap food is to produce, rather than the effects of its production on the environment, our welfare or that of animals.
- Serious concerns exist about the use, collection and storage of data. To cite just three aspects. Firstly, 'if you put rubbish in, you will get rubbish out'. Secondly, individuals are often concerned about privacy. Even with the promise of anonymised data, it can be possible to identify an individual through cross matching data sets. And thirdly, for industries like agriculture, there are risks around whether data is allowing a concentration of power in the market.
- If data is stored, collected and used 'fairly', the potential for data to do good in the environmental and social spheres is enormous. Big, open and linked data can perhaps produce a revolution in values. The bigger, more open and more connected society is, the more values come to the fore.
- What is needed is a social contract between the givers and receivers of data; one that is based on an ethical framework that priorities values over value.

[1] http://www.csc.com/big_data/flxwd/83638-big_data_just_beginning_to_explode_interactive_infographic
[2] http://www.agrimetrics.co.uk/ (note – it was previously known as the Centre of Agricultural Informatics and Metrics of Sustainability)

Data, data everywhere…

Big and open data is pervasive across society, and is having many impacts – seen and unseen – on our lives. Often the impacts are positive, but there is the potential for negative impacts, particularly around the misuse of data and the issue of control. Whoever controls data has power. But as we all know, with power comes responsibility. Who is holding data owners to account?

Enormous amounts of data are collected on a huge range of things, but it can be hard to work out how to use this information to solve real problems. However, recent shifts in the availability of data may change that.

Data is now generated much more cheaply - and more automatically - than it used to be. Mobile phones in people's pockets track locations, collecting information about temperature, movement, and many other things. That data costs little or nothing to produce and is constantly available. The trend is the same across industries: items are automatically tracked through supply chains, creating raw material that, if applied to a specific business problem, may be very useful.

Computer storage has become very cheap. Ten years ago it may have cost a business millions of dollars to store large amounts of raw data; now it only costs a few dollars.

Internet search engine have developed technologies that let them put all of these cheap servers to work in a coordinated way to analyse this huge amount of data.

These three trends combined – raw data, enormous and cheap computing power and sophisticated frameworks – opens up new opportunities. These opportunities become particularly powerful when they are put to solving a specific big problem. This could be a business issue – but equally it could be an environmental or social one.

Open data – good and bad?

Using big data to solve business problems has become fairly standard in many industries in the past few years, with even the more traditional industries such as agriculture catching up. Analysing big data can highlight patterns that relate to a business (or an industry), and be used to make predictions for the future based on much more individualised scenarios than were previously possible. One example of this is Tesco Clubcard, which first accumulates masses of customer data and then tries to understand shopping behaviours and predict what people will buy next. Another application could be that call centres, where there are only a certain number of people to answer calls, could use call data to decide which calls should be answered first (for instance fault reports).

There are many things about open data that can be beneficial to society. It can assess the success or otherwise of a policy or course of action, and suggest different actions. For instance, in New York City data was used to identify and prioritise inspections of buildings that were at the highest risk of fire and housed illegal occupants.

There are also ways that open data can be used to benefit paying customers. The company the Climate Corporation developed prediction software based on soil and climate data, which gave farmers better insurance deals for their produce. The software proved very successful, and the company sold it to Monsanto.

This latter example illustrates how owning data and knowledge sets gives a business a competitive advantage, putting it in a position of power over its competitors. This can lead to the business being less inclined to share the data with others.

Individuals and industries face different issues related to open data. The former are often concerned about privacy – even with the promise of anonymised data, it is possible to identify an individual through cross matching different data sets. For the latter, especially in the case of agriculture, there are risks around whether data is allowing a concentration of power in the market.

The data revolution

It was suggested that big, open and linked data is set to produce a revolution in values. The bigger, more open and more connected society is, the more values come to the fore. So, for instance, the Fitbit tracks how many steps a person walks. This data could lead an insurance company to offer a discount to people who walk a certain number of steps per day. Imagine if this data, added together, tracked a city or even a country, empowering the community as a whole to become fitter. The Mayor of Oklahoma has already

done this, using health data to set a goal of his city's inhabitants losing a million pounds of weight. A subset of fitness data could also monitor other aspects of health, such as glucose levels for diabetes.

Other public health and wellbeing applications could include rewarding people for reducing portion sizes, or even – perhaps more worryingly for the food industry – using storecard and public health data to bring class action lawsuits linking diabetes with the consumption of products.

In agriculture, open data can help to make the food chain smaller, and support local and small-scale farmers. Farmdrop uses data to track who has which products and matches them to the market.

An open data framework?

Data allows citizens to compare and contrast products, services and even lifestyles. It illuminates issues that may otherwise be invisible. But many argue that just having the data isn't enough – citizens need the tools to interpret it, to set guidelines on how it's used, and how it is shared. In effect, there needs to be an ethical framework to allow society to make good choices about the collection and use of data.

As it stands, there is not a clear ethical framework for managing big data. The law is weak and affords little protection for individuals. Many people working in data are talking about what kind of framework there should be, and some grassroots movements are also working on some fundamental principles. They argue that as it is unlikely society will be given 'top down' regulation on the issue, citizens need to agree on a set of principles and a code of behaviour for professionals who are analysing data.

What gets measured tends to get managed. In food and agriculture, one could argue that the wrong things get measured. Traditionally we have measured how cheap food is to produce, rather than the effects of its production on the environment, our welfare or that of animals. Measuring the externalities of food production devalues other social and environmental considerations. Yet new technologies can measure the environmental and health impacts of growing certain foods (e.g. chemical run off into rivers or profiling obesity).

Now we can capture these other metrics, we need to work out how we can best use them. This throws up difficult questions around how to value our planetary resources and the interconnectivity of things. How can we value complexity?

One such way may be through social impact bonds, which allow a government to experiment and reduce risks. One good example of this is to pay a bonus to a prison provider for every prisoner that does not reoffend.

Collecting open data

Citizens are giving away data – knowingly and unknowingly – all the time. The Tesco Clubcard contract between the shopper and the business is well known and widely accepted: the individual gives the company information about his or her shopping habits and gets a financial reward. When does this exchange of data become morally questionable?

When people go through a big life change such as having a baby, they are much more likely to change their shopping habits, so this is a good time to get them to change their behaviours. Using data to identify those people is very lucrative, but is it just smart marketing or manipulative behaviour on the part of the business? Should shoppers be made to understand the extent to which they are actually being manipulated – and do they even want to?

Data collected can affect your access to services, not just your supermarket offers. Wonga requires access to your Facebook account because it understands that who your friends are is a good indicator of whether you are going to pay back your loans.

There is a difference too between freely given and captured data: we need to be very clear of what that difference means. Are there, for instance, enough protocols for opting-in or out, and who benefits from the data in the long run?

There are many ways that citizen participation can help organisations – both profit making and non-profit – to collect data. Governments require farmers to collect farm animal disease data and use it to forecast when and where diseases may occur. Wildlife organisations use citizen science to look for the first signs of spring or track plant and animal species extinction threats. And businesses can encourage their customers to give them data that benefits them both. For instance, Syngenta developed an app that uses weather and pest data to help farmers decide when to plant crops and use insecticides and fertilisers. The data that the farmers also input into the app allows

Syngenta to work out what crop yields and availability will be later on in the growing season – highly valuable data on food availability and prices.

Open data as a driver of innovation

Across the world farmers are using open data to improve yields and get better prices for their produce. In China smallholder farmers are checking wholesale prices on their mobile phones, and in Ethiopia farm cooperatives are overlaying maps on soil, climate and other data to work out which crops to plant where.

It was argued that UK farmers must also embrace the use of open data and innovate – but there are other issues at stake too. So that farmers can take full advantage of data availability, there needs to be widespread access to broadband – especially in rural areas. And when public money is put into private data gathering, that data must be made publicly available.

Final thoughts

As citizens, consumers and businesses we give away our data because we believe that we will get something in return. It is clear that as the collection, storage and analysis of data becomes cheaper and easier this 'understanding' becomes a vexed question. Companies that collect data and refuse to share it find themselves in a quandary. At first their knowledge makes them powerful, but in time the refusal to share their data can result in distrust and the withholding of new data. At the same time, individuals or businesses might not end up benefiting from sharing their data – in fact they may put themselves at a disadvantage.

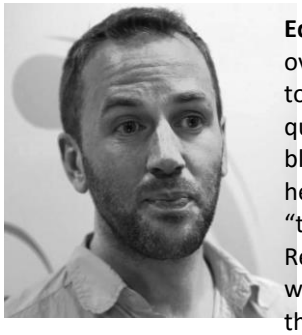
Crucially, the value of data is also closely linked to what is being measured and to the quality of the input data. A business can have the best data collection methods in the world and the best intentions, but 'if you put rubbish in, you will get rubbish out'.

However, if data is stored, collected and used 'fairly', the potential for data to do good in the environmental and social spheres is enormous. The public and ecological health of communities, countries and the globe can be mapped, new policies developed and measured, and the sharing of data can drive innovation for the public good.

It is clear that what is needed is a social contract between the givers and receivers of data; one that is based on an ethical framework that priorities values over value.

Speaker biographies

Francine Bennett is a data scientist, and is the CEO and cofounder of Mastodon C. Mastodon C are agile big data specialists, who offer the open source big data technology and the technical and analytical skills which help organisations to realise the potential of their data. Before founding Mastodon C, she spent a number of years working on big data analysis for search engines, helping them to turn lots of data into even more money. Fran is also Trustee of DataKind UK, an independently-run charity that upholds DataKind's vision of using data in the service of humanity. She enjoys good coffee, running, sleeping as much as possible, and exploring large datasets.



Ed Dowding has been creating social collaboration systems that leverage data and tech for over a decade. In 2002, he built a risk analysis service for the insurance industry. From 2005 to 2010, he developed an SMS alert system for the police to engage private security, which quickly grew into a full emergency management service for London local authorities and blue-lights. In 2012, he founded FoodTrade. Dubbed a 'dating site for food businesses', it helps small food businesses trade more effectively with each other. As Prince Charles says, "this technology could transform the way food networks operate." Ed recently founded Represent, set up to map the world's opinions and values so as to find better ways of working together for the greater good. Ed is a London Food Board member, a key player in the Bristol Green Capital Food Team and a recent TED speaker.

Jon Alexander is founder of the New Citizenship Project, a nascent think tank and consultancy specialising in promoting the role of the individual in society beyond that of the Consumer. Jon worked for a decade in advertising and marketing with a continual bent to finding ways to apply the skills of the industry for genuinely positive social and environmental ends. He piloted an idea called MyFarm with the National Trust in 2010, an early experiment in promoting participation rather than consumption. Jon is a passionate believer in the power of creative thinking, but an equally passionate advocate of thinking rather harder than we currently do as a society about how we use that power. He speaks widely on this subject, including several appearances on Radio 4 and a TEDx talk, and holds three Master's degrees, in Classics, Responsibility and Business Practice, and Global Ethics and Human Values. Jon is a member of the Food Ethics Council.

(Jon chaired the discussion on the evening)