

# Predictive analytics: data unleashed

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**Businesses can predict and manipulate customer behaviour through big data. But they can only reap the benefits if they remain aware of its limitations.**

How can we predict when a crowd is close to panic – and take steps to stop the situation getting out of hand? Or how might we schedule customer communications to prompt a purchase at just the right moment, without being too obvious or annoying?

The answer to both, according to Sander Klous, professor of big data ecosystems for business and society at the University of Amsterdam, is big data analytics. That's the science of constructing useful information from many different inputs. Rather than simply capturing raw data, these tools dig up useable insights with implications for profit and performance in all kinds of situations.

"Big data is about understanding behaviour, whether of a person or group of people, of a process, a machine or an organisation," says Klous, founder of the big data team at KPMG in the Netherlands. His research has a direct impact on decision-making in business – provided, he stresses, you ask the right questions.

Ask the wrong ones, or expect too much from the answers, and at best you'll be disappointed. At worst? You'll make bad decisions or shut off options better left open. But predictive analytics is already crucial for data-driven businesses like Uber or Airbnb, which Klous describes as 'information brokers'. It also applies to established businesses of any sector that wish to pool insights for mutual benefit – or to those that wish to undergo transformative change. Any situation, in other words, where aggregated data can be analysed for patterns.

## **Walking a fine line**

At the simplest level, big data enables businesses to understand customer journeys and develop products that better fit their customers' needs. This applies particularly to retail organisations. If you can understand your customers' behaviour and predict their appetites, you'll stand a better chance of delivering products they're actually going to buy.

"Online retailers are at the forefront of these developments," explains Klous. "Because they collect so much information about their consumers, they are sitting on a goldmine." The limited data collected by a typical brick-and-mortar retailer, or even a well-run shopping mall, pales by comparison.

The challenge lies in getting close to the customer, but not so close that you're 'creeping them out'.

Critics have discussed the 'invisible barbed wire' placed around customers when a corporation predicts and prescribes their actions. (Think of it as a more widespread version of a navigation system taking us from A to B, using a route the system has judged to be optimal. Are we really sure that route is the best one, instead of going via the petrol station down the road?) This means retailers walk a fine line between maximising profitability, and alienating their customers.

According to Klous, that barbed wire is often all too obvious. "It appears every time we receive an advertisement for something we bought only last month," he says. "Organisations like Google and Apple put in significant effort to reduce that visibility, in order to maximise the experience of convenience. But then we're really getting into the territory of invisible barbed wire. Data can be used for good things, but also for bad things."

## Observing the limits

Clearly, if automated decision-making is to have the intended effect, businesses will need to proceed with caution. Big data can be powerful, and it is not always used sensibly. However, there is a tendency to overstate that power. We don't need to look far to find overblown claims for predictive analytics, which assume every system, no matter how complex or unstructured, can be subjected to some kind of big data magic.

For instance, it's been suggested that behavioural data might be used to spot the tipping point in a technology's adoption – the point on the S-shaped growth curve at which the number of users takes off. Klous thinks this is out of reach for now: "There are so many different influences on people's behaviour, including externalities like economic instability. It's better to make your organisation as flexible as possible so it's prepared for different paths – not attempting to predict one innovation."

This means pursuing many possibilities simultaneously, and proceeding with whichever ones work. That's not to say companies shouldn't perform scenario planning or modelling product uptake, for example. They just need to respect the limitations of those techniques, even in the age of the algorithm.

## Crowd control

Klous is most enthusiastic about big data in confined systems, where certain key variables can be controlled. Take Klous's research into crowd behaviour. Working with Amsterdam Arena, he collects data from sources such as CCTV and Wi-Fi, using movement to represent anxiety. Ultimately he hopes to develop a model for the early detection of a tipping point for panic in stadium crowds.

Many inputs in that confined model are simple to predict, says Klous. For example, when one side scores a goal "you know that one part of the crowd will be happy and one sad. We try to reverse-engineer the data from that known base so we can detect the mood of the crowd."

Predicting panic in the confined system of a stadium, even using these relatively unstructured data inputs, should be possible within five years. But as for predicting human behaviour outside a controlled environment? "I hope I see that before I retire," jokes Klous.



True, 'confined systems' goes way beyond a single shop or even arena. For example, big data can be used to predict which shopping streets and districts are likely to gain popularity. In cases like this, it's quite easy to determine the tipping point because you're limiting the number of variables that affect it.

That kind of analysis is already practical. Klous's team has developed the KPMG Affinity Index, showing which combination of stores in a shopping mall works best to increase visitors. By working with retailers, they are measuring how people move through shopping malls and how store arrangements might attract or deter customers.

The trick, then, is to be very clear what question you are asking – and to frame it as a specific issue arising within a confined system. A business might focus on functions that are 'sub-optimal' – either because they are made using incorrect assumptions, or because too many people are required in the decision-making process.

Klous gives the example of one of his projects, involving the maintenance of a public transport system. When trams or buses break down and arrive at the mechanics' workshop, staff assess the vehicle and diagnose the problem. However about 70% of the time, he estimates, the diagnosis of mechanical problems with buses and trams is incorrect. That wastes maintenance time and often takes vehicles out of service for no reason. The transit authority would be able to make huge savings by simplifying and automating decision-making around trouble-shooting to improve diagnostic accuracy – and by analysing maintenance trends to spot common faults early.

"Sometimes improvements are just a matter of rigorous application of a methodology," says Klous. "In other cases, it is all about a bright idea that provides data that wasn't there before."



## Stepping onto the platform

One obstacle to reaching the next level in predictive analytics is businesses' reluctance to share data with other organisations. In a shopping mall, shops could be persuaded to share data. After all, growing the mall's popularity helps every shop inside it. Yet it's hard to imagine most online retailers sharing their data with, say, Amazon in the same way. So, we developed new mechanisms, allowing data owners to stay in control.

But according to Klous, a 'proprietary data' mindset becomes out of date as technology moves us towards a platform business model – and encourages the blurring of the lines between sectors. Consumers increasingly want to use one known gateway – an Amazon or an Airbnb – rather than evaluate lots of different providers. And, like the shopping mall, these platforms work better when combined insights are extracted from their data. That way, customer behaviour can be analysed and predicted.

"Uber is a great example that demonstrates how counter-intuitive a platform can be," Klous explains. "Pre-Uber, booking a taxi was a one-to-one interaction between a client and a taxi company. The biggest companies could spend on marketing and systems, and protect their position to stay big. Uber levelled the playing field for many taxi drivers. This doesn't look beneficial to them at first, because competition means lower prices. But it opened up a whole new market. And due to efficiency improvements, driven in part by big data analytics, it increases profits rather than reduces them."

But Klous has a word of wisdom for people hoping big data will give them real clarity into the future at the press of a button. "The moment of inspiration in the age of predictive analytics is usually when someone with experience realises how to make a process more predictable," he says.

And while big data might enable your business to implement smarter strategies, its limitations are a reminder that you shouldn't try to be smarter than you actually need to be.

For the right situations, answering the right questions and in the hands of people who understand the confines of big data's ability, smarter predictive strategies can be implemented to enhance customer experience – and even evolve it.

- **On your reading list:** [We are Big Data: the future of the information society](#) by Sander Klous and Nart Wielaard, Atlantis Press.
- **On your board agenda:** How do we limit the scope of our decisions to confined systems in order to apply big data predictive analytics more usefully?
- **Anticipate tomorrow...:** When AI like IBM Watson is a commodity service available to all businesses, how will you secure competitive advantage?
- **...deliver today:** How do we get our existing data sets clean and useful for analytics; and ensure new systems are capturing all the data, even from unstructured sources?



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