Big data and HR analytics

IES Perspectives on HR 2014

Paul Fairhurst, Principal Consultant

Member Paper 97

institute for employment studies

If you have half an eye on the latest hot topics in business it has become hard to miss the phrases 'big data', 'data science' and 'analytics'. Indeed in their 2011 report McKinsey & Co described big data as 'The next frontier for innovation, competition, and productivity.' But does it have anything to do with HR; after all people are unique and unpredictable and so can't be quantified, can they?

What is big data?

Let's start by exploring what is meant by big data. In a 2001 research report, META Group (now Gartner) introduced the three Vs: volume (amount of data), velocity (speed of data in and out), and variety (range of data types and sources). In other words, big data means that there is a lot of it, it can change or increase very rapidly and it can come from different places and be of different types. In 2012, Gartner updated its definition as follows: 'Big data is high volume, high velocity, and/or high variety information assets that require new forms of processing to enable enhanced decision making, insight discovery and process optimization.' ie we need new tools and technology because it is so big, fast changing and potentially unstructured.

So what does big data look like? From sas.com/bigdata here are some examples of what might be described as big data:

Examples of big data

- In just four hours on 'black Friday' 2012, Walmart handled 10 million cash register transactions – almost 5,000 items per second.
- United Parcel Service receives on average 39.5 million tracking requests from customers per day.
- VISA processes more than 172,800,000 card transactions each day.
- 500 million tweets are sent per day. That's more than 5,700 tweets per second.
- Facebook has more than 1.15 billion active users generating social interaction data.

From an HR perspective, in high transaction environments such as a call centre or a complex warehouse then the discrete actions of each individual can be collected and subsequently analysed. In low transaction situations and knowledge based working, it is harder to conceive which HR data might be perceived as 'big' when we consider volume and velocity, as often there is not that much of it nor does it change very rapidly. Variety might be a different issue though as HR or people data can exist in many forms and formats, from simple monitoring data, through to annual performance reviews with both scores and free format data, and from employee survey data to individuals' interactions and connections with others (through email analysis

or bespoke data collection). The potential scope for collecting and analysing data is actually quite broad when a creative hat is donned. Also consider what if you link your people data to the front end customer and transaction data and look for patterns in the combined data. Joining HR and customer data can certainly then lead to data sets high in all three Vs.

Interestingly, in a 2011 report from The Data Warehousing Institute looking at the expected benefits of big data for organisations, there was no direct mention of the benefits for the HR function though it is perhaps implicit in some of the categories. Or perhaps the surveyed organisations hadn't yet moved on to addressing the HR opportunities.

The benefits of big data analytics

Big data analytics benefits	Proportion of businesses reporting benefit (per cent)
Better social influencer marketing	61
More accurate business insights	45
Segmentation of customer base	41
Identifying sales & market opportunities	38
Automated decisions for real-time processes	37
Detection of fraud	33
Quantification of risks	30
Better planning & forecasting	29
Identifying cost drivers	29

Source: The Data Warehouse Institute, 2011

Which brings us to one of the most important points in this whole area; it is not just about having lots of data it is what you do with it that counts. Yes, you need to have the hardware, databases and software to store the data and make it accessible and you probably need new technology and tools to cope with all of these when considering big data, as the old technology can't cope. However, it is when you start to do something with the data that it gets interesting from an HR, and business, perspective.

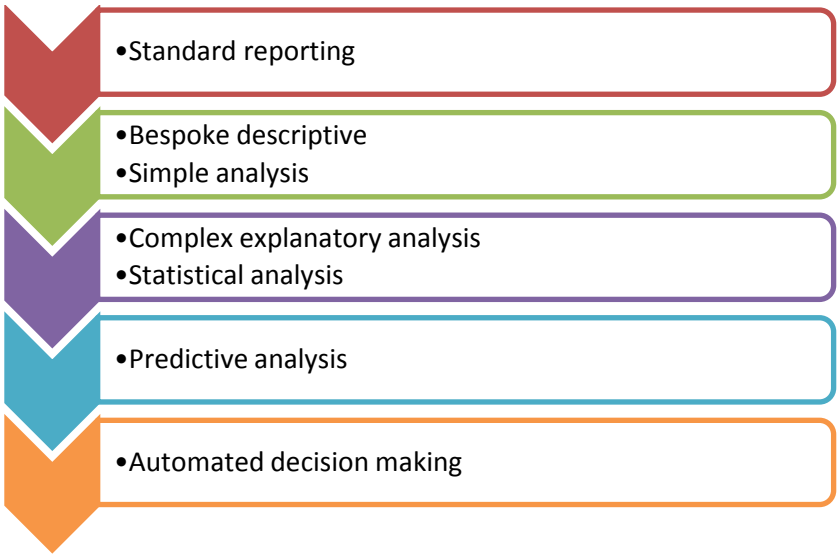
HR analytics

Even if you aren't ready to embrace big data (or don't need to) there is still an important role for data and its analysis in the HR function.

Typically, organisations go through a number of phases in developing their analytic capability. First is standard reporting, eg what is staff turnover, how many people do we employ, where etc. Second is bespoke descriptive or simple analysis such as 'if turnover is high which departments or teams is that in?', using simple query and tabulation tools. The next stage might be to investigate whether this is due to the type

of jobs and people being employed in the high turnover parts of the organisation or whether it is down to poor management which may require some form of statistical tool such as regression analysis. The fourth stage starts to look forward and involves predictive analytics where a statistical model could be built showing which people in the organisation were at risk of leaving. The final stage is to embed the prediction and modelling directly into a decision process such as whether to employ someone or not.

Stages of analytic maturity



Source: IES, 2013

Organisations can be at different stages for different issues. So, for example, an organisation can be quite sophisticated at estimating future resource needs through well-established workforce planning but they may be less good at predicting who are going to be the best long-term bets from their latest graduate intake.

So if you have lots of data (or just some), what sorts of questions might you ask? How about 'what is it that our best managers do that the rest don't?' In what is now a well-known study, Google asked this question in 2009 and a couple of years later had their answer, which perhaps at face value doesn't have too many surprises in it, but now they know the facts based on their own data. The one surprise was perhaps that, even in a very technical organisation, technical expertise was last in the eight factors they identified. Unsurprisingly for a data-led organisation, Google does many studies such as this including determining the optimum recruitment process. They stress though that not all organisations are like them so other businesses should find their own way through the analytics world.

In another example of analysis of people-related data, Wichita State University are using data analytics to identify who will thrive at their college, who is likely to fail and who might need some extra help. They are not alone in the US university system in

crunching data to find who will be the 'high yield' candidates for their next intake. In the UK a new business, Sparx, is working with schools to provide tools and personalised learning experiences for students to help them learn better. They provide a tailored set of exercises, games and incentives to each student, using tools such as iPads. This is underpinned by the collection of data (one year group in one school generates 10,000 points of data a day). The company employs a mix of content specialists, statisticians and data scientists with an ethos of experimentation and statistical analysis to understand what really works and what does not. The parallels are clear for businesses – how can you more accurately predict who will succeed in your organisation through the use of data and how can you provide the best possible learning experiences or work environment for them?

I am also reminded of the excellent factual book Moneyball in which Michael Lewis describes how baseball scouts used to search for the five 'tools' that they thought made a great player - speed, quickness, arm strength, hitting ability and mental toughness - through visiting schools and colleges and putting players through physical tests. The scouts' role was to spot the stars of the future and sign them up before their competitors did. Scouting was an art that only those steeped in baseball with a good eye could possibly perform. However, they didn't pay any attention to what these players had achieved in the past; they were looking for potential based on their expert knowledge and collective prejudices. Moneyball tells the story of how one Major League Baseball team chose instead to draw on techniques from the stock markets for identifying undervalued shares and used these to identify undervalued players and built a successful team at a fraction of the cost (star players get paid many millions of dollars per season) but not without much resistance from the established scouts who believed that big league potential couldn't be spotted by analysing numbers.

The key when looking to develop your HR analytical capability is to start with what the business is trying to achieve and consider what people-related questions you would really like to know the answer to. For example, what types of employee sell best to which segments of customers, or what training methods work best (improve job performance most) for helping law enforcement employees spot potential threats, or how do we get a higher hit rate at recruitment for high performing staff. The questions will depend on your own organisation but successful HR people will increasingly answer these by drawing on insights from data rather than individual or collective perceptions (biases).

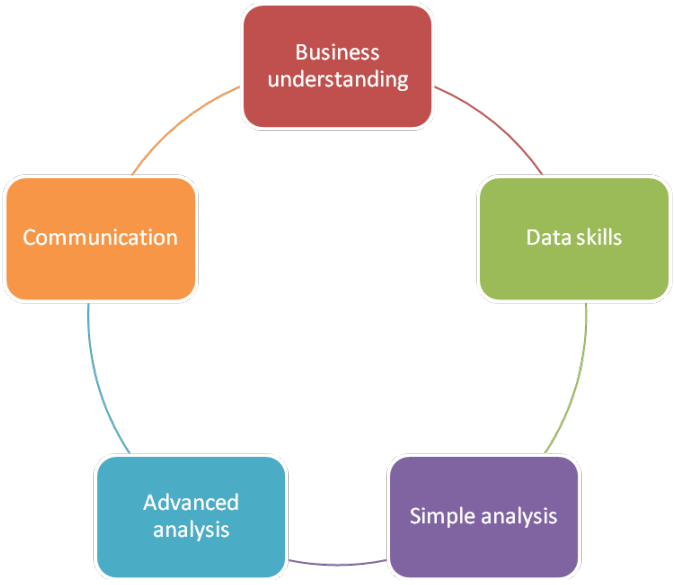
The challenge

The challenge then for getting the best from data (big or otherwise) and analytics starts with being able to understand the business sufficiently that you can conceptualise and articulate the questions that need to be answered. It then requires that technologies and processes exist for gathering and storing the data and that the tools and skills exist for

manipulating and analysing the data. It is also essential that the results are communicated back to the business in a clear, actionable way. These steps are not unique to HR but they are challenging for a function which has, to date, not been heavily data driven and has in many cases yet to develop in some or all of these areas. The skills needed to be successful reflect these steps and are an intriguing mix of technical, commercial and interpersonal. In simple terms they are:

- translating business issues into data analysis questions
- gathering, structuring, storing and manipulating data
- standard analysis of data using simple queries and tabulations
- analysis using advanced statistics and machine learning (neural networks etc)
- presenting results back to the business in a clear, compelling way.

Analytics skill set



Source: IES, 2013

An interesting facet of the Google approach is the mix of their People team which is made up of roughly one-third HR people, one-third business consultants (problem solvers) and one-third high-powered analysts.

During much of the 1990s and early 2000s I was lucky enough to work in and around organisations that were leading the way in data-driven marketing, first setting up an analytical team in an insurance company and then building a customer insight practice in a niche management consultancy. It is now common practice for organisations to do some of the things we were doing back then and predict behaviour such as who is

likely to respond to a marketing campaign, to buy other products and be a long lasting customer as well as many other things. Marketing and risk professionals are now becoming even more sophisticated, embracing the ideas of big data and tools from artificial intelligence.

I see that HR is now on the edge of a similar step change in how it can operate in a data-driven way but it has the advantage that it can learn much from what marketing went through in those early years. Whilst it is not a simple step for some or many HR functions, embracing a data-driven approach to decision making undoubtedly has the potential for HR to add, and be seen to add, more value to the business.

References

Bitcoin.com (2013) *Scalability.* [online] Available at: https://en.bitcoin.it/wiki/Scalability [accessed 13 December 2013]

Bryant A (2011) *Google's Quest to Build a Better Boss*, The New York Times [online] Available at: www.nytimes.com/2011/03/13/business/13hire.html [accessed 16 December2013]

Davenport T H, Dyche J (2013), *Big Data in Big Companies*, SAS

Laney D (2001), *3D Data Management: Controlling Data Volume, Velocity and Variety*, Meta Group Inc.

Laney D (2012), *The Importance of 'Big Data': A Definition*, Gartner

Lewis M (2003), *Moneyball,* W. W. Norton & Company

Manyika J, Chui M, Brown B, Bughin J, Dobbs R, Roxburgh C, Hung Byers A (2011), *Big data: The next frontier for innovation, competition, and productivity*, May, McKinsey & Co

Martinez M (2013) *Twitter CEO Dick Costolo Reveals Staggering Number of Tweets Per Day 2012.* [online] Available at: ttp://www.complex.com/tech/2012/10/twitter-ceo-dick-costolo-reveals-staggering-number-of-tweets-per-day [accessed 13 December2013]

O'Brien M (2010) *Building a New Breed.* [online] Available at: http://www.hreonline.com/HRE/view/story.jhtml?id=533322196 [accessed 16 December 2013]

Smith C, 2013, *You won't believe these 104 amazing facebook stats (Updated November 2013).* http://expandedramblings.com/index.php/by-the-numbers-17-amazing-facebook-stats/ [accessed 13 December 2013]

Sparx.com (2013)[online] Available at: www.sparx.co.uk [accessed 16 December2013]

The Data Warehouse Institute (2011) Big Data Analytics [online] Available at: http://tdwi.org/research/2011/09/best-practices-report-q4-big-data-analytics.aspx?tc=page0 [accessed 16 December2013]

Ungerleide N (2013) *Colleges Are Using Big Data To Predict Which Students Will Do Well--Before They Accept Them*. [online] Available at: http://www.fastcoexist.com/3019859/futurist-forum/colleges-are-using-big-data-to-predict-which-students-will-do-well-before-the [accessed 16 December2013]

Walmart.com (2012) *Walmart U.S. Reports Best Ever Black Friday Events* [online] Available at: http://news.walmart.com/news-archive/2012/11/23/walmart-us-reports-best-ever-black-friday-events [accessed 13 December 2013]

To find out more about the ideas in this article or how IES can help you use data to make a bigger impact or set up a data insight team, please contact:

Paul Fairhurst, Principal Consultant
T: 01273 763400 E: paul.fairhurst@employment-studies.co.uk

IES Briefing: Big Data

17 July 2014, London
with Dilys Robinson

The 'big data' phrase is in vogue. What does it mean - nothing more than a new label for large data sets, or do we also have to consider speed of collection and rate of change? HR's role is not immediately obvious, yet the market is flooded with consultancies offering solutions on HR analytics and metrics. Come to this briefing to find out more about the nature of big data and its relevance to, and opportunities for, HR.

To find out more and book a place visit www.employment-studies.co.uk/network/events

This summary is from the IES report: *IES Perspectives on HR*. (IES Report 504, 2014). ISBN: 978 1 85184 452 4. It is available online at www.employment-studies.co.uk

Institute for Employment Studies
Sovereign House, Church Street, Brighton BN1 1UJ, UK
askies@employment-studies.co.uk
www.employment-studies.co.uk
01273 763400