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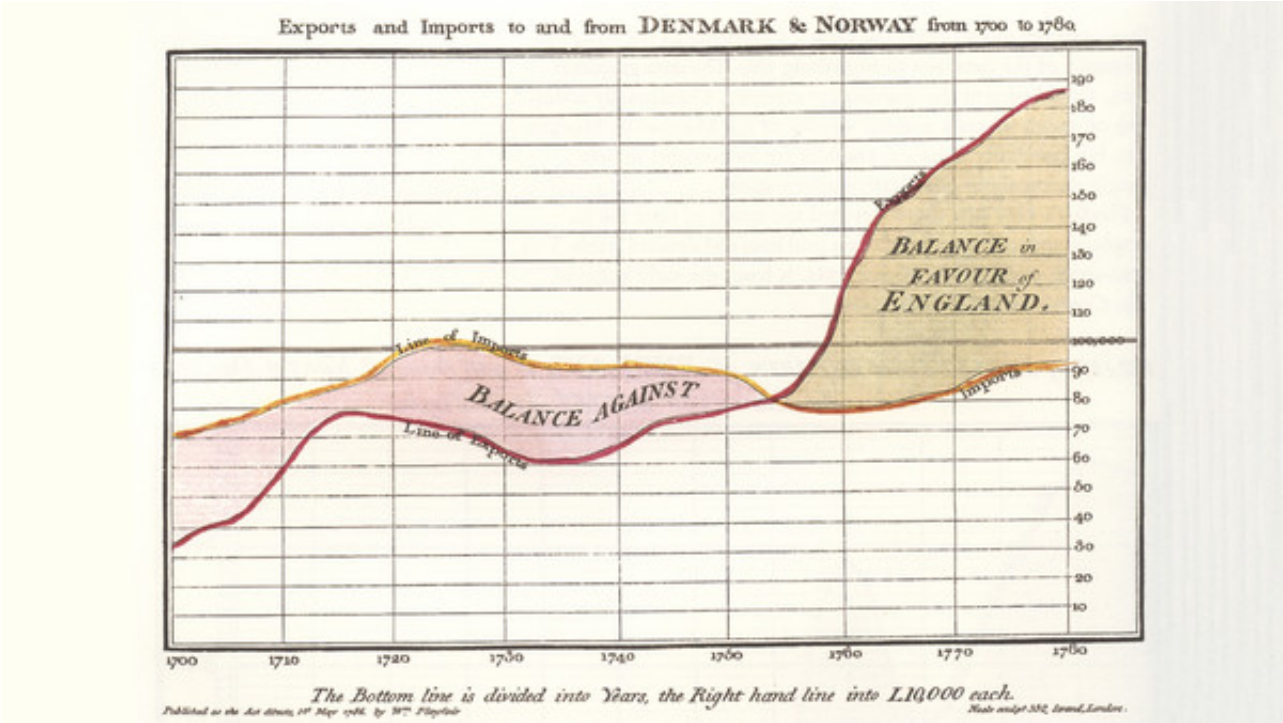
Crafting charts that can withstand the data deluge

Alan Smith

Managers must learn to explain figures crisply, writes the FT's first data visualisation editor



Visual impact: William Playfair's innovative presentation of 18th century trade patterns

More than 200 years ago, William Playfair voiced his frustration with statistics, no doubt pre-empting the thoughts of many a schoolchild and business executive since. "No study is less alluring or more dry and tedious," he wrote.

The imaginative Scot's frustration led him to create what are now widely acknowledged to be the world's first modern data graphics, designed to show patterns of trade between England and the rest of the world.

Playfair was a product of the 18th century Enlightenment: as well as inventing line and pie charts, he was an apprentice to the engineer James Watt and was involved in the storming of the Bastille in 1789. But his graphical inventions, designed to overcome what he diagnosed as information overload, seem better suited to the age of the internet.

Data are an unavoidable part of modern business life and our capacity to produce them in increasing volume shows no signs of abating. In 2012, IBM claimed that 90 per cent of all of the world's data had been produced in the previous two years. This is due at least in part to rapid proliferation in the sources of data — digital transactions, sensors, personal devices and social media have turned everyone into data producers as well as data consumers.

The challenge for businesses is to find ways to unlock the information hidden within this ever increasing store of data, while being acutely aware that not all of it is useful.

"Show me the numbers" is often the refrain. In today's business climate that is not enough: showing what the numbers *mean* can be the difference between success and failure. As a result, the business analytics community is fast growing and increasingly vibrant, awash with new software tools for analysis and visualisation and new approaches to exploiting this harvest of data.

And yet, societally, we remain as number blind as ever. In 2003, a UK government survey estimated that 47 per cent of working age adults in England lacked basic numeracy skills. The figure may have been shocking to many, but the reaction needed has failed to arrive: by 2011, the figure had risen to 49 per cent. This pattern is common in many other countries and attempted improvements are often hampered by deep-rooted cultural values: who reads bedtime algebra to their children?

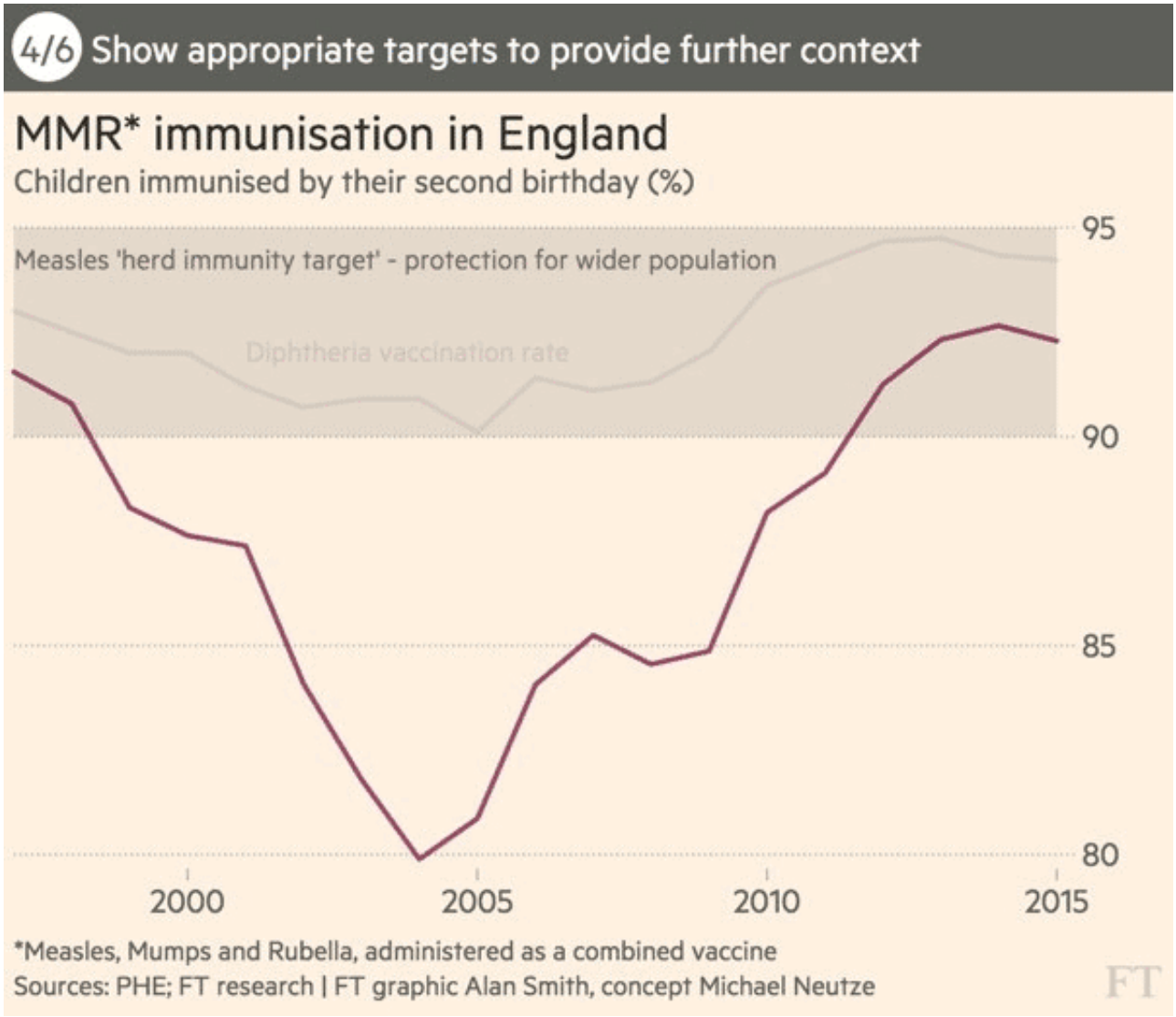
Collectively, humans are poor intuitive statisticians — many of our notions of quantity are based on individual experience rather than an appreciation of the aggregate, leading to frequent misconceptions. Similarly, media conventions often involve reporting the exceptions, leading to biased perceptions of what the norm is. That carries dire potential consequences for decision-making. Daniel Kahneman, the behavioural economist, observes that "we can be blind to the obvious, and we are also blind to our blindness".

Ipsos MORI runs "Perils of Perception" studies that bear this out: in a recent one, American adults estimated that 32 per cent of the working age population in the country were unemployed — the official figure is about 6 per cent.

So when Hal Varian, chief economist at Google, proclaimed in 2009 that "the sexy job in the next 10 years will be statisticians" he was actually making the same point as Playfair: in a world of increasingly ubiquitous data, the complementary scarce factor is the ability to abbreviate and extract value from it — and to communicate it. Mr Varian's only error was to get the job title

wrong. For 20th century “statistician”, read 21st century “data scientist”.

Visualising data in charts and maps remains the most powerful way of communicating them to a wide audience. The graphical vocabulary introduced by Playfair has been expanded beyond pie, line and bar charts in recent years but the concept remains the same: using “visual variables” such as length, angle, area and colour to show quantity often avoids the need to show the underlying numbers at all. As ever, the devil is in the detail. There are good charts and bad charts. More importantly, there are often missed opportunities, even with the seemingly simplest of charts. The best charts add context that goes beyond the numbers (see animated example below).



Newsrooms across the world have also been changing to embrace the emergence of data-driven journalism. At a time of digital upheaval for the industry, the ability of graphics to bring clarity and context to data-driven stories is increasingly important. A recent FT series on the shattering of the US middle class, based on changing patterns of income distribution, was driven by an online animation and print panel that provided crucial context from which the rest of the textual narrative was drawn.

However, despite the popularity of data visualisation, there is an arguable lack of research on how much difference it can actually make to decision-making. A recent blog post by the influential Stephen Few questioned the validity of much of the existing academic studies, prompting vigorous online debate.

Professor Helen Kennedy at Sheffield university recently completed the Seeing Data project, which aimed to understand how people "see data" through visualisations. She was struck by how participants were more likely to remember an emotional connection with data than specific figures. "That people relate to statistics emotionally as well as cognitively and rationally might mean we need to rethink existing, scientific approaches to statistical education and consider what softer, arts-based approaches might contribute to confidence with data," she says.

Meanwhile, the popularity of data visualisation shows no sign of waning. Or as Playfair put it, "it is hoped that, with the assistance of these charts, such information will be got, without the fatigue and trouble of studying the particulars of which it is composed".

In a world of big and messy data, that is no bad thing.

The second and final part of this series focuses on Tableau, the data visualisation software maker taking on Microsoft's Excel. Read it here .

Further reading from the FT archive: Clive Cookson's 2013 FT Magazine article on Edward Tufte, "the guru of graphics, the high priest of presentation"

Letter in response to this article:

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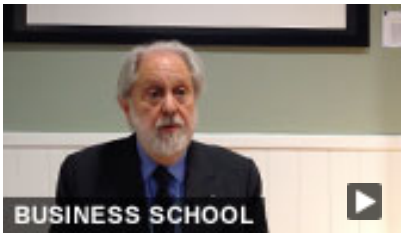

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