

Decision-making and GIS



The most common use of GIS is as a historian's tool, to describe a situation over time. In this, its value reflects the currency, quality and accessibility of the input data. These factors have generally improved greatly in recent years so, in that sense, it is unsurprising that GIS has grown so substantially, according to David Rhind.

(By David Rhind, ret. Vice-Chancellor, The City University, UK)

But many see the greater role of GIS as a decision-making tool, especially where this involves bringing together data from many sources. How do we know if this really is successful? There are two obvious tests. The first is a necessary condition – does the GIS produce results which can be demonstrated to be correct? This varies by discipline and is

easiest when dealing with physical phenomena. Thus outputs from Lidar scanning of buildings can be validated against other descriptors of their position, shape and size. Some systems based on geospatial data can even produce valuable 'snapshot' results by looking into the future (although accuracy checking is inevitably delayed). For instance, small-area meteorological forecasts, based on our understanding of atmospheric physics and global real-time data collection, are now very accurate over short periods in some parts of the world. Future population-change data is produced in many countries by projecting a base level allied to historic rates of change (although these estimates are sometimes perturbed by new surges of migration). Worst of all in quality terms are model-based economic forecasts for nations or regions. These were famously described by J.K. Galbraith who said "the only function of economic forecasting is to make astrology look respectable".

The second and trickier test is to measure improved managerial performance due directly to the use of GIS. Often this is demonstrated solely by the use of qualitative case studies; we should be able to do better. However perhaps the biggest difficulty in assessing decision-making contributions of GIS relates not to the systems but to the human beings involved. The extraordinary book *Thinking Fast and Slow* by Daniel Kahneman, the psychologist who won the 2002 Nobel Prize for economics, demonstrated how many judgements and decisions are guided directly by feelings of liking and disliking, with little deliberation or reasoning and scant regard for evidence. For example, what if any decision-making success is simply just confirmation bias, i.e. the GIS-produced results happen by chance to agree with the customer's prior beliefs? Who is prepared to tell their customer that he/she is the weak link in decision-making? Do we need to become psychologists to achieve the best results? And might some of our claims about added value from GIS lead us from hubris to nemesis thanks to these human frailties married with inescapable uncertainty