

Do we thank science for all our prosperity?

Written by Beth Webster, Director, Centre for Transformative Innovation, Swinburne University of Technology

It is easy to see the benefits from the advances we have made in physics, chemistry, engineering, computer science and the life sciences. Without these impressive leaps in understanding, we would not have lifesaving drugs; computers, wifi; modern transport and the warm, safe houses that are essential to our contemporary lifestyle.

Ask anyone to list the world's top inventions and you are sure to get a list of gadgets and materials. The benefits are immediately tangible and directly traceable.

What about the social sciences?

Less heralded are the benefits to society derived from the ideas of the social sciences and humanities. Anecdotally, we can see that when they are good, they are very good.

[Financial innovations](#) in the form of marine insurance, for example, made the great 17th century European voyages of trade to India and beyond possible. The invention of the joint stock company funded the railways.

Without the theory of British economist John Maynard Keynes, the financial crisis of 2008 would have deepened into a 1930s-style depression. [Economics has brought us the theory and translation](#) behind Medicare; HECS, the income contingent student loans scheme and [Bruce Chapman](#)) and the National Disability Insurance Scheme (the [Productivity Commission](#) and others).

In most cases, reforms to social institutions do not occur without shifts in public attitudes about human rights, entrenched poverty, business models and social responsibility. Policy makers rely on the eloquence and clinching logic of philosophers from law ([Julian Burnside](#) , [Michael Kirby](#) and others) and the other humanities to lever these changes through.

Innovation is a team sport

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Innovation is a human activity. It is rare to find a lone genius, and, even if one existed, they would be unlikely to make a big impact because human interaction is needed to transform these ideas into widespread use.

Yet our understanding of how we can engineer change and societal betterment is largely unscientific and is based on anecdotes, intuition and prejudice. We throw dollars at nascent ideas with only a rudimentary consideration of the human context in which the research will be undertaken.

There are researchers who are undertaking objective, robust studies on what makes research successful: how do research teams transcend national boundaries ([Paula Stefan](#)); how do networks of researchers optimally interact (

[Dean Lusher](#)

); what is the trade-off in research between breadth and depth of skill (

[Ben Jones](#)

); and how do breakthrough inventions arise (

[Reinhilde Veugelers](#)

)? But funding for these studies is minuscule compared with the billions of dollars spent worldwide in research for the physical sciences.

Physical sciences still seen as the main game

The explicit assumption in almost all research funding bodies is that the physical sciences are the main game - serious men's work - and the HASS (humanities, arts and social sciences) is the fluffy stuff we need to keep the "girls" happy.

[Three quarters](#) of Australian Research Council funds go to the science and engineering disciplines and only one in ten Centre of Excellence grants are given to the HASS community.

University rules about what constitutes good research are dominated by what is normal in the natural sciences. Professors have "labs" with a few post-docs and a dozen PhD students. This is not the model that works for the HASS disciplines, but the HASS are constantly having to fight against this assumed model of "gold standard" research. International rankings are based on hi-cite definitions and Web of Science databases that assume the normal physical science mode of operation is the best.

Where should we spend our marginal dollar?

It is a question of where is the best place to spend our marginal dollar. Consider the last million dollars of our national research budget. Should we spend it on the physical sciences or on the social sciences and humanities? Where are the barriers to change that are stalling improvements to our society?

I would argue that changing community understanding on how a carbon tax operates (i.e. by changing householder and business behaviour) would have had a bigger effect on Australian carbon emissions than another study on the engineering of photovoltaics.

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