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Using science to prepare us for the future

Over the past decade or so a particularly strong emphasis has been placed upon research commercialisation as an expected outcome from public R&D. The assumed simplicity – and measurability – of this type of outcome has undoubtedly contributed to the rise of this perspective. Patents, licences, start-up companies and the like can all be measured as outputs. These tangible features tend to assist policy-makers in budget negotiations and help to reassure the general community that ‘value for money’ is being sought in a (reasonably) transparent manner.

Arguably, there is also a ‘Panglossian’ tone to this perspective – rapid scientific and technological progress generates bountiful commercial opportunities; all we have to do is to reap these rewards if we are to live in the best of all possible worlds. We therefore search for the impediments to commercialisation on the assumption that there must be such impediments, because the level of commercialisation does not match our expectations given the levels of spending on R&D. However, the prevalence of research commercialisation as the high-profile outcome class associated with public science is now less clear-cut. A number of researchers and policy commentators, myself among them, have stressed the importance of ‘preparedness’ as another key type of outcome from public science.

The argument runs as follows. In an uncertain and risky world, public science plays a critically important role in identifying risks and associated costs that we may have to face in the future (climate change being an excellent example). The widespread dissemination of this information to business and the general community may (eventually) help to change behaviour – and in turn changes what the future may actually have in store for us. Consequently, the benefits generated by this type of outcome from public science tend to be reflected in less unfavourable futures than would otherwise be the case.

As the *Stern Report* sought to stress, the economic value of mitigating risks in this manner is massive. Preparedness reinvigorates the traditional concept of capability-building by highlighting the uncertainty and risk dimension.

Well-regarded bodies, notably the Federation of Australian Scientific and Technological Societies (FASTS), have acted to support this shift in stance. In submissions to the 2006 Productivity Commission (PC) study of the returns to public support for science and innovation, the importance of preparedness as an outcome class was stressed by FASTS, CSIRO and the Group of Eight. The PC reacted favourably to these arguments and the preparedness dimension featured strongly in its final report.

Previously, the term preparedness was used mainly in relation to defence, counter-terrorism and natural hazards. The wider use of this term is deliberate and attempts to focus policy-thinking on the far more extensive aspects of how science helps us to deal

with uncertainty and risk. Of course, science and innovation are also partly responsible for many of these unfavourable future scenarios (from endocrine disruptors in our water supply through to weapons of mass destruction). The need for preparedness is generated in part by the unexpected consequences of science innovation – the unwelcome downside of modernity. Indeed, many areas of innovative activity address these unwelcome consequences of scientific and technological progress.

One implication is that an evaluation of Backing Australia’s Ability (BAA) has to consider how this funding has increased our preparedness – an issue of particular importance for Australia given our relatively fragile environmental circumstances. The increased recognition given to preparedness also raises questions about our funding priorities. Some areas of public science that have fared relatively badly over the past decade, for example, environmental sciences, earth sciences, and agricultural science, and some of the social sciences and humanities (particularly area studies), are strong contributors to our levels of preparedness. The apparent weakness of such research areas in a research commercialisation-dominated policy framework tend to dissolve when preparedness is given due recognition.

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If we are to pursue a more balanced approach in science policy, in which commercialisation and preparedness outcomes receive the attention they deserve, then we need to articulate how preparedness can be measured – and its value estimated. Some techniques exist to do this because this is how investment banks make their money (so-called ‘value-at-risk’ methods). Consequently, there may be much to be gained from far stronger engagement between the science policy community and the financial sector.

One advantage of preparedness-based approaches is that they avoid the ‘more jam tomorrow’ problem: we obtain the benefits now because this is the point at which we judge the present value of future risks and associated costs – in exactly the same way that financial analysts calculate the present value of a future stream of investment yields. Preparedness-based thinking opens up a rich new seam for outcome measurement.

With luck, it will not take us too long to achieve the better balance we are looking for – casting a more sceptical eye on Dr Pangloss. We need to get better at assessing how widely (and freely) disseminated research findings influence behaviours – behaviours that help to make the future world(s) we may live in less unpleasant than might otherwise be the case.

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