

Venture Research

Fostering trust and freedom in research funding

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Key points

- The Venture Research Unit (VRU) was a funding initiative at BP from 1980 to 1990
- It provided £20 million to about 30 researchers and small teams from Europe and North America
- The VRU aimed to fund determined researchers who questioned current thinking and would do transformative work
- An important driver of the VRU approach was the idea that researchers with radical ideas would struggle to obtain funding through traditional means
- Trust and freedom were considered essential, and organisers sought to minimise administrative burdens
- VRU-funded work led to several notable outcomes, but similar initiatives have not been introduced on a large scale in the UK
- VRU leader Donald Braben continues to advocate for the support of ‘scientific mavericks’ in the UK

“It is fashionable today to focus on the threats to humanity from war, disease, famine, global warming, or from extinction by a wayward meteor. However, the most important threat by far comes to us today from the insidious tides of bureaucracy because they strangle human ingenuity and undermine our very ability to cope.”

—Donald W. Braben¹

From 1980–1990, a research funding initiative ran whose guiding principle was to be different from conventional funders. It aimed to identify and support researchers who were doing groundbreaking work that questioned current scientific thinking and who would, as a result, struggle to find funding for their work. The initiative had no priority subject areas, did not consider wider impacts of the work it funded, minimised the role of proposal peer review, accepted initial proposals of no more than one page and placed minimal restrictions on how funds could be used. The initiative, the Venture Research Unit (VRU), was funded by British Petroleum (BP) and, during its lifetime, provided £20 million in research funding to around 30 researchers and small teams from Europe and North America. It received about 1,000 applications per year. Venture Research work led to several notable outcomes.

Physicist Donald Braben, who continues to advocate this sort of approach to research funding,¹⁻⁵ ran the pro-

gramme within BP. Braben has published three books describing how the programme worked and outcomes of the projects it funded, arguing for the importance of providing a freedom and trust-based approach to funding.⁶⁻⁸ In the following, we summarise Braben’s accounts of the initiative.

VRU BEGINNINGS: 'RADICALLY NEW'

Braben writes that Jack Birks, a BP managing director responsible for technology, invited him in 1980 to run what company leaders 'hoped would be a radically new research initiative... charged with creating completely new types of industrial opportunity'.⁹ The VRU's guiding principle was to be different from the conventional systems that Braben sees as unfit to support 'transformative research' that 'sets out radically to change the way we think about an important subject'.¹⁰

Braben was given freedom to design the programme but was overseen by a board made up of distinguished academics and senior BP executives. Prior to BP's invitation, Braben, who has a background in particle physics, had worked at the UK's Daresbury Nuclear Physics Laboratory, Cabinet Office and Science Research Council. It was through the Research Council that he met Birks.

In describing the VRU's philosophy, Braben refers to what he calls the 'Planck club', a group of eminent scientists from the 20th century. In many cases, the scientific community was initially sceptical of the work done by this group, which includes Nobel laureates Max Planck (who was recognised for laying the foundations of quantum mechanics) and Barbara McClintock (who disproved the idea that genes stay fixed in one place on the chromosome), because it was at odds with current thinking. Braben argues that proposals to do the work done by the Planck club's members would not win support from today's funders because sceptical peers would give negative evaluations during the peer review process funders use to judge proposals. This gap in support affects only a small group of researchers, he says, but leaves us without essential intellectual resources needed to address global problems. Braben intended for the VRU to fill this gap by being a funder that would have supported the Planck club's groundbreaking work in its early stages. He refers to this objective as 'passing the "Planck test"'.¹¹

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Creating such an initiative, Braben reasoned, would involve restoring the scientific freedom that he believes was lost in the 1970s when a 'vicious spiral' began that has led to a pattern of diminishing returns from science in countries such as the US and UK.⁷ Restoring the conditions of the pre-1970s environment would, he said, require getting rid of boundaries, deadlines, milestones, peer review, priorities and any objectives beyond exploration and understanding.¹³ According to Braben, starting in the 1970s, increases in public funding for science brought demands for justification of that spending, which in turn encouraged scientists to produce 'a virtually endless supply of short-term miracles'.¹² This process, he says, has made fields more specialised, driven up the costs of discoveries and fuelled claims that the only discoveries left to be made are difficult and expensive – an idea he refutes.¹²

HOW DID IT WORK?

The VRU team began, Braben writes, by trying to 'eliminate every selection rule imposed since about 1970 that appeared to stand in the way of freedom'.¹³ They concluded that they should focus all efforts on seeking to identify people who have recognised significant gaps in existing knowledge and have ideas about how to address them – a rare group, according to Braben.¹³

The VRU, like many funding organisations, was overseen by a committee responsible for deciding who to fund. In contrast to most other funders, it also had a scientific team – led by Braben – that recruited applicants, helped them prepare proposals for the committee, and advocated on their behalf.

Seeking 'panoramic vision'

To reach potential applicants, Braben and his team did not solicit proposals but instead spread the word by visiting universities and speaking to the media.¹⁴ To encourage interest, applicants were asked to submit proposals of no more than one page and could even apply by phone. The team set no constraints on scientific discipline.

The VRU received around 1,000 applications per year, of which about 10 per cent were from 'serious contenders' proposing to move in a new direction.¹³ All of these applicants were invited to visit the VRU to discuss their proposal in detail. 'We then sat down near a white board and talked about whatever science interested them,' Braben writes. He adds that scientists often had to be discouraged in these meetings from talking about issues that most funders were

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interested in – such as potential impacts and amounts of funding – and focus instead on the scientific questions. Applicants were told to imagine there was an unlimited amount of funding available and asked what scientific work they would like to do that they were not currently doing.¹³ These relatively informal discussions would extend to the weather or music – topics that could put the researchers at ease and improve communication.

While Braben does not make explicit the criteria used for assessing applicants, he says that the team looked for applicants with ‘a panoramic vision’ who were willing to take a flexible approach to explore the questions they were interested in, as opposed to those who were ‘anxious to impress us with their tactical expertise’.¹³ As another aspect of the assessment, a member of the VRU team would pay an informal visit to the researcher at that person’s home lab.

This dialogue, Braben said, allowed trust to build up between the researcher and the VRU team, and set the VRU apart from conventional funders. As an indication of its trust in the researchers, the VRU provided scientists with grants that they were free to spend as they saw fit and carry over from one year to the next. Trust was also considered the best

way for the unit to have a stake in any discoveries, with the reasoning that contracts could not account for the unexpected outcomes that the programme aimed to produce.¹⁵

‘Vestigial’ external peer review

The VRU’s scientific team – made up of three to four people – selected applicants based on the discussions they had with them, but the final funding decision was made by the oversight committee. After going through the discussion process, the scientific team then supported and advocated for the applicants it had selected, who now faced the committee’s evaluation. The team helped applicants prepare their proposal and pitch it to the committee. Though usually short and conceptual, as for the initial application, the final application would also include an assessment from an independent peer reviewer.

Although Braben says that a core problem with today’s funders is their reliance on peer review of proposals (see Box 1), the VRU retained a ‘vestigial’ form of external peer review at the insistence of the oversight committee.¹⁶ The peer reviewer would be suggested by the applicant and selected by Braben, with the aim of finding a prominent person in the field who would be likely to support the proposal. Braben would contact the reviewer, describe the proposal, and encourage the person to make a positive assessment. He notes that reviewers often made useful suggestions but never found any serious problems with the proposals. Braben reports that reviewers gave negative evaluations in a couple of cases despite his advocacy efforts, but that he succeeded in convincing the committee to award funding in those cases nonetheless.

Box 1: What’s wrong with peer review?

Peer review – the evaluation of researchers’ funding proposals and journal articles by colleagues – is used extensively across academia as a form of quality control for research. It is used, for instance, to allocate more than 95 per cent of the £2 billion in public funding that the UK spends annually on medical research.¹⁷ Despite its widespread use, a number of criticisms have been raised about the efficiency and effectiveness of peer review, as it is currently practised.

Critics say the process is expensive, not transparent enough and unreliably subjective, and that it penalises multidisciplinary work and can be anti-innovation. There is evidence to support some of these criticisms, while the validity of others is unclear.¹⁷ Proponents stress that peer review provides accountability for how taxpayer funds are being used, is generally an effective means of evaluation – often leading to improvements in proposals – and is well regarded by the research community.¹⁸ RAND Europe has produced an information pack on alternative methods to peer review for evaluating research funding applications.¹⁹

Braben agrees that the peer review of proposals is usually an effective way of evaluating proposals to do incremental work within established disciplines. However, he writes, ‘the fact remains that if it cannot pass the Planck test, *peer review is fundamentally flawed*.’²⁰ Echoing others’ concerns, the issues Braben raises with peer review are that it is inherently conservative, reinforces disciplinary boundaries²⁰ and relies on anonymous assessments by an applicant’s own competitors.¹³

Box 2: Current programmes

In 2008, UCL established the *Provost's Venture Research Prizes*.²¹ Braben leads the selection committee, which follows the VRU's aims and selection approach. Just one prize has been awarded so far – to Nick Lane, a reader in evolutionary biochemistry at UCL. Braben says the programme received about 30–40 applicants per year initially, but that number has dwindled to less than ten per year as it became clear how selective the programme is. What set Lane apart, Braben says, was his 'degree of exceptionalism' and the fact that his primary need was freedom.²²

While compiling this review, we came across other research support programmes that share features with the VRU, such as an emphasis on freedom or exploring new areas, but none use the same selection approach as the VRU did. We have not made an exhaustive list, but related programmes include the McArthur Genius fellowships, the Human Frontiers Science Programme, the US Defense Advanced Research Projects Agency, the European Research Council and the National Institutes of Health Pioneer Award Program (along with other NIH High Risk–High Reward awards).

Braben stresses that the aim of the selection process was to identify people and ideas to fund, not projects. Supporting this aim was its policy of allowing rejected applicants to reapply, with the reasoning that the willingness to persuade the scientific team of the value of their ideas was a sign of determination, a desirable trait for Venture Researchers.

Low costs

Although applicants were asked to imagine that they could access unlimited funds, Braben says most VRU-funded proposals were exploratory and conceptual, and did not require huge resources. 'In our experience, armies of assistants were always unnecessary. Venture Research is subject to considerable uncertainties, and time to think is usually more important than pairs of hands,' he writes. 'Similarly, very expensive equipment was usually unnecessary because the scientists were going into virgin terrain, which from a scientist's point of view is the ultimate target-rich environment. Determined scientists can hardly avoid making discoveries in these circumstances, and the simplest equipment is usually adequate.'¹⁵

Venture researchers received funding for three years initially. Braben reports that the VRU team provided support for

a further three years to around half of those researchers. Of those who received funding for six years, about half received a further three-year extension, and in Braben's view, very few projects should require support for more than nine years.

The VRU programme was small compared to a national funder, but Braben thinks that only a small number of fellowships of this type are needed to support transformative research. He estimates that there were roughly 300 people doing transformative research in the world in the entire 20th century, which would mean only three researchers need to be funded each year worldwide. Allowing for inefficiencies in the selection process and estimating generously, he concludes that the US should fund about 12 researchers in this way each year, with the number for the UK alone even lower. In keeping with this low estimate, as of June 2014, a venture research programme open to UCL researchers has funded just one researcher since it started in 2008 (Box 2).

Maintaining support

The VRU benefited from high-level support within BP. As VRU leader, Braben reported directly to Birks (and later to his successor, Robert Malpas), which was unusual because normally managing directors would only oversee much larger initiatives. To maintain the interest of higher-level managers, Braben organised an annual research meeting for all Venture Researchers and lunchtime lectures at BP's London office, which would provide an opportunity for senior managers to meet the scientists.

Braben reports that nearly all Venture Researchers chose to attend the annual meeting once a good format had been established; it was run as a festival of science with few talks and a lot of time for questions and discussions. The VRU also organised regular workshops between BP scientists and VRU

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researchers. Interactions at these workshops led to BP creating an in-house IT research unit for processing its oil exploration data, which Braben says became very influential.

WAS IT A RISKY INVESTMENT?

The labels ‘risky research’ or ‘high-risk, high-impact’ are often used today to describe the sort of innovative research that the VRU aimed to support. However, Braben stresses that it is a mistake to describe it as ‘risky’. Although the work done by the Planck club may seem difficult and consequently risky to others, he argues, the researchers doing it probably saw things differently or else they would not have taken it on. Rather, they were confident that they would eventually achieve a breakthrough.²³

WHAT WAS ACHIEVED?

Work supported by the VRU led to creation of an enzyme company, Oxford Asymmetry, which sold for £316m in 2000,²⁴ significant developments in green chemistry and several other notable achievements. It is beyond the scope of this summary to provide a comprehensive evaluation of these

outputs, but Braben’s own assessment is positive. ‘We now have the clarity of more than 10 years’ hindsight from which we know that our decisions, often taken in the teeth of peer-review assessment, were the right ones,’ he writes. ‘Of the 26 groups that were running at the initiative’s close in 1990, perhaps 14 made transformative discoveries: that is, they did radically change the way we think, and several succeeded in achieving important scientific objectives that their peers had thought were impossible or irrelevant.’²⁵

WHY DID IT END?

A few factors led to the closure of VRU in 1990. One was the departure from BP of VRU’s high-level supporter Bob Malpas, which brought the unit under the responsibility of BP’s director of research. Shortly after that change, BP’s new chairman decided to prioritise the company’s core business. The programme was spun out of BP as Venture Research International and was the subject of a documentary on British national television,²⁶ among other media coverage. However, despite an initial offer from the UK government to match industry funding and other waves of interest over the years, the initiative has only been revived on a small scale at UCL.

Notes

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- ⁸ Braben, Donald W. 2014. *Promoting the Planck Club: How Defiant Youth, Irreverent Researchers and Liberated Universities Can Foster Prosperity Indefinitely*. Hoboken, NJ: John Wiley & Sons.
- ⁹ Braben, *Scientific Freedom*, p. 101.
- ¹⁰ Braben, *Scientific Freedom*, p. 36.
- ¹¹ Braben, *Scientific Freedom*, p. 14.
- ¹² Braben, *Scientific Freedom*, p. 54.
- ¹³ Braben, *Scientific Freedom*, pp. 104-6.
- ¹⁴ For example: Stevenson, R. 1988. 'BP Pumps Money into Unlikely Projects, from Plants to Lasers.' *The Scientist*, 25 July. As of 12 August 2014: www.the-scientist.com/?articles.view/articleNo/9630/title/BP-Pumps-Money-Into-Unlikely-Projects--From-Plants-To-Lasers/
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- ¹⁶ Braben, *Scientific Freedom*, p. 45.
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- ²³ Braben, *Scientific Freedom*, pp. 69-73.
- ²⁴ Griffiths, K. 2000. 'Oxford Asymmetry Agrees to German Merger Worth £316m.' *Independent*, 1 August. As of 12 August 2014: www.independent.co.uk/news/business/news/oxford-asymmetry-agrees-to-german-merger-worth-pound316m-711974.html
- ²⁵ Braben, *Scientific Freedom*, p. 108.
- ²⁶ See Braben, *Pioneering Research*, p. 172; on September 7 1990, UK's national channel 4 broadcast a one-hour Equinox programme about Venture Research, called Blue Skies, with an estimated audience of 1.4 million.

About this report

This report is a summary of Donald Braben's work with BP's Venture Research Unit. It is based on his own reports in his books *Pioneering Research* and *Scientific Freedom*. RAND Europe researchers initially came across Don Braben's work in 2005 in the course of supporting the UK Department of Health's Research and Development Directorate in developing a new R&D strategy. We produced an initial summary of Braben's work for that directorate. Because it has generated ongoing interest, we have produced this brief report – an updated version of the original, intended for public distribution. This is an independent report funded through the Policy Research Programme in the Department of Health. The views expressed are not necessarily those of the Department.

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