
Submission to House of Lords Select Committee on Science and Technology Inquiry into Procurement as a Tool to Stimulate Innovation

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1. Background and Summary

- 1.1 In 2004, I launched a campaign with Anne Campbell, then MP for Cambridge, to encourage Government to introduce a policy similar to the US Small Business Innovation Research (SBIR) programme by requiring that departments use 2.5% of their external R&D budgets to procure “Innovation Contracts” with companies, particularly SMEs. A Private Members Bill was presented to Parliament in March 2005.² This proposal was picked up rapidly in Gordon Brown’s March 2005 budget, but failed to bring about any change in departmental behaviour and the campaign therefore continued. In April 2008 the Government announced a revised programme based much more closely on our proposals. The resulting Small Business Research Initiative is managed by the Technology Strategy Board.
- 1.2 Today SBRI is the only procurement based innovation policy that is systematically producing tangible results, albeit at modest expenditure levels.
- 1.3 This submission draws on experience gained during the course of this campaign and on research projects undertaken at the Centre for Business Research. It first gives an overview of the US SBIR programme and discusses why “lead customer” policies are important. It then explains the problems experienced in trying to implement such policies in the UK and makes detailed proposals to address these problems and improve the SBRI’s effectiveness and coverage.

2. Procurement Based Innovation Policies in the United States and the SBIR Programme

- 2.1 The role of Federal Agencies in stimulating the development of new high technology sectors in the United States is well known, with the Department of Defense, through DARPA and other branches playing a key role.³ A topical example is iRobot, currently advertising its “Roomba” vacuum cleaning robot in the national press as the ideal Christmas present. Started by MIT alumni, iRobot’s breakthrough came when it was awarded a series of development contracts in the early 90’s by the Department of Defense. This and revenues from sale of the resulting products provided the platform for a move into domestic robots some years later.
- 2.2 Today, the most visible US procurement innovation mechanism is the SBIR programme. This was established under legislation enacted in 1982 and was expanded in scope through

² Procurement of Innovative Technologies and Research Bill.

³ See for example *The Biggest “Angel” of Them All: the Military and the Making of Silicon Valley*, Stuart W. Leslie in *Understanding Silicon Valley*, ed. Martin Kenney, Stanford University Press, 2000.

subsequent legislation in 1988 and 1992. It has played a major role in funding early stage US science and technology companies.⁴

2.3 The SBIR legislation requires that all federal agencies with R&D expenditures over \$100m spend 2.5% of their external R&D budgets with small businesses through the SBIR process. Only majority US owned businesses are eligible and the R&D must be undertaken in the US.

2.4 The way in which the SBIR programme is structured and managed is an important reason for its success. Key elements are as follows:

(i) Agencies advertise topics ("solicitations") in groups, typically twice a year; each topic relates to an agency's requirements for new technology, either for an agency's own use or to meet its broader objectives

(ii) Awards are made on a competitive basis in two phases:

i. Phase I, typically \$100k for a feasibility study

ii. Phase II, typically \$750k for development of a demonstrator, awarded to roughly 50% of Phase 1 winners

SBIR projects that subsequently receive follow on government funding from non-SBIR budgets are defined as entering "Phase III".

(iii) Unlike UK and EU R&D grants, SBIR awards cover 100% of firms' project costs plus a profit element; this is especially important for smaller firms

(iv) Again unlike most UK grants (under TSB and EU programmes) there is no requirement for collaboration with any other organisation.

(v) The company owns any IP generated.

(vi) Companies can apply for and win multiple awards for different projects in parallel. This is common practice; iRobot won at least 19 separate SBIR awards between 2001 and 2009 totalling \$8.6million. This number excludes non-SBIR R&D contracts, which are typically much larger.

(vii) There is complete transparency in terms of information on solicitations, timescales, award winners and contract amounts, all of which is detailed on public web sites. The legislation requires that the process is timely and efficient.

⁴ "Secrets" of the World's Largest Seed Capital Fund: How the United States Government Uses its Small Business Innovation Research (SBIR) Programme and Procurement Budgets to Support Small Technology Firms; David Connell, Centre for Business Research, University of Cambridge, July 2006.

- 2.5 Today, Phases I and II of the SBIR programmes are worth over \$2 billion per annum with a further \$250 million from the closely allied STTR programme which requires academic collaboration. Phase III funding adds perhaps another \$2 billion.
- 2.6 Firms that obtain Phase III funding from mainstream agency budgets also derive significant commercial benefits, including an expectation that they will become a designated “sole supplier” of the technology to the Government. The higher margins this usually leads to makes them highly desirable partners and acquisition targets for large firms. This, and their potential contribution to small firm subcontracting targets (see Para 2.11), means that large firms are encouraged to monitor the SBIR community closely. Some large defence contractors have established dedicated SBIR Officers.
- 2.7 The majority of SBIR award winners employ less than 25 people, though there are also firms with hundreds of employees, including NASDAQ listed companies, with SBIRs.
- 2.8 The SBIR programme is just the first step on the procurement ladder for small science and technology based firms. Larger contracts, particularly from the Department of Defense, are available through Broad Area Announcements (BAAs) and other mechanisms and there are significant opportunities for small businesses to participate, directly, or as a subcontractor to a larger firm.⁵ Through these mechanisms, early stage US firms can receive significantly more financial support from the government per company than their UK counterparts.⁶
- 2.9 Each agency operates SBIR in a slightly different way, and the National Institutes of Health and National Science Foundation designate awards as “grants”, rather than procurement “contracts”. This reflects greater openness to company ideas and the fact that the term “grant” does not carry the same connotations as it would in the UK. (Under EU State Aids rules, a “grant” to fund 100% of a firm’s project costs would be illegal). In fact, even where SBIR “grants” are awarded, they are for directed research and development (usually highly specified by the agency concerned) and therefore represent procurement contracts in all but name.
- 2.10 The US SBIR programme has been independently reviewed on several occasions and is highly regarded.⁷
- 2.11 It should be noted that the United States also operates a number of policies to favour mainstream (i.e. non-R&D) procurement from small businesses, both directly and indirectly as subcontractors to other US firms. In 2005 44.6% of US federal government procurement

⁵ There are typically some 50 pages of BAA announcements on the FedBizOpps.gov website, representing around 500 separate R&D opportunities.

⁶ *UK Plc: Just How Innovative Are We?* Cosh, A., Hughes, A. and Lester, R.K. (2006) Cambridge-MIT Institute, University of Cambridge and MIT.

⁷ See “*Secrets of the World’s Largest Seed Capital Fund*”; op.cit. and also “*An Assessment of the SBIR Programme*”, ed. Charles W. Wessner, National Research Council of the National Academies, Washington 2008.

was spent through small US businesses in this way⁸. Whilst these broader programmes would be more difficult to operate in a smaller, more open economy like the UK, there can be little doubt that as practised in the US they act as a barrier to UK companies seeking to sell there.

3. Why Innovation Procurement Matters; the Role of Lead Customers in the Innovation Process

- 3.1 Recent research by the Centre for Business Research on successful new science and technology based companies in the Cambridge cluster underlines the crucial role played by lead customers in stimulating and financing the development of new products and technology based businesses.⁹
- 3.2 The evidence shows that the most successful new Cambridge companies, in terms of jobs and profitable revenues, are not university spin-outs based on academic inventions, but firms whose origins lie in developing innovative technology solutions for individual customers.¹⁰ This is best illustrated by the four main Cambridge technology “consultancies”, Cambridge Consultants, TTP Group, Sagentia and PA Technology. Most of their revenues come from overseas. The term “consultancy” is really a misnomer, as their business consists mainly of developing new products and equipment for individual clients rather than reports. Together they have probably created more jobs in product spin-off companies over the last thirty years than spin off businesses built on Cambridge University IP, certainly in relation to engineering and physics based products. However lead customers and customer funded R&D contracts also play an important role in many other sectors.
- 3.3 This is not to undervalue the key role that the university plays in the Cambridge cluster. However this is more diverse and indirect and in relation to new start-ups, just as at Stanford and MIT, entrepreneurial alumni have more impact on the growth of the local economy than inventions arising from university research.
- 3.4 The evidence from Cambridge also shows that its most successful entrepreneurial SMEs are very wary of becoming involved in the kinds of multi-partner collaborative R&D

⁸ See Appendix D, “Procurement - Lessons from US Policies to Support Small Businesses and Progress in Implementing UK Policies”, written by David Connell, in “Small Business and Government, The Richard Report to the Shadow Cabinet”, 2008.

⁹ See Connell, D. and Probert, J. (2010), *Exploding the Myths of UK Innovation Policy: How ‘Soft Companies’ and R&D Contracts for Customers Drive the Growth of the Hi-Tech Economy*, Research Commissioned on Behalf of the East of England Science and Industry Council by the East of England Development Agency. CBR, University of Cambridge.

¹⁰ The role of university IP may be greater for drug discovery companies than for physics, engineering and IT based companies.

programmes which are the traditional mechanism by which the UK government (currently through the Technology Strategy Board) and the European Commission have funded R&D.¹¹ This emphasis on collaboration as a requirement for funding differs markedly from funding policies in the US and Japan, for example. Multi-partner collaborative projects tend to be far too research (as opposed to development) orientated for most SMEs and the multiple partners involved results in IP issues, weaker project management, and a lack of flexibility. When coupled with the fact that firms must bear a significant share of the cost this means that SMEs often prefer to devote their efforts to trying to win a fully funded R&D contract with an informed and committed customer. Although the TSB and EC have tried to address these issues and TSB grants are now more flexible, in the author's view the over-emphasis on this model has reduced the effectiveness of UK innovation policy.

- 3.5 Besides stimulating the creation of innovative new technology solutions and products, the CBR research also shows that R&D contracts with customers and the "soft start-up"¹² model has played the dominant role in funding these successful companies through their early stages, with venture capital playing a less significant, or later stage, role than the conventional wisdom would imply.
- 3.6 The importance of customer funding also reflects three important shortcomings of the alternative "hard start up" model in which venture capital plays the dominant role. First, it is only appropriate for a small subset of innovative new businesses – those offering rapid growth and exit within around seven years. Second, it must focus on building product lines for larger (usually foreign) firms to acquire. This nearly always results in the dispersal of the entrepreneurial founding team and a loss of potential UK jobs through failure to capitalise locally on early success through the development of further new products and lines of business.¹³ Third, the average return delivered by venture capital in the UK, especially by funds focusing on early stage technology investments, has for many years been far too low for most pension funds and other institutional investors to wish to allocate a proportion of

¹¹ EU projects are particularly problematic and participation by SMEs is often seen by VCs as a distraction. Commercial companies account for only 20% of the R&D funding that the UK receives from the Commission under FP7.

¹² A "soft company" is a science or technology based company whose business model is to provide R&D based services (e.g. technical consulting, contract R&D) and which draws on its expertise and/or proprietary technologies to provide bespoke offerings for a range of customers and applications. A "soft start-up" is a company that uses this model in whole or in part to finance its early development, thereby reducing or avoiding entirely the need for external equity investment. Soft start-ups may continue to adopt this model and remain a service business, or they may transition to a "harder" business model based around standard proprietary products. iRobot is a classic US soft start up.

¹³ IPO, the alternative exit mechanisms for VCs and one which preserves the management team to enable further growth is relatively rare in the UK.

their funds to the asset class.¹⁴ As a result, many private equity investors, including 3i, have moved out of the asset class and into buyouts and other later stage investments. Firms that wish to focus on early stage venture capital find it very difficult to raise money.

3.7 Despite the shortcomings of venture capital described above, it is an essential part of the financing mix for certain sorts of business. But if the UK is to have a viable early stage VC industry it must put more money into funding long lead-time R&D alongside it, so that fund investors (including our pension funds) can get high enough returns to encourage them to participate in the asset class. Government R&D contracts could provide a way of doing this.

3.8 Besides the benefits they themselves derive, lead customers therefore play a series of crucial roles in the process by which new technologies are commercialised and new products brought to market:

- (i) by providing an informed description of unmet needs and in-use requirements, thereby ensuring that R&D is well focused
- (ii) by funding the development of specialised applications of new technologies and new products for their own use, and the creation of innovation teams in their suppliers able to exploit that technology more widely in due course
- (iii) by being the first to buy new 'standard' products, often effectively funding prototype development and helping to refine product designs through early trials
- (iv) by acting as reference sites for more risk averse customers at home and abroad for the same product as well as for customers for other applications of the same expertise or platform technology
- (v) by implicitly endorsing new products (and their suppliers) and helping to de-risk investment decisions by venture capitalists
- (vi) by reducing the time before new product companies start earning product revenues, thereby helping them grow ahead of competitors

¹⁴ See British Venture Capital Association and European Venture Capital Association investor return statistics. There is a range of returns around the average, but asset allocations are made largely on the basis of average returns.

Exhibit 1. Policies for Translating Long Lead Time Technologies into Commercial Businesses



- 3.9 Customer contracts can play a particularly important role in funding the “exploratory development” stage associated with long lead time “platform technologies” with multiple possible applications. This is illustrated in Exhibit 1. Many technologies that emerge from the academic science base are of this kind and the risks associated with developing any one application are usually high. Coupled with the time scales involved this make venture capital unsuitable. Nevertheless, this part of the exploitation process must be undertaken in a commercial environment rather than a university. Making it easier for potential customers to place R&D contracts with the private sector firms commercialising these kinds of technologies therefore represents a complementary policy to the new “Technology Innovation Centres” proposed by the Government. It should be noted also that the TIC concept itself relies on Centres being able to earn significant revenues from R&D contracts.¹⁵
- 3.10 From the point of view of the UK economy, therefore, government policies that reduce the risks to organisations of acting as lead customers represent one of the best ways of encouraging innovation and accelerating the growth rates of entrepreneurial firms.
- 3.11 Many private sector companies have long played a lead customer role. Indeed it is the obverse of what is now called “open innovation”. And the impact can be seen across many successful technology companies. For example, Intel’s first single chip processor, the technology on which its success has been built, was developed under contract for a Japanese calculator company.
- 3.12 In contrast to the private sector, government procurement plays only a very modest role in stimulating innovation in the UK, and SMEs in particular generally find government

¹⁵ See also: *The Role of TICs in Rejuvenating British Industry; Submission to House of Commons Committee on Science and Technology Enquiry on Technology Innovation Centres Submission to House of Lords Enquiry on Technology Innovation Centres, December 2010 David Connell, Professor Alan Hughes and Dr Andrea Mina, Centre for Business Research, Judge Business School, University of Cambridge.*

agencies unwilling to act as lead customer. However, the exceptions demonstrate the power of this approach. Both the Bank of England and the Post Office funded early ink jet printing developments (for bank notes and postage franking respectively) at Cambridge Consultants. Alongside larger and later contracts from ICI and others this helped CCL develop proprietary technologies and build a world class ink jet printing technology team. This led to a series of product spin-off companies today employing over 3,000 people.¹⁶ And Acorn Computers, whose alumni founded a string of semiconductor and software companies, was made possible specifically by the BBC's decision to run a competition for a new home computer for its ground-breaking computer literacy programme in 1981.¹⁷ Autonomy is another company which benefitted from a lead customer in the public sector, in this case a county policy force.

4. UK Policy on Using Procurement to Stimulate Innovation and the Small Business Research Initiative

- 4.1 The potential role that UK government procurement could play in stimulating innovation has been regularly highlighted for at least three decades and was a key theme of the DTI "Innovation Report" in 2003¹⁸. This was rapidly picked up in a report by the Office of Government Commerce.¹⁹ Additional OGC guidance on innovation was published in August 2007.²⁰ The Department of Innovation Universities and Skills' White Paper "Innovation Nation"²¹ called for each department to produce an annual "Innovation Procurement Plan". However, when published these were very general in nature. For example, the Department of Transport Plan describes many challenges and activities, but gives no indication that it plans to commission companies to develop technology and innovative new products needed to meet its objectives. The Glover Review²² focused mainly on improving SME access to government contracts of ALL kinds and its recommendations on innovation were limited to endorsing Procurement Innovation Plans.
- 4.2 Inspired by the US SBIR, the UK SBRI was launched by DTI in 2001. Its initial objective was to place £50m of government R&D contracts per annum with SMEs through the SBRI web

¹⁶ *Exploding the Myths of UK Innovation Policy: How 'Soft Companies' and R&D Contracts for Customers Drive the Growth of the Hi-Tech Economy*, op cit.

¹⁷ Though the BBC did not actually pay Acorn to develop the BBC Micro, its involvement in the process and endorsement of the brand underpinned its success.

¹⁸ *Competing in the Global Economy; the Innovation Challenge*, Department of Trade and Industry 2003.

¹⁹ *Capturing Innovation*, OGC, April 2004.

²⁰ *Finding and Procuring Innovative Solutions*; op. cit.

²¹ *Innovation Nation*, DIUS, March 2008.

²² *Accelerating the SME economic engine through transparent, simple and strategic procurement*. H. M. Treasury 2008.

site. However, the scheme was non-mandatory and by 2004, contracts worth only £2m per year were being advertised, mostly for policy research rather than technology development. Very few departments participated. The main exception was the Biotechnology and Biological Sciences Research Council which for several years ran a small scale, but well regarded, competitive programme.

- 4.3 In the March 2005 budget Gordon Brown announced that the SBRI scheme would be re-launched, with “£100m for small firms guaranteed”. Implementation of SBRI Mark 2 took the form of targets set for each Department to spend 2.5% of their external R&D budgets with small firms. This was, of course, a very undemanding target. The US legislation requires agencies to spend 2.5% of their external R&D budgets through the well defined and completely transparent SBIR process, but SBIR awards represent just the first step on the procurement ladder. Figures published by the SBA suggest that the total share of US federal R&D contacts going directly to small firms is 13 per cent²³. Including subcontracted R&D projects from prime contractors the figure is probably much larger.
- 4.4 Following the announcement the DTI collected standardised “SBRI returns” from each department. Not surprisingly in nearly every case the 2.5% target was met or exceeded. However, there is a good deal of uncertainty over what each department included in its figures for SBRI expenditure as no detail was provided and there was no review or audit process. Exceeding the target meant no further action was required. Furthermore some departments had difficulty quantifying “external R&D” expenditure. For example, over the next four years the MOD reduced its annual reported figure for external R&D from £3.6 billion to £1.1 billion and its annual reported SBRI expenditure from £539 million to £137 million.
- 4.5 Despite the success of the BBSRC SBRI programme, Research Councils UK decided that the Research Councils, including BBSRC, should not participate in SBRI Mark 2 and announced their own “Small Business Research Scheme”. However the author is unaware of any competitions run, or awards announced, under this heading.
- 4.6 SBRI Mark 2 was re-launched in spring 2006. This was at roughly the same time as the launch of the Supply2.gov website for smaller procurements and departments were encouraged to advertise SBRI projects through this mechanism. By February 2008, roughly 200 “SBRI” opportunities had been advertised. However, few if any were for technology developments open to commercial companies. The majority were for general procurements with no innovation content whatever.
- 4.7 In 2007 Lord Sainsbury’s review of UK innovation policy recommended that SBRI be revamped using a model much closer to the US SBIR programme and responsibility was

²³ *The Small Business Economy, a Report to the President*, Small Business Agency, 2004.

given to the Technology Strategy Board for coordinating implementation through spending departments.²⁴

4.8 Pilot competitions were run with the MOD and NHS in 2008/9 and it was rolled out to other departments from April 2009.

4.9 In 2009 I made proposals to the European Commission for an EU initiative under which €800m a year of the FP8 budget would be used to cofund SBIR style competitions run by individual member states.²⁵ In October, the Commissioner for Research and Innovation announced a significant commitment to introducing pre-commercial procurement programmes such as SBRI, including an early pilot.²⁶

5. The Current Small Business Research Initiative

5.1 Discussions with departments and the OGC enabled a standardised SBRI model to be developed which can be adopted by any public sector body. Issues such as compliance with EU and UK Government procurement rules and the EU State Aids concerns expressed earlier by officials have all been resolved. This has been helped by the European Commission's own commitment to "Pre-Commercial Procurement" and clarification of how it can be used as a legitimate innovation policy measure²⁷.

5.2 SBRI Mark 3 has the following important features:

- (i) It focuses on funding the development and trialling of innovative technologies and products to help Government bodies improve their effectiveness or meet other policy goals
- (ii) It involves a competitive process which is in principle open to all EU businesses, though the focus on innovation and the need for close customer and user engagement means that in practice nearly all awards go to SMEs based in the UK. Competitions are not required to be advertised through the Official Journal of the European Communities.

²⁴ *The Race to the Top, A Review of Government's Science and Innovation Policies*, Lord Sainsbury of Turville, H.M. Treasury, October 2007.

²⁵ *Creating an EU SBIR Programme; Lessons from the UK SBRI and Proposals for EC Action*, Presentation to EC Workshop, Brussels October 2009. These ideas were later presented to Commissioner Maire Geoghegan-Quinn at a meeting arranged by Malcolm Harbour MEP.

²⁶ *Europe 2020 Flagship Initiative, Innovation Union*; European Commission, SEC(2010) 1161.

²⁷ *Pre-commercial Procurement: Driving innovation to ensure sustainable high quality public services in Europe*. (SEC(2007) 166. European Commission December 2007.

- (iii) Awards take the form of contracts covering 100% of firms' costs. Collaboration is not required but companies may use sub-contractors and consultants if they wish.
 - (iv) Firms own any IP they generate.
 - (v) Projects are phased to manage risk, with Phase 1 awards providing £50-100k for a feasibility/design study, and a percentage of these (ideally 50%) going on to win Phase 2 awards, each providing £250k to £1m to develop a demonstrator or prototype. In this respect it mirrors best practice as demonstrated in commercial R&D and ensures funding is focused on the best propositions.
- 5.3 There is no requirement for departments to spend any given amount on innovative procurement, or to use the SBRI process and they have been unwilling to commit to targets. The Technology Strategy Board has therefore had to market the process actively to a range of individuals in spending departments and the public bodies they sponsor. In principle, "problem owners" have to fund projects from their own budgets, but in recent months the TSB has co-funded some competitions to encourage participation. One of the best examples of an SBRI competition is summarised in Exhibit 2.
- 5.4 The TSB has done an excellent job in developing the SBRI process and marketing it to departments, and the experience of running competitions has led to considerable support from individuals in sponsoring departments who see it as a very useful way of addressing unmet departmental needs.²⁸ The feedback from award winners has been overwhelmingly positive.
- 5.5 However, some important problems remain:
- (i) Departmental R&D budgets tend to be fragmented, tied up under long term contracts or framework agreements and in some cases focused on academic research and/or policy advice. With the exception of BIS and to some extent MOD, funding technology development has not historically been seen as a part of their role.
 - (ii) Mainstream (non R&D) budgets are focused on delivery and value for money and there is little incentive for officials to get involved in funding innovative technology other than as a component of large scale systems procurements through established turnkey suppliers. Reputational benefits are likely to take some time to appear and may not attach to those taking the risk of commissioning projects. There can be severe career penalties for being associated with failure. Despite government exhortation, there is no obvious tangible mechanism at work to encourage the development and testing of

²⁸ See NESTA's review of SBRI progress: *Buying Power; Is the Small Business Research Initiative for Procuring R&D Driving Innovation in the UK?*, Kirsten Bound and Ruth Puttick, NESTA, June 2010.

component technologies, solutions and subsystems in advance of major procurements, such as the investment in the Olympics or major transport infrastructure projects.

- (iii) Those individuals that do wish to sponsor SBRI competitions find it hard to access large enough budgets, so there has been a steady downward pressure on project size and a danger that the “norm” becomes too small to make a meaningful impact on a company’s ability to develop products.

EXHIBIT 2. NHS EAST SBRI COMPETITION

In April 2009, NHS East launched an SBRI competition designed to help industry develop new technologies to support the achievement of regional health priorities and increase the probability of their adoption by NHS. The competitions were co-funded by the East of England Development Agency, TSB and European Regional Development Fund giving a total budget of around £2.8 million.

After a series of workshops with clinicians three topics were defined:

- i) Managing long term conditions
- ii) Patient Safety
- iii) Keeping Children Active

177 proposals were received and after a shortlist of applicants had been interviewed, 11 were awarded contracts for feasibility studies, typically worth £100k each. On completion of these, those wishing to continue were interviewed by a panel comprising clinicians and nursing staff in the relevant fields, and people from the private sector with a venture capital or technology development background. All companies will receive clinical assistance in trialing their products.

Four companies have been awarded Phase 2 contracts:

- Cambridge Design Technology, whose technology for reduction of Ventilator Associated Pneumonia has the potential to save 2000 lives and £150m in NHS costs per annum. It plans to spin out a medical device company based initially on this technology
- Eykona, whose portable 3D camera for assisting wound care, has the potential to reduce healing times for 38000 patients suffering with ulcers. Eykona raised £1.2m in investment on the back of the award
- Oxford BioSignals, whose non-invasive system for monitoring patient vital signs can give early warning of patient deterioration by up to 6 hours and is expected to be able to reduce hospital stays by 8%
- Sonovia whose novel ultrasonic patch technology for therapeutic and drug delivery applications is expected to allow for better treatment of osteoarthritis in the home.

“It’s guided by market need, based on merit, 100% funding and, above all, you let us spend the money in the way we see most effective. In a nutshell, that’s why it’s so good.”

Dr Keith Turner, Cambridge Design Partnership

- (i) The lack of participation by the Research Councils is particularly disappointing as their ability, through the academic researchers they help fund, to help create lead customers for new “research tools” would do much to help this important hi-tech sector. A “Research Tools” SBRI would also probably be the easiest way of encouraging university spin out companies. The two most successful spin outs from Cambridge University of the last 15 years, Abcam and Solexa, both fall under this heading, for example.²⁹
- (ii) The departments with the next largest R&D expenditures, Defence and Health have both made very productive use of the SBRI process. However the amounts they have been able to commit - under about £5million each - are quite modest in relation to their size and there is no sign that they feel able to increase their financial commitments. In the case of the NHS the problem is compounded by the fragmentation of budgets and responsibilities, with the reorganisation currently taking place likely to make this worse.
- (iii) The Department of Transport has so far only run one competition, worth £300k and without a Phase 2. This compares with an overall R&D budget of £60million per annum.
- (iv) A laudable desire to engage with new departments and agencies has led to the TSB taking on some competitions which do not fit the ideal SBRI template, for example, because the awards are less than the desired norm or where sponsors have been unable to fund Phase 2s. Budgetary uncertainties mean that many current competitions do not commit to Phase 2 funding.

5.6 As a result of these difficulties, the total value of SBRI competitions has been running at less than £25m per annum. Moreover, the financial pressures on departments and lack of visibility over future budgets are exacerbating these problems and this number is likely to fall. Based on the US SBRI and the relative sizes of the US and UK economies, a more appropriate number for the UK SBRI would be £240 million per annum, with several times this amount being placed with firms for larger projects outside the scope of SBRI.

6. Conclusions and Recommendations

6.1 The catalogue of problems associated with getting SBRI established shows just how difficult it is to introduce systematic procurement based innovation programmes into organisations focused on operational deliverables and cost effectiveness. Exhortations, guidelines, “plans” and targets have all had virtually no impact.

²⁹ This argument is developed further in “*Scientists are customers too; How the SBRI can help Research Councils drive economic growth*”, David Connell, NESTA, March 2010.

- 6.2 The problem is analogous to that faced by the boards of large corporations. To meet shareholder expectations, large firms must continually drive down costs in their individual (usually mature) operating businesses. This process inevitably squeezes investment in R&D out of the system and hampers major innovations. To counter this wise Chief Executives ensure that there is some central control of R&D budgets, so that the corporation as a whole continues to create new products and revenue streams at the same time as pushing hard on annual financial targets. Spending money outside the company, through the process now known as “open innovation”, has become an important part of the picture.
- 6.3 If government departments are to pull their weight as drivers of innovation and growth, the Treasury must play a similar role, by ensuring that defined budgets are available to those within spending departments capable of playing the lead customer role. Neither BIS nor TSB can achieve this alone. SBRI is a good place to start.
- 6.4 My recommendations are therefore as follows:
- (i) That Treasury allocates £20m to TSB in 2011/12 to enable it to cofund departmental SBRI competitions. This should be increased in steps to £75m per annum over the next three years
 - (ii) That all departments, including the Research Councils, be asked to participate in SBRI during 2010/11
 - (iii) That details of all awards , including the recipient, amount and project description, should be published on the TSB web site within 1 month of contracts being signed (this should be a condition of TSB cofunding)
 - (iv) That TSB, jointly with Treasury, publish a full, factual analysis of SBRI competitions each year
 - (v) That Treasury use this analysis to agree innovation budgets and programmes with spending departments in subsequent years
 - (vi) That within two years, spending departments be required to publish an annual breakdown showing in detail how R&D and innovation budgets are used
 - (vii) That departments, with the help of TSB and major systems suppliers, identify component and subsystem level technologies likely to be needed in future years and use part of their SBRI expenditures to fund their development
 - (viii) That additional budgets are made available, when finances permit, to fund larger scale lead customer projects outside SBRI
 - (ix) That government lobbies the European Commission to use a significant part of the FP8 budget to cofund national SBRI budgets.

- 6.5 The aim should be to build up a suite of lead customer programmes worth £500m per annum in total by the end of this Parliament, sufficient to play a major role in rebuilding the UK's high technology manufacturing sector.

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Note on Conflicts of Interest

David Connell is a Director of TTP Capital Partners Ltd, Opportunity Links Ltd and SIMUL8 Corporation Ltd. He is also a minor shareholder in TTP Group plc and various small specialist technology companies.