

Innovation and public procurement

A new approach to stimulating innovation

As the UK's largest customer, government benefits from business investment in innovation, but the UK is falling short when it comes to pulling through innovative products and services into public procurement. A change of approach at the operational level of public procurement, backed by a new strategic body, could have dramatic returns for public customers and the economy.

Introduction

Innovation, science and technology drive business competitiveness, quality and productivity improvements and, ultimately, economic growth. Business innovation can also help government achieve its goals, for example in meeting the challenges of climate change and in delivering long-term economic stability as traditional industries and markets evolve in response to globalisation. Service innovation and innovative uses of technology also offer significant opportunities to improve the efficiency and effectiveness of public services.

Innovation can be the key to a virtuous circle: investment leading to growth and efficiency, generating and releasing revenue that can be used to achieve further change and support more innovation. Used intelligently, innovation may even provide economic growth that is decoupled from material use growth.¹ In short, expenditure on innovation is growth-enhancing expenditure.

But innovation often requires long-term investment, in particular if radical rather than incremental improvements are sought, comes with significant risk that many firms (and their investors) may find difficult to justify, and creates spill-over effects beyond those who take these risks. As was recognised when the R&D tax credit was established in the UK, the benefits of innovation spill-over can never be captured fully by those funding and engaged in innovative work. Indeed, the more radical innovators may actually put

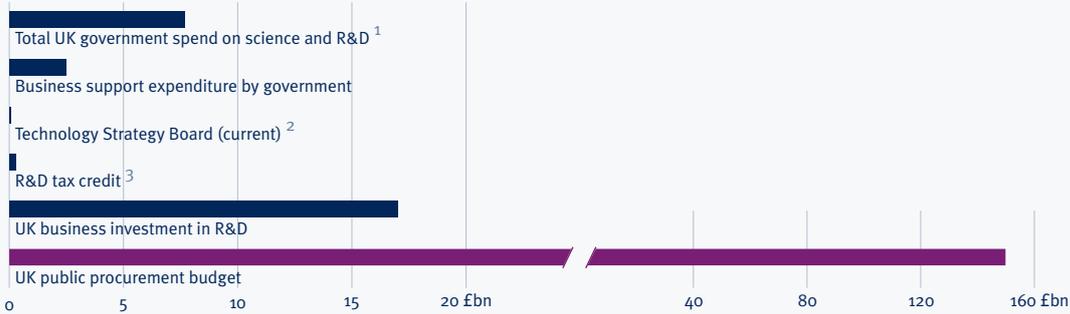
themselves at a marginal disadvantage (at least in the short term) compared to those who let others take the lead. It is appropriate then that innovation should be an important policy focus for the government and that the government should help to facilitate business innovation activity: to benefit business, to meet government's needs as a major customer, and to benefit the wider economy.

In order to help companies invest in innovation, prototype ideas and manage risk, it is vital that focused and effective government support is available in the UK. This support must address the whole ecosystem for business innovation, including access to skills, infrastructure and finance. A welcome part of the approach from government is the 'push' support it provides for business innovation through initiatives such as the R&D tax credit, knowledge transfer partnerships and grants for R&D etc. But a much more significant catalyst for business innovation is the 'pull' effect that can be achieved by using public procurement to buy innovative products and services—creating early stage customers and a market demand that enables businesses to innovate.

This brief, written as part of a two-year CBI/QinetiQ innovation campaign, presents detailed findings on public procurement and innovation from our 2005 innovation survey,² international insights from the EU and US, and sets out practical measures that government should take to make

EXHIBIT: 1

The scale and potential of public procurement relative to other factors in the UK



¹ £7.66bn includes R&D budgets for central government departments (including MOD) and Research Councils
² Approx £90m per year
³ CBI calculates the R&D tax credit to be worth £300m a year to UK businesses

the UK a world leader in innovation through effective use of public procurement. A key focus is on how to transform government’s approach to the early adoption of new ideas.

A summary of key overall findings from the CBI/QinetiQ innovation survey 2005 is shown in Annexe 1.

Public procurement in the UK

The purchasing power of major customers is a key driver of supply-side activity and supplier behaviour. In the right climate and with the right encouragement from customers, fundamental changes in culture, operations and outputs among suppliers can be achieved. In short, if major customers demand innovative solutions then the supply market will adapt accordingly.

Beyond the collective spending power of individuals as consumers, public procurement is the biggest single customer-side driver that could be harnessed to catalyse business innovation activity. In the UK, public procurement spending stands at around £150bn a year³—approximately nine times more than UK companies themselves invest in research and development (Exhibit 1).

The potential for using this spend to stimulate innovation in the UK was first recognised in the DTT’s 2003 Innovation Report.⁴ That report highlighted areas of best practice in procurement and announced that the trade and industry Secretary would chair a ministerial team to lead the innovation agenda across government.

The DTI Innovation Report was followed up with publication of a best practice guide by the Office of Government Commerce (OGC).⁵ The OGC guide was aimed at all those

in government involved in policy development, procurement and commercial activity, project and programme management. Its focus was on government realising better quality, faster delivery and reduced whole-life costs through supplier innovation. There was a strong emphasis on early supplier involvement and for output/outcome-based specifications to be used. In other words, specifying the problem and inviting innovative solutions to be developed.

Both the OGC and the National Audit Office (NAO) specifically state that procurement decisions should not be made on lowest initial price, but on value for money on the basis of ‘whole lifetime costs and quality to meet user requirements’. But as Sir George Cox noted in his 2005 review for government,⁶ the issue is not whether a solution appears to offer value for money, it is whether even greater value could be achieved from being even more innovative, by ‘seeking out more imaginative solutions’.

Despite the strategic importance of public procurement as a stimulus for innovation having been recognised and supported by government at the highest level, the extent to which there has been any impact on the ground remains a serious concern.

Initial findings from the CBI/QinetiQ innovation survey 2005 allowed us to conclude that ‘current procurement practices not only fail to foster business innovation, but also fail to allow government to maximise long-term value from its investments’.

And things do not appear to be improving. The July 2006 innovation survey from the Engineering Employers Federation states, ‘The conduct of public procurement was more likely to be seen as negative rather than positive for innovation. Companies saw public procurement in the UK as risk averse, slow and bureaucratic.’⁷

EXHIBIT: 2

Companies in the innovation survey involved in public procurement

<i>Percentages of totals shown</i>	Company annual revenue (turnover)			Number of employees in company		
	Up to £10m	£10m – 500m	>£500m	1 – 499	500 – 4,999	5,000+
With central government (total 68 companies)	30.3	36.4	33.3	44.1	36.8	19.1
With local government (total 82 companies)	38.8	35.0	26.2	54.9	31.7	13.4

Taking a wider perspective, addressing key shortcomings in public procurement processes is fundamental to the reform of public services. Cancelled contracts and long, drawn-out procurement processes impose costs on the taxpayer and undermine efforts to improve the delivery of public services. The procurement process should enable clients and suppliers to work together to deliver high-quality, flexible services.

An overriding problem is that the £150bn procurement spend is spread across hundreds of departments, agencies, local authorities (accounting for about one third of the total), education and health bodies and many others. All of these need to be challenged to embrace innovation and to consider radical as well as incremental solutions to meet their needs and wider government aims. While the high-level support is there, and the strategic imperative is apparent, consistent culture change among individual public customers at the operational level has yet to occur.

Innovation survey findings

In further analysing responses to our 2005 innovation survey, we have disaggregated data of relevance to public procurement and innovation to reveal how each government department performs on a range of factors. This has allowed us to develop a means of ranking departments and identifying more clearly any problems that government still needs to address. We have also examined whether a firm’s size is a factor in procurement experience.

Involvement with public procurement

Nearly 60% of firms in our innovation survey (94 out of 162) reported that they had either tendered for contracts or already supply government. Of the 94 firms, the majority (59%) reported supplier involvement with both local and central government; 28% had involvement with just local government; and 13% with just central government.

The profile of firms involved in public procurement is shown in more detail in Exhibit 2.

The distribution of suppliers by annual revenue (turnover) is roughly equal across the three bands for central government. For local government supply, companies with lower revenues

are more prominent. By company size, the likelihood of involvement with government supply increases as size decreases for both central and local government. Local government supply in particular appears to favour small firms.

The central government departments with which our sample worked most often were the Ministry of Defence (MOD) and the Department of Health (DoH) — more than 30 companies each. In comparison, fewer than 15 firms worked with each of Her Majesty’s Revenue and Customs (HMRC), Department for Constitutional Affairs (DCA), Department for Culture, Media and Sport (DCMS), Department for International Development (DfID) and the Department of Work and Pensions (DWP).

Overall experiences of public procurement

To gauge overall experience of public procurement, eight propositions were put to survey respondents. These included four that were positive (+), three negative (-) and one that was neutral (0) to ensure that the questioning itself would not lead to respondents adopting an overly biased position. The propositions were:

- Current government procurement processes foster innovation (+)
- Current processes allow government to maximise long-term value from their investments (+)
- Government supports innovation by acting as an early adopter of new ideas (+)
- Government engages us in defining the problem and developing novel solutions (+)
- Government tightly defines the problem and the solution (0)
- Government procurement skills are a major problem (-)
- Previous procurement problems have made government more risk averse (-)
- Current procurement processes pose threats to our intellectual property (-).

EXHIBIT: 3				
Responses to the eight public procurement propositions and whether, on balance, they are favourable or not				
Proposition	Agree (%)	Disagree (%)	Balance (%)	Favourable YES/NO
Current government procurement processes foster innovation (+)	16	70	-54	NO
Current processes allow government to maximise long-term value from their investments (+)	13	59	-46	NO
Government supports innovation by acting as an early adopter of new ideas (+)	9	79	-70	NO
Government engages us in defining the problem and developing novel solutions (+)	19	62	-43	NO
Government tightly defines the problem and the solution (o)	17	64	-47	NO
Government procurement skills are a major problem (-)	69	12	57	NO
Previous procurement problems have made government more risk averse (-)	67	14	53	NO
Current procurement processes pose threats to our intellectual property (-)	33	40	-7	YES

Firms were asked to respond by indicating how much they agreed with each proposition. Options were: strongly agree, tend to agree, tend to disagree, strongly disagree and neither. Disagree responses on the first five propositions above, and agree responses on the final three, show poor government performance. Overall responses to the propositions are recorded in Exhibit 3 (balance figures are 'agree' minus 'disagree').

In detailed analysis of the data, it is notable that there is little statistically significant difference between responses for central and local government to any of the propositions. The conclusions thus apply equally to both central and local government procurement processes.

On the positive side, 40% disagreed that procurement processes were a threat to their intellectual property, and 27% were neutral. Other findings were less encouraging.

A substantial number of respondents indicated that current practices hinder the government's potential to take up innovation. Sixty-nine percent said that government procurement skills are a major problem (combination of 'strongly agree' and 'tend to agree' responses) and 67% said previous procurement problems have made government more risk averse. Just 16% and 13% respectively agreed current procurement processes foster innovation and allow government to maximise long-term value. Nineteen percent said government engages business in defining the

problem and developing novel solutions, and only 17% said government helped by tightly defining the problem.

Just 9% (eight out of 94 firms) rated the government as an early adopter of new ideas, 79% disagreed (with a third disagreeing strongly). This balance of -70% is the most strongly negative score on any of the procurement issues we addressed, and one of the most striking findings from the survey overall. Categorically, the view from business is that the government is not an early adopter and that a major shift in approach would be required for this to be turned around.

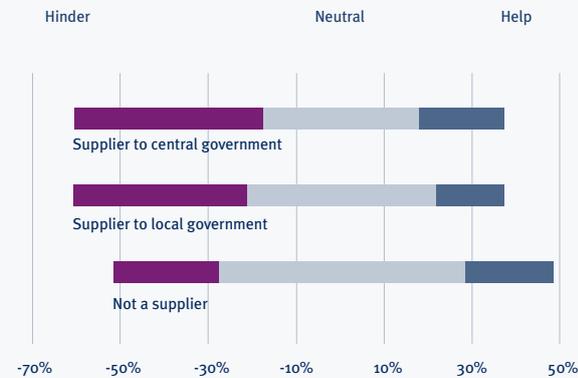
The survey also asked one overall question about whether government procurement practices helped or hindered companies' own innovation activities. Over two fifths of companies supplying government said that the practices did hinder them (46% of suppliers to central government, 43% to local government), compared to only 25% of non-suppliers (Exhibit 4, page 5). Overall, only 16% said that current practices helped.

This is also a point for serious concern. It is one thing for the government to operate procurement sub-optimally, but quite another for its actions to stand in the way of the very business activity that the process could and should be encouraging. Far from being a driver of business innovation, it appears that public procurement is actually acting as a brake on progress.

EXHIBIT: 4

**Wider impact of government procurement practices
(% out of 162 responses)**

Do government procurement practices help or hinder your innovation activity?



Small firms and procurement

Given that small and low revenue firms are so important in the supply to both local and central government, it is of particular concern that these firms in the survey often gave the strongest negative reactions to the propositions. For example, some statistically significant responses were:

- Thirty-eight percent of the smallest firms (those with fewer than 500 employees) strongly disagreed that government engaged them in defining the problem and developing novel solutions (45% of the less than £10m revenue band). For all firms, only 27% strongly disagreed
- Forty percent strongly disagreed that government supports innovation by acting as an early adopter of new ideas (52% of the less than £10m revenue band). For all firms it was 33%
- Thirty-eight percent strongly agreed that government procurement skills are a major problem (48% of the less than £10m revenue band). Again, for all firms the figure was only 28%.

On the overall question concerning impact on company innovation activities, 41% of small firms (those with fewer than 500 employees) said that government procurement practices hinder their own innovation activities, compared to 30% of firms with more than 500 employees (48% were neutral). Again, this should be cause for concern in government, more so because of the disproportionate impact on smaller firms.

Exhibit 5 (page 6) demonstrates the full range of the problem faced by smaller companies. On each of the eight propositions, the smaller companies reported views that were consistently more unfavourable towards current government procurement practices.

The OGC guidance recognises that small firms may face particular problems and suggests that procurement requirements could be broken into smaller chunks, or that larger firms could be encouraged to form alliances with smaller companies to create opportunities for them to participate. We do not know the extent to which this advice is now being followed, but clearly more effort is needed to improve the experience of small firms attempting to become suppliers to government.

The decision to break up requirements into small chunks or not must also be a conscious one, done for reasons of value, not simply to meet targets. There is a real danger that a piecemeal approach to procurement will fail to realise value even if individual elements procured are innovative. To paraphrase the Cox Review: maximising innovation on individual projects maximises overall innovation only if the projects are entirely unrelated.

At the R&D end of the innovation spectrum, the government had a commitment for departments to purchase at least 2.5% of their R&D from SMEs by 2004/5 (the Small Business Research Initiative, SBRI). Recently published figures for the SBRI in 2004/5 show that this target has been exceeded. Overall, 10.6% of departmental extramural R&D was contracted to SMEs. In terms of total departmental R&D spend, the figure is somewhat lower, at 6.7%, but still above target and very welcome. To take the SBRI further forwards, departments should now consider which additional areas of currently intramural R&D could also be opened up externally—for example allowing companies to bid for policy-related research work that is currently let on a single tender basis to government laboratories.

The main procurement issues in detail

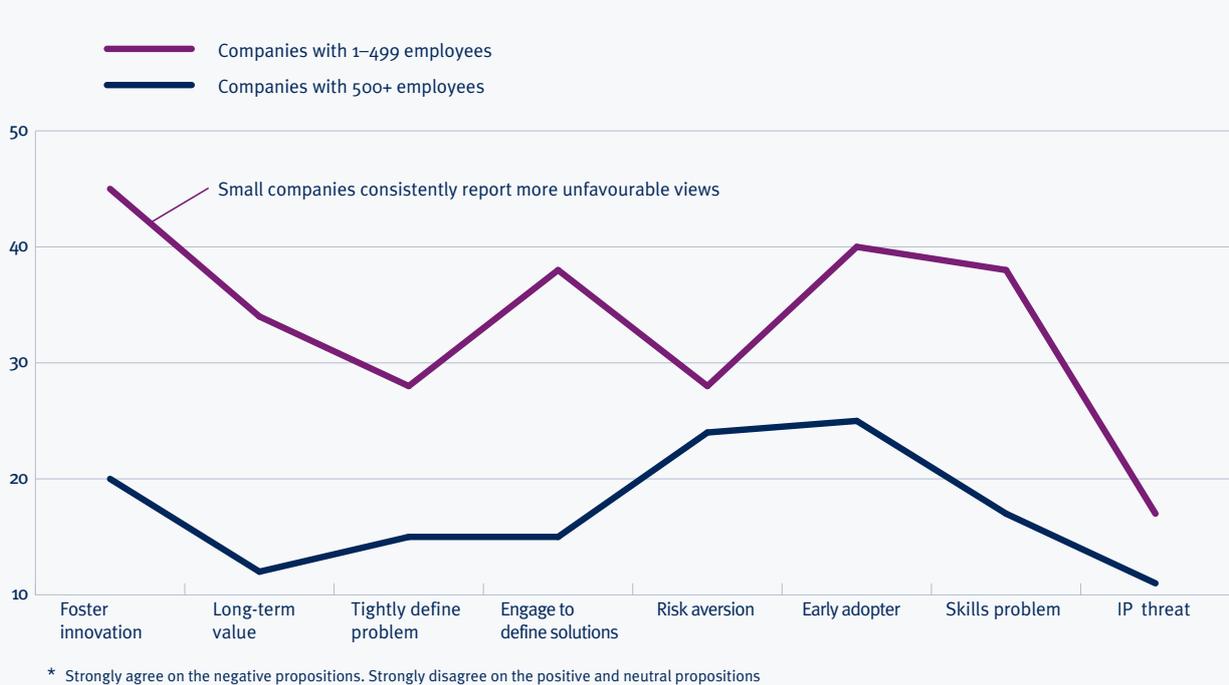
This next section explores each of the eight propositions from the survey in more detail, highlighting where issues with particular government departments were raised.

Current government procurement processes foster innovation

The majority of companies disagreed with this proposition across each department, which is perhaps not surprising given the responses to specific issues which are set out in more detail below. Responses for the DTI and MOD showed the least net disagreement with the proposition, while the DfID and HMRC ranked significantly worse.

EXHIBIT: 5

Companies reporting the most strongly unfavourable views* on government procurement (%)



Current processes allow government to maximise long-term value from their investments

In terms of maximising long-term value, again the majority of firms disagreed. There is a significant cluster around the net 33% to 40% disagreement level. In other words, a balance of just over one third of firms thought that each department was not maximising long-term value from its investments because of problems with procurement processes.

Government engages us in defining the problem and developing novel solutions

A theme running through the OGC guidance is that early supplier involvement is critical if innovation is to be captured. We strongly support this guidance and the specific steps it outlines. Namely, communicating long-term plans to the market (eg providing early warning of a complex requirement); holding suppliers' conferences to engage with potential suppliers; using trade bodies to take early market soundings; and dealing with all parties in an open and equitable way at the earliest stages.

In practice, though, many firms still feel that they are not engaged early on in the process to define problems and develop novel solutions. On average, around two thirds of firms disagreed with the proposition. The DCA ranked worst by a significant margin, 88% disagreeing with the engagement proposition.⁸

Government tightly defines the problem and the solution

Another angle on this is whether or not government can tightly define the problem. If it can, and then invites solutions to solve the problem or achieve the desired outcome then this should also provide a route to capture innovation. But few departments rated highly on this proposition either: the HMRC rated best with 38% agreeing with the proposition.

Government supports innovation by acting as an early adopter of new ideas

The clear message from our survey respondents is that government does not support innovation by acting as an early adopter of new ideas. Typically, departments scored worse on this than on any of the other propositions. The overall net agreement score was -70%. For each department, around 80% of firms disagreed that they acted as an early adopter. The lowest ranked departments being DfID, HMRC and DTI where all or nearly all respondents disagreed with the early adopter proposition.

As we highlighted in our innovation report, early adoption of ideas can have a major impact on supply-side businesses. Providing firms with their first significant customer for a new innovation can form the platform of respectability from which further sales and long-term growth can be achieved.

It is here more than anywhere else that an improved response from government could have a major impact on business innovation in the UK.

Government procurement skills are a major problem

This was identified as a problem across several departments: the DfES and DfID rated worst, with over 80% of firms agreeing that procurement skills were a problem, and 50% or more agreed there were skills problems in each of the other departments. The net agreement scores ('agree' there is a problem minus 'disagree') were relatively good for only the DCA and HMRC.

While the OGC guidance recognises the need for training and the use of skilled procurement professionals, the skills problem may be much more difficult to address in practice. The reality is that a lot of procurement is done not as part of major projects where dedicated professionals can take the lead, but in on-going and day-to-day situations where individuals skilled in other areas have to take procurement decisions. Improving skills and understanding of the role of innovation in procurement across the public sector at this level will be a major challenge.

Previous procurement problems have made government more risk averse

The OGC guidance identifies risk aversion as a problem, noting that innovation may be considered in pilot or short-term projects, but that often this is not followed through into longer-term projects where, instead, low-risk solutions are sought. The guidance mentions effective risk management and the sensible apportioning of risk, although precisely how this should be achieved is not discussed in detail. Again, skills issues may be a key part of the problem.

Our question was prompted because of anecdotal concerns about the knock-on effect of a few high profile procurement projects where problems had arisen, and whether these had made government in general more averse to seeking innovative solutions. The overall response was that there clearly is a problem. Of the 13 departments that we covered specifically, only the MOD and the Home Office rated moderately well. More than 80% of firms with procurement links to the DCA, DCMS, DfID, DfT, DWP and ODPM agreed that previous procurement problems have made government more risk averse.

Acceptance of some additional risk is almost inevitable if the potential for innovation is to be captured, and people need to be able to recognise and deal with this appropriately. Risk management is required, not risk avoidance. Training in the management of risk and an acceptance that failures may occur, but that some failure is acceptable as long as lessons are learnt, are critical if culture change away from unnecessary risk aversion is to be achieved.

It is worth highlighting that even businesses can find it difficult to accept failure as a positive part of being more innovative. The key is to fail early on in the process to minimise sunk costs and then learn so as not to repeat obvious mistakes. In our 2001 innovation survey, 38% of businesses said they didn't follow-up on failed projects to learn from any mistakes that were made; however in our 2005 survey this was down to just 21%.

Current procurement processes pose threats to our intellectual property

Of the eight propositions, this was the only one to gain an overall positive rating in the survey: 33% said their intellectual property (IP) was threatened by government procurement processes, but 40% said that it was not. Indeed, for most departments 50% of firms or more who expressed a non-neutral opinion were generally positive about IP issues. Similar views were expressed across the departments and, on this issue, no one individual department stands out as being either significantly better or worse than the others. Even so, it is hardly a resounding endorsement of public procurement practices when the best result achieved is for a third of firms to note that a particular practice threatens them in some way. And to those companies that are affected, the threat can be severe, typically when government customers insist on owning IP rights to innovations that are developed for them.

Procurement issues by department—overall

The results from our analysis clearly show that no departments achieve a positive rating across each of the procurement propositions. However, some do rate consistently higher on several factors. To assess how departments perform on procurement relative to each other, we have compared their net agreement/disagreement scores for each proposition (Exhibit 6, page 8). Accounting for whether agreement or disagreement is a good or bad outcome, we have then summed these figures to give a total score and rank order (Exhibit 7, page 8). This allows us to see the general pattern of each department's approach to procurement and smoothes out the impact of scores on individual propositions.

Out of a total possible range of +800 (excellent) to -800 (very bad) based on a maximum score of plus or minus 100% for each of the eight propositions, the overall net agreement/disagreement scores for the Departments ranged from -300 down to a low of -429. Scores below zero obviously indicate significant room for improvement.

The range of scores suggests that, in general, between two and three times as many firms reported negative responses to the propositions as recorded positive ones.

As noted earlier, only a small number of firms in our survey reported procurement links with the DCA, DCMS, DfID,

EXHIBIT: 6

Range of balance scores for each of the eight propositions, by department

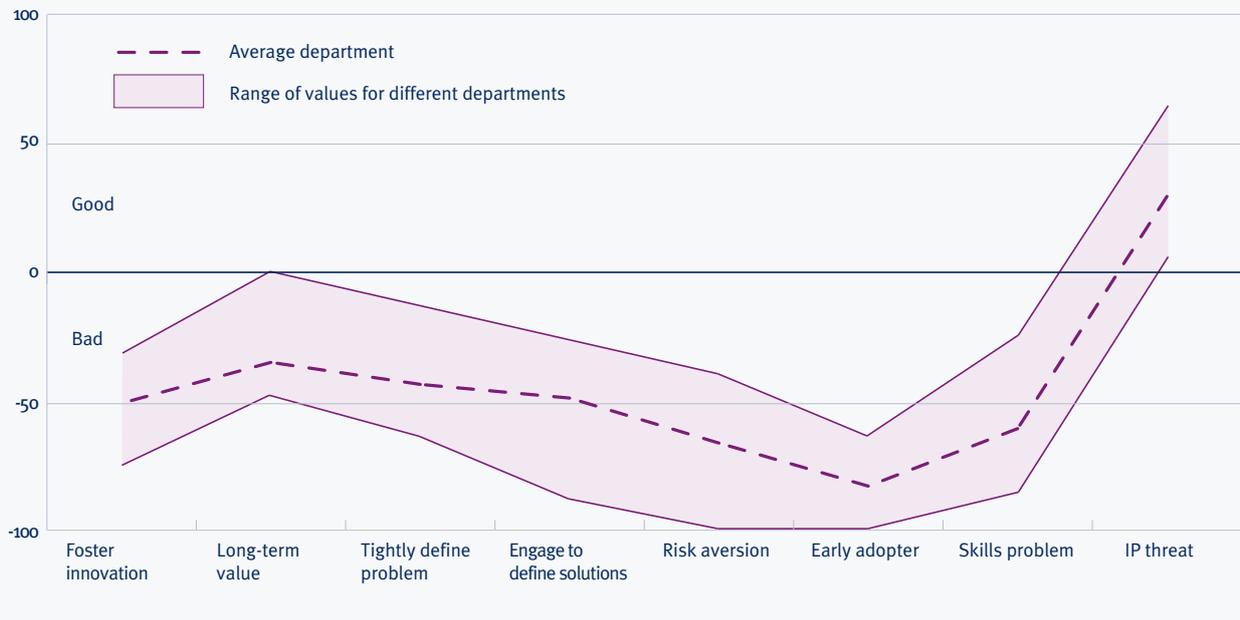


EXHIBIT: 7

Departmental rank order on procurement issues from the innovation survey

Rank	Green = OK/fair	Amber = average	Red = poor
Departments	DCA HMRC MOD	ODPM, DTI, HO, DoH, Defra, DWP, DfES, Others	DCMS DfT DfID
Balance score range for each band out of a possible range of +800 to -800	-301 to -309	-331 to -389	-412 to -429

DWP and HMRC. For these, the responses from just a few firms can significantly influence how the department is rated in terms of its procurement processes. In turn, this may lead to the departments being given more extreme overall scores; therefore results for them need to be treated with more care. Indeed, the DCA, HMRC, DCMS and DfID do all fall towards the ends of the spectrum and their positions are sensitive to individual responses. For example, the DfID rates at the bottom with a score of -429, but a positive shift of only 10% in the net scores for each proposition, which might be achieved with one additional company reporting a more favourable set of experiences, would move the department to an above average position in the ranking.

Outside of these low response departments we can have rather more confidence in the findings. The relatively small

sample sizes still make it difficult to assign a precise rating order that is statistically significant, but departments can be grouped into broad bands (Exhibit 7). The simple red, amber, green banding is based on the average net score over the eight propositions:

- Green represents an ‘OK’ or ‘Fair’ performance with an average net rating of -40% or better for each proposition
- Amber represents an ‘average’ performance—with a net of between -40% and -50% on each proposition
- Red indicates a ‘poor’ performance with a net balance of -50% or worse in each area covered.

Put another way, and taking account of the roughly 20% of responses to the propositions that are neutral, red indicates where at least four times as many companies report negative as opposed to good experiences, and green indicates when this figure falls to three times as many or less.

Remember, that this is a relative banding and that, ideally, we would only wish to assign a 'good' rating to departments with a high net positive score. The banding, for the moment at least, has to deal with a range that is only in the negative. With time, however, we would hope to be able to shift the band boundaries to the positive as departments improve their procurement interactions with business.

Conclusions from the innovation survey

The government has given high-level support to the idea of improving its performance on procuring innovation and has published best practice guidance as part of the process to effect change. The government also recognises that procuring innovation can have a strategic knock-on effect, encouraging business to invest in innovation activities that are likely to be of benefit to the wider economy in the long term.

Our findings show that significant improvements are required before the government will be able to realise either of these twin aims and that business is looking for government to take action.

Currently, public procurement practices are having a net detrimental effect on firms' own innovation activities. This is a concern that should be addressed as a matter of urgency. Respondents highlighted the potential for using procurement more strategically to stimulate innovative firms as one of the top four actions government should take to improve its overall support for innovation: 61% said yes, 17% no and the rest were neutral.

We have studied eight components of public procurement in more detail, from skills to risk aversion, and only on IP issues does the government record a reasonable performance. In all other areas a significant majority of firms report problems. Problems with departments not acting as early adopters of ideas and issues related to skills and risk aversion appear to be the areas needing the most urgent attention.

Overall, the problems identified are similar in scale for interactions with each government department and no department ranks above, or even near to, zero (representing neutral) on our net rating scale. However, of the major government departments studied for which we have reasonable interaction data, the MOD comes out slightly ahead of the rest, with the Department for Transport (DfT) rather behind the field.

International experience

The potential importance of using public procurement in a strategic way to foster innovation is starting to gain momentum across Europe and elsewhere. Either as a broad strategic process as in the UK (which is now becoming a model for others to follow), or focused around particular issues such as sustainability and 'green' procurement, or where information and communication technologies are concerned.⁹ In the US the more focused approach to innovation development and procurement has a long and successful history with the Defense Advanced Projects Research Agency (DARPA).

EU perspective

At the EU level, several significant reports have been published over the last year as part of work for the European Commission: an expert group report on innovation and public procurement,¹⁰ a Fraunhofer Institute review of issues at stake¹¹ and a report on the pre-commercial procurement of innovation.¹² Throughout these, many of the same key issues are raised that have been identified by the OGC in the UK. For example, the importance of training procurement personnel, managing risk effectively, improving opportunities for SMEs, early engagement with suppliers, consideration of whole-life costs, and communicating long-term needs with enough lead time for firms to respond.

The Fraunhofer Institute review is the most extensive, based around a series of detailed case studies. Comparing different countries, it concludes that procurement of innovation can be fostered in centralised systems, and in more diffuse systems where good networks exist to build critical mass and momentum through co-operation and co-ordination. The report breaks down the procurement process into five typical stages and identifies the main practical lessons for success in each, observing that the procurement process is a systemic one: what you do at the start will have impacts throughout the process and on what is delivered at the end.

Exhibit 8 (page 10) summarises the main Fraunhofer Institute findings. The lessons learned are generic and can easily be applied in the UK context. For example, the CBI emphasised similar points on the importance of improved up-front 'needs analysis' in its recent report on NHS procurement.¹³

The pre-commercial procurement report introduces the concept of an end-to-end procurement process where, 'the public procurer is prepared to share benefits and risks with industry in order to exploit the results of research, moving research developments from their early stages to tested pre-commercial products ready for commercialisation'. Their suggested approach falls within WTO and EU rules filling a gap between R&D (where ideas are put forward and explored) and procurement (where workable solutions are

EXHIBIT: 8
Summary of findings from the Fraunhofer Institute review of innovation and public procurement

Procurement stage	Lessons
1. Identifying requirements and ensuring user readiness	What do you need? Identify requirements carefully. Capturing the end user perspective is critical to success.
2. Gathering market intelligence	The procuring customer must be intelligent, with good technical knowledge to evaluate potential solutions and understand what the market can deliver (or should be able to deliver in the future).
3. Tendering process	Strike a balance between specifications that are tight enough to provide clear guidance, while broad enough to allow for alternative solutions. Make a conscious decision about who will bear the risk, or rather how risk will be shared. Consider unbundling complex projects or where the provider may lack experience. Use pilots.
4. Assessing tenders and awarding contracts	Use expert committees with multi-disciplinary skills.
5. Managing contract delivery	Use this phase to gather information and learn lessons for future projects: continue engagement between customers and suppliers.

required). Again, the report stresses the importance of developing technologically demanding customers and the wider benefits (including economic benefits) that can flow from being a first customer for innovative products and services.

Currently the EU is significantly behind the US and Asia where, the report notes, pre-commercial public procurement of innovation is often used strategically to provide a robust home market for domestic firms facing strong international competition. This is particularly true in the area of defence in the US, where an integrated approach to innovation has had a significant impact on both the military and the economy as a whole.

The DARPA model in the US¹⁴

DARPA was set up in the US in 1958 with a clearly defined mission: 'to prevent technological surprises to the US'; and now also 'to create technological surprise for our enemies'. DARPA aspires to 'technological superiority', not just in military capability, but also in the technological and commercial position of the US. This goal is driven by Congress and wider government as well as the Department of Defense.

As a result, DARPA is aggressively mission-oriented. It has a budget of more than \$3bn a year, but only limited overhead costs, 240 staff and none of its own laboratories to support. DARPA is semi-autonomous, with special authority in areas including recruitment, allowing it to operate flexibly and at arm's length from government. One of the keys to its success is that it only recruits the very highest calibre of programme managers and only for relatively short periods of four to six years, to maintain an entrepreneurial atmosphere and the

flow of ideas. Programme managers are technically outstanding and entrepreneurial, keen to have an impact during their appointment, and are more willing to pursue high-risk projects in a way that permanent managers might not.

DARPA co-ordinates and funds projects, bringing together experts from industry, academia and government laboratories to address strategic technology issues. With its focus on defence, it conducts foresighting work to imagine what capabilities military commanders might need in the future. It then seeks to develop these to realisation with its partners as rapidly as possible.

DARPA positions itself to bridge the gap between far-sighted basic research typically found in academia and the more incremental technology development that is directly funded by the military. It focuses on radically innovative and high-risk projects and has been responsible for such novel developments as stealth technologies and unmanned aerial vehicles. The most striking example of its commercial success is ARPANET, which has now evolved into the internet, and the dominant position that the US holds in the technologies and services that it supports.

DARPA maintains very close ties to individuals in the highest levels of the military which enable it to create tight links between need identification and technological opportunity, and follow this through with research, development, testing, demonstration and final pull-through ready for procurement. Since its inception it has been one of the main driving forces behind radical technology developments for the US military and the US economy.

The US government has developed a DARPA-like body in the field of homeland security and is considering a similar body for energy ('to reduce US dependence on foreign energy sources by 20% over the next ten years'). This shows that the DARPA model can also be applied to other areas—providing a mechanism to accelerate innovation and technology through to public procurement and use.

What needs to happen in the UK

The UK already has some advantages over the EU in terms of the government's high profile commitment for using public procurement in a way that also fosters business innovation. But there are several areas where the UK can improve, in particular in terms of ensuring that the message is acted on appropriately at the operational level. The UK also needs to consider how it could act more aggressively and strategically to ensure that it can get ahead and stay ahead in developing and exploiting novel solutions.

We make the following recommendations to government that will help move the UK further along the path that is already being laid, starting with a significant strategic development:

1 Develop an 'ARPA' for the UK

To make effective operational-level improvements, sometimes it is also necessary to take new approaches to strategy that can generate systemic change. The UK should learn from the DARPA experience in the US and take up the challenge of engaging in pre-commercial procurement. It should do this proactively, to position the UK as a place where innovation is the norm not the exception. An opportunity now exists to do this by re-positioning the Technology Strategy Board (TSB), but to be effective the TSB would require a radical overhaul to ensure it embraces the features that have made DARPA such a success.

A key role of an enhanced TSB should be to partner major government procurers and facilitate their engagement with the innovation process, so that they can become early adopters of new ideas.

We envisage an enhanced TSB operating at arm's length from government and taking up a pivotal leadership and co-ordination position for innovation in the UK—linking government departments, research councils, regional development agencies and other public bodies together to address common purposes. It should co-ordinate the government's foresight activities, identify and then sponsor challenging areas of research and technology development that could address government needs, and pull through successful projects into public procurement.

In short, the TSB should become an 'ARPA'-type body (Advanced Research and Projects Agency) modelled closely on DARPA, but covering all areas of activity, not just defence. A key element of the TSB's mission must be the capture of economic and commercial benefits from the development and adoption of technologies and innovation.

The focus of this enhanced TSB should be on challenging innovation, science and technology priorities that are long-term, potentially high-impact and are of practical national (perhaps even global) relevance. An essential element will be for the challenges to have buy-in from government customers so that as solutions are developed they can be taken straight through into appropriate procurement rounds.¹⁵

The enhanced TSB will need to seek innovation from all potential sources with participation in projects open to the best of industry and academia. It would initiate projects and maintain programme and budgetary control, but as projects approached the early demonstration phase they would need to transfer into ownership by the appropriate procurement agent in the mainstream department.

As with DARPA, the enhanced TSB should look for radical, not just incremental, innovation. This will require a high degree of risk and potential for project failure to be managed effectively. The enhanced TSB should take on many of these burdens from sponsoring customers, and its budget should reflect this. It should also be ruthless in reviewing the progress of projects to identify those that are unlikely to meet the innovation needs of procurers so that funds can be redirected. It will be essential for the enhanced TSB to attract the highest calibre project managers, those who are technically outstanding and entrepreneurial—not simply to inherit staff.

To achieve pull-through into procurement, the enhanced TSB will need to be overtly mission-driven, supporting successful projects through technical feasibility to prototyping and advanced demonstration. This approach would enable the creation of complete value chains, from innovators through to manufacturers and end service providers, and encourage universities and industry to work more closely together.

In practice, we envisage the TSB partnering government bodies, companies and research organisations. It should provide up to 50% of funding for pre-competitive research and development projects—which could then be matched by sponsoring departments—and provide knowledge and expertise to create an intelligent and focused link between supplier and user.

To do all of this, and ensure a critical mass of activity, will require a significant budget. Currently the TSB oversees funds of approximately £375m over four years. A recent

report for the MOD¹⁶ recommended creating a defence-specific ARPA in the UK funded at £120m per year—about 25% of the MOD research budget. Following this pattern, it would be appropriate for the enhanced TSB, with its much wider remit, to have funds equivalent to 25% of the UK's £2.5bn science budget.

This would give the enhanced TSB approximately £625m per year—making the new body similar in scale to the Engineering and Physical Sciences Research Council. This should in effect be doubled through joint activities with major research spenders and procurers such as the MOD, ensuring that the enhanced TSB becomes a cornerstone of innovation and technology development activity in the UK.

2 Introduce innovation incentives and stretch targets in public procurement

It is apparent that there can be a disconnect between high-level support for change and action on the ground. At the more operational level of public procurement a challenge is to ensure that all public customers—individuals as well as the bodies they work for—are willing to explore the potential of innovative solutions.

This willingness to engage and explore has to be nurtured and visibly rewarded if practice is to change with time. Individual and group performance and incentive systems must therefore be aligned to encourage this. For example, using longer and split time frames for evaluation: one year for small-scale performance awards, three or five years for major awards and promotion. And these measures should apply to all involved in the procurement process, including finance units and their staff where they are responsible for procurement budgeting. This would support staff in seeking more innovative solutions, recognising that they may take longer to develop, or present more of a challenge to implement, but ultimately are likely to have a more significant impact.

To be effective, public customers also need a commonality of purpose and to be set appropriate, but stretching, targets on which their performance can be judged. The government should demonstrate that it is willing to raise the bar when purchasing products and services at all levels—not just on major contracts—by setting targets that will require innovation and then commit to purchase solutions that meet requirements even if they are the first customer.¹⁷

Target setting and innovation incentive structures should be endorsed by the NAO to ensure that there is still appropriate governance of public funds and to emphasise that it is the longer-term value-for-money benefit that will be rewarded, and can take precedence, when procurement decisions are made.

The extent to which innovation targets have been met by government departments should be reported by ministers on an annual basis. Innovation reporting and targets would then flow down to the operational level in the form of training, culture change actions and stretch goals. The objective should be that, over time, departments would be proud to report on instances where their UK-based suppliers have gone on from early adopter government contracts to take their new products and services to national or global market leadership.

3 Make outcome-based procurement a reality

In line with other commentators, the CBI advocates the setting of outcome-based specifications in public procurement wherever possible. This is already highlighted as good practice in OGC guidance. The task now is to make it a reality on the ground.

To do this will require a change of approach from those involved in procurement and, for some, the change will be significant. Procurers will need to look at their needs systematically and consider what outcome they wish to achieve, not what infrastructure, facilities, technology, products or services they might think would be required. Fully understanding what has to be achieved and, importantly, what could be achieved, before entering into procurement will be critical.

Procurement staff will need to be trained and be given appropriate on-going support to think differently, and creatively, about needs and potential solutions. In effect they must become opportunity translators, identifying the real needs of the organisations they represent and presenting these to the provider market for consideration as early as possible. They will also require specialised technological and risk analysis skills to be able to compare and judge the merits of what may be very different potential solutions on offer.

Improving dialogue between public buyers and suppliers is vitally important eg through suppliers' conferences, network development and other initiatives to foster early supplier involvement. Dialogue also works both ways and procurers will need to be open to ideas presented outside of normal procurement rounds.

The Particle Physics and Astronomy Research Council (PPARC) provides a good example of supplier dialogue. PPARC relies on novel technology developed by others to underpin the science research that it funds. In order to ensure that appropriate technology is available when required, it sets out a roadmap covering what it wishes to do, often five to 15 years ahead. It can then work with potential technology

suppliers to develop robust, but innovative, solutions to meet its science needs over this time.

In another area, the Defence Industrial Strategy White Paper published in December 2005¹⁸ highlighted the value of engaging in partnering activities to achieve rapid acquisition of innovation and better value for money. This is a practical example of early engagement where needs can be discussed and problems can be set for potential suppliers to address through innovation.

4 Procurement on the basis of value

One of the main criticisms raised in our exploration of the innovation and procurement topic was that public customers usually still favoured solutions offering the lowest up-front cost. Training and incentive structures that encourage innovative thinking will help to institute change, but purchasing on the basis of value rather than cost requires a major shift in emphasis. It is a shift that must be supported throughout the audit and governance process for procurement. It may entail additional research in order to fully understand costs and value and it is likely to require more flexibility in financial budgeting.

To assess the whole-life costs of a product or service (possibly including environmental as well as financial costs), may require a lifecycle analysis to be conducted. For a product which also has an impact on on-going running costs, the whole-life operational cost should also be considered. There must then be a system which allows flexibility between different funding categories to ensure that value can be captured effectively. For example, flexibility between operational and capital budgets for a purchase that will reduce long-term operational costs, flexibility between environmental and other budgets for solutions that address sustainability issues.

As the Fraunhofer review noted, care is needed in identifying requirements and the end-user perspective of value must be captured early on in the procurement process too. The following hypothetical example illustrates where a real understanding of end-user value could be important in determining procurement strategy. Example: a hospital wishes to process all of its standard blood tests within two hours to reduce average outpatient waiting times.

This is the outcome it wishes to achieve. But the solution to be procured could be any one of several options, depending on how radical the hospital wishes to be—eg more standard blood testing equipment and staff to increase testing capacity, new technology allowing multiple types of test to be done

in parallel, or perhaps even home-based technology to allow patients needing regular tests to do it themselves and email in results. The latter has the potential to cut outpatient waiting time to zero, further improving patient experience. Clearly, the latter option also has wider economic benefits that will not be captured by the procurer—eg the half-day off work saved by the patient not having to travel for a hospital-based test. This improved end-user experience and overall economic impact should be recognised and valued as part of the procurement process.

Even where an outcome-based approach is taken, much will depend on the risk and innovation appetite of the public customer and how open they are to the possibility of novel solutions. Engaging with users in the above example could establish the feasibility of the home-based option and what would need to be done to make it work. Procurers also need access to tools that will help them understand and place a value on factors such as whole-life costs, end-user experience and economic value: these need to be developed as a priority and must be accepted for use across the public sector.¹⁹

5 Take a rational approach to IP rights

Our survey highlighted IP issues in a relatively positive light. Nevertheless IP problems are still a concern to some of the major suppliers to government and may stop others from seeking to become suppliers. High among the concerns are that public customers often wish to hold onto IP rights for innovative work that they have funded, whether or not they are in a position to exploit this work further.

There are parallels here with the stance taken over IP rights on business-sponsored research undertaken by universities. Following the Lambert Review,²⁰ a wide range of options on IP sharing and ownership are available, taking into account levels of collaboration and which partner is most able to develop and further exploit the IP. The same principles should be applied to business innovation with government customers in that the party conducting the work (the company) should own the IP, but options for IP sharing with the funder should be available for negotiation.

Options for adapting model contracts and guidance material developed by the CBI and others in response to the Lambert Review should be considered to address IP concerns in procurement.

6 Learn and adapt

Those involved in public procurement must have the opportunity to share and learn from best practice. According to our survey, the MOD may be among the departments with the most positive lessons to share at the moment.

Wide networks should be set up to pick up on and communicate experience of procuring innovation. Opportunities should also be taken to learn good practice from the best in the commercial world, for example by setting up programmes to second purchasing staff into business or other areas of government procurement for short periods of time.

Formal project evaluations should be conducted as standard practice and findings should be acted on. As highlighted by the Fraunhofer review, the contract delivery phase should be used to continue engagement between customer and supplier so that lessons can be learnt for the future. This should be done whether or not the procurement process has been successful.

Based on the findings of our survey, particular attention must be paid to the experiences of smaller firms engaging or wishing to engage in public procurement. Smaller firms (with up to 500 employees and/or turnover of less than £500m) make up the bulk of firms involved in public procurement and also the bulk of firms reporting the strongest concerns over current practices. Public customers must be more aware that problems with skills, bureaucracy, IP and other factors are likely to be felt more keenly by these companies. Options for engaging such firms in the procurement process more efficiently should be explored to ensure that they are not disadvantaged.

Overall, our survey suggested that there was significant room for improvement in public procurement in all areas, central and local. As procurers adapt to the changes recommended in this brief, progress should be reported and should be cross-checked with follow-up surveys of provider experience. We recognise that more detailed information may be required from a formal government survey, but our findings provide at least a general baseline from which progress might be assessed.

Summary

In summary we call for two significant changes of approach to public procurement that would be transformational in helping the public sector maximise the value of its investments, become an early adopter of new ideas and catalyse business innovation activity. The two changes are:

- Establish the Technology Strategy Board as a fully resourced 'ARPA'-type body for the UK, accelerating the development of technology and working with government customers, business and universities to pull innovation through to procurement
- Invest in significant business transformation for public procurement, bringing in new skills, training procurers at all levels, placing outcome-based and whole-life value approaches at the heart of operational activity and devising targets and incentive structures to reinforce this change of culture.

Ultimately, these changes also have the potential to be transformational in terms of business competitiveness and the competitiveness of the UK economy as a whole. The opportunity is there, the challenge is to make it happen.

Annexe 1

Key findings from the CBI/QinetiQ innovation survey 2005

- Companies report an advantage when conducting innovation work in the UK: a net positive balance of 21% (38% advantage, 17% disadvantage).
- Ninety-three percent of respondents awarded a score of at least 7 out of 10 when asked to rate the importance of innovation to their company's success.
- Two fifths stress that their company has a strong focus on externally-facing innovation related to new products and services; one fifth emphasise their strong focus on internally-facing innovation related to new processes and models; the remainder focus equally on both.
- On average companies spend 12% of their turnover on innovation, in a ratio of 3:1 externally to internally-focused.
- Almost all innovation activity is funded through profits and funds generated internally. Only a fifth find it easy to access external finance for innovation.
- A significantly higher proportion of companies now report that they specifically train managers to identify and develop new ideas (67%, compared to 20% in 2002) and monitor and learn from failure on innovation projects (79%, compared to 62% in 2001).
- Those factors seen as most critical to innovation success are understanding the market—having the right innovation at the right time, and having a workforce that is able to identify, develop and adopt new ideas.
- Only two fifths (41%) agree that investment in R&D is the best indicator of innovation activity. Over a half (52%) agree that the social sciences are as important to innovation as the other sciences and technology.
- Nearly all companies in the survey collaborate with external specialists to access knowledge, skills and ideas—85% do so with other companies in the supply chain, while around three quarters work with either universities (77%) and/or consultants (75%). Collaboration rates have increased from our previous surveys.
- Collaboration between business and universities on innovation-related work is increasing, yet many companies say such collaborations are not their most effective.
- When assessing the impact of government procurement on business innovation, substantial proportions indicate that current practices hinder business innovation.
- Overall, the impression of companies is that current procurement processes not only fail to foster business innovation but also fail to allow government to maximise long-term value from its investments.
- Business tax and employment legislation are the key areas of government influence hindering innovation—respectively, 51% and 45% of respondents rate these as a hindrance.

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Data

Data reported from the CBI/QinetiQ innovation survey 2005 was collected by MORI through a poll of CBI members. In all, 162 companies and 11 universities responded to the survey, which was conducted by telephone in the autumn of 2005. Data interpretation was by the CBI and MORI.

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