Department for
Business, Energy
& Industrial Strategy

Executive Summary

Ipsos MORI (in association with George Barrett) was commissioned in May 2016 by the Department for Business, Energy and Industrial Strategy (BEIS), to undertake a process evaluation of Government funded civil aerospace research and technology (R&T) funding. This funding is administered via the Aerospace Technology Institute (ATI), by BEIS and Innovate UK. The evaluation involved collecting and triangulating programme management information, secondary data, interviews with 21 policy stakeholders and representatives from seven applicants to the ATI and the preparation of 20 case studies of project funded through the programme (based on a further 52 interviews). This brief summary brings together evidence from across these research strands. The main report includes further detail that links these different evidence sources to the assessments made.

Overview of Aerospace R&T funding

The ATI programme was established in 2013 and is a partnership between the civil aerospace industry and government aiming to sustain and grow the sector through targeted investments in industry led R&T projects. The programme was backed initially by £1.05bn of public funding (increased by a further £900m in the 2015 Spending Review) and matched contributions from industry. While the industry took time to respond to increased availability of funding, little difficulty is now being encountered in committing the available budget. Substantial budget pressures are also foreseen over 2017 due to expected major programmes of aerospace R&T, and the key challenge will be maximising value for money from the remaining budgetary headroom.

Strategy development and industry engagement

The evaluation shows that the ATI has been effective in engaging significant organisations in the aerospace sector in the process of setting a Technology Strategy to guide its activities. Feedback from those engaged by the ATI was largely positive, though some applicants were unclear how strategic priorities were ultimately decided (an issue that could be mitigated with greater transparency with respect to decision making). Evidence from across the evaluation also suggests the ATI has been less focused on engaging SMEs. While programmes such as NATEP mitigate this to some extent, there may be scope to open the programme further to potentially disruptive ideas and technologies.

Application process

The process of applying for funds through the SRC process was considered by applicants to be appropriate and proportionate in relation to the level of funds involved. Verbal guidance provided both by the ATI and BEIS in support of the application process and later VFM assessment was thought by applicants to be of high quality. There may be some opportunities to remodel the application process to improve its simplicity and effectiveness. This could include the development of an application form for the SR1 process, refinements to application forms to collect the data needed for the Value for Money (VfM) appraisal of proposed projects, and consolidating existing guidance.

Appraisal, assessment and project selection

Resources have been allocated on the basis of up to four assessments of the strategic, economic, technological and managerial merits of project proposals. These comprise of:

- **Strategic Review Committee:** A Strategic Review Committee made up of representatives of the ATI and BEIS assesses an outline (SR1) and a second more detailed proposal (SR2)[1]. Observers of the SRC suggested that discussions gave detailed scrutiny to important aspects of project proposals, though historically, issues relating to value for money were given less prominence.

- **Value for money assessment:** Historically, applications successful at SRC progress and with a grant ask exceeding £10m were subject to an assessment of VfM by BEIS. This resulted in the allocation of £617m of public funds to projects without detailed scrutiny of the economic case for funding[2]. Processes have been recently strengthened, and all projects approved at SR2 are now subject to a VfM assessment. The VfM framework is largely fit for purpose and its application is enhanced by using empirical evidence gathered by BEIS on the depth of the UK supply chains to help gauge the strength of R&D spill-overs.

- **Independent assessment:** Applications approved by the SRC are also subject to an Independent Assessment administered by Innovate UK. The process was regarded as a thorough technical review, and an important independent check given the role of the ATI in both prospecting and approving proposals.

It takes an average of nine months between the submission of the SR1 application and the signature of the final Grant Confirmation Letter. Some applicants noted that if these timescales could be shortened it would materially increase the appeal of ATI funding compared to that offered by other European governments (although no applicants suggested that they took projects overseas as a result of these timescales). The time elapsing between the decision of the SRC and the issuance of the Conditional Offer Letter is the largest component of the nine-month timescale.

Securing Ministerial approval can extend timescales for some projects and it may be difficult to find a way of insulating the programme from these types of delay. However, there is scope for accelerating timescales by running the Independent Assessment in advance of the SRC meeting. It is recommended that the SRC only consider proposals that have passed the Independent Assessment and the BEIS VFM assessments. This would retain important safeguards on the independence of the process (by preventing the SRC overturning the outcome of the Independent Assessment). There is also some duplication across the different assessment processes, and efficiency gains could be found by increasing the focus of each on the circle of competence of those involved.

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[1] Note that Innovate UK and HMT also join these meetings as observers

[2] All proposals have received scrutiny of case for funding through the Innovate UK Independent Assessment process. While this includes an assessment of economic considerations, this is not as detailed a process as the BEIS VfM assessment

Greater appetite for enforcing penalties for failing to return the agreement within time limits specified by Innovate UK may also accelerate timescales.

Due diligence, Contracting and Monitoring

Due diligence processes are thought to be effective in maximising the share of the R&T spending associated with projects is delivered within the UK. Safeguards are also now in place to prevent applicants circumventing these checks by requesting contract variations at an early stage of the project delivery process. Monitoring officers did suggest that many applicants prepare initial project plans and costs that incorporate large budget unexplained rows, though Innovate UK have made scrutinising these costs a greater priority in more recent batch funding processes.

The benefits associated with project proposals will typically arise after contracted projects have come to an end. The contractual framework within which projects are delivered commits applicants to the exploitation strategies that they develop and agree with Monitoring Officers. While new annual and project close out arrangements provide useful metrics of project progress, the absence of post-completion monitoring of project outcomes means that the information needed to police the behaviour of applicants is unavailable. Innovate UK have identified plans to develop information in this area, and it will be important for them to work in partnership with BEIS and the ATI to fill this gap.

Interdependencies between projects

Many of the projects supported by the ATI form part of wider programmes of R&T creating interdependencies between individual projects (partly due to limits on project size set by the State Aid regulations). While ATI engagement with the sector has given the SRC a strategic understanding of applicants' R&T portfolios and plans, the treatment of individual projects as discrete work packages creates challenges for appraisal and monitoring (as outcomes and risks will be often determined by the outcomes of parallel programmes of work). BEIS has introduced a 'portfolio' approach to assessing VfM at the level of overall R&T programmes. It is recommended that the ATI, BEIS and Innovate UK should consider whether it would be possible to adopt a similar approach in other processes (for example, organising monitoring at the level of a portfolio rather than individual projects).

Closure of Feedback Loops

The effectiveness of several processes could potentially be enhanced if it were possible to:

- Undertake the VfM appraisal in a way that builds on the judgement of Independent Assessors, for example, to test the credibility of claims about the novelty technologies that feed into the additionality case.

- Formalise the process through which project Monitoring Officers receive information regarding the issues and risks identified through the SRC, VfM, Independent Assessment and due diligence processes to ensure that they are able to most effectively help applicants mitigate these risks.

- Revisit VfM assessments in the event of any major rescoping of projects to ensure that projects continue to represent as strong VfM as those currently being approved.

- Use evidence from previous project assessments and delivery to refine and improve the parameters used in VfM assessment and to inform SRC decision making.

Lessons from project delivery

The projects funded are highly diverse but are aligned closely to the ATI Technology Strategy. The Early-ATI projects reviewed appear to have been associated with what were initially very broad objectives – sufficiently broad that large changes on some projects have been accommodated without needing to revisit these objectives. Case study projects funded through the SRC process appear to have had more specific objectives making it more straightforward for monitoring officers to develop Level 2 plans and gauge success. A larger share of funds appears to have reached projects at earlier stages of development than would be expected given the focus of the programme on projects at TRL4 to 6.

Projects appear to be making progress towards the commercialisation of the technologies involved. However, there appear to have been some delays of some form on a large proportion of projects. In many cases, projects remain some way from completion and expect to make significant further progress along the TRL scale and towards the realisation of commercial outcomes. However, many projects remain highly dependent further de-risking the technology concerned ahead of upcoming customer decision points.

The most important factors identified by applicants as justifying public support for their projects relate to the overall distance that projects are from the market and the large scale of funding required. Threats that projects might have progressed outside of the UK without support were also identified, but appeared more important at the beginning of a major R&T programme, rather than in the delivery of incremental improvements to existing technologies. Difficulties in securing or funding the involvement of collaborative partners also appears to be an important consideration, though often such issues may influence the scope rather than the overall viability of projects. Scope for knowledge spill-overs appear to be less central to the decisions of applicants relative to what the VfM assessments would suggest. However, applicants may not be well placed to comment on this issue given the early stage of delivery of many projects funded.

In some instances, it appears that aerospace companies may be using ATI funding to supplement their overall R&T budgets, with examples of projects identified that would have been likely to have progressed without ATI support (with the risk of offshoring apparently greatest at the beginning of a major R&T programme). The implication is that ATI funding is in some cases unlocking a set of marginal projects, but not necessarily those that were approved through project selection processes. Project approval processes are sensitive to this issue, with conservative assumptions regarding deadweight adopted in the VFM assessment, and underlines the importance of looking at the broader strategic context for proposed R&T projects, and undertaking applicant level monitoring.

Summary of Key Recommendations[3]

#3 ATI and BEIS should give further consideration to the risk that the dominant funding mechanism (the SRC process) may result in disruptive technologies with potentially very large returns being overlooked.

#6 The ATI should look for opportunities to include a set of more specific and focused areas of interest within the next iteration of the Technology Strategy.

#4 ATI should consider developing an application form for the SR1 process, and accompanying guidance that specifies in greater depth what is expected from applicants and explains what information is and is not necessary.

#18 BEIS, ATI and Innovate UK should consider the feasibility of making further use of provisions in contracts to insulate the public sector from the risk that IP developed through the ATI is exploited overseas (e.g. penalising grant beneficiaries that do so).

#19 These efforts can only be policed if it is possible to monitor the post-completion outcomes associated with ATI funded projects. This could draw on the provision in contracts to undertake further monitoring for a period of five years after project completion.

#11, 16, 17, 23 ATI, BEIS and Innovate UK should consider how far there is scope to move away from the treatment of ATI projects as discrete projects through the delivery process to a model that the recognises their interdependencies (resulting in their treatment as a package of projects or work programme).

#14, 21 ATI, BEIS and Innovate UK should consider the scope to establish a set of feedback loops to further support the sharing of knowledge across the programme.

#24 Duplication and delays in the assessment of applications could be minimised if proposals were subject to both the VfM assessment and the Independent Assessment ahead of the SR2 meeting.

[3] Recommendations in the Executive Report retain numbering from sections 3 to 8 of the full technical report and in some cases do not follow natural order

Executive Report

Ipsos MORI (in association with George Barrett) was commissioned by the Department for Business, Energy and Industrial Strategy (BEIS) to undertake a process evaluation of Government funded civil aerospace research and technology (R&T) funding in May 2016. This funding is administered via the Aerospace Technology Institute, BEIS and Innovate UK. The report provides an assessment of the effectiveness and efficiency of processes adopted to administer ATI funding and includes a set of recommendations[4] for consideration.

Evaluation Objectives

The objective of the evaluation (as defined in the Invitation to Tender) was to:

- Generate an understanding of the efficiency and cost-effectiveness of all ATI internal processes and make an assessment of this aspect of the programme's value for money.
- Gain an insight into the barriers to the programme's implementation and understand of the ways in which projects are looking to realise their longer-term outcomes.
- Provide an informed set of recommendations to maximise the net benefits to the taxpayer and participating companies.

Methodology

The evaluation has involved collecting and triangulating evidence from a variety of sources including: application, appraisal, independent assessment and monitoring data; secondary data sources such as the patent record; interviews with 21 policy stakeholders in the delivery process; and interviews with representatives from seven applicants to the ATI. Additionally, a set of 20 case studies of have been undertaken. Fifteen of these focused on individual projects and involved a review of management records and depth interviews with monitoring officers and project partners (52 additional interviews were completed to prepare these case studies). The final set of five case studies brought together all of these different sources of evidence for analysis at the level of individual applicants. The interpretation of evidence has been guided by a process evaluation framework agreed with the Evaluation Steering Group in June 2016.

Overview of Aerospace R&T funding

The Aerospace Technology Institute (ATI) was established in 2013. The ATI is a partnership between industry and government that aims to sustain and grow the sector

[4] Recommendations in the Executive Report retain numbering from sections 3 to 8 of the full technical report and in some cases do not follow natural order

through targeted investments in industry led R&T projects. The programme is backed initially by £1.05bn of public funding (and increased by a further £900m in the 2015 Spending Review), and matched contributions from industry. The objectives of the ATI programme (as set out in the Business Case[5]) are to:

- Sustain and grow the competitiveness of the aerospace industry in the UK and co-ordinate R&T in the sector (including through forming strategic relationships with industry, academia and Government).

- Raise the UK's international profile in the industry.

The delivery of these objectives are supported by the development of a Technology Strategy, an industry led expression of the key technological priorities for the sector over short, medium and long term time horizons.

While the ATI inherited funding obligations from precursor programmes, most public funding for aerospace R&T is now allocated through a Strategic Review Committee (SRC) process introduced in September 2015. This two-stage process involves the preparation and assessment of the strategic, economic and technical merits of an initial outline application for funding and, for those passing this first stage, a more detailed application (which now includes an ex-ante economic appraisal led by BEIS). Proposals passing the second stage are subject to an independent assessment in line with Innovate UK's standard procedures before Ministerial and (if the grant request is sufficiently large) HM Treasury approval. All projects funded through the ATI are subject to due diligence, contracting and monitoring process in line with Innovate UK standard procedures.

While the aerospace industry took time to respond to the increased availability of funding for R&T, little difficulty is now being encountered in committing the available budget for aerospace R&T support. Substantial pressures on the R&T budget are foreseen over 2017 to support major programmes of aerospace R&T, and the central future challenge will be securing value for money from the remaining headroom in the budget. Ten applicants (typically large aerospace Primes or Tier One suppliers) account for over 60 percent of the resources that have been allocated (broadly reflecting the industrial structure of the aerospace sector). The evidence suggests that there have been some difficulties encountered in keeping the delivery of R&T work programmes on track. Around one third of the project portfolio have drawn down grant expenditure less rapidly than originally anticipated and are deemed to be facing high risks to their timescales and costs by Innovate UK monitoring officers.

Strategy development and industry engagement

The ATI appears to have been effective in engaging the most economically and technologically significant organisations in the aerospace sector (across industry and academia) in the process of setting a market-aligned Technology Strategy to guide its

[5] BIS (2013). Aerospace Technology Institute: Business Case.

activities. High engagement with traditional aerospace supply chains may also help explain the success of the programme in allocating a large volume of R&T funding.

While feedback from those engaged by the ATI was largely positive, operational improvements have been identified that could potentially be realised as the organisation matures. Some applicants raised suspicions regarding how far the strategy development had been 'captured' by their competitors. An analysis of the decisions made by the SRC suggests the committee does not favour specific types of technology. However, a lack of transparency in the process by which the long list of technological priorities is reduced to the shortlist presented in the strategy may represent a missed opportunity to demonstrate this. Additionally, industry stakeholders felt the ATI could do more to process the insights generated by the strategy development and feed it back to the sector in the form of thought leadership (e.g. technology road maps).

The evidence also suggests that the ATI has been less focused to date in engaging SMEs inside or outside of traditional aerospace players in this process. There is little SME participation in the Advisory Groups that lead the definition of technical priorities (though this may reflect constrained resources of SMEs to engage in such a process), and few applications have been received by SME led consortia. Of the 195 ATI projects, 137 are led by a large manufacturer, and 50 of these include one or more SMEs as project partners (though SMEs are more strongly represented in the more recent projects funded through the SRC than in Early-ATI projects). ATI activities also aim to support the development of new and stronger collaborations between UK based organisations, including SMEs. Records report that the ATI have acted to have reshaped collaborations in eight percent of applications reviewed by the SRC. This is was not, however, confirmed with research with applicants.

There however, remains a number of innovative active SMEs that have not engaged in the strategic application process either as lead applicants or project partners. There is a possibility that the programme is not reaching disruptive and valuable ideas within smaller companies that could benefit from direct funding. The ATI has recognised weaknesses in its engagement with smaller firms, and has proactively sought to better explain how firms in the supply chain can engage with aerospace R&T funding, working in partnership with the Regional Aerospace Alliances and allocating resources to a second phase of NATEP, though there may be benefits in considering whether there are other ways that SMEs could be engaged.

The Technology Strategy is also designed to support the resource allocation process. While it has been used as a tool for rejecting some applications, the strategy is considered to be broad and will be difficult to use to prioritise proposals as headroom in the budget narrows. The four value streams at the heart of the strategy arguably reflect a typology of aerospace R&T rather than a set of specific priorities, or challenges against which projects could be scored and compared (the 2016 update has mitigated this issue to some extent through its focus is on a set of specific 'gaps' rather than an assessment of where additional R&T is thought likely to produce the most significant economic impacts).

Recommendations

Recommendations

#1 The ATI should consider how far it can communicate why technical priorities were chosen in the strategy ahead of others while avoiding breaking commercial confidentiality. Greater transparency could address any perception that the resource allocation process has been captured by segments of the industry and meet the sector's apparent appetite for more thought leadership.

#2 The ATI should seek further opportunities to communicate the availability of funding to SMEs. The Regional Aerospace Alliances, other membership bodies, and Innovate UK (through its role delivering ATI CRD competitions, NATEP, and HITEA) could be potential conduits. The patent record or details of earlier Innovate UK grants for aerospace R&D may aid identification of further unengaged organisations.

#3 The ATI and BEIS should consider the risk that the SRC process may result in disruptive technologies with large potential returns being overlooked. The high demand for the two CR&D funding competitions from firms illustrates there may be potential in this respect. It may be possible to increase allocations through this instrument without compromising technical quality or relevance of projects funded if the principles of the Technology Strategy are embedded in the definition of the competition scope.

#6 The ATI should look for opportunities to include more specific and focused areas of interest within the next iteration of the Technology Strategy to aid the prioritisation of project proposals in the context of more acute budget constraints. However, it will be important to make clear this is not an exhaustive list of areas of UK capability, but areas where there is a desire to see a stronger set of proposals and that ATI funding remains open to good ideas not foreseen when drawing up priorities.

#7 ATI and BEIS should look to further clarify the relative importance of priorities identified in future iterations of the Technology Strategy. However, adopting targets for investment in specific technologies could result in a reduction in value for money from the programme if it diverts investment away from the strongest projects.

Application process

The process of applying for funds through the SRC process was considered appropriate, involving effort that was deemed by applicants to be proportionate in relation to the level of funds involved. In general, policy stakeholders regarded the application process as generating sufficiently detailed information to support the allocation of funds. Verbal guidance provided both by the ATI and BEIS in support of the application process and later VFM assessment was thought by applicants to be of high quality. However, the evidence gathered through the evaluation suggests that there may be some opportunities to refine the application process to improve its simplicity and effectiveness.

The application process also involves a pre-engagement process with the ATI in which they seek to influence the shape of project proposals to improve their alignment with the

Technology Strategy and maximise benefits to the UK economy. Though management information suggests that the ATI has influenced the development of around eight percent of project proposals to the SRC in some form, evidence gathered from applicants is less conclusive in this respect. The strength of ATI influence in shaping project proposals was explored in more depth as part of the case studies, but only a modest effect was reported by a sub-group of applicants who had been through the SRC process.

Recommendations

#4 The ATI should consider developing an application form for the SR1 process, and accompanying guidance that specifies in greater depth what is expected from applicants and defines what information is and is not necessary for an SR1 decision. Innovate UK should be engaged to ensure compatibility of data across systems. The form would optimally be based on a subset of questions from the Innovate UK application form produced at SR2 to minimise duplication of effort.

#12 BEIS, ATI and Innovate UK should consider whether it may possible to adapt application forms to better gather the evidence needed to underpin the VfM assessment at the application stage (which may reduce the level of engagement required from applicants in the process).

#13 Existing guidance relating to the application process should be consolidated to give applicants a comprehensive guide to engaging with the R&T support process (from the application process through to monitoring).

Appraisal, assessment and project selection

The SRC process involves up to four assessments of the strategic, economic, technological, and managerial merits of project proposals (as part of a two stage application process). These comprise:

- SRC: The Strategic Review Committee (made up representatives of the ATI and BEIS as well as observers from Innovate UK and HMT) provides an assessment of the strategic and economic case for public funding and makes recommendations on which projects should proceed to Independent Assessment. Independent observers of the meetings suggested that discussions at the SRC were well informed and gave detailed scrutiny to important aspects of project proposals (likely supported by the information that ATI has been able to gather regarding the wider R&T agenda of key industrial applicants). The recent piloting of an initial VFM assessment (in addition to undertaking a full VfM assessment of all projects that are recommended to proceed at SR2) in advance of the September 2016 SR2 may offer a route for the SRC to prioritise between proposals more effectively. However, not all of the projects that were recommended to progress to the next stage had been assessed

by BEIS as having the potential to pass VfM assessment[6]. There was also a view put forward by some policy stakeholders that the quality of the project management plans prepared by applicants is weaker than those typically developed by applicants to Innovate UK CR&D competitions. These plans are discussed in greater depth in Section 7. This was not a core focus of discussions at the SRC, though given the high level of delivery risk now observed in the project portfolio, greater scrutiny to this element in discriminating between proposals may be helpful.

- VFM assessment: All proposals now receive a form of VFM assessment which relates the gross public expenditure on the project to the external benefits associated with the project. While some fine tuning to the underlying methodology could be beneficial in improving the fidelity of these analyses, the framework is largely fit for purpose and its application is enhanced by using empirical evidence gathered by BEIS on the depth of the UK supply chains to help gauge the strength of R&D spill-overs. However, many projects funded through the ATI involve follow-on applications for funding, and there are questions about how effectively the VFM assessment is able to handle this (alongside issues caused by interdependent projects as explained below).

- Independent Assessment: An Independent Assessment of applications administered by Innovate UK takes place following decisions made at SR2. The process was highly regarded as a thorough technical review of project proposals by applicants, and viewed by policy stakeholders as contributing an important independent step to the resource allocation process. However, up to December 2016, the Independent Assessment had not rejected any projects recommended for funding by the SRC, leading many stakeholders to question the added value of this process(though some more recent SRC applications and some Early-ATI projects have been rejected at the Independent Assessment stage).

Protections for the public sector

The value for money associated with ATI will be maximised to the degree that the IP developed through the programme is ultimately exploited within the UK. This forms a core focus of the VFM analysis, which involves a projection of the expected economic benefits associated with individual projects (often involving a judgement as to the likelihood that R&T and production capacities would be lost overseas). Due diligence processes are also thought to be effective in maximising the share of the R&T spending associated with projects is delivered within the UK, and safeguards have been in place to prevent applicants circumventing these checks by requesting contract variations at an early stage

[6] This appears to have been particularly true for capital rather than resource projects. It is also important to note that the pilot of the new approach coincided with funding pressures ahead of the Autumn Statement, and records from the meeting identify a set of strategic and technical considerations that drove the determination of outcomes.

of the project delivery process. As such, processes are thought to be effective in retaining short term R&T spending within the UK (although the data needed to demonstrate this has not been available to the team).

More difficult to assess is how effectively the due diligence process is scrutinising the detail of project costs (helping to minimise public exposure to the risk that applicants seek to use R&T funding to subsidise unrelated activity). Policy stakeholders suggested that many applicants prepare initial project plans and costs that incorporate large budget unexplained rows, and part of the focus of Innovate UK financial due diligence is on scrutinising these costs and establishing how far they might be considered reasonable. However, consultations with Monitoring Officers as part of the case studies have suggested that unexplained budget rows can persist (with applicants refusing further discussion or to engage in scrutiny on the basis that the costs involved have been 'agreed' with Innovate UK). The study team did not receive records from due diligence as part of the evaluation so cannot comment on the extent to which these items were probed and confirmed as part of that process. Monitoring Officers also reported that the rigour with which Innovate UK are implementing post award processes has moved recently in a positive direction.

The anticipated benefits associated with project proposals (that form the basis of the assessment of the strategic and economic case for funding) will typically arise after contracted projects have come to an end. The contractual framework within which projects are delivered offers the public sector no protection against the risk that the intellectual property developed through the programme is eventually exploited overseas. This threat has been recognised by the Government, which is in the process of agreeing a MOU with key applicants that recognises their mutually beneficial relationship. However, there may be opportunities to strengthen protections either formally (through adjusting the terms and conditions set out in the Grant Confirmation Letter, though it is recognised that there may be challenges in assuring compatibility with EU State Aid regulations or WTO rules), or less directly through the establishment of feedback loops between the monitoring of projects and the appraisal process. However, the absence of long term post-completion monitoring of the outcomes associated with projects funded also means that delivery processes do not generate the information needed to police the post-completion behaviour of applicants, enforce supplementary conditions, or impose penalties in the event that the Government subsidises technology development that is eventually exploited overseas. Filling this gap in information should be seen as a priority.

Recommendations

#18 BEIS, ATI and Innovate UK should consider the feasibility of making further use of provisions in contracts to insulate the public sector from the risk that IP developed through the ATI is exploited overseas (e.g. penalising grant beneficiaries that do so).

#19 These efforts can only be policed if it is possible to monitor the post-completion outcomes associated with ATI funded projects. This could draw on the provision in contracts to undertake further monitoring for a period of five years after project completion.

#20 Should recommendation #18 prove incompatible with EU State Aid regulations and/or

Recommendations

WTO rules and it not be possible to achieve grant claw-back, consideration could be given to alternative means of achieving the same objective. One possibility would be to penalise applicants in future application rounds where their post-completion commitment to R&T and production has proven weak, through adjustments to leakage parameters in the VfM appraisal.

#22 BEIS and Innovate UK should continue the annual monitoring process to enable the outcomes of the projects funded to be metricated (and relative to the size of the grant awards, it is considered a low-burden process[7]). It is also suggested that this process is integrated more clearly with existing quarterly monitoring arrangements, and is continued beyond the lifetime of the grant to enable tracking of exploitation outcomes.

Interdependencies between projects

Many of the projects supported by the ATI form part of wider programmes of R&T. Division of larger R&T programmes into smaller projects (motivated partly by restrictions set by EU State Aid regulations) is causing inefficiencies in the ATI delivery process in a variety of places. The ATI's engagement with the sector has enabled the SRC to develop a strategic understanding of applicants' wider R&T agendas and where public support is most likely to bring or retain important capabilities in the UK. The treatment of individual projects as discrete work programmes in formal appraisal processes and in monitoring, is however creating some challenges outside the SRC process. For example, it has been necessary in the past to undertake separate VFM assessments of parallel projects that may ultimately delivery the same outcomes, or projects that are in practice part of a single portfolio and intended to contribute towards a common objective. In two instances, BEIS have recently undertaken a VFM analysis at a programme level combining several current and expected applications. Other instances might benefit from this form of portfolio approach, however its use depends on the identification of overlaps between projects.

Independent Assessments are being completed without a full understanding of the range of technical risks associated with the whole package – projects are assessed on the basis of material provided by applicants which in some instances has not fully detailed these interdependencies. Similarly, monitoring officers are in some cases attempting to monitor a project portfolio without full knowledge of the external dependencies. Monitoring Liaison Officers can support an understanding of the key dependencies between different ATI projects, but will have limited intelligence on other R&T activities. Evidence from case studies suggest that it may even be challenging to develop a sensible set of project delivery milestones as a consequence of these external dependencies, potentially contributing to some projects lacking clearly defined outputs and expected impacts.

[7] For example, the Regional Growth Fund required an annual report validating the spending and the jobs created or safeguarded, produced by an independent accountant.

While, as noted above, this has been recognised in some places, with corrective measures taken (e.g. BEIS are now undertaking some VFM analysis at the level of the R&T work programme) it will be difficult to fully address all of the frictions identified by stakeholders while artificially dividing R&T work programmes into discrete subprojects. Efficiencies (and savings on transaction costs) could be achieved if there was a mechanism by which interrelated projects could be presented as a single application or package for the purposes of application and appraisal. It is recognised that it may be challenging to develop a contractual framework that is compliant with EU State Aid regulations, though similar principles could potentially be enshrined in monitoring.

Recommendations

#11 BEIS and ATI should consider whether it may be feasible to strengthen processes through which interdependent projects are identified at the ex-ante appraisal stage, and establish how far it may be possible to appraise these projects as a group rather than as discrete project proposals. This should include explicit acknowledgement of the dependencies between capital and R&T project proposals. Information on interdependencies should be circulated amongst the full range of individuals involved in the assessment of applications.

#16 Guidance to applicants should be updated to stress the importance of applicants fully explaining in their application the relationships between their projects and other R&T activities, and to discuss the risks created by these. This is an aspect that the SRC could be expected to review in depth and to feed any comments here to independent assessors.

#17 There is a case for contracting arrangements to include provisions for BEIS or Innovate UK to change or terminate R&T projects based on the performance or viability of a discrete set of interrelated projects. Intelligence on anticipated project interdependencies could be identified from within application forms, from discussions at SR2, and from VfM assessments (or indeed, directly from the ATI).

#23 There may be benefits in managing the longer-term monitoring process at a portfolio level (given the likelihood that the individuals involved may leave the relevant organisations).

Establishment of feedback loops

The effectiveness of several processes could potentially be enhanced if it were possible to establish a number of feedback loops that have been identified as potentially absent in the evaluation:

- Technical judgements in the VFM appraisal: The assessment of technical risks in the VFM appraisal could potentially be enhanced if there is any way for the latter to build on the judgements of the Independent Assessors. This would require rephrasing of the appraisal process.

- Handover of information to Monitoring Officers: At present, monitoring officers only receive information regarding the issues and risks identified through the SRC, VfM, Independent Assessment, or Due Diligence processes when this is specifically requested. Further formalising this feedback loop and better informing Monitoring Officers has the potential to improve the effectiveness of the monitoring process.

- Reappraisal of change requests: At present, there are limited processes in place for the reappraisal of project proposals should there be significant change requests that materially alter the scope of the project (and which could potentially change the costs and benefits associated with its delivery). Project change request processes are in place for BEIS to refer significant changes to the ATI, however policy stakeholders suggested that there may be a need to clarify what is considered a significant change. Given the scope for moral hazard issues arising following the signature of the Grant Confirmation Letter (e.g. change requests that divert resources to less risky programmes of activity), it is advised that the VfM assessments are revisited in the event of any major rescoping proposed by applicants.

- Feedback of monitoring into appraisal: As suggested above, information capturing the feedback given to projects from Independent Assessment, the progress and results of funded projects could potentially be fed back into the VfM assessment process to improve estimates of key parameters influencing the analysis. This evidence could also be used to support and inform SRC decisions.

Recommendations

#14 BEIS, ATI and Innovate UK should consider options for changing the phasing of the VfM process to better support scrutiny of the technical claims made by applicants (including the judgements made by the Independent Assessors). Closure of feedback loops from monitoring into the appraisal process could be beneficial in enabling case officers to reach an informed judgement of the future risks to the anticipated benefits associated with applications.

#21 BEIS and Innovate UK should consider putting in place processes to reappraise change requests where the underlying economic or strategic case for the funding the project may be significantly changed (i.e. where there is a substantial change to the basis

Recommendations

for public sector support). The establishment of this feedback loop would work to limit the risk that the applicants seek to divert R&T funding to activities that do not produce the anticipated economic benefits.

Efficiency

The process evaluation has also considered the overall efficiency of the resource allocation process and how far there may be opportunities to increase the speed with which resources are committed (or reduce the overall level of resources involved). As illustrated above, the SRC process involves a four stage process for some successful applications, and a number of issues have been highlighted in this evaluation that could form the focus of the focus of efficiency improvements:

- Duplication: There is duplication in the scope of the variety of assessments that are completed at various stages of the process. For example, the ATI (in the preparation of initial scores to feed into discussions at SR2), the VFM Assessment, and the Independent Assessment all provide an assessment of the potential economic value of the applications using different frameworks. Equally, both the ATI and the Independent Assessment provide an assessment of the technical merits of project applications. Applicants have also raised questions regarding the added value of the Independent Assessment as prior to December 2016 it had not rejected any projects recommended for funding by the SRC (some Early-ATI projects were rejected at this stage, and it is understood that some applications have been rejected at Independent Assessment since December). Given the apparent perceptions that the ATI is at risk of 'capture,' the preservation of independence in the process will likely be valuable.

- Timescale issues: It currently takes an average of 9 months between the submission of the SR1 application and the signature of the Grant Confirmation Letter. The biggest contributor to the time elapsed is the period between the decision of the SR2 committee and the issuance of the Conditional Offer Letter (during which the Independent Assessment, the Funder's Panel, Ministerial Approval, and if needed VFM assessment and HM Treasury approval take place, though it is not clear which aspects of these processes absorb the greatest amounts of time). The process absorbs 3 months on average. However, the time passing between SR1 and SR2 decisions and the receipt of the Conditional Offer Letter and the submission of the Collaboration Agreement both absorb 2 months (with around 40 percent of applicants taking more than the maximum of three months allowed for this process in the terms of conditions of the Conditional Offer Letter).

- Smaller issues identified in the evaluation include processes involved for the approval of change requests (monitoring officers only have flexibility to sign off contract variations with a maximum value of £25k – a trivial share of the overall

value of a typical ATI project, which is thought to produce unnecessarily large requirements for approvals by Innovation Leads in Innovate UK). Scope was also identified to simplify the SR1 process by introducing a standard application form (as acknowledged above).

There is scope for the simplification of the assessment process for full applications by dividing up the review tasks in a way that focuses each assessment on the circle of competence of those involved. This would concentrate the judgement of the ATI on the strength of the strategic case for funding (e.g. the scale of the market opportunity), the VfM assessment on assessing the strength of the economic case, and the Independent Assessment on an assessing of the engineering merits of individual project proposals and aspects of project management. These reviews could run in parallel, and feed into a full Strategic Review meeting which would now be informed by each strand of assessment. The implementation of these simplifications would require the Independent Assessment and VfM Assessment to be brought forward ahead of SR2 meetings (with the SRC only considering those proposals passing both of these tests). This would simplify the process from the perspective of the applicant by reducing the apparent number of assessment stages and accelerate the process between the SR2 decision and the issuance of the Conditional Offer Letter. This would come with costs, however, in that the volume of proposals considered by the Independent Assessment process and full VfM would need to increase by around 33 percent (which could be partly offset by rationalising the number of issues considered by assessors).

Recommendations

#24 Duplication and delays in the assessment of applications could be minimised if proposals were subject to both the VfM assessment and the Independent Assessment ahead of the SR2 meeting. The role of the committee would be to check that the project has not materially shifted away from its scope at SR1, and to prioritise competing calls on the funding available. Preserving the independence of the process would require that only proposals passing the Independent Assessment are considered by the SR2 panel (so the judgements could not be overturned). If required, ministerial sign-off could follow SR2 – or could feed into HMT and BEIS representation at the meeting following a twin track approach. Consideration of how the Funder's Panel might feed into to this process would also be needed.

#25 An increase in the frequency of SR2 meetings (subject to demand) could be introduced on a trial basis to explore the extent to which this can accelerate the Strategic Assessment process. A key question for this trial would be to assess whether having fewer projects to review in a batch limited the extent to which reviewers could assess the relative merits of applications.

#26 Project confirmation would be quicker if applicants were required to agree the terms of their collaboration before submitting proposals. ATI, BEIS and Innovate UK should consider making more use of the three-month obligation to complete these processes set out in the Conditional Offer letter (i.e. 'use it or lose it') in order to accelerate and reduce the uncertainty around this aspect of the process. Stakeholders noted that action to

Recommendations

enforcing the three-month limit is already being taken.

Lessons from project delivery

The ATI projects reviewed within the case studies had objectives that were generally well aligned with those specified in the ATI strategy. Project aims appear to have been generally broader for earlier projects compared to those approved under the current SRC process. In some cases, these earlier projects were described by Monitoring Officers and lead partners as 'vague'. While some of these projects with broad and ambitious aims failed to provide clear evidence of what was delivered, others managed to highlight clear successes in form of specific work packages that served almost as individual projects and with execution which provided a clear pathway to product and process innovation within the participant's business.

Recommendation

#27 There should be a focus on ensuring that project objectives are precise and clear to improve outcomes. It is positive that more recently approved case study projects appear to have more specific objectives than those approved earlier. This is an aspect that could be potentially covered by requesting Independent Assessors or the ATI flag areas to be addressed by applicants as part of the development of Level 2 Plans with monitoring officers, prior to project kick-off meetings.

Large companies involved in the ATI have substantial R&T departments with portfolios of projects funded through EU RTD programmes, national R&D programmes in the UK, US, Germany, France and others and internally funded projects. This means that projects funded under ATI tend to have their roots in previous R&T activity and more often than not feed into follow on projects. In a number of cases these R&T activities are being undertaken in parallel and feed findings to other projects. The prominence of these interrelationships underscore the importance of the recommendations discussed above relating to appraisal, assessment and project section in particular.

A large volume of activity appears to be at an earlier stage of development than would be expected given the focus of the programme on projects that are validating a technology in a laboratory or relevant environment, or working on prototyping and demonstration (Technology Readiness Levels / TRL 4 – 6). There is a need to consider issuing further guidance to all individuals involved in the assessment and monitoring of ATI projects to ensure a closer focus on activities at TRL4-6, or consider clarifying the focus of the programme.

Recommendation

Recommendation

#28 BEIS, the ATI and Innovate UK should consider including further guidance to all individuals involved in the assessment and monitoring of ATI projects to ensure a closer focus on activities at TRL4-6, or consider clarifying the focus of the programme.

Only a small proportion of projects were finished at the time of the review and all required more time than anticipated in the level 2 project plans. The majority were still delivering but experienced either minor or more substantial delays – predominantly as a result of challenges securing the resources needed for delivery o to pin down project objectives. The case studies did not reveal any substantial changes in the overall aims of the projects. In cases where change had occurred this was generally within what were initially very broad objectives. In the majority of cases projects expect to make significant further technological progress (in the region of an additional two TRL stages). However, the realisation of commercial outcomes from projects is, in a number of cases, highly dependent on the extent to the technology concerned can be de-risked ahead of a key customer purchase decision point.

The most important factors justifying public support relate to the overall distance that projects are from the market. Long time-horizons for realising returns as well as the remaining technological and other risks were seen as preventing applicants from raising finance from private sources. The overall scale of R&T investment required was also reported to be a key element of the rationale for ATI funding reflecting the challenge of supplying enough investment to enable the coordination and implementation of improved technology standards where each component is often derived from a larger number of sub-components, developed independently in some instances. For some of the largest aerospace manufacturers, this consideration was strongly reflected in discussions of their portfolio of ATI grants.

In some instances, where access to finance was a key issue, it appears that ATI funding has helped to unlock a different set of activities to those that formed the focus of grant applications and are being monitored. Particularly amongst larger applicants, there appear to be instances where ATI funding has been used to supplement their R&T budgets, rather than to deliver specific projects. This underlines the importance of looking at the broader strategic context for proposed R&T projects, and undertaking applicant level monitoring.

Recommendation

#29 There is a need for project selection processes to probe the role of proposed projects in the strategic context of applicants' other R&T activities. This is required to understand instances where projects would have been likely to proceed without ATI funding, but where this has helped to unlock other R&T projects. This could most effectively be handled at project review to more fully understand what activities are being unlocked by ATI funding, and should be complemented with additional applicant level monitoring.

Threats that projects might have progressed outside of the UK without support were of particular prominence for the justification of public funding for several of the case study projects. In some cases, this support was seen as either an inevitable part of the funding landscape, while in another, funding was seen as compensating for the fact that the applicant's UK operations were less advanced in the particular technology compared to that of a foreign sister site.

Finally, the case for public support reflected the need to overcome the co-ordination challenges involved in forming a project consortium in a small number of cases. These applicants reported that in helping to overcome these co-ordination challenges, ATI funding had improved their projects by supporting a more robust approach to testing, providing access to specific technologies, or offering an external perspective of their work.

When discussing projects with applicants, the scope for knowledge spill overs appears to be less central to the justification for public support, compared to what the VfM assessments would suggest. However, applicants may not be well placed to comment here, particularly at this point in time.