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Advanced Manufacturing Supply
Chain Initiative (AMSCI): Early
Additionality Study

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RESEARCH

BIS Expert Peer Review for Evaluation

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This publication was peer reviewed by Dr Edward Anderson, School of International Development and Dr Hasan Bakhshi, NESTA.

The peer reviewers' assessment can be found here: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/472983/BIS_Evaluation_Summary_-_AMSCI_Early_Additionality_Report-1.pdf

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Summary

Ipsos MORI, Ecorys and George Barrett were commissioned by the Department for Business, Innovation and Skills in June 2014 to undertake the study 'Advanced Manufacturing Supply Chain Initiative: Data Monitoring, Process Evaluation, Scoping Impact and Economic Evaluation Options, and Early Additionality Assessment.' This report sets out an assessment of the Early Additionality of the Advanced Manufacturing Supply Chain Initiative.

Objectives

The aim of this report is to provide early evidence of the additionality of the projects funded through the Advanced Manufacturing Supply Chain Initiative. This includes an assessment of the extent to which AMSCI has addressed the market failures it was intended to address, as well as an exploration of how far the evidence suggests that the projects receiving funding would have been taken forward in the absence of public sector funding.

AMSCI

- AMSCI was created in 2011 as a competitive fund that provides subsidies for capital investment, research and development expenditure and training for industrial projects involving collaborations across supply chains (including projects involving the re-shoring of manufacturing operations to the UK). AMSCI has the following stated aim (set out in the 2011 Business Case): 'to increase manufacturing sector growth potential by addressing market failures to improve the competitiveness of England-based Supply Chains to globally competitive levels.'
- AMSCI funding has been allocated over seven discrete funding rounds through a competitive application process. Bids must pass both a technical appraisal and a value for money appraisal to be submitted to the Independent Investment Board, which makes the final project selection decisions. The requirements for collaboration were relaxed for two of the rounds funded: a regional round that was created to commit funds that were unallocated following the conclusion of Round 1, and a West Midlands Liverpool City Region programme. A total of £175m was committed to 58 AMSCI projects over the first six rounds of the scheme.
- The rationale for AMSCI is underpinned by traditional market failures associated with imperfections in financial markets, spill-over effects associated with R&D activity, and difficulties in internalising the full benefits of training. However, AMSCI also has distinctive features in supporting collaborative supply chain projects, which may fail to emerge even where it is in the best interests of the parties involved to collaborate, due to problems caused by the threat of free-riding, the incompleteness of contracts, and issues caused by the potential uneven distribution of returns. Public subsidies (as well as the requirements for monitoring) for these types of collaborative project have the potential to address these market failures and strengthen the competitiveness of firms within the supply chain of large manufacturers.
- AMSCI projects might be expected to lead to range of intermediate or short to medium term effects that will need to be explored through the eventual evaluation. These include raising capital, R&D and training expenditure amongst beneficiary firms. In turn, these

effects would be expected to lead onto improvements in the productivity of beneficiary firms (both in terms of average labour productivity and Total Factor Productivity). If this translates into reductions in output prices, this may also lead to an increase in their market share, which may be accompanied by an increase in overall output (GVA) and employment. Such strengthening of the competitiveness of manufacturing supply chains may also help beneficiary firms resist competition from non-domestic suppliers, reduce the dependency of Primes on inputs produced by overseas suppliers, and support domestic firms to increase their export sales.

- The evaluation will also ideally capture a number of potential effects on non-beneficiaries. While this would include the extent of any displacement from UK based firms operating in similar markets (or supply chain multiplier effects), AMSCI may also generate a number of spill-over effects through reduced CO2 emissions (as a consequence of enhanced energy efficiency), and through R&D spill-over effects.

Progress to date

- The first tranches of AMSCI funding were allocated in 2012, and the majority of projects are in the early phases of delivery (which is reflected in the drawdown of AMSCI grant funding against budgeted amounts). 168 applications for AMSCI were received over the 6 rounds to date, and monitoring data at August 2014 suggests that, of the total grant and loan commitment of £175.6m, just 15 percent of this expenditure had been defrayed (the majority of which was associated with the twenty projects funded through the first two rounds of the scheme). 442 jobs were certified as having been created, and 1,918 as being safeguarded. Monitoring data also suggests that only three of the projects funded in later rounds have begun (with majority in the process of due diligence).
- As the majority of projects are either in their early stages or have not started, there are substantial constraints on the range of outcomes that can realistically be explored through this early additionality assessment. Given these constraints, the primary focus of this report is on how far the projects funded through AMSCI align with its overall strategic aims, and exploring the issue of project additionality (i.e. how far the projects would have otherwise proceeded in any form in the absence of the funding provided through AMSCI) relative to the judgements made at the appraisal stage (which indicated that on average, deadweight of 55 percent was expected by appraisers).

Strategic Alignment

- In broad terms, the portfolio of projects funded through AMSCI aligns with its overall objectives. A diverse range of projects have been funded, mainly collaborative R&D projects focused on the development of new products, but also projects aimed at resolving specific inefficiencies in supply chains, and in one case, the creation of a new supply chains to manufacture products not currently produced in the UK. Such projects might be expected to deliver the objectives targeted by AMSCI, and in particular creating more competitive supply chains. Additionally, a high proportion of applicants aimed for an increase market share or to enter new product markets, which would also be expected to lead onto increased levels of purchasing from UK supply chains by Primes or Tier Ones, or the attraction of new customers. However, it should be noted that the policy objectives of AMSCI are relatively broad, potentially justifying a diverse range of project activity provided it contributed to enhanced supply chain competitiveness.

- In addition, the survey evidence suggested that AMSCI funding has reached the types of firms intended, with a high proportion of beneficiaries reporting that their main customers were based in the UK, while facing predominantly international competition. Additionally, the survey evidence suggests that exchange of skills and knowledge was a key motivator for applicants to work in collaboration, while case study evidence suggested that in at least a share of cases, a need to maintain technological advantage or parity with international competitors was motivating the project. As such, AMSCI projects may work as much to safeguard the competitiveness of UK supply chains as strengthen them (particularly as a high proportion of applicants indicated that the projects were driven to a large extent by existing customer requirements).
- Given the availability of subsidies for capital investment and other projects on a single firm basis through the Regional Growth Fund (including RGF funded programmes led by intermediaries), valid questions might be asked around the need for the Regional Round 1 of AMSCI and the West Midlands Liverpool City Region programmes where the need for collaboration was relaxed. In the delivery of future schemes, careful consideration of how far changes to eligibility criteria might dilute the focus on the underlying policy objectives should be undertaken before they are made.

Additionality

- The early evidence suggests broadly that AMSCI has had positive impact on the probability that projects were taken forward (though this is indicative at best). The views of applicants gathered through the survey and the case studies pointed to positive effects both in terms of accelerating projects, and enabling them to proceed at a higher scale or greater scope. However, there was little suggestion that AMSCI has helped retain economic activity in the UK, with few respondents suggesting the project would have taken the project forward in other locations.
- Around half of successful applicants suggested the projects would not have gone ahead at all without AMSCI funding. However, statistical results were inconclusive, with insufficient observations available to obtain statistically significant results.
- Additionally, approximately fifty percent of unsuccessful applicants were able to (or were planning to take their project forward) in the absence of AMSCI funding. Taken together, these results are broadly supportive of the judgements being made at the appraisal stage: the average estimate of deadweight applied in the appraisal process was 50 percent amongst unsuccessful applicants, rising slightly to 55 percent for successful projects (projects were mainly differentiated by the overall scale of their anticipated benefits, and potentially more evidence may have helped appraisers discriminate between projects in terms of their additionality). However, given the propensity of a small share of applicants to pursue (or suggest they would pursue) private finance options following rejection, this reinforces the possible need for more stringent tests of financial constraints at the appraisal (or due diligence) stage (such as requiring applicants to demonstrate that they have been rejected for finance). Estimates of displacement used in the appraisal process also appear reasonable.
- The evidence does not point to substantial duplication of other Government programmes, with few applicants either applying for alternative sources of subsidy either before or after AMSCI funding decisions were made. Case study evidence suggests that Innovate UK programmes might be most relevant, though the levels of subsidy available are an order magnitude smaller than those needed for the delivery of typical AMSCI projects.

- Given the early stage of programme delivery (the majority of projects have yet to begin, and none have completed), there is very little evidence at this stage to provide any conclusions around the likely net economic results of AMSCI.

Lessons

- In general terms, the early additionality assessment suggests that the design of the AMSCI marketing and communications, application, appraisal and project selection processes have been effective in directing funding towards to the types of collaborative supply chain project funded forming the focus of its overall policy objectives. There was no evidence to suggest that the judgements being made at the appraisal stage were misjudging the likely rates of deadweight (despite the fact that applicants had rarely 'proven' financial constraints through being rejected for finance of offered terms at unreasonable cost).
- This reinforces the general conclusion of the Process Evaluation that the underlying processes (and in particular, the combination of a technical appraisal and an HM Treasury Green Book VFM appraisal, alongside an Independent Investment Board with a clear terms of reference), are an effective means of administering competitions for large scale investment subsidies (albeit with some scope for improvement at the margins).
- In terms of lessons (ordered in terms of importance):
 - **Application evidence:** Application forms for future collaborative supply chain projects might be adjusted to focus more strongly on the following issues:
 - **Collaborations:** Requiring applicants to demonstrate the nature and history of their working relationships may aid appraisers in judging how fragile the collaboration might be, and how critical the collaboration in the delivery of project objectives. Novelty of relationships may be one aspect, though hold-ups can occur in existing supply chain, particularly where a Prime or Tier One perceives they would need to subsidise suppliers' R&D activity to take the project forward.
 - **Financial constraints:** Given the propensity of a small share of applicants to pursue (or suggest they would pursue) private finance options following rejection, this reinforces the possible need for more stringent tests of financial constraints at the appraisal (or due diligence) stage. In particular, application forms should *require* applicants to describe their attempts to secure alternative funding (and where they have not made such attempts, provide a clear explanation of the reasons why) – as opposed to highlighting that the provision of such evidence is a feature of a strong application. Information on firms' financial history may also be beneficial (e.g. have they ever raised equity finance?).
 - **Strategic alignment:** Given the availability of subsidies for capital investment and other projects on a single firm basis through the Regional Growth Fund (including RGF funded programmes led by intermediaries), valid questions might be asked around the need for the Regional Round 1 of AMSCI and the West Midlands Liverpool City Region programmes where the need for collaboration was relaxed. In the delivery of future schemes, careful consideration of how far changes to eligibility criteria might dilute the focus on the underlying policy objectives should be undertaken before they are made.

- **Role of grants:** Where projects are only constrained by their inability to secure finance from private sources, loans or equity finance may be a more cost-effective instrument than grants (i.e. provision of the type of finance constrained by market failures, by the public sector, would reduce overall costs while addressing the key issues preventing the project from moving forwards). However, this would mainly apply to projects involving capital investment at a single firm level, and would be unlikely to ease some of the transactional frictions involved in supply chain collaborations.

1.0 Introduction

Ipsos MORI, Ecorys and George Barrett were commissioned by the Department for Business, Innovation and Skills in June 2014 to undertake the study 'Advanced Manufacturing Supply Chain Initiative: Data Monitoring, Process Evaluation, Scoping Impact and Economic Evaluation Options, and Early Additionality Assessment.' This report sets out the results of an assessment of the Early Additionality of the Advanced Manufacturing Supply Chain Initiative.

1.1 Objectives

The aim of this report is to provide early evidence of the additionality of the projects funded through the Advanced Manufacturing Supply Chain Initiative. This includes an assessment of the extent to which AMSCI has addressed the market failures it was intended to address, as well as an exploration of how far the evidence suggests that the projects receiving funding would have been taken forward in the absence of public sector funding.

1.2 Methodology

This report is based on the triangulation of a range of sources of evidence gathered as part of a parallel process evaluation and the scoping of impact and economic evaluation methodologies. Comparisons are made between projects that have received AMSCI funding, and those firms that were unsuccessful, regardless of the status of the proposed project. For the purposes of this analysis all available evidence is used. However, future analysis may be able to more narrowly define a counterfactual group, dependent on the quantity of applicants in future rounds. This range of evidence includes:

- **Case Studies:** As part of the process evaluation, 10 in-depth case studies were undertaken with successful projects, involving depth interviews with lead applicants, partners, and monitoring officers, as well as a review of the secondary information (such as monitoring data) associated with the project. These covered a range of issues surrounding the bids and collected evidence around present status, experience of the AMSCI process and evidence about the non-quantifiable impacts of the programme:
 - Two different topic guides were used to inform the qualitative interviews with successful applicants. While there were overlaps between the two, one emphasised questions relating to the AMSCI process (e.g. applicants' experience of the application, contracting and monitoring processes) while the other had a greater emphasis on questions relating to additionality (it was felt that including a full set of process and additionality questions for all respondents would place too great a burden on applicants). The additionality questions probed along the following lines of enquiry: extent to which other sources of finance were used or sought to fund the project, or would have been available had the application to AMSCI been unsuccessful; extent to which the company would have taken the project forward in the absence of AMSCI support, and how it would have differed (e.g. timescales, scope, level of collaboration); extent to which expected outputs and outcomes of the project (e.g. R&D outputs, stronger supply chains, onshoring manufacturing activities, jobs created and safeguarded, business growth etc.) could have been achieved in other ways; and the added value of AMSCI.

- Case study projects were selected on the basis of ensuring an appropriate balance of cases across rounds, sectors, project objectives and collaboration make-up. Ten projects were selected, five of which were allocated to the process-focused topic guide and five of which were allocated to the additionality-focused topic guide. This allocation was conducted on the basis of ensuring a balance between the two groups, based on project characteristics. The selection of the collaborating partners to be interviewed for each case study was undertaken primarily based on those that had responded to the applicant survey and had expressed consent to be re-contacted for further research.
- A total of 20 interviews were completed, 10 with each of the lead applicants from the selected case study projects and 10 with collaborating partners. Up to two collaborating partners were interviewed for each case study. Note that in some cases it was not possible to interview a partner (e.g. one of the case studies was sampled from the WMLCR Round, which was a single firm project). The interviews were conducted over the telephone with the results being written up into a case study template (one per case study integrating findings from both lead applicant and partner interviews) to allow thematic analysis across all ten completed write-ups.
- **Survey results:** A random probability (telephone) survey of 207 AMSCI applicants (split equally between successful and unsuccessful applicants) was undertaken to provide a quantitative perspective on the issues of interest. This included exploring the motivations of firms to apply for AMSCI funding, issues of market failure, and how far the projects involved would have proceeded (or did in the case of unsuccessful bidders) in the absence of AMSCI support. The survey was also used to examine the extent to which clear economic results had been delivered to date.
- **Statistical analysis:** The survey findings were combined with monitoring information to undertake exploratory statistical analysis to examine how far it would be feasible to identify a causal effect of AMSCI funding on the probability that projects went forward.
- **Data-linking:** Records of successful and unsuccessful applicants have been linked to the datasets held within the ONS Virtual Microdata Laboratory by Aston Business School, with the intention of examining how far it is feasible to isolate a causal effect of AMSCI on employment, turnover and productivity at this early stage of delivery.

1.3 Structure of this report

The remainder of this report is structured as follows:

- **Section 2 – Analytical Framework:** This section sets out an analytical framework for understanding the impacts of the AMSCI programme, including an outline of the market failures it might be expected to address, and the anticipated outputs, outcomes and impacts.
- **Section 3 – Strategic Alignment:** This section sets out an analysis of how far the evidence suggests that the projects funded through AMSCI have a close alignment with the overall strategic objectives of the programme.
- **Section 4 – Additionality:** This final section sets out the evidence available on the additionality of the projects funded through AMSCI, and an outline exploration of the early economic outcomes that have been delivered.

- **Section 5 – Conclusions:** This section summarises the main conclusions for the report, and sets out some general recommendations that might be applied in the design of future schemes aiming to address market failures inhibiting industrial collaboration.

2.0 Analytical Framework

This section sets out an analytical framework for understanding the impacts of the Advanced Manufacturing Supply Chain Initiative. This covers a descriptive overview of the programme, an assessment of the market failure rationale for the programme, and a logic model defining its anticipated outputs, outcomes and impacts. Consideration is also given to the progress that has been made by AMSCI projects to date, and the potential effects that might be expected at this stage.

2.1 AMSCI

AMSCI is a competitive fund that provides subsidies for capital investment, research and development expenditure and training for industrial projects involving collaborations across supply chains (including projects involving the re-shoring of manufacturing operations to the UK). AMSCI has the following stated aim (set out in the 2011 Business Case): ‘to increase manufacturing sector growth potential by addressing market failures to improve the competitiveness of England-based Supply Chains to globally competitive levels.’

In addition, the 2011 Business Case sets out the following objectives:

- Create more competitive supply chains that anchor high value-added work in England;
- Increase levels of purchasing from UK supply chains by Primes/Tier 1s;
- Attract new customers to existing supply chain companies and sustain or create new employment opportunities;
- Create better synergies and sustained collaborative relationships throughout targeted supply chains;
- Prime / Tier 1 involvement and grant competition targets public resource on greatest sector growth opportunities and levers in significant private investment;
- Enhanced Government reputation for promoting growth and rebalancing the economy.

No major revisions to the objectives of AMSCI were made in a reiteration of the 2014 Business Case (although the emphasis on re-shoring was increased substantially).

AMSCI funding has been allocated over seven discrete funding rounds through a competitive application process. Bids must pass a technical appraisal and a value for money appraisal to be considered by an Independent Investment Board that makes the final project selection decisions. The requirements for collaboration were relaxed for two of the rounds funded: a regional round that was created to commit funds that were unallocated following the conclusion of Round 1, and a West Midlands Liverpool City Region programme.

2.2 Market failures

Given the policy rationale for AMSCI, justification for Government intervention will rest on how far there are market failures inhibiting investment in collaborative projects. The 2011 and 2014 Business Cases highlighted the well-established market failure issues associated with access to finance, and sub-optimal investment in skills and research and development. However, no specific market failure rationale was outlined in either of the Business Cases prepared with respect to the distinctive collaborative dimensions to the AMSCI programme.

Nevertheless, the academic literature points to a range of market failures affecting supply chains in the manufacturing sector. Prime manufacturers (from the 1980s onwards, and particularly in the automotive industry) have increasingly specialised in the assembly of finished components produced by the suppliers (rather than internally), as a means of increasing their profitability. As a consequence of these trends, Primes have become increasingly reliant on co-operative relationships with their supply chain to both deliver efficiency improvements and bring new products to market (which may require bespoke components, as well as R&D investment on the part of suppliers).

However, the academic literature points to a range of **transactional frictions** that may prevent the emergence of these forms of collaboration within supply chains:

- **Incomplete contracts:** The outcome of collaborative projects within supply chains (particularly those involving a strong R&D component) can be highly uncertain. This uncertainty can create difficulties in agreeing an appropriate contractual framework under which the terms of the collaboration are defined (such as the terms under which ownership of IP will be shared, the conditions under which the Prime or Tier One manufacturer will enter into supply contracts for the components forming the focus of the R&D effort, or the quantities that may eventually be demanded). As such, some projects may not proceed owing to difficulties in agreeing these contractual issues.
- **Free-riding:** The success of collaborative projects will rely on the commitment of financial and human resources by the partners involved. However, unless the agreed terms of commitment can be rigorously monitored and contractually enforced, there will be incentives for each partner to reduce or minimise their contributions (without compromising their ability to appropriate project outputs). As a consequence, collaborative projects can be inherently unstable and may break down before project goals are realised.
- **Uneven distribution of returns:** There will often be one partner who brings the greatest expertise and resources to the collaboration. Often this partner also has the least to gain from the collaboration (and may be better off pursuing the investment on their own), so that unless partners can find some way of compensating the partner involved, the collaborative project may not be viable.

These issues can potentially be addressed to some extent through greater levels of vertical integration through the supply chain (for example, a Prime purchasing a Tier One supplier). However, such integration may not always be economically efficient: a large Tier One supplier with multiple customers may be able to develop 'vanilla' technology that can be customised to the needs of different Primes (an efficiency that is not feasible with vertical integration), as well as allow them to pursue competing technologies (Primes may not have the resources to invest in the development of multiple options). As such, vertical integration has the potential to increase the cost of bringing new products to market and reduce competitiveness.

These market failures relating to supply chains are further complicated by the more typical market failures highlighted in the business case. For example, the uncertain and technical nature of many collaborative projects may make it difficult for investors to appraise the risks involved, creating reluctance to invest in or finance collaborative projects (and these issues will be more significant during periods of financial distress). If the collaborative project is likely to lead to substantial spill-over benefits to other firms (for example, if the technology involved will be easily copied), then this may also prevent the project proceeding.

There may also be reluctance by firms to invest in any training that is fundamental to the collaborative project if there are fears that workers may be lost to competitors (preventing them from fully internalising the benefit of that training). The market failures inhibiting collaborative projects are likely to lead to loss of social welfare through failure to realise gains in the productive capacity of supply chains through capital investment, R&D, and training. Faced with competition from low cost locations, these issues may encourage Primes to choose to source componentry and other inputs outside of the UK (leading to job losses and the 'hollowing out' of supply chains observed).

2.3 Logic Chain

This section describes an overarching logic chain for AMSCI. The scheme primarily provides subsidies for R&D, training and skills and capital expenditure, but also provides a framework within which projects can manage and monitor the progress of collaborative industrial projects. As such, the scheme has been set up to deal with imperfections in financial markets that may cause sub-optimal levels of capital investment, spill-over effects causing sub-optimal levels of investment in research and development and training, as well as helping to correct for the market failures that prevent collaborative projects being taken forward.

On the assumption that AMSCI is effective in dealing with these market failures, the expectation is that subsidies will enable collaborative projects to proceed that would not have otherwise been taken forward by the firms involved. However, while the scope of spending associated with these projects is clear, it is not immediately clear what intermediate outcomes might be expected in terms of changes in spending on capital investment, R&D, and training. In particular, if AMSCI is more effective at addressing those market failures preventing collaboration, then it is entirely possible that no effect is observed on these measures (for example, if the AMSCI project displaces less effective single firm investments). Notwithstanding these issues, the intermediate results of projects might be expected to be observed amongst the firms concerned include:

- **Capital investment:** Increased fixed capital formation (in the form of new plant equipment and in some cases, property assets through the construction of new facilities). Studies of programmes of involving capital investment subsidies on single firm basis have shown that subsidies have the potential to raise capital expenditure, though these effects are less pronounced (or absent) where subsidies have reached large firms¹;
- **Research and development:** Increased R&D expenditure and staffing levels, which in turn (depending on the outcome of projects) may lead to the acceleration of the development of new technologies, increase the readiness of the firms involved to manufacture new products or utilise new processes. This may also be observed in increases in patenting activity, the commercialisation of new products and processes, and the value of intellectual property held by the collaborating firms. A range of studies have explored the causal effects of R&D subsidies on firm level R&D expenditure and output (largely in the form of patents) and have found positive effects in both areas: a study examining the effectiveness of ERDF subsidies for R&D over the 2000 to 2006 period found that (for marginal grantees), €1 of R&D subsidy led to an increase of €1.49 in firm

¹ See 'The Causal Effects of an Industrial Policy,' Criscuolo, Martin, Overman and Van Reenan, CEP Discussion Paper 1113, 2012. Available at <http://cep.lse.ac.uk/pubs/download/dp1113.pdf> (accessed October 2014).

level R&D expenditure², and a 2014 study of an Italian R&D subsidy programme³ found a positive impact of R&D subsidies on both post-treatment probability to register patents and the number of patents registered (albeit with substantially larger effects for small companies than larger firms);

- **Training:** Increases in training expenditure might reasonably be expected to lead on to increase in the number of workers trained, and the quality (or level) of training provided;
- **Crowding out:** Any additional spending stimulated by AMSCI in these areas has the potential to lead to offsetting effects in secondary markets. Additional demand for plant equipment, research and development staff, or training provision may, for example, place pressure on the prices of these factor inputs, leading to reduced demand elsewhere in the economy, less likely historically, given prevailing macro-economic conditions.
- **Supply chain coordination:** Firms aiming to improve capabilities across the entire supply chain should address the following areas:
 - Improve communication and collaboration within chains by addressing how information is best shared – this could be investment in new inventory control tools or simply scheduling regular calls between production managers.
 - Train staff so that skilled and flexible labour across the supply chain can cope with fluctuations in demand, non-standard scenarios or crisis.
 - Address weaknesses in inventory management to reduce cost, where possible, and unnecessary delays in production. Supply chains should understand the differing role of the inventory – safety, replenishment, excess – and use the best production forecasting tools available based on sound strategic decision making.
 - Share contingency plans to minimize disruptions.
 - Enhance Intelligence gathering to monitor shared risks to production for early identification of problems. This could be regular updates from critical links in the supply chain (one that has the potential for most disruption if problems occur), or protocols to be followed when unusual or concerning delays occur (such as the delay associated with a container ship delay exceeds a certain number of days).
- **Crowding out:** Any additional spending stimulated by AMSCI in these areas has the potential to lead to offsetting effects in secondary markets. Additional demand for plant equipment, research and development staff, or training provision may place pressure on the prices of these factor inputs, leading to reduced demand elsewhere in the economy, less likely historically, given prevailing macro-economic conditions.
- **Supply chain efficiency:** Supply chains that address the issues arising from their interdependence (such as production cycles, demand fluctuation, strategic planning and investment decisions; and supply chain risk) should hope to see gains in their overall and individual efficiency. If firms within the supply chain develop production runs that are more closely aligned, or are more effective in their communication, then the associated

² See 'The Impact of TEKES Direct Support on Business R&D,' Einiö, 2013. Available at http://personal.lse.ac.uk/EINIO/Support_on_Business_RandD.pdf

³ 'The Impact of R&D Subsidies on Firm Innovation,' Bronzini and Paselli, Bank of Italy Discussion Paper 960, 2014. Available at http://www.bancaditalia.it/pubblicazioni/econo/temidi/td14/td960_14/en_td960/tema_960.pdf (accessed October 2014)

reductions in waste and inventory will reduce costs and increase allocative efficiency. Firms may simply spend less time on transactional activity among its suppliers and customers reducing the cost of inventory management. A secondary effect of enhanced supply chain efficiency is improvements in the resilience of the supply chain to risks associated with disruption (which may result from localised issues with suppliers, regional issues affecting infrastructure, or global risks that could hamper the delivery of inputs to numerous links in a chain). Enhanced resilience – arising from better communication, coordination and collaboration – will help with;

- Supply chain pro-active risk strategy: the readiness of the supply chain to deal with threats to production.
- Supply chain reactive risk strategy: its ability to respond quickly and effectively to production disruptions and overcome them

The effects of reduced exposure to risk of disruption may also be visible in supply chain insurance premia (where the reaction time of a supply chain can represent a competitive advantage). If disruptions impact on multiple supply chains there is an opportunity for the firms that recover quickest to capture demand in the absence of its competitors.

If the collaborative project is successful (and has addressed the market failures highlighted above), then the impacts of all three types of activity might be expected to be observed in an increase in productivity (i.e. the efficiency with which inputs are combined by the firms concerned):

- **Capital investment:** If AMSCI subsidies have been targeted at those firms facing financial constraints due to imperfections in financial markets, then the firms concerned might be expected to achieve (or move closer to) an optimal allocation of factor inputs in the production process (and raising overall profitability). It should be noted that the few evaluations of programmes of capital investment subsidies exploring these types of effect in depth have found it difficult to demonstrate effects on productivity, raising concerns that in some cases, subsidies reach marginal⁴ capital investment projects rather than those that were constrained by genuine failures in financial markets. In such cases, the impact of subsidies may be to reduce overall social welfare (by encouraging inefficient allocation of factor inputs), though there may be compensating effects in the form of additional jobs or reduced unemployment⁵.
- **Research and development:** The adoption of more efficient processes or the production of higher quality products will lead to improvements in the total productivity of factors employed in production (and also reflected in higher average labour productivity). These types of effect are not typically realised quickly, as illustrated in a 2013 evaluation of ERDF support for R&D in Finland between 2000 and 2006 which showed that productivity gains did not begin to emerge until three years following the allocation of subsidies⁶. Given the long product development cycles involved in the industries targeted by AMSCI (such as the aerospace or automotive industry where, for example, R&D activities can last up to 10

⁴ I.e. those projects where the present values of risk-weighted expected returns are less than the present value of the opportunity and depreciation costs involved.

⁵ 'The Causal Effects of an Industrial Policy,' Criscuolo, Martin, Overman and Van Reenan, CEP Discussion Paper 1113, 2012

⁶ 'The Impact of R&D Subsidies on Firm Innovation,' Bronzini and Paselli, Bank of Italy Discussion Paper 960, 2014.

years⁷ and where the average product cycle for a new automotive drive train is seven years⁸), such effects may not emerge for longer periods.

- **Training:** If the acquisition of new skills improves the productive capacities of workers (for example, to operate new technology), then this might also be seen in an increase in average labour productivity. In this case, the threat that trained workers might leave may mean that the productivity gains might be split to some extent between firms and workers (numerous studies have suggested that the returns on employer funded training are split equally between workers and firms⁹).

However, to the extent that these improvements in productivity are also accompanied by an increase in demand for these products, then increases in employment might be also expected. Equally, improvements in efficiency may also raise the competitiveness of the firms concerned, reducing the probability that Primes and Tier 1s source inputs from (or relocate production) to foreign territories (potentially leading to jobs safeguarded). Again, these impacts will have effects in secondary markets:

- **Product market displacement and multiplier effects:** Increases in production and market share will potentially be achieved at the expense of competitors (either competing firms within the supply chain, or other firms within the same industry). To the extent these competitors are based in the UK, there may be corresponding losses in employment (though if these firms were less productive, then such losses may be more than offset by benefits to the consumer in the form of lower prices or higher product quality). Equally, increases in production may lead on to increased demand for the inputs produced by supplier firms (leading to positive effects elsewhere in the supply chain).
- **Crowding out:** Increases in production will potentially be associated with greater demand for factor inputs, which may place pressure both on wages and the prices of intermediate goods and services. In the medium term, this may encourage other firms to reduce their consumption of these inputs, leading to offsetting effects (at the level of the whole economy). Equally, any human or other resources displaced in the short run will dampen pressure on factor prices, leading to the opposite effect. Once prices have adjusted, the medium term benefits of AMSCI projects are likely to be in the form of increases in the aggregate productive capacity of the economy (unless projects have also indirectly supported the absorption of under-utilised resources).
- **Spill-over effects:** Finally, AMSCI projects may lead to a wide range of spill-over effects that may not be captured by the firms concerned. These could include:
 - **R&D spill-overs:** Patents may not offer complete protection of the intellectual property generated through the delivery of AMSCI projects. Competitors may find patents straightforward to 'break', or find ways of building on the technologies protected,

⁷https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/142625/Lifting_off_implementing_the_strategic_vision_for_UK_aerospace.pdf

⁸ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/211901/13-975-driving-success-uk-automotive-strategy-for-growth-and-sustainability.pdf

⁹ See 'Forecasting the Benefits of the UK Commission's Portfolio of Investments,' Evidence Report 80, 2013, UK Commission for Employment and Skills. Available at https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/303349/forecasting_the_benefits_evidence_report_80.pdf (accessed October 2014).

allowing them to exploit the innovation efforts of beneficiary firms. Additionally, churn in the labour market may lead to the transfer of knowledge to competitor firms. As such, there may be spin-off economic benefits of AMSCI (in the form of profits) that are not captured by the firms concerned.

- **Environmental externalities:** Many AMSCI projects have energy efficiency objectives, with aims to reduce the cost of energy for the firms concerned. If projects are successful in meeting these objectives, then there may be broader environmental externalities associated with the projects in the form of reduced CO₂ emissions (as well other possible effects such as improved air quality). This will in turn lead to a reduction in the future cost of abatement.
- **Consumer surplus:** Improvements in productivity may not solely be captured by the firms concerned. For example, if firms seek to increase their market share through reducing their prices (and encouraging other firms to follow suit), then the welfare benefits involved may not be visible in improvements in firm profitability or productivity but enhanced consumer welfare. Estimating such effects would require an assessment of the causal effects of AMSCI on both overall level of consumption of the goods produced by the industrial sectors of interest, and their prices.

A logic model for AMSCI is set out in Figure 2.1.

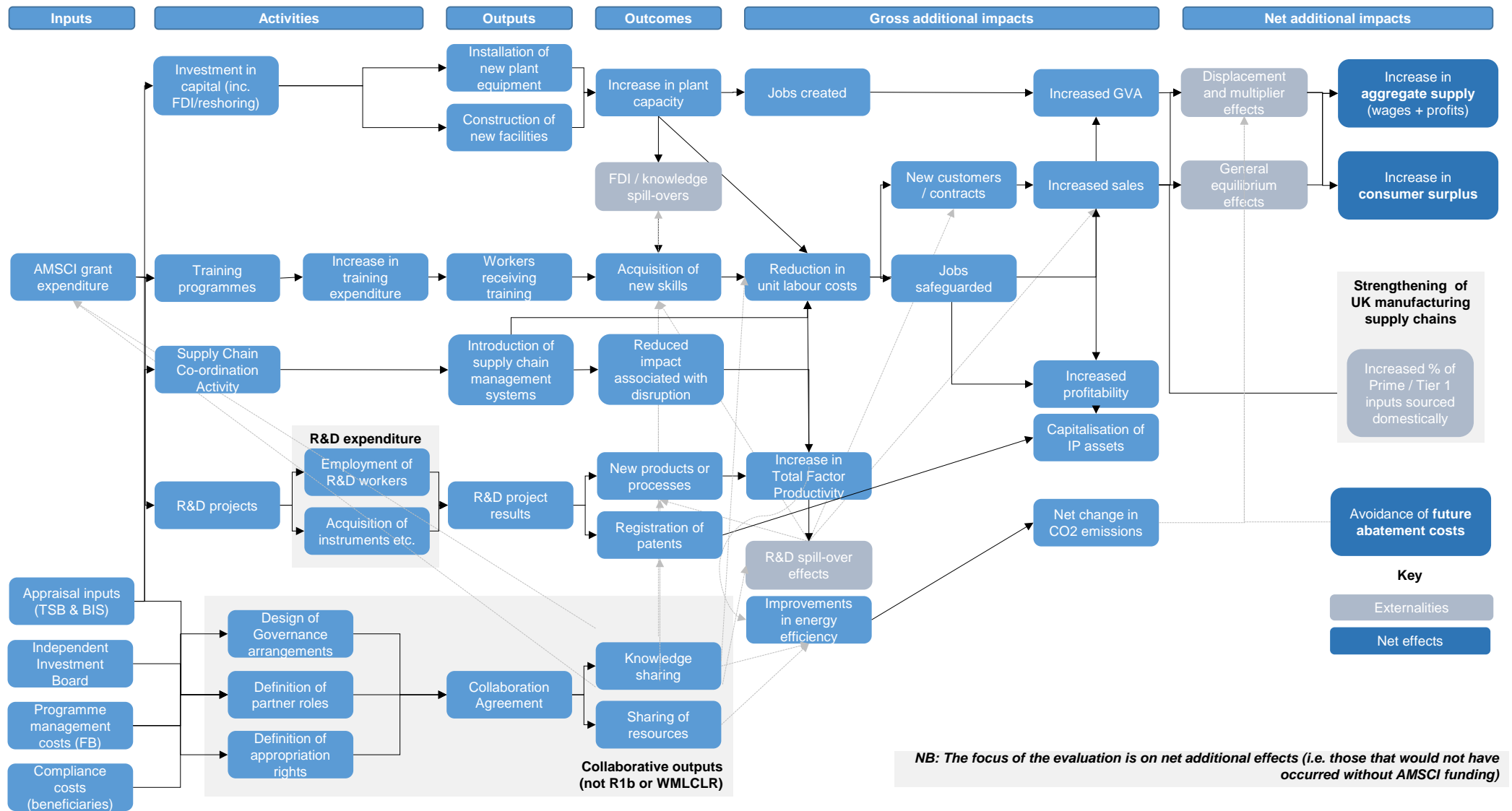
2.4 Progress to date

The first tranches of AMSCI funding were allocated in 2012, and the majority of projects are in the early phases of delivery (which is reflected in the drawdown of AMSCI grant funding against budgeted amounts – see Figure 2.2). Monitoring data at August 2014 suggests that, of the total grant and loan commitment of £175.6m, just 15 percent of this expenditure had been defrayed (the majority of which was associated with the twenty projects funded through the first two rounds of the scheme).

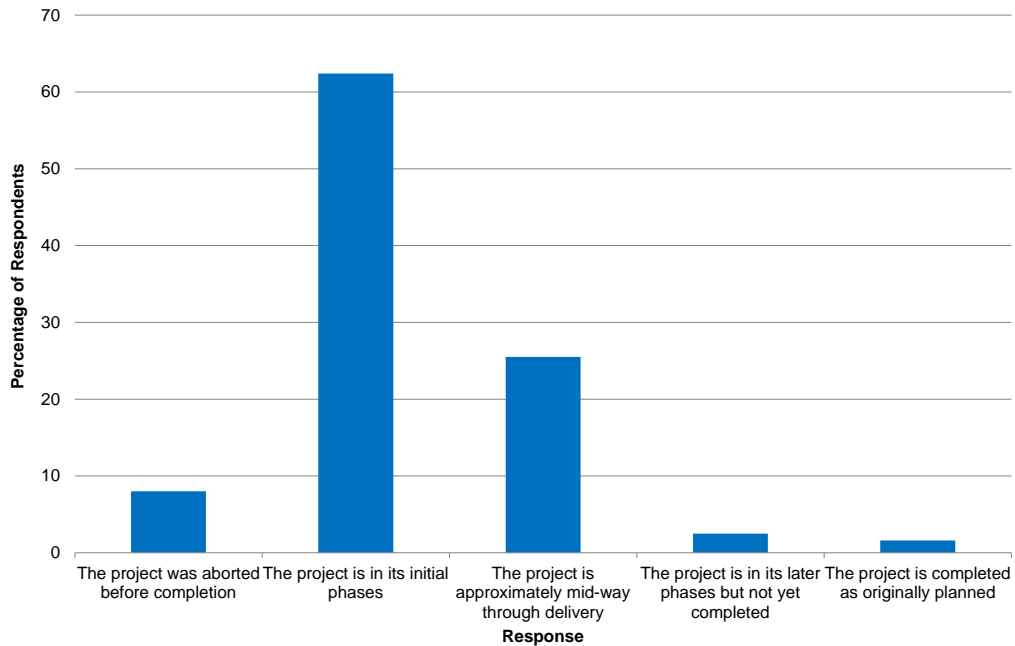
Monitoring data also suggests that only three of the projects funded in later rounds have begun (with majority in the process of due diligence). These observations were confirmed by the survey of applicants undertaken as part of the study, in which the majority of respondents reported that the project was in its initial phases.

In addition, the evidence gathered through the Process Evaluation of AMSCI suggests a number of projects are progressing slightly more slowly than expected, resulting in underspend relative to the original profile of expenditure. Similarly, as can be expected there is still progress to be made before the overall jobs targets are met (11.5 per cent of the overall target for the number of jobs created has been met and 42 per cent of the number of jobs safeguarded). However, it should be noted that most projects appear to be progressing successfully or are relatively free from major risks. Moreover, in-depth interviews with applicants suggest that there is a relatively positive outlook regarding the potential for successful project implementation though the Process Evaluation also highlights a risk of potential under-performance.

Figure 2.1: AMSCI Programme Logic

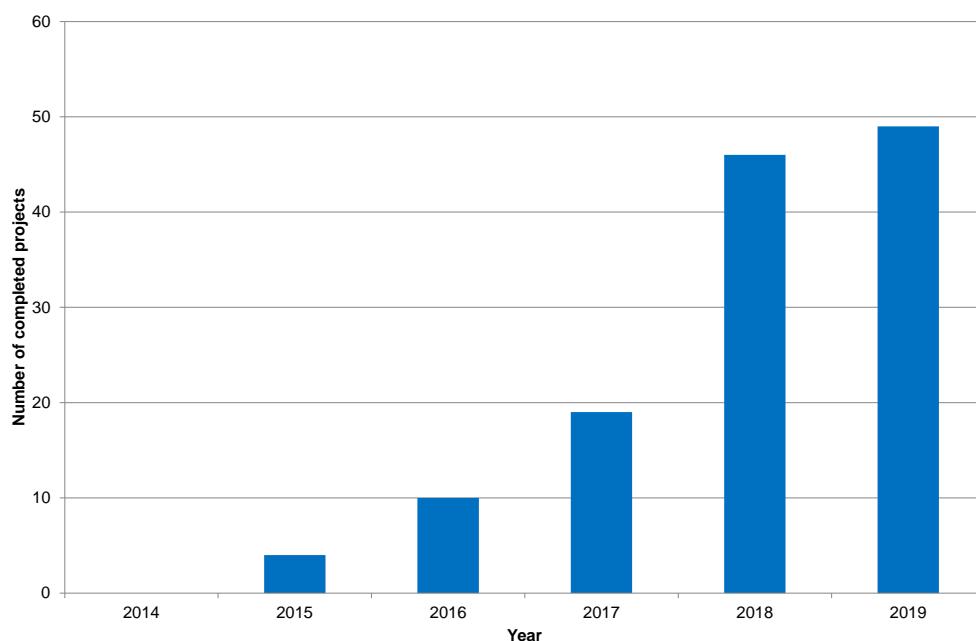


Success factors from literature: Trust and information sharing; prior experience of collaboration; stable personnel; geographical proximity to enhance communication (Cunningham and Gok, 2012)

Figure 2.2: Progress of AMSCI funded projects

Survey of applicants (base: 62 lead applicants and partners)

AMSCI projects are also long term in nature. Appraisal data suggests that the average project length is in the order of three years, and it is not expected that the majority of projects will complete until 2018, as shown in Figure 2.3. Additionally, given the prominence of R&D projects in the project portfolio, it may be some time beyond 2018 before the impacts are felt (an issues examined in more detail in the parallel scoping study).

Figure 2.3: Estimated completion year of AMSCI projects

Source: Innovate UK appraisal data

As the majority of projects are either in their early stages or have not started, there are substantial constraints on the range of outcomes that can realistically be explored through this early additionality assessment. In the majority of cases, there would unlikely be any evidence of effects on investment and employment, unless the Conditional Offer Letter is sufficient to give confidence to the firms to make investments in the projects before the due diligence process is complete (as is the case for firms involved in the Regional Growth Fund). For those projects that have started, early job creation effects may be visible (though it is likely that additional jobs are associated with the R&D investment, rather than on-going jobs associated with expansions in capacity or the production of new products).

Given these constraints, the primary focus of this report is on how far there is evidence that AMSCI has tackled the market failures it might be expected to address, and exploring the issue of project additionality (i.e. how far the projects would have otherwise proceeded in any form in the absence of the funding provided through AMSCI). Some consideration is given to the economic outcomes that have been delivered to date (based both on the results reported by applicants in the survey, and quasi-experimental results from a data-linking exercise). However, given the early stage of delivery, it is premature to attempt to estimate the overall value of the possible benefits of AMSCI (or provide estimates of value for money).

3.0 Strategic Alignment

The first tranches of AMSCI funding were allocated in 2012, and the majority of projects are in the early phases of delivery (which is reflected in the drawdown of AMSCI grant funding against budgeted amounts). This section considers how far the portfolio of projects funded through AMSCI aligned with the overall strategic objectives of the programme.

3.1 Resource Allocation

AMSCI has been delivered as a contestable fund over seven discrete funding rounds. Applicants for funding submit an application form which is subject to an initial scope check (to verify that the bid meets the eligibility criteria for funding, such as the requirement for collaboration). If the submission passes the scope check, the bid is then subject to an appraisal process. This appraisal process has two dimensions: a technical appraisal focusing on issues of technical feasibility, and a value for money appraisal undertaken by BIS economists (which values the likely net benefits of the project¹⁰ relative to the costs to the private sector). If the application passes both appraisals, the bid, appraisals (and supplementary information on the financial health of the companies involved) is given considered by an Independent Investment Board to reach a decision on whether to fund the project. The considerations of the IIB revolve around how far the application aligns with the overall objectives of AMSCI, the technical feasibility of the project, the level of risk involved, and issues of return on public sector investment.

Table 3.1 provides details of the number of applications received and their success in the application process. A total of 168 applications were received across the various AMSCI funding rounds (excluding AMSCI 2014), of which 12 of these were repeat applications (an application associated with one project was submitted in three funding rounds, implying 157 unique applications were received). 73 of these bids passed both the technical and (where relevant) the VFM appraisal, and were considered by the Independent Investment Board. This led to the approval of 58 projects for funding.

Table 3.1: Number of applications to AMSCI by Round

Application	Round 1.1	Round 1.2	Round 2	Round 3	Round 4	WMLCR	Total
Total applications received	10	22	41	24	51	20	168
Number of repeat applications	0	0	2	3	7	0	12
Number of unique applications	22	22	30	30	34	0	157
Bids passing technical and VFM appraisals (where relevant)	5	9	14	11	15	19	73
Number of projects funded	3	9	13	5	9	19	58

Source: AMSCI application forms held by Finance Birmingham

¹⁰ In the form of wages accruing to the expected additional workers employed directly or indirectly by the applicant, increases in wages accruing to workers receiving training funded through the project, the value of R&D spill-overs, and any wider benefits that can be monetised.

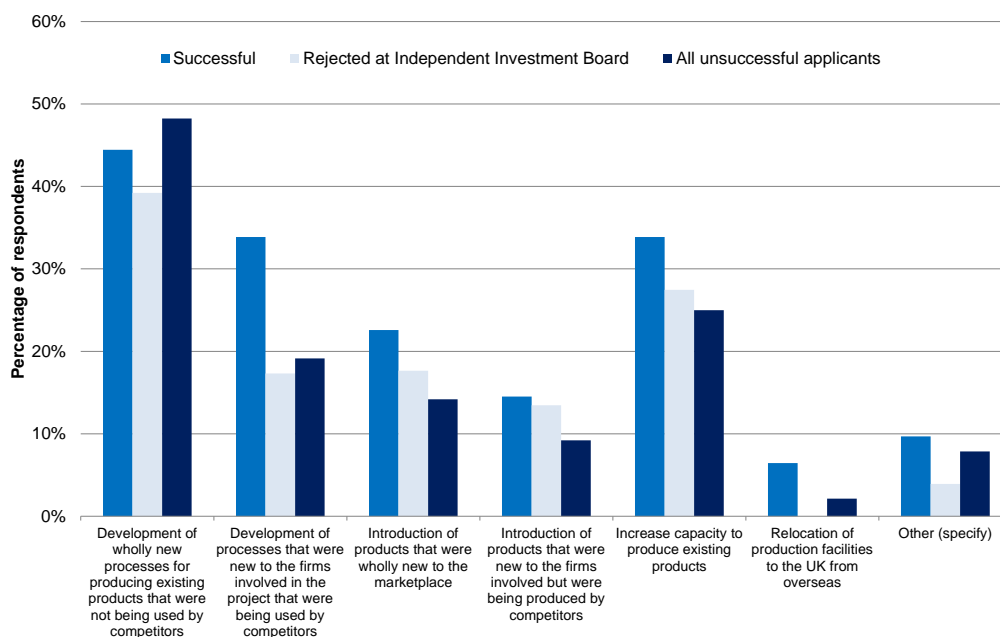
3.2 Characteristics of Projects

The applications associated with successful applications for funding were examined in depth and classified against an initial typology describing the key features of the bids involved (in terms of their goals, spending, market failure justifications, and collaborative features). The classification framework was developed initially through a detailed examination of 15 applications, before iteratively refining the framework through its application to the remaining successful applications. In addition, the survey of applicants was utilised to provide additional information on the key features of projects.

Project characteristics

Respondents to the survey that took place as part of the parallel process evaluation completed as part of this study were asked to report the main business objectives associated with AMSCI projects. As suggested in Figure 3.1, respondents indicated that AMSCI projects mainly involved some form of process or product innovation (with the emphasis on the former rather than the latter). In addition, the emphasis of both process and product innovation was on frontier technology (bringing wholly new products or processes to market) rather than catching up with competitors (i.e. innovations new to the firm). Around a third of successful projects also involved an emphasis on up-scaling production capacities to produce existing products. Few projects involved re-shoring objectives (the relocation of production facilities to the UK from overseas).

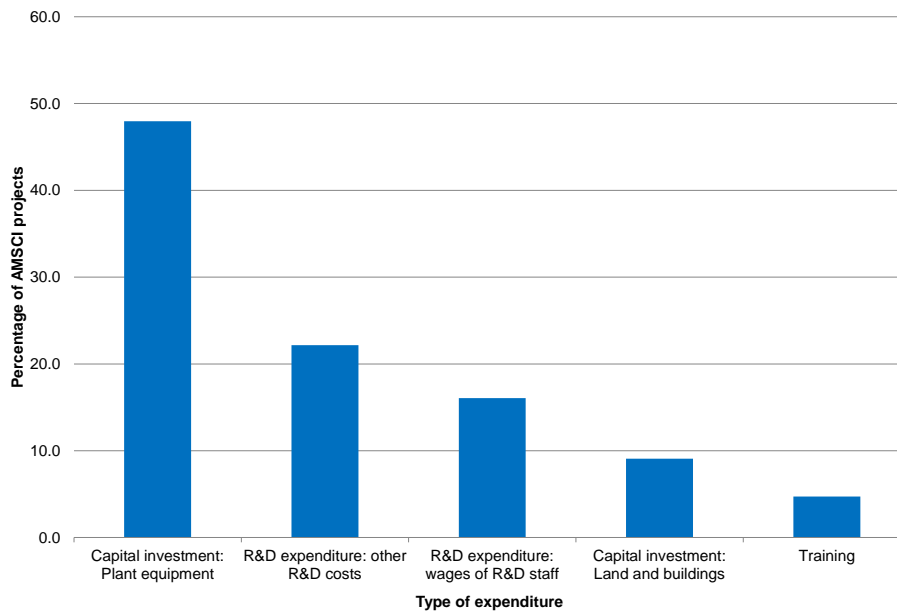
Figure 3.1: Planned development or delivery from AMSCI projects



Source: Survey of applicants (Base: 203 lead applicants and partners)

Project Spend

The spending of AMSCI projects was classified in terms of type of capital spend (land and buildings or plant equipment), type of R&D spending (wages associated with R&D staff or other R&D project costs), and training expenditures. Figure 3.2 shows that close to half of the expenditure associated with AMSCI projects, is in the form of capital investment in new plant equipment, with a further 40 percent associated with R&D project costs or the wage of R&D staff. Training expenditure was only a small component of project spending (4 percent of total project costs).

Figure 3.2: Distribution of AMSCI project expenditure

Source: Analysis of Application forms

Business objectives

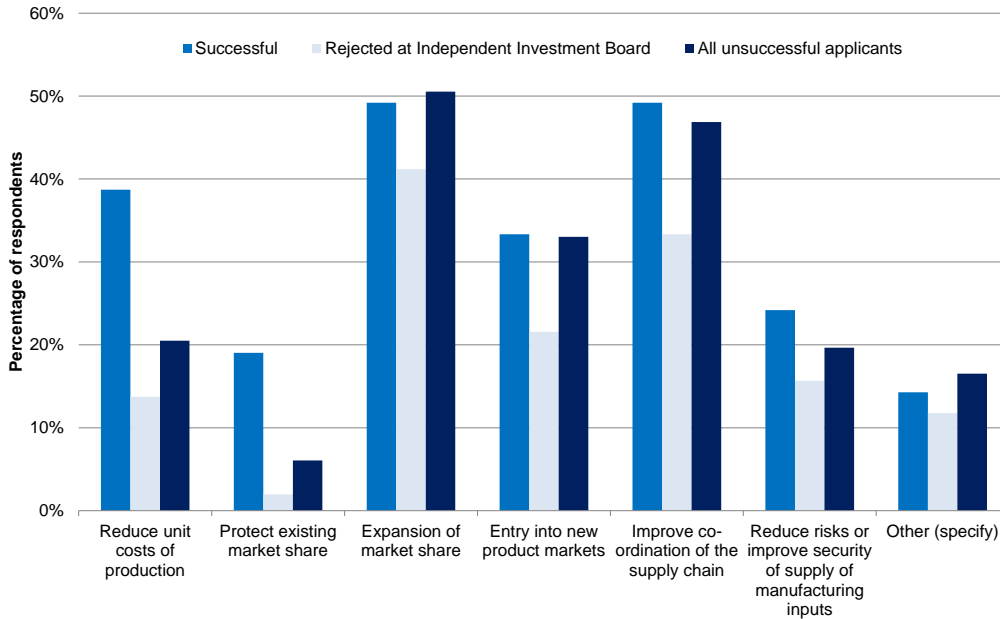
Figure 3.3 sets out the main business objectives associated with the projects funded through AMSCI (as reported by the lead partners and collaborators). The survey suggested that there were four main aims associated with AMSCI projects: expansion of market share, improving co-ordination across the supply chain, reducing unit costs, and securing entry into new product markets. There was little evidence that AMSCI projects were defensive in nature: protection of market share did not seem to be a key consideration. This is broadly consistent with the overall policy goals of AMSCI to improve the competitiveness of manufacturing supply chains and to secure growth in high value added sectors.

The case studies provide some support for these findings in the sense that each of the ten case study projects involved a focus on the reduction of unit costs (either through installation of plant equipment or through collaborative R&D) or through the development of new products. In three cases, the projects involved specific collaborations involving a Tier One supplier or Prime and component manufacturers to develop defined new products (while a further project involved funding to establish a new supply chain for a product that was not manufactured within the UK). Two further projects involved activities aimed at addressing specific inefficiencies in existing supply chains. A final programme was funded to support collaborative R&D projects aimed at developing new technologies in the aerospace sector.

However, in one case (involving a capital investment subsidy for a single firm), the potential improvement in overall supply chain efficiency was less clear. Another involved funding for facility to allow the low cost manufacture of novel componentry and systems that might feed into collaborative R&D projects (though it less clear that such a project would specifically improve the efficiency of supply chains, though such an outcome would be a plausible scenario).

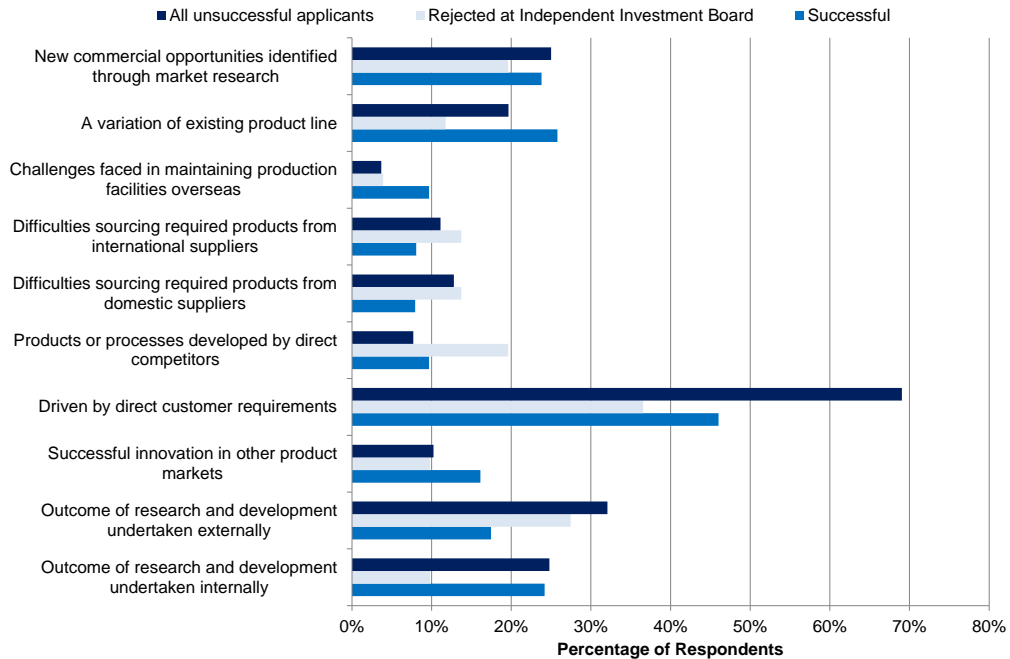
Respondents were also asked to report where the idea for the project originated. The survey suggested that in almost half of cases, the project was being driven by direct customer requirements (see Figure 3.4).

Figure 3.3: Main business objectives of the AMSCI projects



Source: Survey of applicants (Base: 203 lead applicants and partners)

Figure 3.4: Origin of the idea or concept behind AMSCI projects

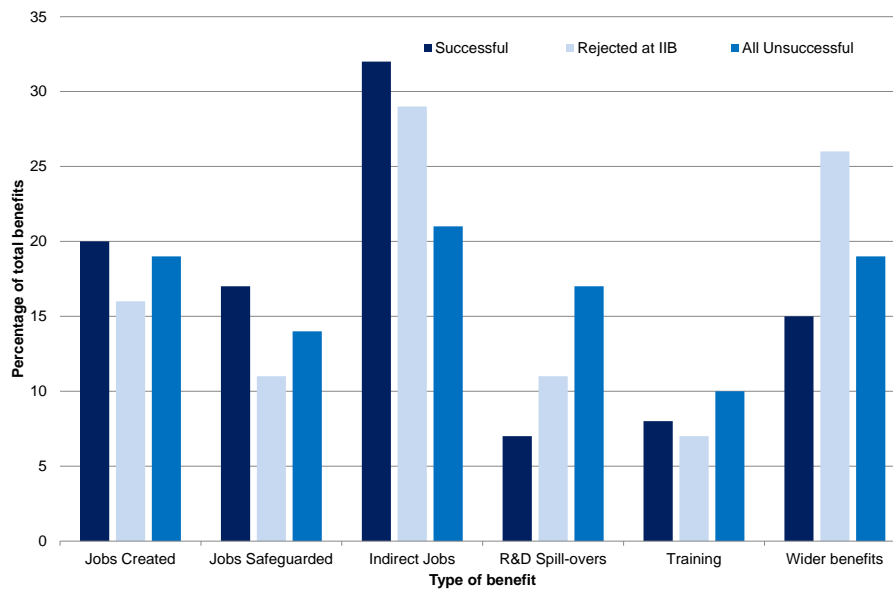


Source: Survey of applicants (base: 203 applicants)

Anticipated benefits

Figure 3.5 shows the decomposition of benefits associated with successful and unsuccessful projects by type of benefit (as measured through the VFM appraisal process). As the figure shows, over 35 percent of the anticipated benefits of successful AMSCI projects were driven by estimates of the job creation and safeguarding effects associated with the bids and more than one third through indirect employment impacts (i.e. multiplier effects beyond the immediate collaborators involved). Productivity gains through R&D spill-overs and training effects were a relatively small component of the overall benefits involved as measured through the appraisal process (though estimates of wider benefits often incorporated measures such as cost savings driven by energy efficiency gains, which should also be included under the heading of productivity gains).

Figure 3.5: Distribution of projects by expected benefits



Source: Analysis of (VFM) appraisal Data

Lead applicants and partners were asked to describe how their organisation anticipated benefitting from the collaborative project. While the main benefits anticipated were greater profitability (reported by 38 percent of respondents) and increased market share (31 percent of respondents), there was also a suggestion that the acquisition of knowledge and skills through the project was almost of equal importance (29 percent). This might suggest the maintenance or creation of a technological advantage was central to at least some of the projects funded through AMSCI. Case study evidence is supportive of this interpretation, with this being a key aspect mentioned by four of the ten projects: as an example, one lead applicant (a manufacturer of diesel engines) suggested that, to remain competitive, continual advances are required in both the technical and environmental performance of the products concerned. In turn, this required co-ordinated R&D activity across the supply chain to ensure componentry was also improved (to specifications required by the lead applicant).

Markets

The survey was used to establish measures of the geographical profiles of the customers and competition of AMSCI beneficiaries and unsuccessful applicants. Successful applicants reported that (on average) around 35 percent of their customers were outside the UK, while 65 percent of their main competition was based outside the UK. A similar profile was reported by unsuccessful applicants. This again suggests that AMSCI subsidies are broadly reaching the target groups it was intended to reach: manufacturers facing competitive threats from overseas manufacturers.

The applications forms were also used (where possible) to categorise the geographical profile of the main customers of supply chains (i.e. the export orientation of the products involved), and the geographical profile of the competition faced (in terms of 'domestic,' 'international' or 'mixed' markets). The majority of AMSCI projects involving goods being produced for mixed (both domestic and international markets, 83 percent of projects), facing competition from suppliers based internationally (68 percent of projects).

3.3 Collaboration

The distinctive feature of AMSCI (as compared to programmes such as the Regional Growth Fund) is its emphasis on collaboration across supply chains. As highlighted in the preceding chapter, there are a range of market failures that could constrain the emergence of co-operation across supply chain firms (such as the unevenness of the returns involved, free-riding, and incompleteness of contracts), though none of the aspects were highlighted in the Business Case for AMSCI.

Table 3.2 shows the total number of (gross) participants involved in AMSCI applications (lead applicants and partners) by round. An analysis of application forms suggest that a total of 870 lead applicants and partners were involved in AMSCI applications over the six rounds (an average of 5.1 partners per application). The average number of partners involved in Rounds 3 and 4 tended to be higher than average at 7.0 to 8.0 partners per application.

As is clear in the table, there were two rounds (1.2 and the WMLCR round), in which levels of collaboration were substantially lower: in the former, the requirement for collaboration was relaxed, while the WMLCR round was delivered as a single firm funding round. In these cases, it is more difficult to see that the projects funded aligned closely with the objectives of AMSCI (which aimed to improve the efficiency and competitiveness of supply chains, rather than individual links in those chains).

Table 3.2: Number of applications to AMSCI by Round

Application	Round 1.1	Round 1.2	Round 2	Round 3	Round 4	WMLCR	Total
Lead applicants	10	22	41	24	51	20	168
Partners	38	22	162	160	319	0	701
Average no. of participants	4.8	2.0	4.9	7.7	7.3	1.0	5.1
Total	48	44	204	184	370	20	870

Source: AMSCI application forms held by Finance Birmingham

Partners

There was some overlap in the partners across bids: firstly, in the case of repeat bids, the partners involved are counted in twice in Table 3.2. Additionally, some partners were named in multiple projects. Table 3.3 shows the distribution of ‘unique’ partners by applicant type, and success in the application process (partners that were successful at any point have been classified as successful applicants). This analysis suggests:

- **Numbers of unique partners:** There were a total of 247 unique successful partners involved in AMSCI funded projects.
- **Type of firms:** SMEs formed the majority of partners involved (around 66 to 75 percent), and large firms formed a large share of the remainder. Close to 20 HEIs were involved in total, alongside smaller numbers of other organisations (such as the NHS). The distribution of partners across different types of bid was relatively balanced.
- **Total Primes / Tier One suppliers:** Details of the Primes or Tier One suppliers named within the applications were extracted from successful and unsuccessful applications making it to the Independent Investment Board. It was feasible to identify one or more named Primes or Tier One suppliers in 48 successful applications and 14 unsuccessful applications that made it to the Independent Investment Board. A total of individual 67 Primes or Tier One suppliers were named across the bids examined. Fifty three of these firms were named in just one application across the pool of bids considered. A further 10 were named in two applications, with four further firms named in 3, 6, 7 and 14 applications respectively.

Table 3.3: Unique partners by organisation type (%s)

Application	Successful	All unsuccessful
Large Firm	30 (74)	24 (102)
SME	60 (148)	63 (273)
HEI	8 (19)	6 (27)
RTC	2 (5)	2 (7)
LA	0 (0)	1 (3)
NHS	0 (1)	0 (0)
Unknown	0 (0)	5 (20)
Total	100 (247)	100 (432)

Source: Application forms and minutes of the Independent Investment Board (number of partners provided in brackets)

Characteristics of Collaborations

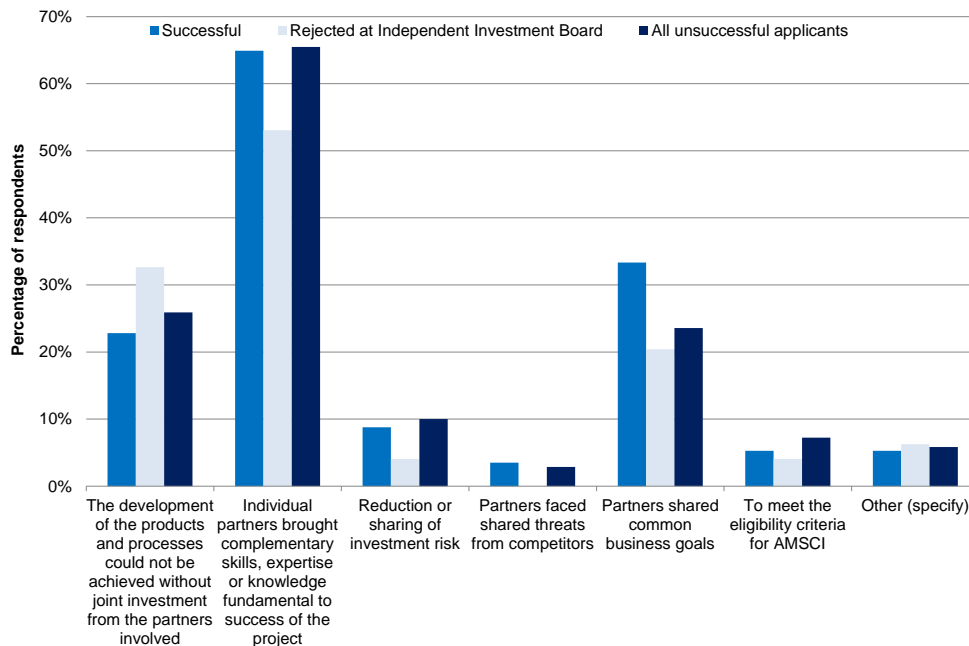
The survey was employed to explore the characteristics of the collaborative projects funded:

- **Novelty of relationships:** The survey was also used to explore the novelty of the collaborative relationships involved, and the results indicated that AMSCI has helped catalyse new relationships between firms. Thirty percent of respondents reported that they had never worked with the partners involved in the bid previously, while a further 43 percent had only worked with ‘some’ of the partners before. The case studies also highlighted some examples of lead applicants seeking out new partners to work with them in the project and bring specific

expertise (usually a manufacturing partner to support the development of new products), though this was by no means universal.

- **Nature of collaborations:** Collaborations tended to be vertically structured: 75 percent of respondents reported that the collaboration was mainly made of firms within the same supply chain, with few examples of firms competing in the same product markets working together. As such, this indicative that the communication of AMSCI objectives has been effective in stimulating applications from supply chain projects.
- **Motivations to collaborate:** Respondents to the survey were asked to report their main motivations to work on a collaborative basis. As suggested in Figure 3.6, the main reason for working in collaboration was that the individual partners brought complementary skills and expertise that was fundamental to success of the project, with sharing common business goals and a requirement for joint investment given as motivations of secondary importance.

Figure 3.6: Main motivation for working on a collaborative basis



Source: Survey of applicants (base: 203 applicants)

3.4 Summary

- In broad terms, the portfolio of projects funded through AMSCI aligns with its overall objectives. A diverse range of projects have been funded, mainly collaborative R&D projects focused on the development of new products, but also projects aimed at resolving specific inefficiencies in supply chains, and in one case, the creation of a new supply chains to manufacture products not currently produced in the UK. Such projects might be expected to deliver the objectives targeted by AMSCI, and in particular creating more competitive supply chains. Additionally, a high proportion of applicants aimed for an increase market share or to enter new product markets, which would also be expected to lead onto increased levels of purchasing from UK supply chains by Primes or Tier Ones, or the attraction of new customers. However, it should be noted that the policy objectives of AMSCI are relatively

broad, potentially justifying a diverse range of project activity provided it contributed to enhanced supply chain competitiveness.

- In addition, the survey evidence suggested that AMSCI funding has reached the types of firms intended, with a high proportion of beneficiaries reporting that their main customers were based in the UK, while facing predominantly international competition. Additionally, the survey evidence suggests that exchange of skills and knowledge was a key motivator for applicants to work in collaboration, while case study evidence suggested that in at least a share of cases, a need to maintain technological advantage or parity with international competitors was motivating the project. As such, AMSCI projects may work as much to safeguard the competitiveness of UK supply chains as strengthen them (particularly as a high proportion of applicants indicated that the projects were driven to a large extent by existing customer requirements).
- Given the availability of subsidies for capital investment and other projects on a single firm basis through the Regional Growth Fund (including RGF funded programmes led by intermediaries), valid questions might be asked around the need for the Regional Round 1 of AMSCI and the West Midlands Liverpool City Region programmes where the need for collaboration was relaxed. In the delivery of future schemes, careful consideration of how far changes to eligibility criteria might dilute the focus on the underlying policy objectives should be undertaken before they are made.

4.0 Additionality

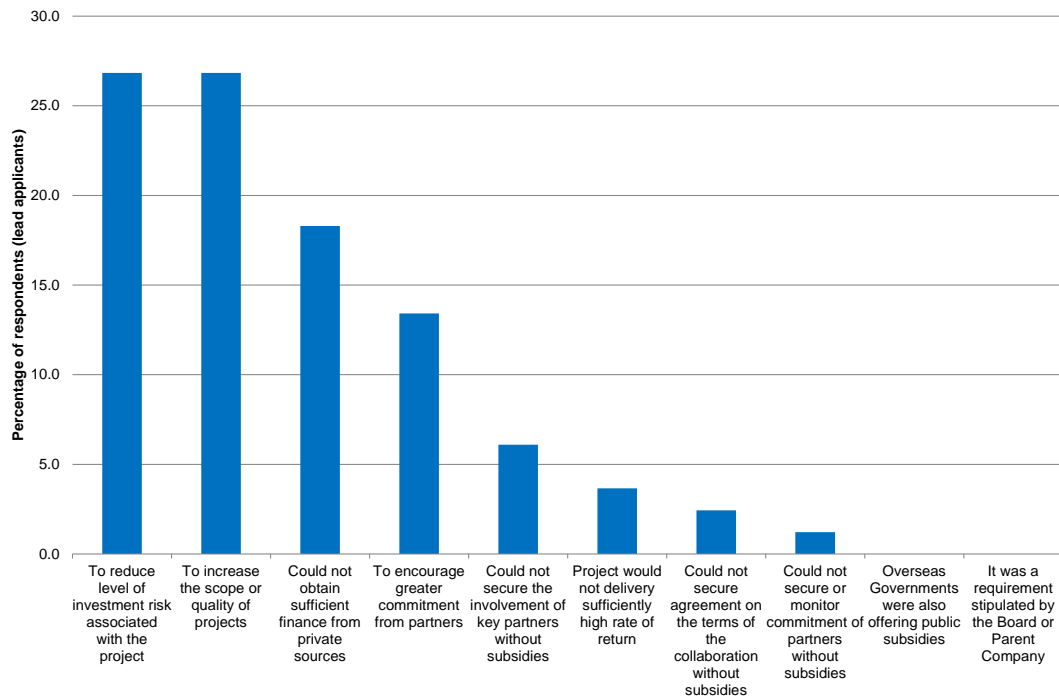
This section provides an assessment of the evidence available on the additionality of the projects funded through AMSCI. This section first examines how far the available evidence suggests that the projects funded through AMSCI would have otherwise gone ahead without the funding provided. Consideration is also given to evidence of economic results, though at this stage, the evidence is limited.

4.1 Motivations for applying to AMSCI

Lead applicants responding to the survey were asked to report their primary motivation for applying for funding through AMSCI (and responses to the survey are provided in Figure 4.1). Although motivations were diverse, the most commonly reported objectives were to reduce the level of investment risk associated with the project, and to increase the quality or scope of projects (though the latter was less commonly reported by successful applicants). Difficulties in obtaining finance from private sources were reported by 18 percent of respondents, while 14 percent suggested that AMSCI funding was sought to encourage greater commitment from partners.

The priority of reducing the level of investment risk within projects may explain, in part, the low level of loan requests for AMSCI projects. Only 20 percent of the funds requested have been in the form of loans. While it is logical that grants, when available, would be preferred by firms to loans, it should also be noted that loans would not perform the function of reducing investment risk.

Few respondents suggested that they sought AMSCI funding because the project would not generate sufficiently high returns on investment (though clearly there is a strong possibility of strategic response bias in these findings). No respondents indicated that overseas Governments were offering competing subsidies, aligning with the finding above that AMSCI has not (at least over the first six rounds of the scheme) seen large volumes of funding reach internationally mobile re-shoring projects (which may be most likely to see competing subsidies from overseas territories).

Figure 4.1: Reason for seeking AMSCI funding for the project

Survey of applicants (base: 62 lead applicants and partners)

4.2 Financial Constraints

As suggested in the preceding section, AMSCI projects tended to focus on frontier product and process innovations, which tend to be associated with greater risk than innovations that are new to the firm but not to the market, owing to uncertainties as to whether technology will deliver its anticipated cost savings or the strength of demand for the products concerned. The most frequently reported motivation for applying for AMSCI funding was to reduce the level of financial risk associated with the project. This section considers how far AMSCI beneficiaries were subject to constraints in financial markets, which would have prevented them taking forward their projects using private resources.

Lead applicants were asked to report whether they had sought any form of private finance prior to making their application for AMSCI funding. Almost 70 percent of respondents reported that they had not¹¹ (with the majority of the remainder reporting that they had sought debt finance to fund the project). The main reason given for being unable to secure sufficient funding privately was that the project involved too much risk for creditors. While this would be suggestive of financial market imperfections (given the anticipated profits associated with the projects), too few firms had sought private finance to make a judgement as to the strength (or indeed the presence) of the market failures involved. Firms may also make these decisions based on

¹¹ This result is drawn from a census survey of applicants, and is likely representative of the population of AMSCI applicants (the findings were also broadly confirmed by the qualitative results from the case studies). This finding is to some degree surprising as AMSCI application guidance suggests that high quality applications would include such information, though discussions with steering group indicated that firms may not be willing to make an application for finance if they thought there was a risk of being turned down (owing to negative effects associated with being rejected on ability to secure finance in the future).

previous experience of applying for private finance or internal constraints, being aware of the transaction costs and risks involved in rejected bids (and almost all successful applicants anticipated that they would have had difficulties funding the project had their application been rejected). The case studies shed additional light on this issue:

- **Debt:** In only one case study did an applicant report that they had sought debt finance before applying to AMSCI, and had been rejected twice (this project was a purely capital investment in focus). In four cases, the applicant reported that they did not want to incur the transaction costs involved on the expectation that they would be rejected (largely because they assumed that the project would have carried too much risk for a bank, and in each case, the project in question was an R&D project). One firm commented that financial institutions typically require detailed projections of the anticipated sales or cost savings, which could not be produced by the applicant (and, as such, they did not seek funding). However, in four further cases, debt finance was not considered as an option, on the assumption that the company involved would otherwise be funded from own funds. The final project was delivered as a 'mini-AMSCI' programme (and as such, the programme itself could only have been funded through public funds).
- **Equity finance:** In four of the ten cases was equity finance given any consideration by the applicants or partners. In two cases, the applicants were not open to equity investment as it would have entailed a loss of control of the business. In one further case, the partner holding the relevant patent had previously obtained equity finance to fund its R&D, though there was some debate amongst the partners as to that project as to whether further equity finance might have been otherwise obtained. In one final case, the applicant considered that the AMSCI grant made the balance sheet of the firm a more attractive proposition for external investors (though the applicant had not secured further investment at that stage).
- **Own funds:** For six of the case studies, there was an implicit or explicit assumption that the firm would otherwise seek to fund the project from its own funds. In three of those cases, the view from the applicant was that the project would have otherwise progressed at a slower rate using the working capital available internally. In two cases, there was a perception that the board would not have approved the investment needed to deliver the project, because the project was deemed too risky, or because delivery of the project would have required the lead applicant to subsidise the R&D expenditures of its suppliers. In a final case, the project had been shelved owing to internal funding constraints and may have ultimately been taken forward overseas. Uncertainties regarding the potential pay-offs also appeared to constrain funding from own company funds: a metal packaging manufacturing seeking to implement a new process leading to reduced material consumption, weight and cost per unit faced substantial uncertainties over the size of unit cost reductions (leading to reluctance of the board to invest at the scale required).
- **Alternative exit strategies:** There was also a suggestion in two cases where ownership of patent rights was critical, that an alternative exit strategy of selling those rights would have been adopted.

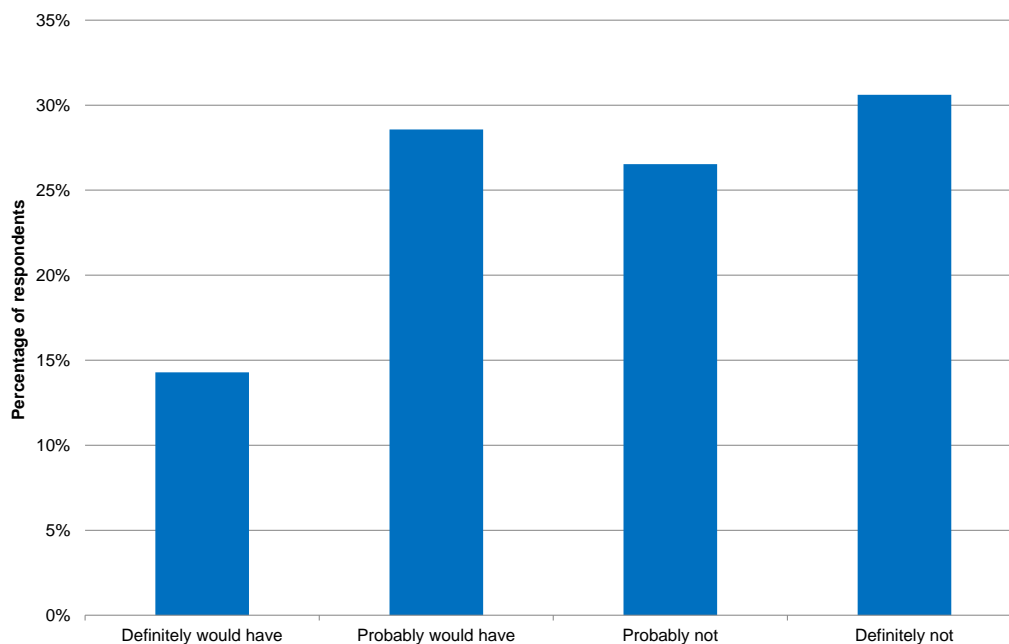
Given the above, it is not clear that financial market imperfections will have always prevented projects moving forwards, particularly given the expectations amongst many applicants that they would fund R&D activity from their own funds (and clearly, difficulties in securing finance is not an indication of market failure, unless the social benefits of the project exceed the costs). As highlighted by the Process Evaluation, the Independent Investment Board placed substantial emphasis on considering how far the relevant supply chains would have an

incentive to fund the projects themselves. Nevertheless, this result is possibly suggestive that more stringent tests of the financial constraints faced by firms might be applied to improve the overall value for money associated with the portfolio (either as part of the appraisal or due diligence processes), for example, by asking firms to produce greater evidence of their financial constraints, their corporate financing history or (as suggested in the Process Evaluation) use the expertise of sector analysts to a greater degree.

4.3 Collaboration Issues

Given the emphasis on supply chain collaboration in AMSCI, the transactional frictions identified in section two also have the potential to create challenges in moving projects forward without public sector support. The survey was used to gather views from the partners involved in successful applications on the importance of AMSCI funding in securing their commitment to the collaboration. Results were mixed, with a slightly higher proportion of respondents (around 55 percent) reporting that they definitely or probably would not have participated in the project had the funding application been unsuccessful than the reverse (see Figure 4.2).

Figure 4.2: Whether organisation would have participated in the project had the application for AMSCI funding been unsuccessful



Source: Survey of applicants (base: 203 applicants)

There was some evidence that suggested that the collaborative nature of the projects may have caused hold-ups in some cases:

- **Uneven returns:** Uneven returns to collaboration were also highlighted as an issue in two of the ten case studies. In one, the lead applicant was of the view that without AMSCI funding they would have had to subsidise the R&D activity of their suppliers, creating intolerable risks for the board and would have caused their withdrawal from the project. This pattern was observed in another case study, in which a partner involved in a project involving the development of new lighting products in that they would have only been willing to participate on commercial terms (i.e. as a subcontractor). In these cases, the subsidies available through

AMSCI appear to have been an important factor in securing the commitment of partners to share risk and commit resources to the project.

- **Incomplete contracts and free-riding:** Both successful applicants and unsuccessful applicants that took (or were planning to take) their projects forwards were asked to report how far they had faced issues in reaching agreement on the ownership intellectual property, the creation of legal entities for joint ventures, creating contracts defining the roles and responsibilities of partners, and reaching agreement on how the lead partner would monitor the contributions of lead partners. These issues were highlighted as difficulties by around 20 percent of respondents (rising to a third of successful applicants) with the exception of creating legal entities for joint ventures. In no case study, however, were these issues highlighted as a significant factor preventing the project proceeding, though in two of the ten case studies, the lead applicant suggested the AMSCI due diligence process did serve to focus the partners involved on resolving these issues.
- **Transaction costs:** In one case, the lead applicant indicated that the a key function of AMSCI subsidies was to enable them to incur the transaction costs involved in managing multiple collaborative projects simultaneously, rather than sequentially. In addition, the same applicant suggested that the funding rules also altered the pattern of collaboration, forcing them to work with UK based partners where they might have otherwise selected from a broader range of international partners.

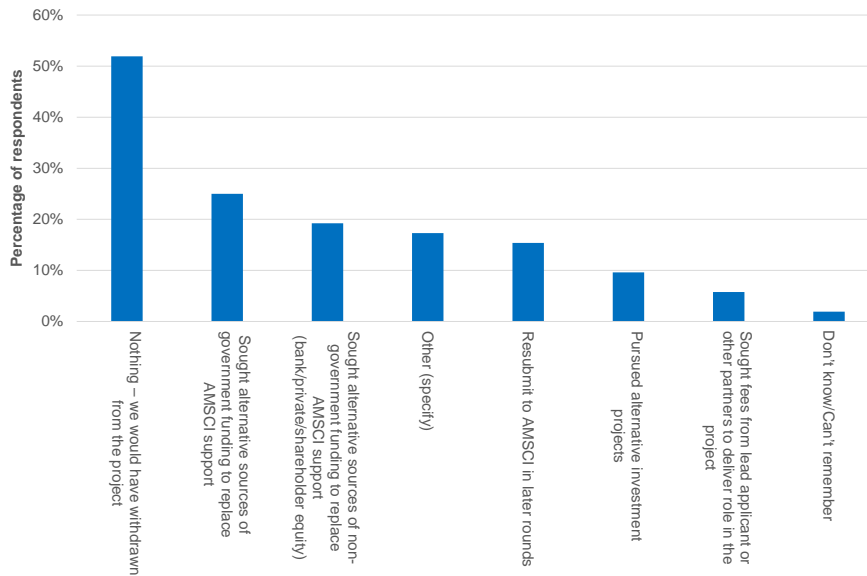
The existence of previous collaborative relationships may be indicative that the partners involved have managed to overcome some of the transactional frictions inhibiting supply chain collaboration identified in Section 2, though the evidence suggests that even where relationships are not novel, Prime or Tier One firms may struggle to leverage their suppliers to commit resources to risky investments. The Process Evaluation notes that these types of issue are considered at the appraisal stage, but such evidence was only considered if it was provided by the applicant. Adjustments to the application form to require applicants to demonstrate why the collaborative aspects of the project could not be delivered without public investment could be beneficial in supporting a stronger assessment of additionality (particularly where the evidence on financial market constraints is weaker).

4.4 Views of successful applicants

Successful applicants were asked to consider how they might have responded to a rejection of their application for AMSCI funding (Figure 4.3), and take a view on whether projects would have been taken forward (in any form) without this funding. Around half of respondents suggested that they would have withdrawn from the project if they had not been successful in their application for AMSCI funding. The remainder of respondents mainly suggested that would have either sought other Government funds or private funding. This may suggest the possible benefits of including more stringent tests of the financial constraints faced by applicants - however this could be a result of firms making full use of the preparatory work that has already been completed.

Respondents were also asked to consider the range of difficulties that they might have encountered in taking their project forward in the absence of AMSCI funding (Figure 4.4). Almost all successful applicants suggested they would have faced challenges in securing the capital investment or revenue funding involved and securing the commitment of the board or parent company. The majority also suggested that they would have faced difficulties in securing the commitment of partners.

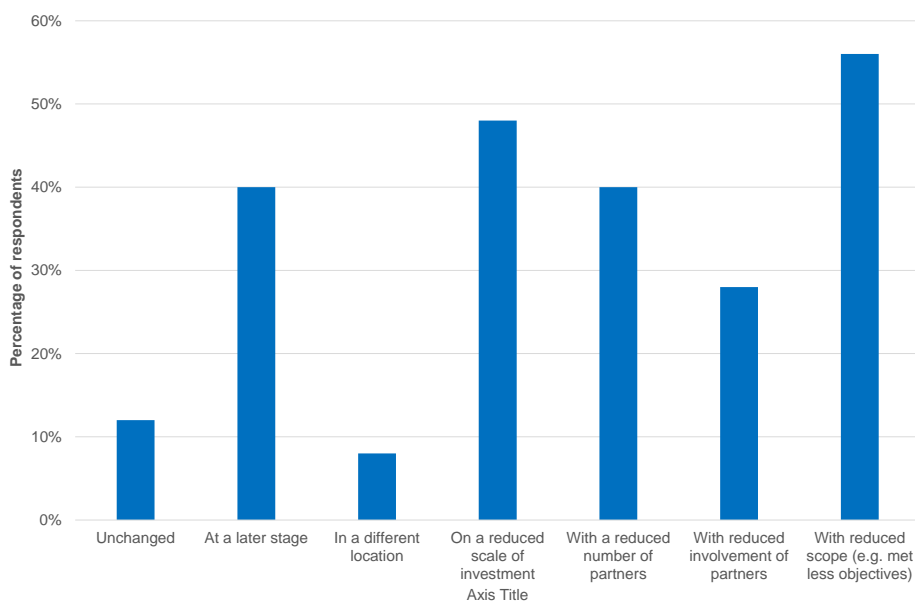
Figure 4.3: Expected course of action taken if the AMSCI application had been unsuccessful



Source: Survey of successful applicants (base: 101 applicants)

Forty three percent of successful applicants suggested that the project would have proceeded in some form in the absence of AMSCI funding (though care should be taken in interpreting this as an estimate of deadweight, owing to the substantial issues associated with the validity of self-reported estimates of impact). Of these, around 12 percent indicated that the project would have proceeded unchanged. Over half suggested the project would have gone ahead with reduced scope, with slightly smaller proportions suggesting the project would have been taken forward with a reduced scale of investment, at a later date, and/or with a reduced number of partners.

Figure 4.4: How unsuccessful projects would have proceeded without AMSCI funding



Source: Successful applicants suggesting project would have been taken forward without AMSCI funding (base: 43 applicants)

The case studies of successful projects provide a range of complementary insights into how successful applicants anticipated their projects might be taken forward in the absence of funding. Two lead applicants suggested that it would be probable that the project would go forward in a sequential manner where the investments being made were divisible: one SME led project suggested that the project could have been taken forward from working capital (though over a period of ten years), while one large firm indicated that the R&D programme would have been split into smaller projects and taken forward sequentially rather than simultaneously (again, over a period of ten years).

Although cited by only a few collaborators in the survey, there is evidence from one case study that some partners would be keen to pursue the project on a fee basis (i.e. being commissioned by another partner to undertake the work without having to commit their own funds), if the application to AMSCI had not been successful. This is likely to be a more appropriate solution where the collaborator is providing technical expertise or product testing rather than making risky R&D investments as suppliers. However, this would rely on the lead applicant, or another partner, being able and willing to take on the full cost and risk of the investment (highlighting the possible barriers being created by the unevenness of returns across partners, as well as the issues of the lead being able to fully capture the full returns from investment in this scenario).

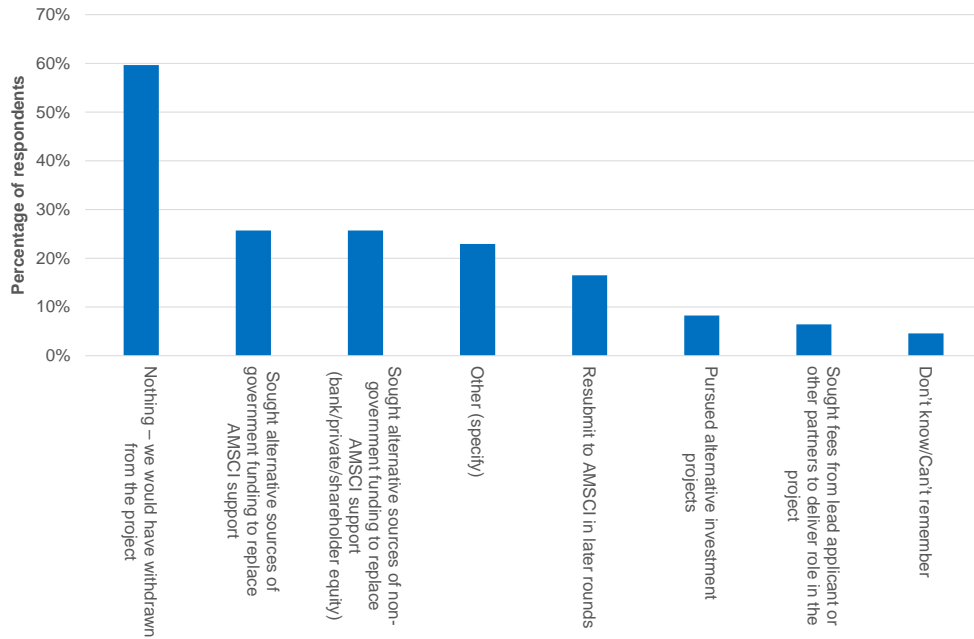
The case studies also explored whether firms would have identified other investment opportunities had the application to AMSCI been unsuccessful. In general respondents value innovation and would be willing to invest funds for research and development, but in support of lower risk or shorter term projects (where the private return to the company is more predictable). For example, one collaborator said that the company would continue to invest in developing their manufacturing processes but this would mainly involve “fine-tuning” of existing processes rather than “a step in the dark”.

4.5 Experiences of unsuccessful applicants

Unsuccessful applicants were asked a similar set of questions to report their experiences following rejection for AMSCI funding (Figure 4.5). Respondents were asked to report the action they took following rejection for funding: 60 percent reported that they withdrew from the project, while around 25 percent indicated that they applied for private finance, other Government funds, and/or resubmitted to AMSCI in later rounds.

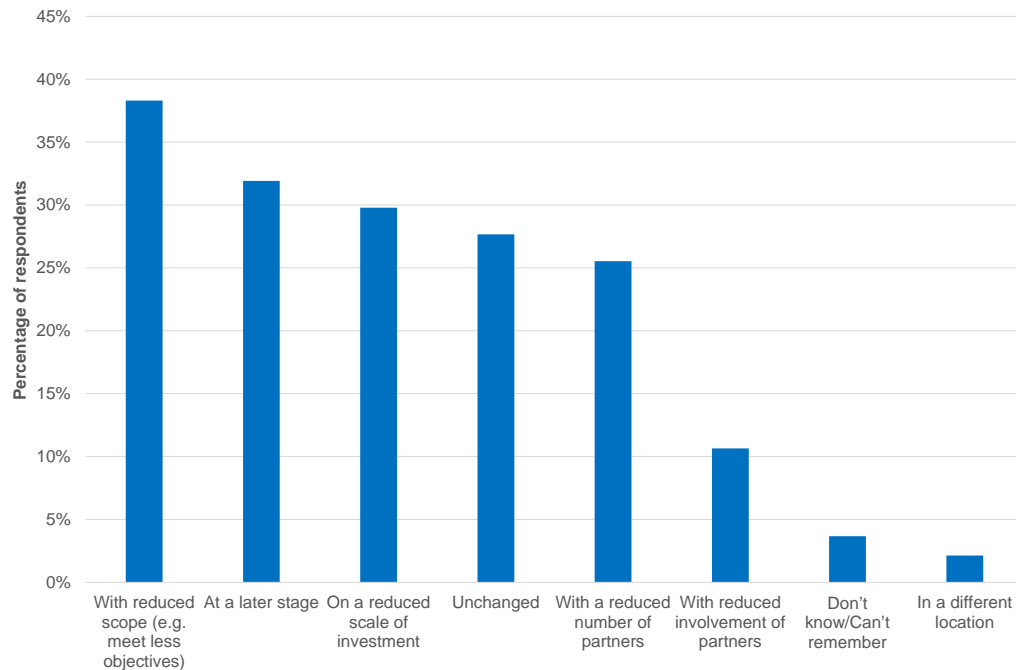
Forty three percent of unsuccessful applicants reported that they had taken or were planning to take the project forward in the absence of AMSCI funding. This is broadly in line with the judgements being made at the appraisal stage (an average adjustment for deadweight of 50 percent was applied by BIS VFM appraisers). Around 30 percent of those suggested that the project has gone ahead unchanged (Figure 4.6), with unsuccessful applicants generally suggesting that the main impacts of rejection for AMSCI funding was to reduce the overall scale and scope of the project, and to delay the project. These effects were possibly smaller than the counterfactual projections being made by successful applicants (pointing to the potential presence of strategic response bias in the views outlined above, or that appraisers have made effective judgements with respect to additionality).

Figure 4.5: Actions taken by unsuccessful AMSCI applicants



Source: Unsuccessful applicants (base: 109 applicants)

Figure 4.6: Changes to unsuccessful projects which still proceeded without AMSCI funding



Source: Unsuccessful applicants taking or planning to take forward their projects (base: 47 applicants)

Unsuccessful applicants generally reported that their projects were still in the initial planning phases (60 percent of those taking their projects forward), though 25 percent reported that the project had been aborted before completion. While not conclusive, this does point to the potential for AMSCI to produce effects by increasing the success rate of collaborative industrial

projects (as abortion rates were lower amongst successful applicants, though this could equally reflect the effectiveness of the technical appraisal process).

4.6 Markets

As noted previously, the survey was used to establish measures of the geographical profiles of the customers and competition of AMSCI beneficiaries and unsuccessful applicants. Successful applicants reported that (on average) around 35 percent of their customers were outside the UK, while 65 percent of their main competition was based outside the UK. A similar profile was reported by unsuccessful applicants. These percentages are often multiplied to give an approximation of displacement: in this case, this would lead to an estimate of displacement of 22 percent¹². Clearly such estimates are an approximation rather than an empirical assessment of the causal effects involved. However, an average adjustment for displacement of 18 percent was applied in the appraisal process (and this evidence is again broadly supportive of the judgements being made at the appraisal stage).

4.7 Availability of other funding

Lead applicants were asked to report whether they had sought other Government funding in connection with the project, either before or after the initial application for AMSCI funding. No successful applicants (and 5 of 24 unsuccessful lead applicants) suggested that they had applied for funding from other programmes. Two of 24 unsuccessful lead applicants applied for other sources of Government funding following their rejection for funding. These findings do not suggest that AMSCI duplicates existing funds.

The case studies also explored the extent to which projects would have applied to or secured funding from other Government sources if AMSCI were not in existence. Case study respondents referred to the added value of the collaborative nature of AMSCI. One project manager stated that small firms in the industry may be put off applying independently to other funds for research and development provided by Innovate UK due to the complexity of the bidding process, while a being part of a larger collaboration means that the administrative burden on an individual SME during application and due diligence is minimal. A collaborator from another case study project also mentioned Innovate UK as a potential funding option but stated that the amounts on offer would not have been sufficient to make it worthwhile putting in a collaborative bid.

4.8 Project additionality: statistical results

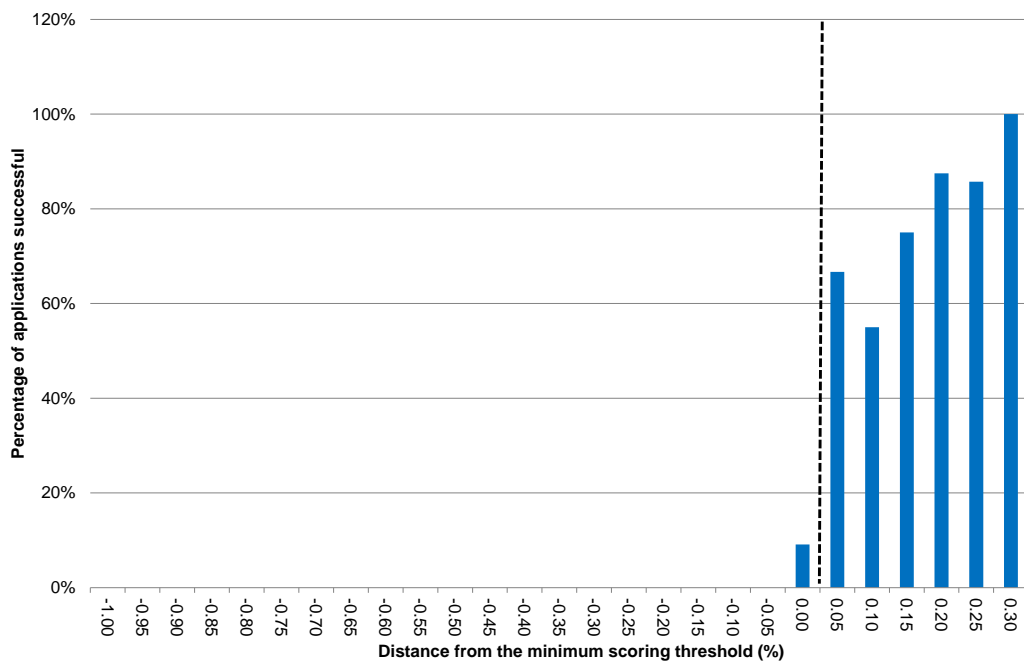
The results of the survey (and other data collected through the appraisal process) were examined in more detail to establish whether a more robust measure of the extent to which AMSCI funding has led to a causal effect on the probability that projects were taken forward. The analysis aimed to exploit the discontinuities created by the minimum scoring thresholds applications need to pass in order to be considered for funding by the Independent Investment Board through the application of Regression Discontinuity Design methods. These methods compare those that just passed the minimum scoring threshold and those just missing out to provide estimates of the causal effects of treatment amongst 'marginal projects' (i.e. those bids receiving funding, that just made it).

¹² i.e. $0.65 \times 0.35 = 0.22$

As illustrated in Figure 4.7, the *probability* of assignment into treatment changes discontinuously at the threshold, and fuzzy RDD approach was adopted. These approaches first estimate the discontinuity in the probability of assignment into treatment at the threshold, which is then used as an instrumental variable in a second step to estimating the effect of treatment on the outcome of interest at the threshold. The outcome variable in this case was binary: whether the project was taken forward or not. For unsuccessful applicants, this measure was constructed from the survey observations outlined above (contradictory views of lead applicants and partners were resolved by taking a simple average at the project level¹³), while for successful applicants this measure was constructed from monitoring data (and where projects were withdrawn, this was treated as a project not being taken forward).

All available observations were included in the first stage of the analysis (more reliable results can typically be obtained by focusing on a narrow bandwidth of observations around the threshold, but there were insufficient observations to permit such an approach). This yielded an estimate of the jump in the probability of assignment into treatment of the order of 30 percent at the threshold (this result was comparatively consistent across a set of linear and non-linear parametric specifications, though is likely biased by the need to include all observations in the regression models, with visual inspection of Figure 4.7 suggesting that this may be an understatement of the discontinuity in the probability in treatment assignment).

Figure 4.7: Probability of assignment into treatment by distance from minimum scoring thresholds

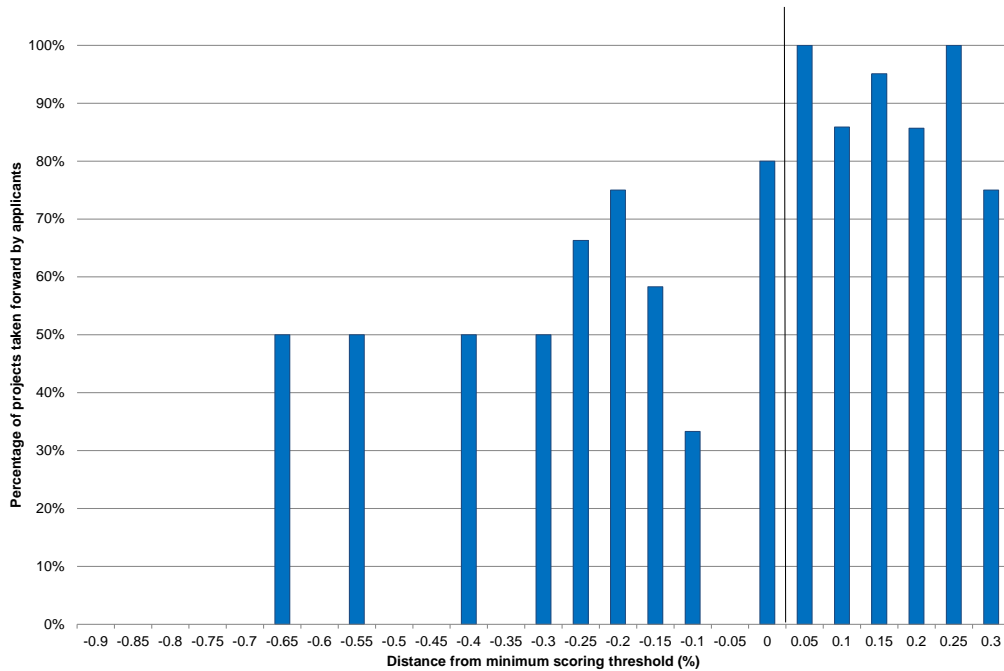


Source: Technical Appraisal from 'Panel Sheets' (TSB), VFM appraisals (BIS), and minutes of the Independent Investment Board

¹³ This was the case for 16 of the 66 projects covered in this analysis.

However, there were ultimately insufficient observations at a project level to identify a statistically significant effect of AMSCI on the probability that the project would be taken forward (the parallel evaluation scoping provides recommendations on how these issues might be addressed moving forwards). The distribution of the outcome variable is shown in Figure 4.8, which is indicative of discontinuous jump in the probability a project was taken forward around the threshold (though these findings are ultimately inconclusive).

Figure 4.8: Percentage of projects taken forward by distance from minimum scoring thresholds



Source: Technical Appraisal from 'Panel Sheets' (TSB), VFM appraisals (BIS), and minutes of the Independent Investment Board

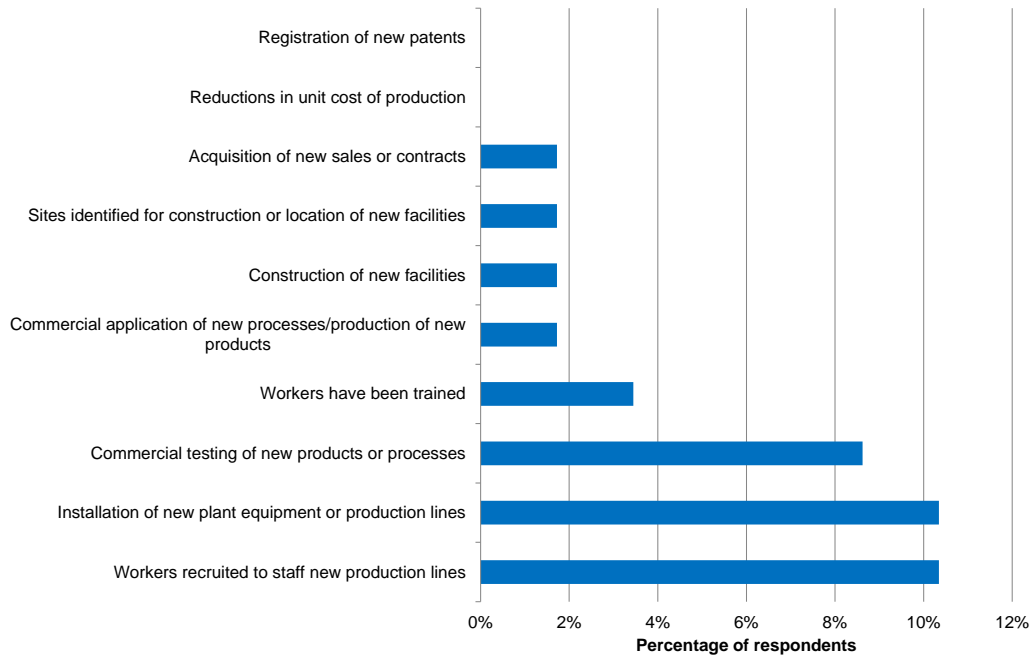
4.9 Economic outcomes

Successful applicants were asked as part of the survey to report any economic outcomes that had been delivered to date (see Figure 4.9). The most commonly reported outcomes (by 6 of 58 respondents) was that workers had been recruited to staff new production lines or that new plant equipment or production lines had been installed. Five of 58 respondents reported that commercial testing of new products and processes had taken place. No respondents indicated that any productivity effects have been realised at this stage. This confirms the earlier observation that it is too early to identify any economic results associated with the AMSCI programme (though the forthcoming analysis of administrative data by Aston University will confirm or disprove this expectation).

However, the case studies have pointed to a range of short term effects. For example, one supplier of automotive components suggested that the capital investment subsidised by AMSCI enabled them to increase sales of fluid tubes from 8,000 per week to 20,000 per day. Another applicant suggested that the receipt of AMSCI has enabled them to improve their relationship with potential customers through enabling them to demonstrate their R&D capacities. These types of demonstration effects were highlighted by other case study projects: one lead applicant described a 'halo effect' in which the support from AMSCI has helped promote the applicant and their product, while another suggested that the publicity generated through AMSCI support

generated interest and sales from a big six energy supplier. These latter promotional benefits were perhaps unexpected, indicating the potential for stronger employment and sales effects than might have been anticipated at the appraisal stage (though clearly, there is a strong risk that such sales will be subject to displacement effects).

Figure 4.9: Short term project results reported by applicants



Source: Survey of successful applicants (base: 58 respondents)

4.10 Econometric analysis of administrative data

An econometric analysis, based on a data-linking exercise, was completed by Aston Business School as part of this review. This involving linking records of successful and unsuccessful firms to the datasets within the ONS Virtual Microdata Laboratory (including the Business Structure Database, the Annual Business Survey, and the Business Expenditure on Research and Development survey) to obtain longitudinal measures of employment, GVA and other variables of interest. In practice, while a high proportion of firms could be linked to the IDBR (that acts as a sampling frame for the surveys concerned), very few appeared within the ABS and BERD datasets. As such, the analysis focused exclusively on utilising the Business Structure Database and was limited to an investigation of how far it might be feasible to observe an effect of AMSCI on employment and turnover (using observations from 2005 to 2014), as well as turnover per worker as a proxy measure of productivity.

The analysis explored a range of different approaches to examining the effects of AMSCI: covering both the selection of counterfactuals (all unsuccessful applicants, and an analysis using successful applicants to Rounds 3 and 4 as a counterfactual for those successful in Rounds 1 and 2), econometric methods (an ordinary least squares analysis, a difference-in-difference approach, and Heckit selection models), and specification of the dependent variable (levels and inter-annual growth). However, these different approaches yielded highly inconsistent results including some implausible findings given the progress made in project delivery to date and the survey findings highlighted above. It is anticipated that these issues were driven by a combination of the limited post-treatment data available (applicants to Rounds 1 and 2 would

have only been notified of their successful application in 2013, giving just one year of post application data from which to identify the causal effects of interest), and the lags associated with the data within the Business Structure Database (both employment and turnover measures are known suffer lags by up to 2 years).

As such, the results of this analysis are not presented here and it is concluded that it is too early to attempt this form of evaluation strategy. The analysis should be repeated at a later date (potentially in 2018 as recommended in the parallel evaluation scoping study) to examine the short term impacts of AMSCI on these variables.

4.11 Summary

- Few applicants had sought finance for their projects prior to their application. However, there was frequently an assumption that the applicant would either face difficulties in obtaining finance from the market or would be unable to secure board commitment to funding the project from the companies' own funds. Reluctance to fund projects was frequently linked to the risks associated with the project, though in some cases there were specific aspects of collaborative relationships that caused hold-ups (where the buyer would have otherwise had to subsidise their suppliers' role in the project). This is not always indicative of market failure: where projects are being dictated by customer demands (as is the case for many projects), it may be feasible for the customer to compensate suppliers for the risks taken in developing new inputs or products (though sub-contracting arrangements that may be difficult to implement as a consequence of the transactional frictions involved).
- Adjustments to the application form to ensure applicants focus on the specific issues that will prevent a project moving forwards without public spending may be beneficial (be they financial or linked to the collaborative nature of the project). The AMSCI application guidance does clearly state that a 'good application' would provide evidence that they have been rejected for finance or were only offered finance at an unreasonable cost, though there is no section of the application form that forces the applicant to focus on these issues. However, there is limited evidence that scrutiny of the financial case needs improvement (particularly when taken together with the finding that the appraisal of additionality has proven comparatively accurate).
- The early evidence suggests broadly that AMSCI has had a positive impact on the probability that projects were taken forward (though this is indicative at best). The views of applicants gathered through the survey and the case studies pointed to positive effects both in terms of accelerating projects, and enabling them to proceed at a higher scale or scope. However, there was little suggestion that AMSCI has helped retain economic activity in the UK, with few respondents suggesting the project would have otherwise been taken the project forward abroad.
- Around half of successful applicants suggested the projects would not have gone ahead at all without AMSCI funding. However, statistical results were inconclusive, with insufficient observations available to obtain statistically significant results.
- Additionally, approximately fifty percent of unsuccessful applicants were able to (or were planning to take their project forward) in the absence of AMSCI funding. Taken together, these results are broadly supportive of the judgements being made at the appraisal stage: the average estimate of deadweight applied in the appraisal process was 50 percent amongst unsuccessful applicants, rising slightly to 55 percent for successful projects.

However, given the propensity of a small share of applicants to pursue (or suggest they would pursue) private finance options following rejection, this reinforces the possible need for more stringent tests of financial constraints at the appraisal (or due diligence) stage (such as requiring applicants to demonstrate that they have been rejected for finance). Estimates of displacement used in the appraisal process also appear reasonable.

- The evidence does not point to substantial duplication of other Government programmes, with few applicants either applying for alternative sources of subsidy either before or after AMSCI funding decisions were made. Case study evidence suggests that Innovate UK programmes might be most relevant, though the levels of subsidy available are an order magnitude smaller than those needed for the delivery of typical AMSCI projects. Nevertheless, given the availability of subsidies for capital investment and other projects on a single firm basis through the Regional Growth Fund (including RGF funded programmes led by intermediaries), valid questions might be asked around the need for the Regional Round 1 of AMSCI and the West Midlands Liverpool City Region programmes where the need for collaboration was relaxed.
- Given the early stage of programme delivery (the majority of projects have yet to begin, and none have completed), there is very little evidence at this stage to provide any conclusions around the likely net economic results of AMSCI. Additionally, evidence from the data-linking exercise confirms this view (i.e. it is too early to make this form of assessment).

5 Conclusions

Progress to date

- The first tranches of AMSCI funding were allocated in 2012, and the majority of projects are in the early phases of delivery (which is reflected in the drawdown of AMSCI grant funding against budgeted amounts). 168 applications for AMSCI were received over the 6 rounds to date, and monitoring data at August 2014 suggests that, of the total grant and loan commitment of £175.6m, just 15 percent of this expenditure had been defrayed (the majority of which was associated with the twenty projects funded through the first two rounds of the scheme). 442 jobs were certified as having been created, and 1,918 as being safeguarded. Monitoring data also suggests that only three of the projects funded in later rounds have begun (with majority in the process of due diligence).

Strategic Alignment

- In broad terms, the portfolio of projects funded through AMSCI aligns with its overall objectives. A diverse range of projects have been funded, mainly collaborative R&D projects focused on the development of new products, but also projects aimed at resolving specific inefficiencies in supply chains, and in one case, the creation of a new supply chains to manufacture products not currently produced in the UK. Such projects might be expected to deliver the objectives targeted by AMSCI, and in particular creating more competitive supply chains. Additionally, a high proportion of applicants aimed for an increase market share or to enter new product markets, which would also be expected to lead onto increased levels of purchasing from UK supply chains by Primes or Tier Ones, or the attraction of new customers. However, it should be noted that the policy objectives of AMSCI are relatively broad, potentially justifying a diverse range of project activity provided it contributed to enhanced supply chain competitiveness.
- In addition, the survey evidence suggested that AMSCI funding has reached the types of firms intended, with a high proportion of beneficiaries reporting that their main customers were based in the UK, while facing predominantly international competition. Additionally, the survey evidence suggests that exchange of skills and knowledge was a key motivator for applicants to work in collaboration, while case study evidence suggested that in at least a share of cases, a need to maintain technological advantage or parity with international competitors was motivating the project. As such, AMSCI projects may work as much to safeguard the competitiveness of UK supply chains as strengthen them (particularly as a high proportion of applicants indicated that the projects were driven to a large extent by existing customer requirements).
- Given the availability of subsidies for capital investment and other projects on a single firm basis through the Regional Growth Fund (including RGF funded programmes led by intermediaries), valid questions might be asked around the need for the Regional Round 1 of AMSCI and the West Midlands Liverpool City Region programmes where the need for collaboration was relaxed. In the delivery of future schemes, careful consideration of how far changes to eligibility criteria might dilute the focus on the underlying policy objectives should be undertaken before they are made.

Additionality

- The early evidence suggests broadly that AMSCI has had positive impact on the probability that projects were taken forward (though this is indicative at best). The views of applicants gathered through the survey and the case studies pointed to positive effects both in terms of accelerating projects, and enabling them to proceed at a higher scale or greater scope. However, there was little suggestion that AMSCI has helped retain economic activity in the UK, with few respondents suggesting the project would have otherwise been taken the project forward in other locations.
- Around half of successful applicants suggested that their projects would not have gone ahead at all without AMSCI funding. Approximately fifty percent of unsuccessful applicants were able to (or were planning to take their project forward) in the absence of AMSCI funding. These results are broadly supportive of the judgements being made at the appraisal stage: the average estimate of deadweight applied in the appraisal process was 50 percent amongst unsuccessful applicants, rising slightly to 55 percent for successful projects. Estimates of displacement used in the appraisal process also appear reasonable. However, there were insufficient observations (or it was too early) to derive significant results from the statistical analyses undertaken as part of this project.
- The evidence does not point to substantial duplication of other Government programmes, with few applicants either applying for alternative sources of subsidy either before or after AMSCI funding decisions were made. Case study evidence suggests that Innovate UK programmes might be most relevant, though the levels of subsidy available are an order magnitude smaller than those needed for the delivery of typical AMSCI projects.

Recommendations

- In general terms, the early additionality assessment suggests that the design of the AMSCI marketing and communications, application, appraisal and project selection processes have been effective in directing funding towards to the types of collaborative supply chain project funded forming the focus of its overall policy objectives. There was no evidence to suggest that the judgements being made at the appraisal stage were misjudging the likely rates of deadweight (despite the fact that applicants had rarely 'proven' financial constraints through being rejected for finance of offered terms at unreasonable cost).
- This reinforces the general conclusion of the Process Evaluation that the underlying processes (and in particular, the combination of a technical appraisal and an HM Treasury Green Book VFM appraisal, alongside an Independent Investment Board with a clear terms of reference), are an effective means of administering competitions for large scale investment subsidies (albeit with some scope for improvement at the margins).
- In terms of lessons (ordered in terms of importance):
 - **Application evidence:** Application forms for future collaborative supply chain projects might be adjusted to focus more strongly on the following issues:
 - **Collaborations:** Requiring applicants to demonstrate the nature and history of their working relationships may aid appraisers in judging how fragile the collaboration might be, and how critical the collaboration in the delivery of project objectives. Novelty of relationships may be one aspect, though hold-ups can occur in existing

supply chain, particularly where a Prime or Tier One perceives they would need to subsidise suppliers' R&D activity to take the project forward.

- **Financial constraints:** Given the propensity of a small share of applicants to pursue (or suggest they would pursue) private finance options following rejection, this reinforces the possible need for more stringent tests of financial constraints at the appraisal (or due diligence) stage. In particular, application forms should *require* applicants to describe their attempts to secure alternative funding (and where they have not made such attempts, provide a clear explanation of the reasons why) – as opposed to highlighting that the provision of such evidence is a feature of a strong application. Information on firms' financial history may also be beneficial (e.g. have they ever raised equity finance?).
- **Strategic alignment:** Given the availability of subsidies for capital investment and other projects on a single firm basis through the Regional Growth Fund (including RGF funded programmes led by intermediaries), valid questions might be asked around the need for the Regional Round 1 of AMSCI and the West Midlands Liverpool City Region programmes where the need for collaboration was relaxed. In the delivery of future schemes, careful consideration of how far changes to eligibility criteria might dilute the focus on the underlying policy objectives should be undertaken before they are made.
- **Role of grants:** Where projects are only constrained by their inability to secure finance from private sources, loans may be a more cost-effective instrument than grants. However, this would mainly apply to projects involving capital investment at a single firm level, and would be unlikely to ease some of the transactional frictions involved in supply chain collaborations.

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