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ASTUTE 2020 Operation External Evaluation

Mid-Term Evaluation

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ASTUTE 2020 External Evaluation: Mid-Term Evaluation

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Glossary

Acronym/Key word	Definition
ASTUTE	Advanced Sustainable Manufacturing Technologies (delivered as part of the 2007–13 ERDF Programme)
ASTUTE 2020	Advanced Sustainable Manufacturing Technologies (funded via the 2014–20 ERDF Programme)
CCTs	Cross Cutting Themes
ERDF	European Regional Development Fund
HEI	Higher Education Institution
M2A	Materials and Manufacturing Academy
SME	Small to Medium-sized Enterprise
TRL	Technology Readiness Level
UWTSD	Aberystwyth University and University Wales Trinity Saint David
WEFO	Welsh European Funding Office
WW&V	West Wales and the Valleys

Executive Summary

- i. This report documents the findings of the formative Mid-term Evaluation carried out as part of the external evaluation of the ASTUTE 2020 Operation.
- ii. The purpose of the Mid-term Evaluation was to assess progress to date, to check that the Operation was on-target to meet its objectives and to identify any lessons-learnt or ways in which the Operation could be re-shaped (if necessary) to maximise its impact.
- iii. The mid-term evaluation comprised:
 - Document and Monitoring and Information System Review
 - Qualitative Interviews with Stakeholders – 13 stakeholders from 8 organisations.
 - Online Survey of Beneficiary Businesses – 22 responses were received from 30 companies.
 - Analysis and Reporting – including emerging outcomes assessments and lessons learnt.

Mid-Term Position

Policy Drivers and Needs

- iv. The evaluation team undertook a review of the policy context, drivers and needs for the ASTUTE 2020 Operation to assess if the political and strategic landscape for its delivery had changed. The review found that the Operation remains coherent with the strategic objectives of West Wales and the Valleys (WW&V). The review highlighted two important developments. Firstly, a horizon scanning exercise has been undertaken to further develop the understanding of the Operation delivery team regarding current (changing) and future (political, technical, social and economic) market conditions. The review concluded that this process had been integral in ensuring the Operation remains fit for purpose. Secondly, that the UK Government published its *Industrial Strategy: building a Britain fit for the future* in November 2017. This provided further assurance that the objectives of the Operation were well aligned with the foreseeable future political

direction—and particular credit was given to the purposeful alignment of the Operation with the three Adaptive Smart Specialisation areas.

Objectives

- v. The evaluation team reviewed the Operation's objectives in light of developments in the policy context. Stakeholders were unanimously confident that ASTUTE 2020's objectives are unchanged since the Inception Evaluation and are still highly relevant. They also expressed confidence that the Operation has the necessary systems in place (particularly the Stakeholder Advisory Board) to monitor whether its objectives are still relevant on a regular basis.
- vi. The desk-based review of literature also suggests that the ASTUTE 2020's objectives are still highly relevant in the context of current policies and strategies.

Inputs/Resources

- vii. The evaluation team reviewed the Operation's inputs/resources in the context of its progress towards targets. The review concluded that the resources available to the Operation are likely to be sufficient for it to achieve its targets and they are being used effectively.
- viii. Stakeholders unanimously praised the time and effort inputted by the ASTUTE 2020 technical teams across the four partner HEIs and the efficiency and organisation of the Operation's Coordination and Support Team. The Operation's governance arrangements are effective. Stakeholders and beneficiary companies were highly satisfied both with the expertise and knowledge of academic staff and Project Officers, and the technology and facilities of partner HEIs. There appears to be sufficient demand from industry for the Operation, but also an observation from an industry stakeholder that those companies collaborating are those who have previously collaborated with HEIs or accessed public-sector support—with a suggestion that engagement beyond those already engaged could be beneficial to achieve wider impacts. The Operation has received referrals from other schemes, but there is room for further

improvement in the relationship with Welsh Government's SMART team. The Operation has developed close links with industry through Industry Wales and EEF,¹ and used a limited marketing budget effectively to promote the Operation.

Activities

- ix. The evaluation team reviewed the Operation's activities (identified in the Inception Evaluation) for their efficacy and effectiveness. The review concluded that the Operation's activities have generally been undertaken effectively and in a way that maximises outputs.
- x. The project approval process appears robust and designed to identify projects with the potential for high impact and minimise private sector displacement. This process facilitates the Operation providing demand-led, targeted and tailored support to enterprises, which are highly satisfied with the support they have received. The Operation is providing suitable facilities to enable this. The Operation's project approval process seeks to encourage larger-scale 'cluster' projects, but there is a concern that the remaining delivery time-frame might restrict the ability to do this. The Operation uses both established and new referral routes to signpost companies to other services. The Operation's horizon scanning process was well-received by stakeholders. The monitoring of the Operation is undertaken efficiently and transparently. Finally, the Adaptive Smart Specialisation areas selected in planning the Operation remain relevant.

Outputs

- xi. The evaluation team reviewed the progress of the Operation at producing outputs from its activities, both those with WEFO targets and others. Generally, the Operation appears to be on-track to achieving its output targets, as it is on or above target for all indicators but one and there is significant activity in the pipeline to suggest that the Operation will remain on target against its profile.

¹ The Manufacturers' Organisation (formerly the Engineering Employers' Federation).

Table ES.1: Summary of ASTUTE 2020 outputs

Output/Outcome	Indicator	Final target	Profiled cumulative targets as of March 2018	Progress (Q11, March 2018)
ERDF Indicators				
Enterprises supported to introduce new to the market products	Number of enterprises supported to introduce new to the market products / processes	8	2	4
Enterprises supported to introduce new to the firm products	Number of enterprises supported to introduce new to the firm products / processes	39	8	9
Enterprises cooperating with supported research institutions	Number of enterprises cooperating with supported research institutions	89	70	72
Enterprises receiving non-financial support	Number of enterprises receiving non-financial support	42	31	30
Patentable intellectual property	Number of patents registered for products / processes	5	0	0
Private investment matching public support	Private investment matching public support (£)	5,000,000	546,803	1,058,616
Employment increase in supported companies	Employment increase in supported companies	80	12	13
Additional Indicators				
Enquiries, referrals, and other initial contact with companies	Number of enquiries, referrals, and other initial contact with companies	n/a	n/a	189 ²
Formal requests for collaboration from companies	Number of formal requests for collaboration from companies	n/a	n/a	41 ³

² As of 18 January 2018.

³ Ibid.

Scientific Papers with supported enterprise as joint author	Number of scientific papers with supported enterprises as joint authors published (submitted)	n/a	n/a	2 (2)
Research Excellent Framework Impact Case Studies	Number of research excellent framework impact case studies	n/a	n/a	0
Non-Patentable intellectual property	Number of items of non-patentable IP	n/a	n/a	35
Referrals to other schemes (including Welsh Government)	Number of referrals to other schemes	n/a	n/a	18 ⁴
Referrals to private sector	Number of referrals to private sector	n/a	n/a	25 ⁵
Publicly available case studies	Number of publicly available case studies on projects with supported companies	n/a	n/a	6 ⁶

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Outcomes

- xii. It is noted—by their nature—outcomes and impacts take time to be realised and so the assessment at the mid-term stage provides indication of emerging results only.
- xiii. In general, the evidence collected from participant companies (n=21) at the mid-term stage illustrates that collaboration with ASTUTE 2020 is leading to positive benefits.
- xiv. Emerging results suggest that ASTUTE 2020 is particularly effective at increasing knowledge and expertise, safeguarding jobs, employment increased and increasing the amount of private investment secured.

⁴ Ibid.

⁵ Ibid.

⁶ Short abstracts of all projects are provided on the Operation website. Case Studies are developed for a smaller number of projects where it is possible to gather sufficient information.

- xv. The results for additionality of ASTUTE 2020 intervention are also positive with eight of the eleven observable impact indicators queried were self-reported as 'unlikely' to have been produced without ASTUTE 2020 collaboration. The extent of additionality for the creation of jobs was less convincing (although not negative), which could be the result of self-assessment bias (respondents believing in their own company's ability to create jobs or not admit that jobs cannot be created without external support) and should be monitored closely during the final evaluation.
- xvi. Similarly, stakeholders were unanimous in supporting the positive emerging outcomes and impacts that the Operation was generating (or forecast to generate). Stakeholders pointed to exemplar examples of project success, better captured through individual project cases—which illustrates the importance such evidence should have in the final evaluation.
- xvii. Of note, Operation monitoring data reports that £1,058,616 private investment matching public support has been achieved—which is on-track for target levels.
- xviii. Operation monitoring data shows an employment increase of 13 has achieved to date—further emphasis is given towards the effectiveness of support to job creation from the survey results which shows that on average, participant projects rate that their collaboration with ASTUTE 2020 have been 'effective' at leading to employment increases.

Impacts

- xix. At the mid-term stage, there is limited data to report on change, given that impacts take time to be realised. Instead, the survey has focussed on establishing emerging sentiment from the participant companies.
- xx. Feedback from the survey and stakeholder interviews regarding perceptions on how effectively ASTUTE 2020 is leading to the intended impacts is positive.
- xxi. There is evidence in Operation monitoring data to show that ASTUTE 2020 involvement is leading to tangible impacts. At the time of the

mid-term evaluation there have been 13 Jobs Created (OC.3) and 29 Jobs Safeguarded (OC.5), which in turn is estimated (using standard multipliers) that between 18.59 and 26.91 jobs could have been created—and between 41.47 and 60.02 jobs safeguarded in the supply chain as a result of ASTUTE 2020 activity (not discounting for deadweight, leakage or displacement).⁷

- xxii. The emerging findings from the Mid-Term Evaluation also show a positive link between the support that companies are receiving as a result of collaboration with ASTUTE 2020 and savings in energy, greenhouse gas emissions and waste.
- xxiii. The Operation team have embedded an effective data monitoring process via project status reports, which captures additional impacts from participant companies. Of note, additional impacts include non-patent generated IP (now included as an outcome), additional new to firm products, processes or services (over and above those which can be claimed as ERDF indicators), jobs safeguarded, increased investment into companies, and the publication of case studies.

Conclusions

- xxiv. In summary, the feedback from both stakeholders and companies who participated in the mid-term survey were highly positive towards the delivery of ASTUTE 2020 to date.
- xxv. In general, current outputs have exceeded profile expectations to date for all but one indicator (number of enterprises receiving non-financial support). The Operation delivery team are confident that all targets will be met by the end of the project.
- xxvi. To date, the value of private investment matching public support is twice as high as the profiled target. Employment increase in supported companies is marginally ahead of schedule (13 achieved compared with 12 target). Although other noted outcomes and impacts are difficult to measure at this stage in delivery, the feedback collected from survey respondents is on the whole very positive.

⁷ See paragraph 3.94.

- xxvii. ASTUTE 2020 appears to be particularly effective at increasing knowledge and expertise, safeguarding jobs, increasing employment and increasing the amount of private investment secured. This is particularly encouraging as these are the key objectives for the Operation.

Recommendations

- xxviii. At the mid-term stage it is recommended that the ASTUTE 2020 Operation should continue to be delivered largely as it is, but taking into consideration the following recommendations:
- Consider a time-extension
 - Continual monitoring of referral process
 - Continue to record full project costs
 - Proactively pursue cross-HEI and large, strategic / cluster projects
 - Continue to monitor and review the range of enquiries to ensure the Operation is addressing the challenge of engaging companies across the spectrum of target industries.
 - Ensure the external evaluators commissioned for the final evaluation engage with the participant companies as soon as possible to understand the viability of collecting the data required to evidence the outcomes and impacts.
 - Review the project status report template to explore the potential for collecting data to inform the final evaluation
 - External evaluators to re-visit the inception report recommendation to boost the UKIS Wales sample

1. Introduction

- 1.1 This report documents the findings of the formative Mid-term Evaluation carried out as part of the external evaluation of the ASTUTE 2020 Operation. Swansea University commissioned Miller Research to undertake the formative Inception and Mid-Term Evaluations of the Operation. The Inception Evaluation was completed in January 2017.⁸ A summative Final Evaluation will be commissioned separately by the ASTUTE 2020 team.
- 1.2 The ASTUTE 2020 Operation aims to build on the success of its predecessor (ASTUTE) and provides support to enterprises to facilitate the adoption of advanced manufacturing and related technologies in West Wales and the Valleys (WW&V). The Operation, which is part funded via the European Regional Development Fund (ERDF), is being delivered by a partnership of universities (Swansea University, Cardiff University, Aberystwyth University and University of Wales Trinity Saint David).
- 1.3 The purpose of the Mid-term Evaluation is to assess progress to date, to check that the Operation is on-target to meet its objectives and to identify any lessons-learnt or ways in which the Operation could be re-shaped if necessary to maximise its impact. Moreover, the formative evaluation provides the opportunity to consider the underlying causes of impacts so that effort can be focused to raise the level of impact achieved during the course of the ASTUTE 2020 intervention.
- 1.4 The remainder of this Mid-Term Evaluation Report is structured as follows:
- Chapter 2 describes the Mid-Term Evaluation methodology.
 - Chapter 3 assesses the Operation's progress to date.
 - Chapter 4 contains conclusions and recommendations for the remainder of the Operation.

⁸ Miller Research (January 2017) *External Evaluation of the ASTUTE 2020 Operation: Inception Evaluation*.

2. Mid-Term Evaluation Methodology

- 2.1 Document and Monitoring and Information System Review** – all documentation relating to the ASTUTE 2020 Operation to date, including target spreadsheets and progress reports sent to WEFO, was re-reviewed to assess whether there had been any significant changes. This included assessment of progress against targets, using the most recent Monitoring and Information System data and a review of the Horizon Scanning exercise undertaken.
- 2.2 Qualitative Interviews with Stakeholders** – qualitative, semi-structured telephone interviews were undertaken with 13 stakeholders from eight organisations, using a topic guide pre-agreed with the ASTUTE 2020 delivery team. A list of stakeholders and the topic guide can be found in Annexes A and B, respectively. In summary, the focus of the interviews was to obtain stakeholders' perspectives on the progress of ASTUTE 2020 to date. Findings from the interviews are included in this report where appropriate.
- 2.3 Online Survey of Beneficiary Businesses** – an online survey was developed in May 2017 and disseminated via email in three waves (July, September and November 2017). Each contact wave included businesses who had first received support from (collaborated with) ASTUTE 2020 at least six months prior to contact. The evaluation team sent a link to the survey directly to the appropriate contact in the business, following an invitation to participate from the ASTUTE 2020 Project Officer responsible for managing each business. In total, the survey was sent to 30 companies⁹ and 22 responses were received. The online survey questionnaire, which comprised questions derived from those in the evaluation framework (developed during the Inception Evaluation), can be found in Annex C.
- 2.4 Analysis and Reporting** – all fieldwork carried out (above) was analysed to inform the assessment of progress in this Mid-term Evaluation Report. The draft Report was circulated with the Operation

⁹ Wave 1: 17, wave 2: 7 and wave 3: 6.

delivery team and WEFO. A final report was produced taking into consideration the feedback from stakeholders. At all times the independent viewpoint of the external evaluators prevailed during editing.

3. Mid-Term Position

Policy Drivers and Needs

- 3.1 During the Inception Evaluation, a detailed review of the policy context, drivers and needs for the ASTUTE 2020 Operation was undertaken. The review concluded that the ASTUTE 2020 Operation was designed through a very robust and comprehensive process that clearly set out to identify industrial RD&I needs. The use of Adaptive Smart Specialisation areas, which were based on an evidence report identifying industry needs in Wales (including observing global megatrends in manufacturing and how Welsh manufacturing can capitalise on changes), has resulted in a concentration in the areas of support which display potential for high economic impact—the result of analysis of the areas of support provided under the previous ASTUTE Operation. As a result, the Operation has a strong coherence to the identified needs of the manufacturing sector in WW&V. This is still the case at the time of the Mid-Term Evaluation.
- 3.2 Since the Inception Evaluation Report, a horizon scanning exercise has been undertaken to further develop the understanding of the Operation delivery team regarding current (changing) and future market conditions (political, technical, social and economic). The study concluded that:

“the current ASTUTE 2020 operation and its structure around the three “Adaptive Smart Applications” of Computational Engineering Modelling, Advanced Materials Technology and Manufacturing Systems Engineering are still highly relevant and of high importance to the industrial community.”¹⁰

The report offered six areas for consideration, based on the findings of the facilitated session:

- Supporting the readiness of individual companies and the region for the continued expansion and impact of Industry 4.0.

¹⁰ Novactus Limited (February 2018) *ASTUTE 2020 Horizon Scan Report*, pg. 16.

- The continued requirement for the expert skills in data management in the industrial ecosystem.
- Ensuring the speed of support from the ASTUTE 2020 Operation continues to match the needs of business.
- A holistic approach to enhanced international collaboration to enhance the Welsh industrial ecosystem.
- How to continue supporting the development of a creative technical and business mind-set within the regional industrial ecosystem.
- Monitoring the nature of support given to ensure it matches the needs of individual companies.

3.3 The Inception Evaluation reported that the ASTUTE 2020 Operation has a strong fit with overarching policy and strategic objectives. Since the previous evaluation, there have been few changes to overarching policy and so the fit of ASTUTE 2020 with policy and strategy remains strong. This sentiment was echoed by all stakeholders who provided commentary.

3.4 One of the changes was the UK Government's publication of its *Industrial Strategy: building a Britain fit for the future* in November 2017. The horizon scanning exercise and subsequent report documents that the changes brought about following the Industrial Strategy featured during workshop sessions. For example, consideration was given to how Welsh Government infrastructure projects might affect the Operation. The increased importance afforded to infrastructure projects, following the UK Government's industrial strategy commitment, further solidifies the importance of the areas of the economy that ASTUTE 2020 is aligned with—especially considering the science and innovation theme for advanced engineering and digital innovation in the neighbouring South East Wales region.

3.5 A further change was the publication of *Prosperity for All: the national strategy* by Welsh Government in September 2017. The strategy identifies a 'vibrant higher education system' as a crucial partner in

building the economy, and pledges to ‘ensure closer working between industry, schools, universities, colleges and the NHS to raise ambition and increase investment in research, developing the jobs and technologies of the future.’¹¹ ASTUTE 2020, with its focus on collaboration between industry and HEIs, therefore aligns with this commitment.

- 3.6 The three Adaptive Smart Specialisation areas of ASTUTE 2020 are inherently connected to the industries at the forefront of the new strategy direction. Manufacturing Systems Engineering, Advanced Materials Technology and Computational Engineering Modelling all have major implications for how the strategy will be realised. The emphasis on these smart areas being adaptive is also important as it implies that the Operation can change, react to and reflect future changes—which is clearly happening in practice, as evidenced by the horizon scanning report.
- 3.7 The other significant change in the political landscape is Brexit—the theorised effects of which were also discussed at the horizon scanning workshop. Specifically, the effect of Brexit on micro-companies¹² and the effect it might have on future funding, post-ERDF.
- 3.8 Finally, the expansion of ASTUTE 2020 via the closely related ASTUTE EAST Operation provides an opportunity to widen the influence and reach of the initiative.

Objectives

- 3.9 At the Mid-Term Evaluation stage, the key questions for the Evaluation Team are: are the objectives still the same as those identified at the Inception Stage? Do they still address the needs? Should they be modified at all? If so, how? To what extent is ASTUTE 2020 achieving/expected to achieve its objectives?
- 3.10 The objectives (first identified at the Inception Evaluation stage) and Mid-Term stage evaluation questions are identified in the table below.

¹¹ Welsh Government (2017) Prosperity for all: the national strategy, pg. 17.

¹² Acknowledging that micro-companies are not the primary target for ASTUTE 2020.

Below this, we answer the evaluation questions, based on the information provided by stakeholders during the qualitative interviews and a review of secondary literature related to the policy/strategic context in which the Operation sits.

Table 3.1: Objectives

Objectives What change is ASTUTE 2020 trying to achieve?		Evaluation Questions (Section)
OB.1	To increase the successful translation of research and innovation processes into new and improved commercial products, processes, and services, through improved technology transfer from HEIs	Are the objectives still the same as those identified at the Inception Evaluation stage? Do the objectives still address the needs? To what extent is ASTUTE 2020 achieving/expected to achieve its objectives?
OB.2	Speed progress from laboratory to concept to increase commercialisation of R&D for the benefit of the Welsh economy through demand-led combination of academic and industry strengths	
OB.3	Bring together manufacturing innovation with product/process innovation and supply chain organisation to future proof the Welsh economy	
OB.4	Develop new and support existing local supply chains to become sustainable and resilient	
OB.5	Address current technical challenges and provide de-risking support for new technologies to enable sustainability and agility in responding to global disruptive megatrends	
OB.6	Contribute towards a change in current innovation culture to increase innovation in business and to stimulate new business creation	
OB.7	Use adaptive Smart Specialisation and leading research expertise to respond to global megatrends in manufacturing and benefit local manufacturers	

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Notes: For all Objectives the following applies:

Evaluation Stage	Data Type	Data Source	Data Collection Responsibility
Mid-Term	Qualitative	Interviews with stakeholders and desk research	External Evaluation Team

- 3.11 Stakeholders were unanimously confident that ASTUTE 2020's objectives are unchanged since the Inception Evaluation and are still highly relevant (as the need for the Operation is unchanged see policy context discussion above). It was suggested that one reason why this might be the case was the experience gained during the previous Operation (ASTUTE), the "fine-tuning" of areas of support that followed this, and the horizon scanning exercise (further information below) ensuring that the Operation adapts to emerging trends.
- 3.12 Stakeholders also expressed confidence that the Operation has the necessary systems in place (particularly the Stakeholder Advisory Board) to monitor whether its objectives are still relevant on a regular basis.
- 3.13 The desk-based review of literature also suggests that the ASTUTE 2020's objectives are still highly relevant in the context of current policies and strategies (see policy context discussion above).
- 3.14 Stakeholders were generally confident that the Operation would achieve its broad objectives, despite some perceiving that it had made a slow start towards achieving its output targets (see below).

Inputs/Resources

- 3.15 At the Mid-Term Evaluation stage, the key questions for the Evaluation Team are: are the inputs/resources still the same as identified at the Inception Evaluation stage? Are they sufficient for the Operation to achieve its objectives? Should they be modified?
- 3.16 The inputs/resources and Mid-Term Evaluation stage questions are identified in the table below. The answers to the evaluation questions are based on the qualitative interviews with stakeholders and data from the online survey of beneficiary businesses.

Table 3.2: Inputs

Inputs/Resources		Evaluation Question (Section)
What is ASTUTE 2020 inputting in order to achieve its objectives?		
IN.1	£14.7 million funding	Are the inputs/resources still the same as identified at the Inception Evaluation stage? Are they sufficient for the Operation to achieve its objectives? Should they be modified?
IN.1a	£4.7 million (monetary value of academics' and technical specialists' time, equipment, and overheads) from partner HEIs, inputted in compliance with State Aid laws	
IN.1b	£10 million ERDF, inputted in compliance with State Aid laws	
IN.2	Time and effort of ASTUTE 2020 team in 4 partner HEIs and WEFO	
IN.3	Time and effort of companies collaborating with the Operation	
IN.4	Governance	
IN.5	Expertise and knowledge of world-leading Academic Staff and Project Officers	
IN.6	Technology and facilities of partner HEIs	
IN.7a	Demand from companies	
IN.7b	Referrals from other schemes	
IN.8	Support from Industry Wales and EEF – The Manufacturers' Organisation	
IN.9	Communications and marketing	

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Notes: For all Inputs the following applies:

Evaluation Stage	Data Type	Data Source	Data Collection Responsibility
Mid-Term	Qualitative and quantitative	Interviews with strategic stakeholders, desk research and online survey data	External Evaluation Team

IN.1 Funding

- 3.17 The ASTUTE 2020 Operation is funded by £10 million ERDF funding through Welsh Government (68 per cent intervention rate) and £4.7 million in match-funding from the four partner HEIs. As at the Inception Evaluation stage, stakeholders were content that the level of funding available to the Operation appears sufficient for the Operation to reach its objectives and fulfil its targets, and that the distribution of the funding (to projects and therefore collaborating HEIs) has been well-managed.

A concern was raised that the procedure by which the Operation claims its costs to WEFO does not permit the full cost of an HEI engaging with the Operation to be represented—for example, certain general overheads of providing a function/service that is not directly related to the time of the technical officer. It is suggested that data covering the full costs of providing the ASTUTE 2020 service are maintained so that they can be reported on for value for money calculations at the final evaluation stage.

IN.2 Time and effort of ASTUTE 2020 team

- 3.18 Stakeholders were unanimous in their praise for the time and effort inputted by the ASTUTE 2020 technical teams across the four partner HEIs. They particularly praised the efficiency and organisation of the Operation's Coordination and Support Team (the Operation Director, Operation Manager and other Coordinators and Officers).

IN.3 Time and effort of collaborating companies

- 3.19 Stakeholders were confident that the Operation effectively manages expectations for the time and effort required from companies collaborating with the Operation up-front—and is clear that they are required to be an active partner in the collaboration. Effective collaboration is an essential component for State Aid compliance and is also an important step to ensure full engagement and collaboration from partner organisations at the outset. This approach ensures that projects from companies who cannot commit are not approved—

which reduces the likelihood of the project not reaching its targets, given that company input is essential to achieving targets. One stakeholder commented that there has been the odd isolated situation whereby the importance of the ASTUTE 2020 project within the company reduces—because of a change in focus / direction of the companies' priorities (i.e. the ASTUTE 2020 collaboration becomes less important relative to other company priorities) and the project can be delayed, but there has yet to be a major concern. The robust project approval process and clarity of expectations are seen to be important functions to mitigate this risk.

- 3.20 Furthermore, one stakeholder expressed that there had been some difficulties obtaining the necessary information required for monitoring forms—suggesting that although the technical teams (academics etc.) had no issues with company engagement, the operational team responsible for collecting detailed monitoring records suffered slightly as companies are less enthusiastic about providing the necessary evidence.

IN.4 Governance

- 3.21 Stakeholders were generally positive about the Operation's governance arrangements. Specific mention was made of the Project Committee (which undertakes monthly monitoring and reviews proposals and status reports), which was said to be effective, particularly because of the robust discussions about the strengths and weaknesses of project proposals. Stakeholders also praised the Stakeholder Advisory Board and noted the active participation of the Welsh Government representatives and industry partners.

IN.5 Expertise and knowledge of academic staff and Project Officers

- 3.22 Stakeholders were highly satisfied with the skills and expertise of the academic staff and Project Officers working across the four HEIs, and they did not highlight any areas of weakness. In fact, stakeholders reported that the skills of some Project Officers have been such—and ASTUTE 2020 has highlighted/developed them to such an extent—

that the Officers have moved on to become academic staff members at the HEIs—whilst this change in personnel might appear to be negative, as one stakeholder expressed: this is the nature of academia and a sign of success of the Operation.

The beneficiary businesses who responded to the online survey were also highly complimentary about the staff providing support through the Operation. All respondents (n=21/21) rated the technical expertise of those delivering the Operation as “extremely effective” or “effective”¹³ and 95 per cent of respondents (n=18/19) rated the dedicated Technical Manager as “extremely effective” or “effective”.¹⁴ In addition, respondents praised the willingness of staff to explore further opportunities for support and maintain active communications, to fully embed the knowledge transfer embedding process—for example in providing follow-on advice for fully utilising the new technology / processes in practice.¹⁵

Overall, the risk identified during the Inception Evaluation stage that partner HEIs might not (for various reasons, including staff contract lengths) be able to provide the necessary knowledge and expertise to meet demand does not appear to have been realised.¹⁶

IN.6 Technology and facilities of partner HEIs

- 3.23 Stakeholders were content that the technology and facilities at the HEIs were sufficient. This sentiment was also reflected by the results of the online survey of beneficiary businesses, in which 84 per cent of respondents (n=16/19) rated the access to facilities to equipment through ASTUTE 2020 as “extremely effective” or “effective” with the

¹³ Miller Research (2016–18) *ASTUTE 2020 Mid-Term Evaluation Survey*, Q9 “How would you rate the following aspects of support you have received as part of the ASTUTE 2020 Operation? Technical Expertise”.

¹⁴ *Ibid.*, “Dedicated Technical Manager overseeing the collaborative project”.

¹⁵ *Ibid.*, “If you have selected 'other support', please specify”.

¹⁶ Miller Research (January 2017) *External Evaluation of the ASTUTE 2020 Operation: Inception Evaluation*, v2.1, pg. 38.

remaining respondents indicating a neutral (neither effective nor ineffective) rating.¹⁷

IN.7a Demand from industry

3.24 Generally, stakeholders were content that there is sufficient demand to allow the Operation to reach its output targets and achieve its objectives.

Related to this, however, was the observation expressed by some stakeholders that the companies collaborating with ASTUTE 2020 were often those that had previously collaborated with HEIs or accessed public-sector support—with one commentator questioning whether the Operation could be doing more to encourage engagement beyond those already engaged. This observation was qualified, however, by the explanation that this was not unusual and not a result of any shortcomings in the Operation. The monitoring data suggests that previous involvement with ASTUTE is an important source of referrals to ASTUTE 2020, as almost one in three (29 per cent) enquiries were from those with previous involvement.¹⁸

IN.7b Referrals from other schemes

3.25 As of January 2018, ASTUTE 2020 received 193 referrals from partners, other schemes and directly from companies. These include 8 (4 per cent of total) from the Welsh Government Smart Specialisation team and 12 (6 per cent) from elsewhere in Welsh Government. Fifty-six enquiries (29 per cent) were related to a company's previous involvement in ASTUTE, 45 referrals (23 per cent) were from Cardiff and Swansea University contacts, and 31 (16 per cent) originated from social media/events.¹⁹ This data suggests that the referral mechanism from Welsh Government's business support programmes is less important to the Operation than expected

¹⁷ Miller Research (2016–18) *ASTUTE 2020 Mid-Term Evaluation Survey*, Q9 “How would you rate the following aspects of support you have received as part of the ASTUTE 2020 Operation? Access to facilities and equipment”.

¹⁸ ASTUTE 2020 (2018) *18-01-25 Target Spreadsheet – ASTUTE 2020*, “EnquiryForm”.

¹⁹ *Ibid.*

(see, for example, page 45 of the Inception Evaluation Report)²⁰
thanks to the profile of the partner HEIs and positive experience of
previous collaborators with ASTUTE.

- 3.26 Stakeholders highlighted the relationship between the Welsh Government SMART teams and ASTUTE 2020, which has delivered fewer leads than some anticipated. One stakeholder suggested that a possible reason for this is the similar goals (and targets) of ASTUTE 2020 and the SMART team, which might have led to competition rather than complementarity—that is where both initiatives have a requirement to evidence levels of engagement. It was suggested by one stakeholder that perhaps WEFO could help to clarify the roles regarding routes to market for both the SMART team, and ASTUTE 2020, to differentiate the services and help to alleviate this element of competition. Stakeholders reported that the relationship has improved, however, thanks to the efforts of the ASTUTE 2020 team and representatives on the Stakeholder Advisory Board. These efforts include regular catch-ups between Operation Managers and attendance at a workshop with Welsh Government’s SMART and AM&M teams in January 2018.

IN.8 Support from Industry Wales and EEF

- 3.27 As during the Inception Evaluation stage, stakeholders stressed the need for the Operation to develop close links to industry—and one means of doing this is through engaging with Industry Wales and EEF. Stakeholders report that ASTUTE 2020 and Industry Wales have a close relationship. Both Industry Wales and EEF provide representation on the Project Committee and Stakeholder Advisory Board.

IN.9 Communications and marketing

- 3.28 At the time of writing, the Operation has spent approximately 45 per cent of the allocated marketing budget.²¹ Additionally, the Operation

²⁰ Miller Research (January 2017) *External Evaluation of the ASTUTE 2020 Operation: Inception Evaluation, v2.1*, pg. 45.

²¹ Out of a total budget of £43,700, £19,600 has been spent to date on all marketing activity.

has made use of free opportunities to advertise. Advertisements have been produced for:

- The Business Insider Wales Magazine (April 2017)
- Business Matters Magazine (October 2017)
- Chamber Chat Magazine (November 2017)

Other marketing routes utilised by the Operation include printed case studies, exhibition stands, posters, and social media content disseminated via Twitter, Facebook, LinkedIn and Flickr. Operation Officers have also attended existing events / conferences and seminars and publicised ASTUTE 2020 wherever possible.

- 3.29 Stakeholders were generally satisfied that the communications and marketing of ASTUTE 2020, scaled-down in comparison to the previous Operation, were sufficient due to the established nature of the ASTUTE brand—particularly amongst those who engaged with the previous Operation. Some stakeholders expressed concern that some people in industry and Welsh Government still remain unaware of ASTUTE 2020, despite the promotion and relationship-building undertaken by stakeholders; however, it is hoped that attendance at planned engagement events and the launch of and promotion of ASTUTE EAST will address this.
- 3.30 One of the issues highlighted during the horizon scanning exercise was the need for the Operation to encourage Welsh micro-companies to look at the opportunities available to them, particularly internationally, and move away from purely ad-hoc problem solving.²² That being said, it should be noted that micro-companies are not the primary target companies for engagement with ASTUTE 2020.
- 3.31 The beneficiary businesses who responded to the online survey were largely positive about the promotion and marketing of the Operation, with 86 per cent (n=19/22) rating it “extremely effective” or “effective”.²³ (Of course, as this survey population is engaged with the

²² Novactus Limited (February 2018) *ASTUTE 2020 Horizon Scan Report*.

²³ Miller Research (2016–18) *ASTUTE 2020 Mid-Term Evaluation Survey*, Q5 “In your opinion, how effective is the way in which the Operation is being promoted/marketed?”.

Operation, it is possible/likely that their views are not reflective of the industry at large²⁴.) Suggestions about how the promotion or marketing could be improved included:

- more contact with manufacturers and trade organisations such as EEF
- use of companies (through case studies?) in promotional material
- increased participation at industry conferences.

Activities

- 3.32 At the Mid-Term Evaluation stage, the key questions for the Evaluation Team are: are the activities undertaken as part of ASTUTE 2020 still the same as identified at the Inception Evaluation stage? Are they working as expected? Should they be modified?
- 3.33 The activities and Mid-Term Evaluation stage questions are identified in the table below. The answers to the evaluation questions are based on the qualitative interviews with stakeholders, data from the online survey of beneficiary businesses and the Operation's monitoring data.

²⁴ This raises the question of whether companies who have not engaged with ASTUTE 2020, or who were referred but did not proceed, should be engaged to understand the strength of marketing and promotion – however, surveying unengaged is resource intense and beyond the scope of this commission, and secondly, a referred company which did not receive a successful application will have an equally (opposite) biased view to those who were successful.

Table 3.3: Activities

Activities		Evaluation Question (Section)
What is ASTUTE 2020 doing with the inputs/resources in order to achieve its objectives?		
A.1	Approve projects that have the potential for a high impact	Are the activities undertaken as part of ASTUTE 2020 still the same as identified at the Inception Evaluation stage? Are they working as expected and delivering the desired outputs? Should they be modified?
A.2	Provide demand-led targeted and tailored support to enterprises	
A.3	Provide demand-led world-class academic expertise	
A.4	Provide innovation and manufacturing demonstration and development facilities to future-proof and de-risk technology development for industry	
A.5	Undertake more strategic larger scale 'cluster' projects for the development of Smart Specialisation clusters, involving elements of the supply chain for specific sectors	
A.6	Refer to other schemes	
A.7	Horizon Scanning	
A.8	Monitoring and evaluation of Operation	
A.9	Selection of Adaptive Smart Specialisation areas	

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Notes: For all Activities the following applies:

Evaluation Stage	Data Type	Data Source	Data Collection Responsibility
Mid-Term	Qualitative	Interviews with strategic stakeholders, online survey data and monitoring data	External Evaluation Team

A.1 Project approval process

3.34 As of January 2018, a total of 44 proposals had been received for approval by the Project Committee. Twenty-six of these (59 per cent) related to collaborations led by Swansea University,²⁵ 15 (34 per cent) led by Cardiff University, 2 led by University of Wales Trinity Saint David²⁶ and 1 led by Aberystwyth University.²⁷

3.35 Stakeholders were generally positive about the project approval process (outlined in the Inception Evaluation report²⁸) and its ability to select projects that have the potential for a high impact. The process (and in particular the scrutiny by the Project Committee) was praised for its robust and thorough nature, which reportedly raises important questions about the suitability of a project. Some stakeholders expressed concern that the detailed and lengthy nature of the proposal form is onerous and can put pressure on Project Officers' time, but they also accepted that the process was ultimately effective and that the form was designed in such a way that facilitates effective scrutiny.

Those beneficiary businesses that responded to the online survey were largely positive about the project approval process, and specific comments that expressed concern about the paperwork and form-filling required were offset by positive ratings of the process.²⁹ When asked what could be improved, one survey respondent provided the comment "Make it easier to do the paperwork - maybe online forms", although it should be noted that Operation paperwork is filled in and submitted electronically at present and that the costs to creating a fully automated online form would outweigh the benefits at this point in the Operation's delivery.

²⁵ Swansea University are also partners in one Cardiff University led project and one University Trinity Saint David project.

²⁶ University Trinity Saint David are also partners in one Swansea University led project.

²⁷ Aberystwyth University are partners in two Cardiff University led projects.

²⁸ Miller Research (January 2017) *External Evaluation of the ASTUTE 2020 Operation: Inception Evaluation*, v2.1, pg. 39.

²⁹ Miller Research (2016–18) *ASTUTE 2020 Mid-Term Evaluation Survey*, Q8 "Thinking of the Operation delivery so far, please could you rank the effectiveness of the following aspects?".

- 3.36 One aspect of the project approval process commented upon by some stakeholders was the issue of to what extent the process (particularly its risk assessment element) encourages or dissuades the more innovative projects to be approved. Stakeholders suggested, however, that this was less a function of the project approval process and more a result of the nature of the proposals coming forward from companies. Furthermore, the stakeholders were confident that the approval panel were sufficiently experienced and knowledgeable to effectively assess the risk—ensuring a balance between enabling innovation and avoiding failure.
- 3.37 A further aspect of the project approval process that is significant is the requirement to minimise private sector displacement—a key consideration of the Operation. Stakeholders were confident that the project approval process sufficiently considers this (potentially highly-significant) issue and has resulted in some proposals being rejected as a result.

A.2 Provide demand-led targeted and tailored support to enterprises

- 3.38 Stakeholders were satisfied that the Operation provides support that is demand-led, targeted and tailored to businesses. This was largely attributed to the detailed project proposal form, which asks about a company's need, and the rest of the support provided by Project Officers during the proposal process. The project approval process—and particularly the involvement of Industry Wales and EEF in it—was highlighted by stakeholders during the Inception Evaluation as one of the mechanisms by which the Operation would work to ensure that its support is demand-led.³⁰ Evidence suggests that this is indeed the case, as stakeholders were positive about the representation and attitude of the Project Committee.
- Stakeholders were also confident that the Operation has the necessary flexibility to allow collaborative projects to adapt during delivery should the business's priorities change.

³⁰ Miller Research (January 2017) *External Evaluation of the ASTUTE 2020 Operation: Inception Evaluation, v2.1*, pg. 40.

Evidence from the online survey of beneficiary businesses suggests that they are highly positive about their experience of collaborating with ASTUTE 2020. All respondents who answered the question (n=21, 1 skipped) rated their overall experience of collaborating with the Operation as “very positive” or “positive”, with 62 per cent (n=13/21) of these answering very positive.³¹

A.4 Provide innovation and manufacturing demonstration and development facilities to future proof and de-risk technology development for industry

- 3.39 Stakeholders did not raise any concerns about the facilities provided by the Operation. This is supported by evidence from beneficiary businesses (see IN6 above).

A.5 Undertake more strategic larger scale ‘cluster’ projects for the development of Smart Specialisation clusters, involving elements of the supply chain for specific sectors

- 3.40 On the whole, stakeholders felt confident that the proposals process encouraged long-term thinking when developing projects, particularly in comparison to the previous ASTUTE Operation—however, one commentator expressed some caution that ASTUTE 2020 needs to be seen to go beyond the ‘usual suspects’ and should continue to market itself (acknowledging a limited marketing budget) and that key partner organisations such as the Welsh Government should promote the scheme—to ensure that the key, strategically important projects engage with the Operation. It was also noted that in order to be able to deliver large-scale, strategic projects it may be necessary to increase the delivery time-frame. Decreases in staff numbers are expected to start in autumn 2019 as a result of staff looking for new posts due the approaching end of employment contracts. *And* there is a concern that there is not sufficient time to deliver larger, more

³¹ Miller Research (2016–18) *ASTUTE 2020 Mid-Term Evaluation Survey*, Q16 “Miller Research (2016–18) *ASTUTE 2020 Mid-Term Evaluation Survey*, Q9 “What has been your overall experience of collaborating with ASTUTE 2020 so far?”.

strategic projects considering the length of time it takes to design, approve and deliver projects.

A.6 Refer to other schemes

- 3.41 As outlined in the Inception Evaluation, the ASTUTE 2020 Operation refers misguided enquiries by both established and “new” referral routes. These routes include referral to the Welsh Government SMART team, with whom ASTUTE 2020 tries to have a “symbiotic” relationship. Stakeholders—who are informed via the Strategic Advisory Board meetings were satisfied that these routes generally worked well.
- 3.42 As of January 2018, ASTUTE 2020 made a total of 43 referrals to other schemes. Further information about these referrals is included under OP10 and OP11 below.

A.7 Horizon Scanning

- 3.43 The ASTUTE 2020 horizon scanning process is overseen by the Operation Director. The Operation procured external consultants to facilitate a full-day horizon scanning workshop in February 2018, which was attended by ASTUTE 2020 staff from the partner HEIs and representatives of Welsh Government and Industry Wales. The workshop comprised ‘inspiration and insight talks’ and a group review and ranking of key themes, such as Industry 4.0. This process resulted in the production of a report,³² delivered to the ASTUTE 2020 team in April 2018.

Stakeholders were satisfied that the process has been useful so far. For example, one stakeholder suggested that the process had partly informed recent appointments to a robotics team within the College of Engineering. Whilst this itself is likely be of indirect benefit to the Operation, it suggests that the process is effective.

A.8 Monitoring and evaluation of Operation

³² Novactus Limited (February 2018) *ASTUTE 2020 Horizon Scan Report*.

- 3.44 Stakeholders were confident that the monitoring of the Operation is undertaken efficiently and transparently and in alignment with the ASTUTE 2020 Monitoring and Evaluation Plan.

A.9 Selection of Adaptive Smart Specialisation areas

- 3.45 Stakeholders were satisfied that the Adaptive Smart Specialisation areas selected in planning the Operation (see the Inception Evaluation report for further information)³³ were still relevant and sufficiently broad to permit flexibility when dealing with enquiries from businesses. The “adaptive” nature of the areas has not been significantly tested to date, as the three areas chosen have shown to be relevant to businesses in West Wales and the Valleys (evidenced by their engagement), but exercises such as the horizon scanning workshop provide confidence that the Operation’s delivery team remain vigilant to potential changes

Cross-Cutting Themes

- 3.46 The Inception Evaluation report detailed the Operation’s approach to WEFO’s Cross-Cutting Themes (CCTs), which was set out in the ASTUTE 2020 Business Plan.³⁴ In summary, the Operation’s approach reflected WEFO’s preference for centralisation of CCT support, committed to actively engaging in this process, and set out to develop CCT ‘Champions’ in the four partner HEIs.
- 3.47 Stakeholders were satisfied that the Operation’s approach to Cross-Cutting Themes was working as planned. Feedback from WEFO suggests that no significant issues have been raised about ASTUTE 2020’s approach.
- 3.48 The Operation’s activity that contributes to the three Cross-Cutting Themes (Equal Opportunities and Gender Mainstreaming, Sustainable Development, and Tackling Poverty and Social Inclusion) is set out in the Progress Reports submitted to WEFO. An example of

³³ Miller Research (January 2017) *External Evaluation of the ASTUTE 2020 Operation: Inception Evaluation, v2.1*, pg. 43.

³⁴ *Ibid.*, pg. 30.

this activity includes lead partner Swansea University's award of a Silver Athena SWAN Charter award for its equipment to promoting gender equality.³⁵

- 3.49 The Operation has delivered against the case level indicators set by WEFO: An Eco-code has been developed as well as a Sustainable Travel Plan, and team members are encouraged to consider sustainable transport and to save resources. CCT champions have been appointed in the Swansea and Cardiff University teams. The partners in Aberystwyth University and University Wales Trinity Saint David (UWTSD) work closely with these champions to identify opportunities for embedding delivery of the CCTs into the operation. All partner Universities run a range of initiatives and activities on equality, sustainability and Welsh language and have achieved a number of awards in different areas.
- 3.50 ASTUTE 2020's industrial collaborations have led to improvements and achievements in sustainability for a number of companies e.g.:
- Waste Management – four tonnes of plastic waste diverted from landfill per week and weight reduction of components, reducing raw materials needed for manufacture.
 - Reduction of CO₂ emissions – reduction in energy consumption and improvements in processes leading to potential significant reduction in CO₂ emissions.
 - Energy conservation – reduction in energy consumption and improvements in processes leading to potential significant reduction in energy usage.
 - Renewable Energy – providing support to companies working on wind and wave energy.
 - Sustainable Wales – Supporting local supply chains while investing in people and jobs.

³⁵ <https://www.ecu.ac.uk/equality-charters/athena-swan/about-athena-swan/>

Outputs

- 3.51 The below table contains the outputs of ASTUTE 2020, the (quantitative) indicator that is used to measure its progress, the overall target agreed with WEFO, and progress towards this target, as of March 2018. Below the table, we provide commentary on the progress towards outputs, including stakeholder perspectives and data from the survey of beneficiary businesses.
- 3.52 The Evaluation Team understand that WEFO are currently revising the definitions of some indicators, although it is expected that this will not affect the indicator targets.

Table 3.4: Outputs

OUTPUTS				Progress (Q11 of Operation– March 2018)	Final target	Profiled cumulative targets as of March 2018	Monitoring Group	Data Source
What is being produced by ASTUTE 2020's activities?		Indicator	Overall Target					
OP.1	Enquiries, referrals, and other initial contact with companies	Number of enquiries, referrals, and other initial contact with companies	n/a	189 ³⁶	n/a	n/a	R	Monitoring Data
OP.2	Formal requests for collaboration from companies	Number of formal requests for collaboration from companies	n/a	41 ³⁷	n/a	n/a	R	Monitoring Data
OP.3	Enterprises supported to introduce new to the market products	Number of enterprises supported to introduce new to the market products / processes	8	4	8	2	ERDF	Monitoring Data
OP.4	Enterprises supported to introduce new to the firm products	Number of enterprises supported to introduce new to the firm products / processes	39	9	39	8	ERDF	Monitoring Data
OP.5	Enterprises cooperating with supported research institutions	Number of enterprises cooperating with supported research institutions	89	72	89	70	ERDF	Monitoring Data
OP.6	Enterprises receiving non- financial support	Number of enterprises receiving non-financial support	42	30	42	31	ERDF	Monitoring Data

³⁶ As of 18 January 2018.

³⁷ Ibid.

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OP.7	Scientific Papers with supported enterprise as joint author	Number of scientific papers with supported enterprises as joint authors	n/a	2 (2)	n/a	n/a	R	Monitoring Data
OP.8	Research Excellent Framework Impact Case Studies	Number of research excellent framework impact case studies	n/a	0	n/a	n/a	R	Monitoring Data
OP.9a	Patentable intellectual property	Number of patents registered for products / processes	5	0	5	0	ERDF	Monitoring Data
OP.9b	Non-Patentable intellectual property	Number of items of non-patentable IP	n/a	35	n/a	n/a	R	Monitoring Data
OP.10	Referrals to other schemes (including Welsh Government)	Number of referrals to other schemes	n/a	18 ³⁸	n/a	n/a	R	Monitoring Data
OP.11	Referrals to private sector	Number of referrals to private sector	n/a	25 ³⁹	n/a	n/a	R	Monitoring Data
OP.12	Publicly available case studies	Number of publicly available case studies on projects with supported companies	n/a	6	n/a	n/a	R	Monitoring Data
OP.13	Any other outputs	Assessment of any other outputs	n/a	n/a	5,000,000	546,803	n/a	Monitoring Data
					80	12		

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³⁸ Ibid.

³⁹ Ibid.

*OP.1 Enquiries, referrals, and other initial contact with companies:
189*

- 3.53 As of January 2018, ASTUTE 2020 had received 189 enquiries from 159 unique enterprises. The majority of enquiries (97 per cent) related to collaboration with Swansea or Cardiff University.⁴⁰ This output has no target attached to it.

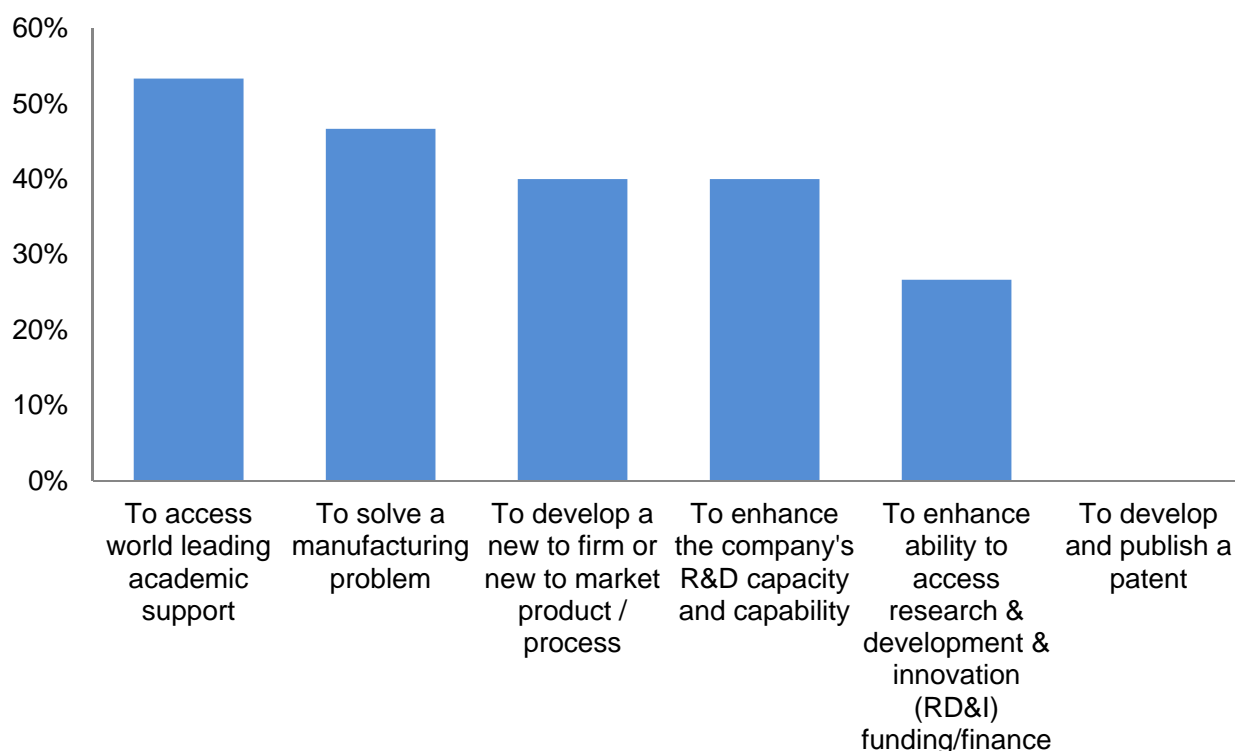
OP.2 Formal requests for collaboration from companies: 41

- 3.54 These enquiries resulted in formal requests for collaboration from companies. As of January 2018, ASTUTE 2020 had received 41 Requests for Industrial Project (RFIP)—stage one of the Operation’s Approval Process. Of these RFIPs, 39 were approved and 2 were rejected, using criteria set out in the Operation’s Business Plan.⁴¹ These RFIPs progressed to formal proposals, as discussed under A1 (above). The high rate of conversions of RFIPs into formal proposals and projects suggests that support provided by ASTUTE 2020 staff during the proposal process is effective and efficient, a view supported by stakeholders.

⁴⁰ ASTUTE 2020 (2018) *18-01-25 Target Spreadsheet – ASTUTE 2020*, “EnquiryForm”.

⁴¹ ASTUTE 2020 (2016) *ASTUTE 2020 Business Plan v36 “Appendix XI – Industrial Project Selection Criteria and Approval Process”*, pg. 212.

Figure 3.1: Reasons for participation in ASTUTE 2020



Source: Miller Research, ASTUTE 2020 Mid-Term Evaluation Survey⁴²
Note: Base=15, 7 skipped.

3.55 Evidence from the online survey of beneficiary businesses suggests that businesses had a range of reasons for participating in ASTUTE 2020. Amongst respondents, accessing world-leading academic support and solving a manufacturing problem were the most selected, with no respondents selecting the aim to develop and publish a patent as one of the main reasons for collaborating in ASTUTE 2020.

OP.3 Enterprises supported to introduce new to the market products/processes/services: 4

3.56 Currently, the Operation is half-way towards its target for new to the market products and ahead of profile (2). An example of a project that led to this output was research into liquid flow patterns through micro nozzles, conducted by an enterprise and Swansea University within the Computational Engineering Modelling Smart Specialisation.

⁴² Miller Research (2016–18) *ASTUTE 2020 Mid-Term Evaluation Survey*, Q7 “Please indicate the main reason(s) why you participated in the ASTUTE 2020 Operation.(Please tick all that apply)”.

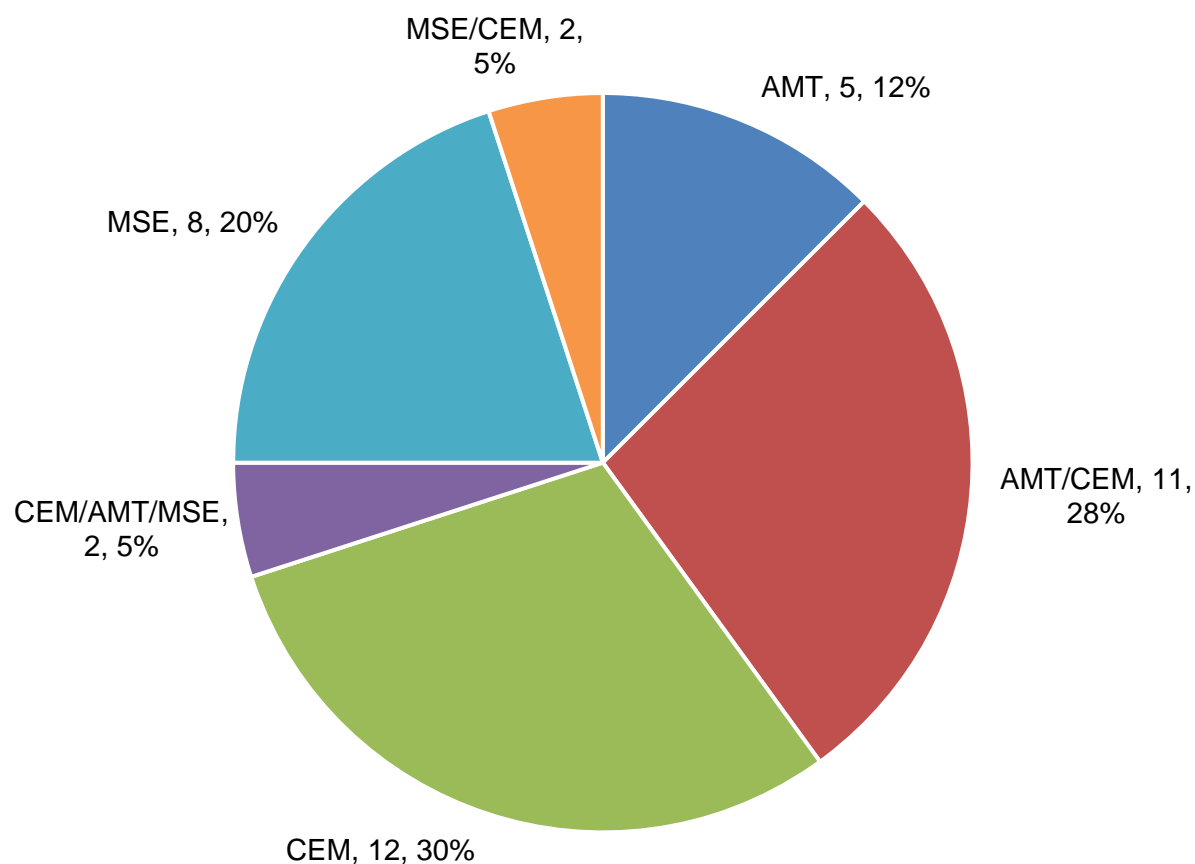
*OP.4 Enterprises supported to introduce new to the firm
products/processes/services: 9*

3.57 The Operation is currently slightly ahead of profile (8) for this indicator.

OP.5 Enterprises cooperating with supported research institutions: 72

3.58 The Operation is slightly ahead of profile (70) on this indicator. The majority of the projects undertaken by the Operation to date have involved two parties (one enterprise and one HEI), although some projects have involved direct collaboration between an enterprise and two partner HEIs—for example, a Computational Engineering Modelling research project involving an enterprise, Swansea University and University of Wales Trinity Saint David.

Figure 3.2: Split of projects across Smart Specialisation areas, January 2018



Source: Miller Research, based on ASTUTE 2020 Target Spreadsheet,
“ProjectsCAandDM”

Notes: AMT= Advanced Materials Technology, CEM=Computational Engineering Modelling, MSE=Manufacturing Systems Engineering

3.59 The Operation's modelling data suggests that a majority of projects involved an element of Computational Engineering Modelling. As of January 2018, 66 per cent of completed and active ASTUTE 2020 projects involved an element of Computation Engineering Modelling.

3.60 Evidence from the online survey of beneficiary businesses illustrate that the largest proportion of enterprises with which ASTUTE 2020 cooperates are located in the Swansea and Neath Port Talbot local authority areas (12/22 responses). This is perhaps to be expected due to the industrial strength of the region and the proximity to Swansea University. The evidence also suggests that fewer engagements with the Operation originate from the north of the West Wales and the Valleys area. In recognition of this, the ASTUTE 2020 delivery team have continued to engage with regional stakeholders via the Regional Engagement Teams, including Gwynedd County Borough Council/Gwynedd Business Network and Conwy County Borough Council—Conway Business.

OP.6 Enterprises receiving non-financial support: 30

3.61 The Operation is almost on-track with profile (31) on this indicator.

OP.7 Scientific Papers with supported enterprise as joint author: 2

3.62 The Operation has to date resulted in the publication of two scientific papers that include a supported company as a joint author. These two papers were one of the products of a Computational Engineering Modelling research project into the modelling of blood flow in medical devices involving an enterprise and Swansea University. One of the papers was presented at a European conference and nominated for an award for the quality of the scientific content. A further two manuscripts have been submitted to publishers.

3.63 The two beneficiary businesses who responded to the online survey and answered the question about the publication of a scientific paper suggested that the benefits of doing so were in advertising the

company, increasing confidence in R&D and so leveraging funding from investors, and sharing knowledge (in areas that are not core to the business).⁴³

OP.8 Research Excellent Framework Impact Case Studies: 0

- 3.64 The Operation has currently not delivered any REF Impact Case Studies, but a small number are currently in development and under consideration by partner institutions. It is likely that these will be delivered later in the Operation's delivery.

OP.9a Patentable intellectual property: 0

- 3.65 The Operation has currently not resulted in the registration of patents for products/services. Stakeholders did not express concern about this, suggesting that they remain confident that the Operation will meet its target (5) as more projects develop.

- 3.66 The Operation will refer standard enquiries on IP support, audits and IP portfolio management to SMART Innovation's IP specialists. The Operation has procured external IP and Technology Transfer advice to provide IP due diligence for their high value industrial collaborations in order to assess the feasibility in terms of existing IP and impact through technology transfer potential. This will determine whether investing public resources into a project will result in new and innovative products and processes or whether the project should not go ahead because there is already existing IP. This will also provide the opportunity to assess the potential for technology transfer opportunities and for opening-up new markets for the project results.

OP.9b Items of Non-Patentable intellectual property: 35

- 3.67 ASTUTE 2020 collaborations with nine companies have generated 35 items of non-patentable intellectual property.

OP.10 Referrals to other schemes (including Welsh Government):

169

⁴³ Ibid., Q15 "If you have been involved in the publication of a scientific paper, please could you explain the benefit it has had on your organisation below".

- 3.68 As of January 2018, the Operation had referred 18 enquiries to other schemes, including other European-funded schemes such as the Materials and Manufacturing Academy (M2A).

OP.11 Referrals to private sector: 25

- 3.69 As of January 2018, the Operation had made an additional 25 referrals to the private sector. The majority of the referrals were interested in routine testing services, some were looking for local component manufacture and others were looking for expertise in areas that the Operation does not provide.

OP.12 Publicly available case studies: 6

- 3.70 As of January 2018, six case studies have been produced with the collaborating companies and published on the ASTUTE 2020 website. In addition, short abstracts of all projects are provided on the Operation website.

OP.13 Any other outputs

- 3.71 Overall, stakeholders were confident that the Operation will meet its output targets, should they remain at their current level.

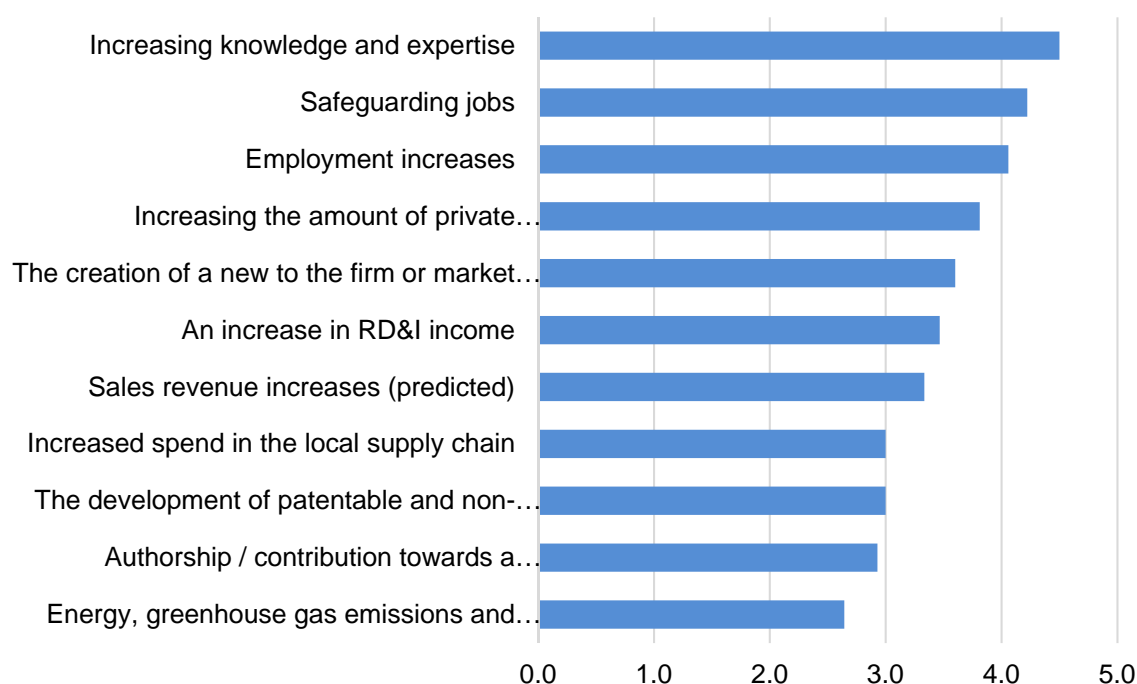
Outcomes

- 3.72 This section of the report provides evidence to show mid-term progress against the outcome and impact indicators identified and detailed in the Inception Evaluation's Monitoring and Evaluation Framework. It should be noted that—by their nature—outcomes and impacts take time to be realised and so the assessment here provides indication of emerging results only.
- 3.73 Thus, at the mid-term stage, there is limited data to evidence changes due to the relatively short length of time that has passed since first engagement—rather, the approach has been to gather data regarding emerging outcomes and impact more generally by considering the effectiveness of ASTUTE 2020 collaboration in driving change for the observable indicators.

- 3.74 This sentiment was confirmed by one survey respondent who commented “We are not at a stage where we can answer most of the [evaluation question 13] section or the section below [evaluation question 14].”⁴⁴ Another respondent commented to the same effect, adding, however, that they would be willing to share the outcome with the evaluators at the successful conclusion of the project. Thus, a summative assessment of the outcomes and impacts is the primary concern of the Final Evaluation.
- 3.75 In general, the evidence collected from participant companies (n=21) at the mid-term stage illustrates that collaboration with ASTUTE 2020 is leading to positive benefits. Importantly, this is the case for the primary objectives, which ASTUTE 2020 set out to achieve, indicating that the Operation is achieving its original aims / purpose. Figure 3.3 provides evidence that collaboration with ASTUTE 2020 is particularly effective at increasing knowledge and expertise, safeguarding jobs, employment increased and increasing the amount of private investment secured. All aspects receive a rating above 3.5 on a five-point scale where five is very effective and 1 very ineffective.
- 3.76 The survey results also asked participant companies to rate (self-assessment) the extent to which the observed effects may have been realised without ASTUTE 2020 support. This is used in this report as a proxy indicator for the amount of deadweight that ASTUTE 2020 may be producing. The results (Figure 3.4) are also positive, with the highest weighted average score of 3.2 (on a five-point scale), indicating that only ‘some’ of the observed effects might have been realised without support from ASTUTE 2020. Of note, eight of the eleven impact indicators queried in the survey reported a figure less than three, which corresponds to a self-assessment that it was ‘unlikely’ that the achievements noted would have been produced without ASTUTE 2020 collaboration.

⁴⁴ Questions 13 and 14 of the survey ask for effective ratings for all outcome and impact indicators.

Figure 3.3: Effectiveness of ASTUTE 2020 collaboration



Source: Miller Research, ASTUTE 2020 Mid-Term Evaluation Survey:
Question 13
Unweighted Sample: 21

3.77 In support of the ASTUTE 2020 Operation’s additionality (impact over and above that which would have been realised anyway), one survey respondent provided insight into the way in which collaboration is enabling companies to pursue research, development and innovation opportunities, that are increasingly difficult to pursue in a highly commercial marketplace, by offering the following quote:

“A manufacturing organisation with foreign headquarters such as ours is inevitably driven towards cost improvement and efficiency savings. The long-term implication of this is that it becomes increasingly hard to apply resources to technical investigations or feasibility studies that are speculative even if the potential returns are significant. Having access to resources such as ASTUTE [2020] has provided a highly valuable resource which helps to evaluate and drive innovation locally and maintain the site's value and investibility [sic] to the wider corporation.” [survey respondent]

In this specific example, collaboration with ASTUTE 2020 is clearly the enabling factor to help the organisation overcome innovation

barriers, contributing to the future sustainability of the local company, ensuring it remains in the WW&V area.

- 3.78 Stakeholders were unanimous in supporting the positive emerging outcomes and impacts that the Operation was generating (or forecast to generate). All stakeholders felt that the Operation was ‘on-track’ to meet expectations. One commentator noted that it was important that the ‘big picture’ of what ASTUTE 2020 is aiming to achieve is kept in mind and warned not for those judging performance to be solely concerned with metrics.

Stakeholders pointed to exemplar examples of project success, better captured through individual project cases. For example, reference was made to a successful spin-out company based on the intellectual property that resulted from ASTUTE 2020 collaboration. Another example of emerging impacts was provided from a project case which has already led to reductions in carbon dioxide emissions—one of the impact indicators—with an expectation that more will follow.

- 3.79 Furthermore, it was clear from discussions that the project approval process and the project monitoring (specifically the feedback from the project status reports) information was effective at ensuring that where activities / projects were leading to observable results, lessons-learnt or good practice was shared and implemented in the Operation. For example, one commentator noted that the Operation “should never stand still” and that it should “always look to improve”. Another commentator spoke of the attitude the Operation team possessed to keep going and keep learning. Clearly, there is a culture of continual learning among the Operation team, where outcomes from approved projects were continually monitored and improvements / tweaks to the process were fed back into the approval process and embedded into monitoring processes.

- 3.80 The survey findings, feedback from stakeholder interviews, and Operation monitoring data is scrutinised in depth below, to provide analysis of performance to date for each of the outcome indicators.

OC.1 Private investment matching public support in innovation or R&D projects

- 3.81 Monitoring data shows that £1.058 million private investment matching public support in innovation or R&D projects has been achieved to the end of March 2018, compared with an expected cumulative target at the end of quarter 11 of around £550,000 —more than double the expected profile. This is clearly a positive sign that ASTUTE 2020 support is leading to observable outcomes and also suggests that ASTUTE 2020 is on-track to realise target profiles (assuming the trend can continue). Discussions with the Operation team reassure that there is sufficient project work in the pipeline to ensure targets will continue to be met.
- 3.82 To assess the extent of additionality, the survey asked two questions, designed to address the following deadweights:
- The extent to which support led to the observable changes
 - The extent to which the companies believe they would have been able to realise the changes without support

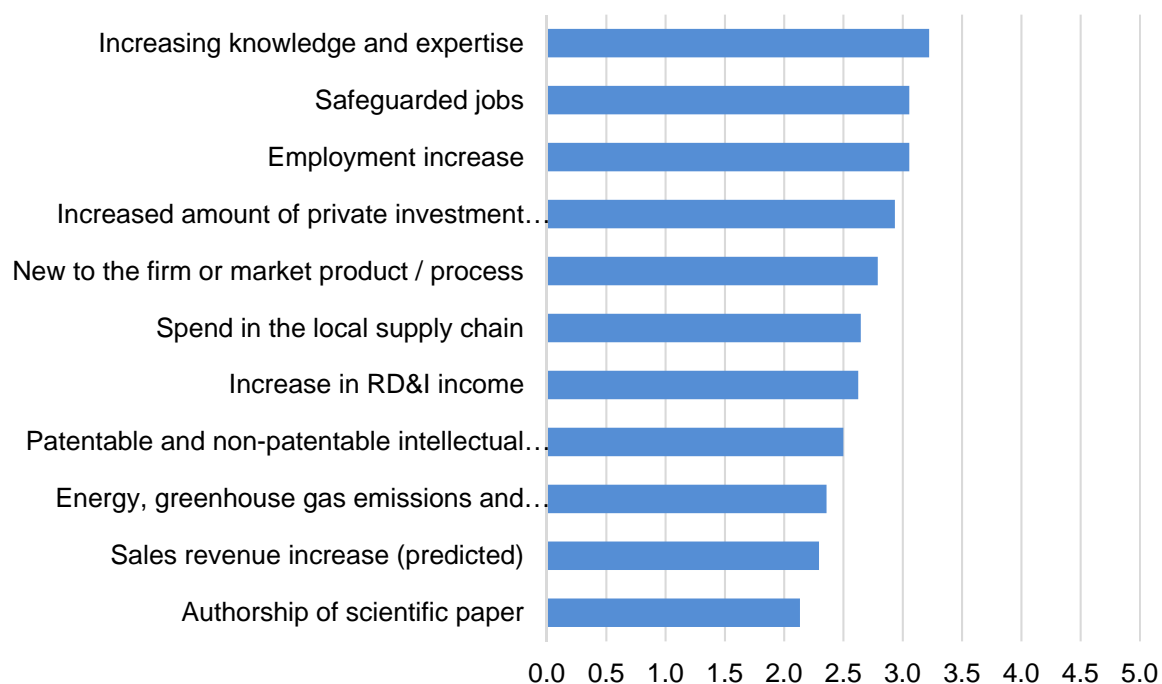
The survey findings are noted below.

- 3.83 The survey asked participants the extent to which they felt the collaboration support they received via ASTUTE 2020 led to an increase in the amount of private investment secured (in innovation or R&D projects; including wider investment and not just that matching the public support). Figure 3.3 shows the average response was a score of 3.8 on a 5-point scale (where one is very ineffective and five is very effective). This indicates that at the mid-term stage, the sample as a whole felt that collaboration was better than 'effective' at increasing private investment. A similar score was recorded (3.3) for respondents reporting sales revenue increases. This data suggests that collaboration with ASTUTE 2020 is leading to positive effects on the current level of private sector investment in R&D. Given the difference between the effectiveness of investment and sales (as a turnover proxy), this might infer that the proportion of investment is

increasing as a share of turnover as a result of ASTUTE 2020 collaboration.

3.84 The survey asked collaborating companies how likely they think they would have been able to produce the outcomes without collaboration with ASTUTE 2020. This information is used to infer the likely deadweight of the Operation using a self-assessment approach. The results show that on average, respondent companies recorded a weighted score of 2.9 (on a five-point scale where five is highly likely and 1 very unlikely) for the increased amount of private investment secured (in innovation or R&D projects, as above), which leans marginally towards the ‘unlikely’ rating. The average rating for the likelihood that sales revenue increases would have been realised without ASTUTE 2020 collaboration is lower, at 2.3—closer to ‘very unlikely’. These early results from the companies engaged to date suggest that being involved with ASTUTE 2020 is leading to benefits over and above those which would have been realised anyway (without support).

Figure 3.4: Additionality (the likelihood that benefits would have been realised without collaboration with ASTUTE 2020)



Source: Miller Research, ASTUTE 2020 Mid-Term Evaluation Survey

Question 14

Unweighted Sample: 21

OC.2 RD&I research income increases

OC.2 Amount of RD&I research income achieved

- 3.85 As noted above, it was felt during the development of the mid-term evaluation survey that the timing of the evaluation would be too early for the Operation to realise an increase in RD&I income for the university and collaborating companies (secured through grants that require HEI and company collaboration, for example Innovate UK grants). This information should be attempted to be collected through project status reports and at the final evaluation.

OC.3 Employment increase in supported enterprises

OC.3 Number of additional employees in supported enterprises

- 3.86 As specified in the Operation's Monitoring and Evaluation Plan, the number of additional employees in supported enterprises in WW&V is recorded by the Operation team via the indicator form. Operation monitoring data shows that 13 jobs have been achieved so far, compared with an expected target of 12. At this stage, the realisation of additional employment is on target however, there is a notable difference between the expected profile to date and the ultimate target (80). The relatively low number (compared with final target) was frequently mentioned by stakeholders however there was unanimous agreement that this was simply the result of the time-lag between support and job creation and therefore there was complete confidence that the ultimate target will be met. It should also be noted that there has been a change in emphasis in the Welsh Government approved Green Book approach to appraisals from jobs created to the creation of higher value jobs. As such, there is a minor concern that focussing solely on the number of jobs created might underestimate the overall impact of ASTUTE 2020 in raising the quality of jobs (and therefore the economic contribution to the local economy).
- 3.87 The survey data shows that on average, participant projects rate that their collaboration with ASTUTE 2020 have been 'effective' at leading

to employment increases, with an average rating of 4.1 on a five-point scale (Figure 3.3). The potential level of deadweight (the extent to which the changes would have been made without ASTUTE 2020 collaboration is rated at 3.1, equivalent to an 'average' rating – suggesting that sentiment lies somewhere between 'likely' and 'unlikely' to have realised changes without support. The extent of deadweight will be explored further at the final evaluation stage. It should be noted that there is a possibility that the self-reported deadweight regarding the creation of jobs is subjected to bias from those reporting, if they are employed in a position in their company that is responsible for job creation. For example, particularly for SMEs, a Director, who is responsible for growth in jobs may self-report a high level of deadweight because they may believe not being able to create jobs without ASTUTE 2020 could reflect badly on their own performance—and so would report that it is likely they would have realised the job growth anyway.

- 3.88 Due to the statistically insignificant number of jobs created to date, meaningful comparisons with general employment changes cannot be made at the mid-term. It should be noted however, that to accurately compare change with the general change in employment (as described in the Inception Evaluation report), the level of employment before and after intervention in collaborating companies will need to be collected at the final evaluation stage.

OC.4 Knowledge and expertise increase in supported enterprises and partner universities

OC.4 Assessment of extent to which knowledge and expertise has increased.

- 3.89 The survey results indicate that ASTUTE 2020 has been particularly effective at increasing knowledge and expertise, with an average rating of 4.5 on a five-point scale (Figure 3.3). This was the highest rating of all the benefits realised by companies as a result of ASTUTE 2020 support, however, it also recorded the highest rating for potential

deadweight, as on average, the self-assessment of how likely this would have been realised without support was 3.2 (five point-scale, see Figure 3.4). These results suggest that although ASTUTE 2020 is highly effective at increasing the knowledge and expertise, this is something that may have happened within the companies anyway (without collaboration with ASTUTE 2020). Nonetheless, it is quite likely that collaboration with ASTUTE 2020 has accelerated the process or increased the quality of knowledge and expertise – both of which are justifications for intervention, and which should be explored in more detail in the final evaluation.

OC.5 Jobs safeguarded in collaborating enterprises; Jobs created / safeguarded in other organisations

OC.5 Number of jobs safeguarded

- 3.90 To the end of March 2018 (quarter 11) Operation data reports that 29 jobs have been safeguarded. At present, changes in employment for the participating companies is unknown, but given the relatively low numbers is not likely to be significant at this point in time. Employment data will be collected at the final evaluation stage and adjustments will be made to account for general employment changes in the target sector for WW&V (as detailed in the Inception Evaluation Report) and for the deadweight.
- 3.91 As previously reported, emerging findings from the mid-term survey show that employment increases (not jobs safeguarded) may or may not have been achieved in participant organisations without ASTUTE 2020 collaboration as evidenced by a score of 3.1 on a five-point scale (where five is highly likely to have produce the same result and one is very unlikely).

OC.6 Assessment of any other outcomes

- 3.92 During the mid-term evaluation stakeholder interviews, no additional outcomes (those not already captured by the evaluation framework) were identified.

Impacts

3.93 In the Inception Evaluation, it was suggested that baseline data is collected from companies during engagement, which can subsequently be compared with changes in observable indicators at the final evaluation stage. At the mid-term stage, there is limited data to report on change, given that impacts take time to be realised. Instead, as with outcomes, the survey has focussed on establishing emerging sentiment from the participant companies regarding their perception of how collaboration with ASTUTE 2020 will result in impacts. Feedback from the survey and stakeholder interviews regarding perceptions on how effectively ASTUTE 2020 is leading to the intended impacts for each indicator is discussed below.

IM.1 Further increase in employment

3.94 This indicator will aim to measure any observable increases in employment which are the result of the support received via ASTUTE 2020, over and above that which is already considered as part of the outcome assessment (specifically OC.3 and OC.5). The suggestion at the inception evaluation stage was to use industry employment multipliers to understand the wider employment effect in the supply chains of companies supported by ASTUTE 2020. At the time of the mid-term evaluation there have been 13 Jobs Created (OC.3) and 29 Jobs Safeguarded (OC.5). Input-Output Table for Wales (2007)⁴⁵ provide multipliers to enable estimates to be made for the employment effect⁴⁶ of an initial change in output.⁴⁷ Employment multipliers⁴⁸ for ASTUTE 2020 related industries⁴⁹ range from 1.43 to

⁴⁵ https://www.cardiff.ac.uk/_data/assets/pdf_file/0010/698869/input-output-tables-2007-final-30-6.pdf, Table 5.2, page 29.

⁴⁶ The employment effect includes the direct (initial change), indirect (a change in the supplies output as a result of the direct spend) and induced (the effect of the spend of those supported in employment from the direct and indirect change in output) effects.

⁴⁷ Please refer to pages 29-32 of The Input-Output Tables for Wales 2007 [https://www.cardiff.ac.uk/_data/assets/pdf_file/0010/698869/input-output-tables-2007-final-30-6.pdf] for details of the limitations of using input-output multipliers.

⁴⁸ Type II only.

⁴⁹ The input-output multipliers aggregated the Welsh economy into 25 industries. For the purpose of this analysis the range of multipliers for the following are used as a proxy for ASTUTE 2020 related industries: Rubber and plastics (7), Non-metallic mineral products (8),

2.07, suggesting that between 18.59 and 26.91 jobs could have been created—and between 41.47 and 60.02 jobs safeguarded in the supply chain as a result of ASTUTE 2020 activity (not discounting for deadweight, leakage or displacement).

As noted previously (see discussion for OC.3), the survey results suggest a positive link between ASTUTE 2020 collaboration and employment increases (an effectiveness rating of 4.1 on a five-point scale where five is very effective). The level of potential deadweight however reports an average rating, somewhere between likely and unlikely that employment changes would have been realised without ASTUTE 2020 support.

IM.2 Increased investment by the company

- 3.95 Increased investment over and above that already reported for outcome OC.1 will be monitored at the final evaluation stage.

IM.3 Increased spend by the company in local supply chain

- 3.96 As reported in the inception evaluation stage, the amount of spend by the company in the local supply chain pre-and post-ASTUTE 2020 engagement should be collected from the supported companies by the external evaluators. It should however, be noted that some enterprises may not be willing or able to provide this information, therefore the quality of evidence data is unknown. This should be tested for viability ahead of the final evaluation stage. Nonetheless, at present, project status reports indicate that three collaborator companies have stated that spend in the local supply chain has increased as a result of their involvement in ASTUTE 2020.

IM.4 Increased external investment into the company

- 3.97 As noted in the inception evaluation stage, the change in external investment into the company will need to be collected directly from supported companies⁵⁰ after collaborative project completion and

Metal and Metal products (9), Machinery (10), Other electrical equipment (11), Consumer electronics, instrument engineering etc. (12), Vehicles (13), and furniture and other manufacturing (14).

⁵⁰ By the external evaluators.

subsequently at the final evaluation stage. The emerging impact data collected from Operation data (Table 3.5) shows that to date, three companies (from 15 companies that have provided data to date) have reported increased external investment as a result of ASTUTE 2020 collaboration. This is a positive sign, which indicates that the expected impacts are being realised. The mid-term survey data also shows a positive rating for the effectiveness of collaboration on increasing the amount of private investment (as already discussed in the Outcome section) with a rating of 3.8 on a five-point scale.

IM.5 Predicted increase in sales revenue

- 3.98 Sales revenue data will be collected as a proxy for turnover at the final evaluation stage.. At the mid-term, the survey suggested that on average, companies indicate a relatively low rating of effectiveness for sales revenue increases (an average of 2.3 on a five-point scale – see Figure 3.4)—although it is likely that this is the largely the result of the short amount of time since engagement as it is expected that sales increases from innovation will take time to be realised. Wider economic effects of the increase in spend will be carried out as briefly described in IM.1, using industry input-output tables to estimate regional economic effects of changes to output.

IM.6 Predicted increase in export revenue

- 3.99 To date there is no data relating to export revenue. The change in predicted export revenue increases will need to be collected directly from supported companies after completion of a collaborative project and at the final evaluation stage.

IM.7 Savings in energy, greenhouse gas emissions and waste

- 3.100 The emerging findings from the Mid-Term Evaluation show a positive link between the support that companies are receiving as a result of collaboration with ASTUTE 2020 and savings in energy, greenhouse gas emissions and waste. Table 3.5 reports that three companies have reported some savings in energy and fuel costs as a result of collaboration with ASTUTE 2020 (based on data from 15 companies).

Energy savings and reduction of CO2 emissions were achieved through process optimisation that resulted in significant reduction of plastic usage per part, and improvement of process efficiency to obtain higher yields in an energy and CO2 intensive process. Projects supporting the development of alternative energy sources have led to a reduction in greenhouse gas emissions from traditional energy sources. It is likely therefore, that the relatively low rating of effectiveness of ASTUTE 2020 support leading to energy, greenhouse gas emissions and waste savings obtained from the mid-term survey (a rating of 2.6 on a five-point scale, see Figure 3.3) reflects the fact that only a small proportion of projects (3 of 15 to date or 20 per cent) are carrying out activity with the intention to generate these savings. For those companies / projects which are geared towards making savings in energy etc., there appears to be a relatively low level of deadweight. Survey results reported that it was unlikely that such savings would have been achieved without support (2.4 on a five-point scale, see Figure 3.4).

IM.8 Any other impacts

- 3.101 The Operation team have embedded an effective data monitoring process via project status reports, which captures additional impacts from participant companies. This data has been summarised into a table form for the purpose of the mid-term evaluation (Table 3.5).
- 3.102 The table below shows that there are notable additional impacts emerging from ASTUTE 2020 support. Notably, nine out of fifteen companies providing additional data have indicated that non-patent intellectual property has been generated. Four companies have reported additional, new to firm products, processes and services⁵¹ and three companies have received increased external investment. Also, of note, six case studies have been published, which ensure

⁵¹ Additional products, processes and services (PPS) refers to those over and above those which can be claimed according to the ERDF definition—which only considers one new PPS per enterprise (i.e. limiting claims to one PPS per enterprise, even-though more than one new PPS could be created).

good practice and lessons learnt can be shared with other organisations, ensuring knowledge transfer.

Table 3.5: Additional Impact Measures

Additional Impact Measure	Number	Unit
Further increase in employment	1	Company
Increased spend by company in supply chain	3	Companies
Non-Patent IP Generated	35	Number
Additional new to firm PPS	4	PPS
Scientific papers published	2	Papers
Manuscripts for scientific papers submitted	2	Manuscripts
Jobs safeguarded	29	Jobs
Increased external investment into the company	3	Companies
Savings from lower manufacturing costs	1	Company
New post created to implement project work	2	Posts
Results published at international conferences	1	Project
Press release published	1	Project
RD&I income generated	2	University partners and companies
Case study published	6	Case studies
Savings in energy and fuel costs	3	Companies
Reduced failure rates	1	Company
Reduced raw material requirement	1	Company
R&D development award	1	Company
Savings in shop-floor space	1	Company

Source: ASTUTE 2020 Operation Monitoring Data, Summary of Project Status Report information, end of March 2018, based on project information from 16 projects (15 companies)

4. Conclusions and Recommendations

- 4.1 In summary, the feedback from both stakeholders and companies who participated in the mid-term survey were highly positive towards the delivery of ASTUTE 2020 to date. Evidence from the online survey of beneficiary businesses showed that 100 per cent of respondents were positive about their experience of collaborating with ASTUTE 2020, of which 62 per cent were 'very positive'. This is clearly a high endorsement for the Operation's delivery.
- 4.2 In a similar vein, the performance of output targets relative to profile expectations is on-track. Although the claimed number of outputs for some key metrics (especially employment increases⁵²) is low relative to the ultimate target, this is in-line with expectations for when outputs can be claimed, due to the time-lag between support being received and outputs realised.⁵³ The Operation delivery team are confident that targets will be met, considering the progress of current supported projects and the projections based on the most recent project status data, which also provides positive signs that jobs are being created in collaboration projects. It should also be noted that employment increases consider only net gains—which could mask job creation that is taking place if losses are realised in other areas of the enterprises, despite an overall gain in economic contribution if the new jobs are higher quality and replace lower quality jobs. Thus, the quality of jobs should also be taken into consideration to fully contextualise the change in the employment increase indicator.
- 4.3 Although outcomes and impacts are difficult to measure at this stage in delivery, the feedback collected from survey respondents is on the whole very positive. The correlation between the activities and outcomes appears to be sound, as companies are reporting that collaboration is effective at generating outcomes / impacts.

⁵² There has been a shift in emphasis from net jobs created to employment increases, which is intended to reflect a move towards acknowledging the creation of higher value jobs, rather than counting job increases.

⁵³ Therefore the achievement to date is in-line with profile and so there are no concerns at this stage.

Specifically, ASTUTE 2020 appears to be particularly effective at increasing knowledge and expertise, safeguarding jobs, increasing employment and increasing the amount of private investment secured. This is particularly encouraging as these are the key objectives for the Operation.

- 4.4 **Policy Drivers / context**—since the Inception Evaluation, the overarching policy context has not changed significantly, thus the Operation retains its strong fit with policy. The slight shift in government policy towards the new Industrial Strategy has reiterated the importance of initiatives like ASTUTE 2020 that operate in key industrial sectors. This is a clear advantage of the Operation, based on its Smart Specialisation and commitment to adaptability – ensuring it can react to change. The horizon scanning exercise appears to have been effective at ensuring the Operation remain adaptive to current and emerging future trends. There appears to be confidence from all involved that the Operation is well placed to react to and address emerging industry trends.
- 4.5 **Objectives** – the Operation’s objectives remain unchanged and still fit for purpose. The governance arrangements have been praised for ensuring the Operation remains on-track and the addition of the industrial partners (additional from ASTUTE) is proving to be effective.
- 4.6 **Inputs** – the level and quality of inputs have been satisfactory for the Operation to carry out its activities as intended. The minor concerns at the inception stage relating to the ability to attract the right project officers has not been a problem. The only minor issue identified at the mid-term was some delays in obtaining monitoring information from a small number of participant companies.
- 4.7 **Activities** – as noted above, the feedback from participant companies regarding the delivery of the Operation was overwhelmingly positive. To improve, some stakeholder mentioned a need to focus on the potential for more cross-HEI projects, and more strategic (large / regional / cluster) projects that address the areas for consideration identified in the horizon scanning report, which would make significant steps towards achieving national strategic goals as well as the

Operation's own objectives. There was also a suggestion to continue to try harder to go beyond the usual suspects to achieve this—whilst at the same time acknowledging that demand levels have been high, and marketing budgets are relatively low. Nonetheless, it would be sensible to ensure promotion and marketing where possible continues—particularly with ASTUTE EAST commencing, and also monitoring referral routes.

4.8 **Outputs** – on the whole, the progress of output targets is on-track compared with expectations to date. Nonetheless, it is worth noting that the employment increases⁵⁴ indicator is relatively low compared with the ultimate target – however, this was to be expected and there appears to be significant activity in the pipe-line to suggest future profile targets will be met. The only risk to achieving this is a degree of reliance on the companies being successful to create the jobs that were identified at the outset of engagement. There is a slight risk that the project becomes less important to the company, however, this risk is thoroughly assessed at project approval and monitored throughout delivery. Another area worth highlighting at this stage is the fact that there is no patentable IP yet, however, this is expected to be a medium to long-term achievement in line with forecasts in the Business Plan.

4.9 **Outcomes** – although very early in delivery from an outcome perspective, there are positive signs. So far evidence suggests that activity is leading to the expected outcomes and so there are no concerns at this stage. That being said, proving change with robust evidence will be a challenge for the external evaluators at the final stage and so it is suggested that a process of consultation with participant companies is embedded into the final stage, so that the viability of the proposed data collection is fully tested. It would also be pertinent to ensure ASTUTE 2020 is adding value and that there is no deadweight – which should be addressed at the project approval

⁵⁴ In total a net increase of 13 has been realised in supported enterprises but not yet claimed in official ERDF reporting documentation.

process – so that all projects are considered for the extent to which there is duplication of existing activity (private sector displacement).

4.10 **Impacts** – the general conclusion is that it is still early to assess the extent of impacts, but there are positive emerging signs and additional impacts data is being captured through monitoring information via project status reports.

Recommendations

4.11 At the mid-term stage it is recommended that the ASTUTE 2020 Operation should continue to be delivered largely as it is, but taking into consideration the following recommendations:

- Consider a time-extension to be able to realise more and larger strategic cluster projects.
- Continual monitoring of referral process – continue to build strong relationships with Welsh Government SMART teams and to fully clarify the expectations of all organisations in the referral process.
- Continue to record full project costs to ensure final total costs of delivery are captured.
- Proactively pursue cross-HEI and large, strategic / cluster projects in the areas of consideration identified in the horizon scanning report (conditional on achieving the first recommendation)
- Continue to monitor and review the range of enquiries to ensure the Operation is addressing the challenge of engaging companies across the entire spectrum of target industries.
- Ensure the external evaluators commissioned for the final evaluation engage with the participant companies as soon as possible to understand the viability of collecting the data required to evidence the outcomes and impacts. Then ensure the mechanisms are in place to collect the required data. This includes:
 - Post support level of private sector investment in R&D

- Pre and post support level of public sector investment in R&D received
- Pre and post support total turnover (to enable calculation of ratio of R&D as a proportion of turnover)
- Pre and post support average share of total turnover from product innovation and novel innovation: new to market, new to business and significantly improved
- Pre and post support employment levels.
- Pre and post spend within the local supply chain.
- Review the project status report template to explore the potential for collecting data to inform the final evaluation (noted above) via this function and work with the project officers to understand the potential for collecting the information and ensuring the need for the data is clearly understood by the Officers and is communicated to the supported enterprises.
- External evaluators to re-visit the recommendation in the Inception Evaluation Report to boost the UKIS Wales sample so that there is sufficient comparison data at the time of the final evaluation stage.

Annex A—Stakeholder Interview List

Organisation	Name	Role
Swansea University	Prof Johann Sienz	Operation Director
Swansea University	Dr Gavin Bunting	Operation Deputy Director
Swansea University	Prof David Gethin	Adaptive Smart Specialisation leader CEM
Swansea University	Prof Steve Brown	Head of College of Engineering
WEFO	Mark Williams	Project Development Officer
WEFO	Keith Parsons	Project Development Manager
Welsh Government	Phil Catherwood	AM&M Sector (Advanced Materials & Manufacturing)
The Manufacturers' Association EEF	Paul Byard	National Director, Wales
Industry Wales	Paul Davies	CEO of Industry Wales
Cardiff University	Prof Mohamed Naim	Co-director of the Centre for Advanced Manufacturing Systems, Adaptive Smart Specialisation leader MSE
Cardiff University	Prof Emmanuel Brousseau	Director, Mechanics, Materials and Advanced Manufacturing
Aberystwyth University	Prof Chris Price	Prof of Computer Science, Principle Investigator ASTUTE 2020

Annex B—Stakeholder Interview Topic Guide

Objectives:

1. Are the objectives still the same?
2. Are the objectives still fit for purpose?
3. Should they be modified at all? If so, how?

Inputs:

4. Has the level of funding been suitable to deliver ASTUTE2020 so far?
5. Has the amount of time / effort of:
 - the ASTUTE 2020 team
 - collaborating companies

Been sufficient for it to achieve its objectives to date?

6. Are the governance arrangements fit for purpose / effective?
7. Do the academic staff have the necessary knowledge and skills to deliver ASTUTE 2020 effectively?
8. Is there sufficient demand from companies?
9. Are the referrals from other schemes sufficient to date?
10. Are communication and marketing arrangements fit for purpose?
11. Do any of the inputs need to be modified / changed in any way to ensure the success of ASTUTE 2020?

Activities:

12. What has the process been for approving high-impact projects? How has the partnership ensured that high impact projects have been selected?
13. How is ASTUTE 2020 providing the demand-led targeted and tailored support to enterprise?
14. What are the mechanisms to ensure that the support is tailored to industry needs?
15. How is ASTUTE 2020 providing this academic expertise?
16. How/where is ASTUTE 2020 providing these facilities (innovation and manufacturing demonstration and development facilities to future proof and de-risk technology development for industry)?
17. How is ASTUTE 2020 ensuring that it is undertaking more strategic larger scale 'cluster' projects for the development of Smart Specialisation clusters, (involving elements of the supply chain for specific sectors)?
18. How is ASTUTE 2020 referring businesses to other schemes?
19. How is ASTUTE 2020 undertaking horizon scanning?
20. How is ASTUTE 2020 monitoring the operation?
 - a. Are the mechanisms appropriate?
 - b. Is the necessary data being collected?
21. How effectively is ASTUTE2020 being delivered?
22. Do you think that any of the activities are more / less effective than the others?
23. Should Astute 2020 deliver any of its activities differently?

Outputs:

24. How well does the number of enquiries, referrals and other initial contact with companies relate to the A2020's activities and objectives?
 - a. Are you aware how many have been recorded to date?
 - b. Is this ahead / behind target?
 - c. Should anything change to ensure it meets targets or exceeds?
25. How well does measure the number of formal requests for collaboration from companies relate to the A2020's activities and objectives?
 - Are you aware how many have been recorded to date?
 - Is this ahead / behind target?
 - Should anything change to ensure it meets targets or exceeds?
26. Regarding the support offered to enterprises to introduce new to the market products
 - a) What is the current achieved value?
 - b) Will the target be achieved?
 - c) Should/Has the target be revised?
27. In regard to the support to enterprises to introduce new to the firm products,
 - a) what is the current achieved value?
 - b) Will the target be achieved?
 - c) Should/has the target be revised?
28. Concerning the cooperation between enterprises and supported research institutions,
 - a) What is the current achieved value?
 - b) Will the target be achieved?
 - c) Should/has the target be revised?
29. Regarding the output of enterprises receiving non-financial support
 - a) What is the current achieved value?
 - b) Will the target be achieved?
 - c) Should the target be revised?
30. How many Scientific Papers with supported enterprise as joint author have been recorded to date?
 - Will the target be achieved?
 - Should the target be revised?
31. Research Excellent Framework Impact Case Studies
 - a) How well does this output relate to the A2020's activities and objectives?
 - b) How many have been recorded to date?
 - c) Should the target be revised?
32. What is the current achieved value in patentable and non-patentable intellectual property?
 - a) Will the target be achieved?
 - b) Should/has the target be revised?
33. How many referrals to other schemes (including Welsh Government) have been recorded to date?

34. How well does referrals to private sector relate to the A2020's activities and objectives? and How many have been recorded to date?
Re: Publicly available case studies
35. Is this output still relevant to the A2020's activities and objectives? and How many have been recorded to date?
36. Are there any other outputs not listed here that ASTUTE 2020 has created so far?

Outcomes:

37. To date, how efficient has the operation been in converting inputs into observable outcomes?
38. What are the outcomes and are they in-line with the expected outcomes?
- Private investment matching public support in innovation or R&D projects
 - RD&I research income increases
 - Employment increase in supported enterprises
 - Knowledge and expertise increase in supported enterprises and partner universities
 - Jobs safeguarded in collaborating enterprises; Jobs created / safeguarded in other organisations
39. Do you think that ASTUTE2020 is on track to deliver the outcomes expected?
40. Should anything be carried out differently to ensure success of ASTUTE 2020?
41. Has (or do you think that) ASTUTE 2020 created any outcomes not listed here?

Impacts:

42. How / is / will ASTUTE2020 lead to further increases in?
- Further increase in employment
 - Increased investment by the company
 - Increased spend by the company in local supply chain
 - Increased external investment into the company
 - Predicted increase in sales revenue
 - Predicted increase in export revenue
 - Savings in energy, greenhouse gas emissions and waste
43. Are there any other impacts that you expect ASTUTE 2020 will lead to not listed here?

Cross-Cutting Themes:

44. What has ASTUTE 2020 done to date to address:
- equal opportunities and gender mainstreaming?
 - sustainable development?
 - address poverty and social exclusion?

Annex C—Online Survey of Beneficiary Businesses Questionnaire

This survey will take approximately 10-15 minutes to complete and forms part of the external evaluation of the ASTUTE 2020 operation being carried out by Miller Research (UK) Ltd. on behalf of the operation partners. It is designed to help us to understand what you think about the ASTUTE 2020 operation and for us to measure the impact the Operation has had to date. The results of this survey will be used to inform the mid-term evaluation, which will include recommendations to inform the future delivery of the Operation. As such, the information you provide in this survey may lead to changes in the Operation's delivery to better meet your needs.

This survey is being carried out in accordance with the Market Research Society guidelines. All of the information you provide in this survey will be used anonymously i.e. when we use the data you provide it will not be possible to identify the industrial project to which it relates. The information collected during this survey will only be used to inform the midterm evaluation of the ASTUTE 2020 Operation and will be destroyed once the evaluation is complete. The data will be used only by Miller Research and will not be passed onto any third party organisation.

If you have any queries about how we will use the data you provide, please contact Sam White on sam@millerresearch.co.uk or 01873 851 884 quoting 'ASTUTE 2020 Evaluation – Online Survey'. Thank you in advance for your participation in the survey.

1. What is the name of your business/enterprise/organisation?
2. In which local authority of West Wales and the Valleys is it located? (Please tick all the areas where you have a business site which has directly benefited from ASTUTE 2020 support)
Isle of Anglesey, Gwynedd, Conwy, Denbighshire, Ceredigion,
Pembrokeshire, Carmarthenshire, Swansea, Neath Port Talbot, Bridgend,
Rhondda Cynon Taf, Merthyr Tydfil, Caerphilly, Blaenau Gwent, Torfaen
3. Please indicate your ASTUTE 2020 partner organisation(s) (Please tick all that apply)

Swansea University, Cardiff University, Aberystwyth University, University of
Wales, Trinity Saint David, Don't know

4. Please could you indicate which of the following Adaptive SMART
Specialisation areas your project is aligned with? (Please tick all that apply)
Manufacturing Systems Engineering (MSE), Computational Engineering
Modelling (CEM), Advanced Materials Technology (AMT) Don't Know

5. In your opinion, how effective is the way in which the Operation is being
promoted/marketed?

Extremely effective, Effective, Neither effective nor ineffective, Ineffective,
Extremely ineffective, Don't know

6. If you think the promotion or marketing of the Operation could have been
improved, please explain below.

7. Please indicate the main reason(s) why you participated in the ASTUTE
2020 Operation.

To access world leading academic support, To develop a new to firm or new
to market product / process, To develop and publish a patent, To enhance
ability to access research & development & innovation (RD&I)
funding/finance, To enhance the company's R&D capacity and capability, To
solve a manufacturing problem, Other (please specify)

8. Thinking of the Operation delivery so far, please could you rank the
effectiveness of the following aspects. [Extremely effective to Extremely
ineffective]

The project approval process (i.e. the process you went through to get your
project approved), The ASTUTE 2020 project delivery process (i.e. the way in
which the University provided support etc.), The technical support process
(i.e. the processes for engaging with / accessing the research / technical
support received), The level of communication you received from the ASTUTE
2020 delivery team.

Please let us know if anything has worked particularly well or if you have any suggestions for improvements relating to the above aspects of ASTUTE 2020's delivery.

9. How would you rate the following aspects of support you have received as part of the ASTUTE 2020 Operation? [Extremely effective to Extremely ineffective]

Technical expertise, Access to facilities and equipment, Dedicated Technical Manager overseeing the collaborative project, Other support from the collaboration.

If you have selected 'other support', please specify:

10. If ASTUTE 2020 did not exist, where might you have been able to access similar support? (Please tick all that apply)

Private sector in West Wales and the Valleys, Private sector in Wales, Private sector elsewhere, Collaboration with other Higher Education Institution, Not aware of expertise being available elsewhere, If 'other' or if you have further comments, please use the box below.

11. How likely would you have been to secure this/similar support without ASTUTE 2020? [Very likely to Very unlikely]

Technical expertise, Access to facilities and equipment, Dedicated Technical Manager overseeing the collaborative project, Other support from the collaboration.

If you have selected 'other support', please specify:

12. Please let us know if anything has worked particularly well or if you have any suggestions for improvements relating to the support from ASTUTE 2020.

13. How effective was the collaboration with ASTUTE 2020 in supporting you to achieve the following? [Very effective to Very ineffective]

The creation of a new to the firm or market product / process, Authorship / contribution towards a scientific paper, The development of patentable and nonpatentable intellectual property, Increasing the amount of private investment secured (in innovation or R&D projects), Safeguarding jobs, Increasing knowledge and expertise, Employment increases, An increase in RD&I income, Energy, greenhouse gas emissions and waste savings, Sales revenue increases (predicted), Increased spend in the local supply chain

If there are other outputs not listed which you feel have resulted from ASTUTE 2020 support, or if you would like to comment on any of the outputs listed, please use the box below

14. How likely do you think you would have been to produce the following without collaboration with ASTUTE 2020? [Very likely to Very unlikely]

New to the firm or market product / process, Authorship of scientific paper, Patentable and nonpatentable intellectual property, Increase in RD&I income, Employment increase, Increasing knowledge and expertise, Safeguarded jobs, Increased amount of private investment secured (in innovation or R&D projects), Energy, greenhouse gas emissions and waste savings, Sales revenue increase (predicted), Spend in the local supply chain

15. If you have been involved in the publication of a scientific paper, please could you explain the benefit it has had on your organisation below.

16. What has been your overall experience of collaborating with ASTUTE 2020 so far?

Very Positive Positive Average Negative Very Negative

17. Is there anything else, not covered in this survey, that you would like to comment about the ASTUTE 2020 Operation?