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End of Programme Evaluation of the SMARTCymru RD&I Financial Support for Business Programme

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Final Evaluation of the SMARTCymru RD&I Finance for Business Programme

CM International and The Innovation Partnership

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Views expressed in this report are those of the researcher and not necessarily those of the Welsh Government

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Table of contents

Glossary of acronyms

A4B	Academic Expertise for Business
BIP	Business Innovation Programme
BRES	Business Register Employment Survey
DoC	Development of Concept
ED	Experimental Development
ERDF	European Regional Development Fund
ERP	Economic Renewal Plan
EST	The Welsh Government Department for Economy, Science and Transport
EU	European Union
FP7	Seventh Framework Programme
FTE	Full-Time Equivalent
GDP	Gross Domestic Product
GVA	Gross Value Added
HEI	Higher Education Institution
ICT	Information and Communication Technologies
IP	Intellectual Property
IR	Industrial Research
R&D	Research and Development
RD&I	Research, Development and Innovation
SIF	Single Investment Fund
SME	Small and medium sized enterprise
TCF	Technical and Commercial Feasibility
WEFO	Welsh European Programme Office
WG	Welsh Government

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This report has been written by Dr Dylan Henderson (project manager and lead researcher), Meirion Thomas (project director) and Ioan Teifi (researcher) at CM International.

Important contributions have also been made by the Welsh Government's Innovation team.

List of tables

List of figures

Executive Summary

1. This report sets out findings from the end of programme evaluation of the SMARTCymru Research Development and Innovation (RD&I) financial support for business programme, and provides an analysis of final programme achievements, and recommendations for future project activity.

> *The evaluation has been carried out prior to the project's formal closure (in line with the required evaluation timetable) and does not consider any monitoring or spend data produced after June 2015. As a consequence the reported outputs, spend and impacts should be considered as provisional.*

2. The evaluation research was undertaken in the period April and September 2015 by CM International (CMI) and The Innovation Partnership (TIP), and built on monitoring data collected by the Welsh Government Innovation team, alongside a number of surveys of participant businesses, counterfactual businesses[1], and wider business awareness of the programme in Wales. The evaluation also included a small number of interviews with stakeholders and a workshop with Welsh Government management and delivery staff.

Programme overview

3. The SMARTCymru programme offers all-Wales support for businesses at different stages of the RD&I process, including Development of Concept (DoC), Technical and Commercial Feasibility (TCF), Industrial Research (IR), Experimental Development (ED), and Exploitation. It represents the Welsh Government's core support for business RD&I, and operates alongside other Welsh Government programmes such as the Business

[1] Innovative business who approached the programme, but did not receive financial support (i.e. they chose not to proceed, or were rejected or withdrew applications).

Innovation programme and the Academic Expertise for Business (A4B) programme.

4. The results of this evaluation suggest that the programme was established with a sound programme logic model, based on an identified need, clear objectives, grant activities focused on the different RD&I phases, and anticipated targets both informed by early programme experience, and aligned to the objectives. Clear links were also embedded in the logic model to partner projects such as the Business Innovation Programme, to maximise the potential for follow-on support, access to academic expertise and so on.
5. The programme intended to contribute towards the cross-cutting themes, through the referral to sources of expertise in the all Wales Regional Centre Services (now Business Wales Centres). The role of the Innovation Specialists (funded by the Business Innovation Programme), providing initial contact and support to potential applicants, meant it was difficult for SMARTCymru to respond to the cross-cutting themes targets directly.
6. Delivering the logic model was, in practice, made difficult by the economic, policy and organisational factors. The economic downturn, and associated decline in business R&D expenditure contributed to lower than expected demand for the programme. This was compounded by the changes brought about by the implementation of the Economic Renewal Programme (ERP), notably the decision to move towards repayable finance in place of grants and the reorganisation of the then BETS (now EST) department into sector teams. Together these factors hindered the Innovation team from effectively promoting the programme, and resulted in confusion, both internally and externally, about the availability and offer of the programme.
7. While the confusion surrounding the programme's availability and offer subsided with the decision to revert back to grant funding, (re)adopting the SMART branding, and relocating the Innovation Specialists (back) to within the Innovation team, the challenge for the programme continued to

be one of stimulating demand in the final stages of the programme, and redressing the low levels of demand experienced during the ERP[2].

Profile of programme participation and achievements against targets

8. At the end of programme stage SMARTCymru had supported 146 enterprises with financial assistance, of which 62 per cent were in the Convergence area, and 38 per cent in the Competitiveness area. These businesses were typically SMEs, although a small number of large companies were supported in both Convergence and Competitiveness areas. Swansea and Cardiff accounted for a large proportion of projects funded (34 per cent).
9. The programme supported the key priority sectors including, manufacturing, professional, scientific and technical activities, and information and communication. All projects were consistent with the SMARTCymru quality criteria – defined by a robust technical and financial due diligence processes.
10. The survey results reveal that a high proportion of companies had undertaken research, development or innovation activities prior to SMARTCymru (89 per cent).

Programme funding and expenditure

11. Overall, £26.2m (£16.2m in the Convergence area and £10m in the Competitiveness area) was spent compared to a forecast of £27.6m. This meant that just 95 per cent of the budget was used, with an underspend of £1.4m. This reflects the lower than anticipated demand for the programme, linked to the introduction of repayable finance by the ERP. The likelihood of an underspend was identified by the programme team at the mid-term

[2] See annex B for more details on the context challenges faced by the programme.

stage, however, reprofiling was only possible for the Convergence area programme[3].

Gross outputs achieved against targets

12. The outputs and results collected for the SMARTCymru programme show that 146 businesses were financially supported (90 Convergence and 56 Competitiveness), below the target of 245 (120 Convergence and 125 Competitiveness). Despite this, positive results were achieved by the programme, with targets exceeded for jobs created and investment induced in the Convergence area. Although the Competitiveness area programme underperformed in relation to jobs created and products/processes/services registered, it did exceed targets for new or improved products launched and investment induced.
13. The number of products launched also illustrates the programme's contribution towards RD&I activity. The fact that performance was below forecasted targets in relation to the number of businesses financially assisted in the Convergence and Competitiveness areas reflects, in part, the challenges faced by the programme in stimulating and maintaining demand. It does, however, illustrate that many of the key outputs have been achieved, despite these challenges.

Beneficiary experiences and achievements

14. A total of 61 companies were either interviewed or completed an online survey, representing 42 per cent of all SMARTCymru beneficiaries. The majority of these companies were active in conducting RD&I activity (89 per cent of respondents) prior to participation in SMARTCymru. Ten case study companies were also interviewed.
15. The findings indicate that a large proportion of SMARTCymru businesses reported the development or launch of new products, processes or

[3] Reprofiling of the Competitiveness programme was not deemed necessary as several large projects were expected to make significant claims in the final stages of the programme. There was also time for a number of new projects to be secured.

services (72 per cent of respondents), with a similarly high proportion (94 per cent) indicating that they would be introducing new products, processes or services in the next three years. This was supported by evidence of new intellectual property being created (54 per cent of respondents).

16. Strong evidence of behavioural additionality was noted with respect to the adoption of a more strategic approach to R&D (69 per cent of respondents), greater confidence in conducting RD&I in the future (65 per cent of respondents), new research-based collaborations and networking (45 per cent of respondents), and more knowledgeable about RD&I and its role in their businesses (56 per cent).
17. The innovation activity undertaken by businesses helped to produce economic benefits, including positive sales benefits, with an average of £420K of additional sales reported, alongside the creation of new jobs (reported in section 3). A small number of equality, diversity and environmental practices were evident, and this reflected difficulties in fully implementing the logic model.
18. In many instances, however, full commercialisation will require further development of projects by the companies. This was evident from the case studies, supported by companies raising additional finance from schemes such as Finance Wales and Innovate UK, and highlights the potential for future RD&I benefits.
19. Without SMARTCymru, half of respondents indicated that they would generally not have been able to achieve these impacts without funding. This points to a high degree of additionality.
20. Overall beneficiary and case study satisfaction levels reported were strong, although SMARTCymru businesses would value streamlining of the administration processes of the programme.
21. Results from the *counterfactual survey* indicate that counterfactual businesses were more likely than SMARTCymru businesses to be microenterprises, with some 39 per cent not undertaking RD&I activity since their initial contact with SMARTCymru. In comparison to SMARTCymru businesses, counterfactual businesses spend on average, less on RD&I (£34.5K lower), achieve fewer sales (11 per cent lower),

create fewer new collaborative research links (19 per cent lower), establish new environmental management or equality / diversity practices (4 per cent lower), create intellectual property (22 per cent lower) or development new products, processes and services (6 per cent lower).

22. Results of the awareness survey of a wider population of businesses in Wales suggest that awareness of SMARTCymru and the support available is generally low (16 per cent). Some 76 per cent, however, would like to receive further information and potentially applying for support.

Impact and effectiveness analysis, including cross-cutting themes

23. Programme impacts at the end of programme stage are primarily economic- and innovation-related.
24. The economic impacts have been calculated for all public sector investment, using employment impacts (jobs created and safeguarded). The Innovation impacts draw on results from the survey. The impacts draw out the net impact – the difference between what would have happened anyway and the benefits generated by the support, adjusted for displacement, leakage, substitution and multiplier effects.
25. The Programme (Competitiveness and Convergence) has created or safeguarded 768 net jobs (476 net jobs in the Convergence area, and 293 in the Competitiveness area) and £27.9m net additional GVA (£17.3 million (Convergence) and £10.6m (Competitiveness)).
26. The Return on Investment produced by the programme – 1:0.06 - compares favourably with the other similar schemes across the UK. This suggests the programme has been comparatively successful in targeting business projects with strong economic impact potential.
27. *Innovation impacts*, at the end of programme stage, the business survey and case studies indicate that companies have been able to launch new products, processes or services (35 per cent) and generate new IP (54 per cent). They also suggest potential for innovation impacts to occur beyond the lifetime of the programme, with some 94 per cent of respondents indicating they intend to launch one or more products, processes or services in the next three years, with 69 per cent of respondents indicating

that their business had adopted a more strategic approach towards RD&I, and 56 per cent indicating that they were more knowledgeable about RD&I and the role it can play in their business. This points towards the programme delivering positive 'R&D behavioural additionality' (OECD, 2006).

28. This innovation impacts data gives some confirmation to the research, development and innovation process being a medium-to-long-term activity. In this respect the evidence of attitudinal change, experience developed and investment all point towards the potential for such impacts to emerge in future.
29. In relation to the *cross-cutting theme impacts* the limited referral support available through the programme and its partner programmes (the Business Innovation Programme) hindered the development of results. The evidence from the case studies does, however, indicates several instances of the programme supporting some projects, products, processes and services that have the potential to produce potential health, social and environmental benefits.
30. Against the original objectives of the SMARTCymru programme the results of the end of programme evaluation suggest that it has, in spite of the economic, policy and organisational challenges faced, been able to address its core objectives, including creation of R&D related jobs (768 net jobs), increased business expenditure on R&D (induced investment of £1.3m), support for industry collaborations (45 per cent of surveyed participants), produced return on investment (GVA of 1:0.06), ensured business links to other business support (via the Business Innovation programme and other Welsh Government Innovation supports such as A4B, and Finance Wales, highlighting its strong Strategic Added Value), and launched new products, processes and services (148).

Recommendations

31. There are a number of areas where the management and delivery of the programme could be strengthened in the forthcoming 2014-2020 SMARTCymru programme:

Recommendation 1: Welsh Government should prioritise awareness raising in the new SMARTCymru programme.

In light of the difficulties of promoting SMARTCymru linked to uncertainties regarding grant availability and the evidence from the awareness survey research conducted in the evaluation research, action is needed to boost brand awareness and maximise SME participation in any new programme. This will require the programme team to continue to work with strategic partners to raise awareness (see recommendation 2). Demand for the programme is likely to come from the main science and technologically R&D intensive sectors such as Advanced Materials and Manufacturing, and while demand is also likely to exist in other sectors, to stimulate this will require more concerted actions.

Recommendation 2: Welsh Government should seek to maximise synergies and knowledge exchange with key stakeholders such as universities and Finance Wales

The SMARTCymru programme forms part of a wider policy ecosystem for innovation support in Wales. While SMARTCymru operates in a clear niche – providing financial support for business RD&I - there are clear synergies with other projects. While, during the course of the programme, efforts were made to strengthen synergies and referrals, the development of a new suite of programmes offers the opportunity to establish clearer referral paths by working with partners to raise awareness and ensure that businesses are presented with clear pathways through the innovation ecosystem.

Recommendation 3. Welsh Government should prioritise greater delivery efficiency by ‘smoothing’ the progress of businesses through the R&D phases

The evaluation suggests that companies can be frustrated by the time taken to progress through the stages of the programme. In this respect it is important that any blockages in the SMARTCymru process do not develop to the detriment of achieving impacts or managing the profile of private sector funding. SMARTCymru should continue to refine the ‘triage’ system

developed to fast track projects, and where appropriate draw on lessons from existing experience as well as any relevant findings from the recent PDR[4] review.

Recommendation 4. Welsh Government should closely review the the DoC phase in the new programme

The DoC phase was introduced at a late stage in the SMARTCymru programme. The concept of the DoC was sound - to minimise the risk to companies of exploring early stage ideas. Such risks (real or perceived) are particular barriers to companies new to the innovation process. The implementation of the DoC, however, has been hampered by the need to carry out the same level of appraisal and monitoring as required by other (larger) phases. Despite these weaknesses there is potential for the DoC to complement the offer of SMARTCymru positively, and help to attract more companies to undertake RD&I projects for the first time. To achieve this potential, it will be important for the new programme to ensure that it balances the support for companies to explore new ideas with funding, against the need to monitor them through 'lighter' monitoring.

Recommendation 5. The SMARTCymru team should, alongside other core RD&I programmes supported by the Welsh Government, develop a far stronger and proactive response to the cross-cutting themes

Given that the Business Innovation Programme (via its Innovation Specialists) have acted as the front line for business applicants, SMARTCymru has found it difficult to address the cross-cutting themes of equality and diversity and environmental sustainability. The results of the evaluation, however, suggest that there is substantial potential for SMARTCymru and the other Welsh Government Innovation programmes to more directly target RD&I projects that have the potential to contribute towards the cross cutting themes. The potential to introduce thematic calls should be explored and specific promotional material developed.

[4] PDR is the Cardiff-based international centre for design and research formerly The National Centre for Product Design and Development Research.

Recommendation 6. Welsh Government should continue to review longer term innovation impacts through its Innovation Impacts programme, complementing regular programme evaluation

Programme spend to date is consistent with the lower than expected demand for the programme. The high proportion of projects in the early RD&I phases is also contributing towards higher than anticipated match funding demands for Welsh Government contributions.

1 Introduction

The SMARTCymru Research, Development and Innovation (RD&I) Financial Support for Business Programme (the programme) was launched[5] in the Convergence area of Wales in December 2009, and subsequently rolled out in the Competitiveness area in March 2012. It ceased operating in both areas at the end of June 2015.

It offered all-Wales support for businesses at different stages of the RD&I process, including Development of Concept (DoC)[6], Technical and Commercial Feasibility (TCF), Industrial Research (IR), Experimental Development (ED), and Exploitation. It represented the Welsh Government's core support for business RD&I, and operated alongside other Welsh Government programmes such as the Business Innovation programme and the Academic Expertise for Business (A4B) programme.

The programme was initially managed as part of the Single Investment Fund (SIF), but was later transferred to the Economy, Science and Technology (EST) Innovation team, with the support of Welsh Government Innovation Specialists providing all Wales coverage.

This report sets out evaluation findings for both the Convergence and Competitiveness area programmes at the end of programme (June, 2015).

Aims of the evaluation

The focus of the evaluation was to understand the end of programme performance of SMARTCymru against both its objectives and specified targets. It is intended that the results of the evaluation will inform the future delivery of support for business RD&I in Wales.

The aims of the evaluation, taken from the specification, were to provide an end of programme evaluation report for the SMARTCymru programme by considering:

- project outcomes against the key performance indicators

[5] It was originally known as the RD&I Financial Support for Business Programme.
[6] The DoC phase was available in the 2014/15 period only.

- effectiveness and efficiency of project delivery in achieving the project aims and objectives
- added value of the project for its potential beneficiaries (businesses in receipt of financial or non-financial support from the project), including improving capacity and cost-effectiveness
- unintended outcomes not covered by the WEFO key performance indicators
- the project's delivery and achievements against the cross-cutting themes aims, objectives and CCT-related indicators outlined in the business plans
- the need and demand for the grants provided through the project
- the quality of businesses supported and created by the project, including growth potential, ability to create jobs and sustainability
- the integration with other provision for businesses, including the New Business Start-Up Support and JEREMIE projects
- any evidence of 'behavioural additionality' as defined in the business plan
- the appropriateness of the project indicators and related targets, including an assessment of potential achievements after the project end date
- the impact of grants provided through the project
- the extent to which the project is contributing to structural change and sustained impact beyond the funding period, including the move from a grant to an investment culture
- progress towards an exit strategy.

Source: (Welsh Government, 2015b)

The specification also set out a number of objectives for the evaluation:

- How and to what extent did project activity reflect the commitments set out in the business plan?
- What are the perceived outcomes of the project from the perspective of beneficiaries? How and to what extent is this making a difference

compared to a scenario where the improvements had not been implemented?

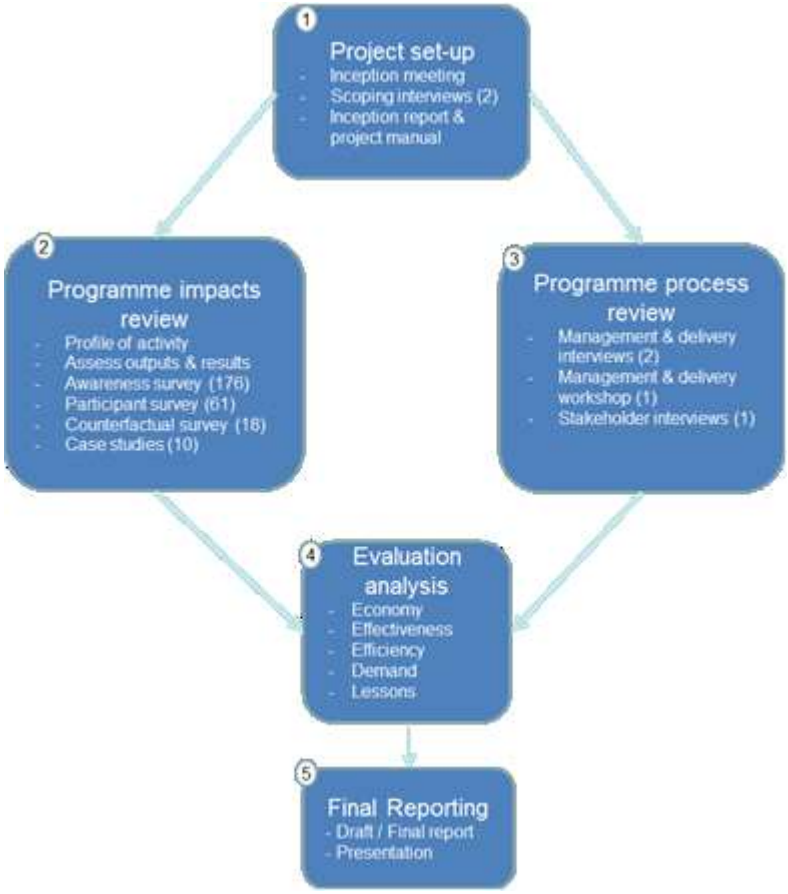
- Based on evidence, what would be the outcome, and potential long term impacts, of withdrawing future project funding for beneficiaries of the project?
- Which aspects of project delivery have led to positive outcomes, or could be viewed as 'good practice'?
- What barriers and constraints has the project faced? What are the 'lessons learnt' from dealing with such barriers and constraints?
- Additionally, the evaluation should also consider the following issues when conducting the fieldwork and making recommendations for the project in the 2014-2020 programme:
    - identify what proportion of businesses in Wales are aware of the availability of SMARTCymru funding and would consider applying
    - identify the main factors that would encourage/dissuade businesses to apply for SMARTCyrmu funding and what has been the most successful method of encouraging businesses to apply for SMARTCymru
    - identify what elements of the funding were critical for a successful project
    - if there is a particular business type, or industry sector that is more likely to apply for and carry out successful SMARTCymru grants, and which type of businesses have produced the most successful outcomes
    - identify the role, if any, that the administrative process has in the success of the project.

Source: adapted from (Welsh Government, 2015b)

Research methodology

The end of programme evaluation was based around five work stages and built on monitoring data collected by the Welsh Government Innovation team, alongside a number of surveys of participant businesses, counterfactual businesses[7], and wider business awareness of the programme in Wales. The evaluation also included a small number of interviews with stakeholders and a workshop with Welsh Government management and delivery staff. A summary of the approach adopted can be found in figure 1 below detailing the focus and scale of the fieldwork undertaken for the evaluation. Further details of the approach adopted can be found in annex A.

Figure 1. End of programme evaluation work stages



[7] Innovative business who approached the programme, but did not receive financial support (i.e. they chose not to proceed, or were rejected or withdrew applications).

The end of programme evaluation research was carried out in the period March to September 2015.

Structure of the report

The report begins with an overview of the SMARTCymru programme logic model, including targets, funding and expenditure plans (section 2), followed by a profile of participation and achievements against targets (section 3). The main focus of the report, however, is found in sections 4, 5 and 6. These sections set out beneficiary experiences and achievements, along with results of the counterfactual and awareness survey (4), programme impacts, including cross-cutting themes (5), and value for money analysis (6). This is then followed by an assessment of the project's Strategic added value (section 7). The report concludes by examining the key end of programme evaluation findings, including key issues and recommendations for future Welsh Government support for business R&D (section 8).

2 Overview of the programme

The following sections outline key features of the programme model its aims, rationale, activities, management and targets (output, outcome and impact).

Programme aims

The aims for the SMARTCymru programme are shared by both the Convergence and Competitiveness area programmes. They include:

- Create high quality R&D related jobs.
- Increase business expenditure on R&D through the provision of financial support to undertake innovative research and technological development with commercial potential, leading to new products, processes and technologies.
- Encourage and support industry collaborations with other partners with research-based organisations in carrying out industrial research and experimental development activities.
- Measure the return on investment of supported R&D projects and provide continuous improvement of the project management of R&D in companies supported.
- Enable business links to other sources of business support to optimise commercialisation.
- Contribute towards the cross-cutting themes, including targets for business adopting environmental action plans, equality and diversity strategies and monitoring systems
- Support the introduction of new processes and technologies and the consideration of environmental issues in the design in new product development.

Sources: (Welsh European Funding Office, 2012a; Welsh European Funding Office, 2012b)

Programme rationale

The **need** for the SMARTCymru programme was set out in the respective Business plans prepared for the Convergence (Welsh European Funding Office, 2012a) and Competitiveness (Welsh European Funding Office, 2012b) area programmes.

These documents highlight the role of business R&D in producing new products, processes and services, and acting as a driver of economic development. Wales, however, has long underperformed in business expenditure on R&D statistics, accounting (at the time of the Convergence business plan analysis 2010) for some two per cent of total UK business R&D[8]. This figure, it was noted, was some way below what might be expected given Wales' population share in the UK (5 per cent). Providing financial support for business R&D, it was argued, would further help to address UK targets for business R&D to reach a total of three per cent of Gross Domestic Product (GDP).

The Community Innovation Survey (Eurostat, n.d.) provides data on the innovation performance of European member states. This points to key barriers to innovation in the UK, including a lack of finance, new ideas and time to innovate, many of which are likely to be shared by businesses in Wales.

The strategic rationale for SMARTCymru was also highlighted in the SMARTCymru Business plans (Welsh European Funding Office; 2012a, Welsh European Funding Office, 2012b). These pointed to SMARTCymru's role in supporting the 'Innovation and R&D Strategic Framework' (Welsh Assembly Government, 2008) objective to 'increase investment in commercially driven R&D, focused on the commercialisation of knowledge and Intellectual Property'. They also sought to contribute towards the strategic objective to 'support knowledge based/technology companies, within Wales', and 'encourag(e) more to move to Wales'. The encouragement, provided by the programme, for collaborative engagement with higher education researchers further indicated its potential to contribute towards the second

[8] This figure has increased to 2.4 per cent in 2013 - the most recently available figures (Welsh Government, 2015).

objective of the Innovation and R&D framework to ‘maximise the economic impact of academia and business through technology transfer and the creation of a stronger science, engineering and technology base with clear commercial potential’.

Further, the programme contributed towards strategic priorities in Wales embedded in Programme for Government (2011), and its aim of ‘strengthening the conditions that will enable business to create jobs and sustainable economic growth’, as well as policy statements on innovation. These strategic linkages are clearly identified in the SMARTCymru programme’s business plans, which indicates potential for its role to support research, development and innovation in the Welsh economy.

The innovation and economic development agenda in Wales is most clearly expressed in Innovation Wales (Welsh Government, 2014). This document identifies ‘providing flexible support and finance for innovation’ as a key strategic priority for Wales. It argues that:

‘There is a need to increase the levels of research and innovation within businesses in Wales. We need to attract businesses active in research to Wales, help the ones here to research more and to link with the knowledge base, and we need to support the start-up of new research intensive businesses.’ (p. 25)

The lack of a large public or private R&D base was cited in earlier strategic statements made during the life of the SMARTCymru programme, including the Economic Renewal Programme (ERP) (Welsh Government, 2010). This cited funding as an important barrier to improving Wales’ performance in the UK business R&D ‘league table’.

Taken together these strategic statements point to the importance of encouraging SMEs to both recognise the importance R&D, and helping them to build their capability to conduct R&D. These are challenges that the SMARTCymru programme addressed directly.

Programme activities and cross-cutting themes delivery

The SMARTCymru programme provided match funding to innovative businesses to 'develop new, technologically innovative products and processes with commercial potential' (Welsh European Funding Office, 2012a). Financial support was available according to the stage that the business had reached in its innovation process. This included:
Development of Concept – funding for SMEs to explore an initial concept and develop it into a more defined project plan, with sufficient detail to justify investment of further time and resources, or the decision to drop the project.
TCF (Technical and Commercial Feasibility) – funding for SMEs to investigate and assess technological and commercial viability of new, innovative ideas for products, processes or technologies.
IR (Industrial Research) – funding to support research to acquire new knowledge, which will facilitate the development of new products, processes or technologies, or significant improvement of existing ones.
ED (Experimental Development) - funding to implement the results of industrial research for the development of new products, processes or technologies, including the creation of results such as a pre-production prototype, conceptual formulation, product design, and initial demonstration of pilot projects.
Exploitation – funding to assist with the exploitation costs of a new product or process (developed in an earlier SMARTCymru funded phase), including marketing, publicity, advertising, publication of sales literature, trade fairs and product certification.

Sources: (Welsh Government, 2013) (Welsh Government, 2015b)

The intervention rates applying to projects undertaken by small, medium and large enterprises are summarised in the table below:

Table 1. SMARTCymru programme intervention rates

	Small enterprise	Medium enterprise	Large enterprise	Funding limits
Development of Concept	Up to 50 per cent	Up to 50 per cent	Up to 50 per cent	£1,400
Technical & Commercial Feasibility	Up to 75 per cent	Up to 75 per cent	Up to 65 per cent	£15,000
Industrial Research	Up to 70 per cent	Up to 60 per cent	Up to 50 per cent	£100,000
Experimental Development	Up to 45 per cent	Up to 35 per cent	Up to 25 per cent	£200,000
Exploitation	Up to 50 per cent	Up to 50 per cent	Up to 50 per cent	£20,000

Source: (Welsh Government, 2013); (Welsh Government, 2015b)

Against the cross-cutting themes the SMARTCymru programme sought to work with the Business Innovation Programme (via the Innovation Specialists) to ensure the referral of companies to relevant support. It also worked with the Welsh Government's Welsh Language Unit to ensure that publications and publicity materials were available bilingually.

Approved funding and output targets

As noted in the introduction, the SMARTCymru programme was funded by the EU Convergence and Competitiveness ERDF programmes, with additional public funding provided by the Welsh Government, and match funding from the private sector beneficiaries.

The original financial profile for the programme was subject to change due to lower than anticipated demand. This, in part, was a consequence of the period of economic downturn which characterised the early period of the programme's delivery. It also resulted from a confusion in the marketplace, part-way through the programme, following the introduction of the principle that all Welsh Government financial support should be in the form of repayable finance[9]. This resulted in the SMARTCymru programme receiving fewer applications than had been expected and profiled in the programme's

[9] This was introduced following the introduction of the ERP, and resulted in lower than anticipated applications to the programme.

budget. A change of Government subsequently led the programme to be returned to its initial grant terms, however, the remaining time available for delivering the programme was insufficient to meet the original targets. As a consequence, the funding profile and outputs were reduced to account for the fewer number of enterprises financially supported (more detail on these contextual changes can be found in annex B).

The reprofiled and original[10] approved funding for the programme is outlined in table 2 below. This indicates a decommitment of £2.0m in the Convergence area and £10K in the Competitiveness area. The larger decommitment in the Convergence area is linked to the comparative length of the programme relative to the Competitiveness programme, and the greater impact consequently felt by the decrease in demand.

Table 2. SMARTCymru programme approved funding (original figures are in brackets)

	Convergence	**Competitiveness**
ERDF	£7,559,278 (£8,000,000)	£4,944,437 (£4,980,000)
Welsh Government	£741,510 (£671,796)	£823,711 (£303,558)
Private sector match funding	£7,864,083 (£9,478,157)	£5,701,000 (£6,195,237)
Total programme cost	£16,164,871 (£18,149,954)	£11,469,148 (£11,478,795)

(Welsh European Funding Office, 2012a) (Welsh European Funding Office, 2012b) (Welsh Government, 2015a)

The SMARTCymru business plans identified the following intended outputs for the programme (Welsh European Funding Office, 2012a; (Welsh European Funding Office, 2012b):

- Job creation
- Increase in Gross Value Added (GVA) and turnover
- Increased business expenditure on R&D

[10] Shown in brackets

- Introduction of new products, processes and technologies
- Industry collaborations with other industrial partners and with research based organisations in carrying out the industrial research and experimental development activities
- Links to other business support to optimise commercialisation of new products and processes

Alongside these core output areas, the business plans further recognised the potential for longer-term outcome benefits to emerge, including encouraging businesses to go on to conduct and attract public and private sources of funding for innovation, positive behavioural changes to R&D (so-called 'behavioural additionality' (OECD, 2006)), and commercial value.

Finally, the programme, in line with the ERDF Operational Programme (Welsh European Funding Office, 2010), was designed to contribute towards the overall targets for cross-cutting themes - environmental sustainability (20 per cent of companies to adopt or implement environmental action plans), and equal opportunities (50 per cent of employers adopting or improving Equality & Diversity strategies and monitoring systems). In seeking to achieve these objectives the SMARTCymru business plans indicate that the programme would support companies by referring them to advice from the (then) All-Wales Regional Support Centre (now Business Wales centres). The programme's outputs were also anticipated to include environmental impacts through the introduction of new products and processes.

In light of the lower than anticipated demand for the programme noted earlier, a number of changes to the original outputs targets were agreed during the life of the programme. This saw reductions in the targets for the number of enterprises financially assisted and gross jobs. Collaborative R&D targets were also reduced.

The targets for cross-cutting theme outputs were also amended. Here, the primary mechanism for generating the cross-cutting theme targets was via the work of the Business Innovation Programme and its Innovation Specialists. These Innovation Specialists acted as the first point of contact for SMARTCymru businesses and, it is understood, an agreement was reached

(with WEFO), that the Business Innovation Programme would 'claim' all cross-cutting theme outputs on behalf of both programmes.

The reprofiled and original (in brackets) targets for the Convergence and Competitiveness areas are set out in table 3 below. It should be noted that the Competitiveness area programme had a greater number of target indicators than the Convergence area.

Table 3. SMARTCymru output indicators (original figures are in brackets)

Indicator	Convergence target	Competitiveness target
Enterprises financially supported (number)	120 (200)	125
Gross jobs created (FTE[11])	72 (120)	75
Investment induced (GBP)	£809,208 (£800,000)	£502,414 (£500,000)
Collaborative R&D (number)	-	15
New or improved products, processes or services launched	-	45
Products, processes or services registered	-	45

Source: WEFO projects database (Welsh European Funding Office, n.d. a; Welsh European Funding Office, n.d. b)

Note: where there are no bracketed figures, no changes were made to the original indicator targets

Programme management

The SMARTCymru programmes were managed by staff within Welsh Government's Innovation team. This included a senior programme manager, based in the Welsh Government Penllergaer office, with overall responsibility for the programme. The SMARTCymru team included appraisal, finance and monitoring staff.

In addition to the dedicated SMARTCymru team, the Welsh Government's Innovation Specialists (funded, as noted above, by the Business Innovation

[11] Full-time equivalent

Programme) played an important role in the SMARTCymru process. They worked closely with the businesses to understand their innovation needs, and support the application process for SMARTCymru or another programme. The role of the Innovation Specialists was particularly important for small businesses with limited experience or capacity to plan, develop, assess and fund R&D projects. Here, the Innovation Specialists worked with businesses to scope a project and determine the most appropriate support route. They were then able to provide application support and ongoing assistance.

Once a company submitted an application to the programme a technical and financial assessment was conducted by the SMARTCymru appraisal team. The aim here was to verify both the technical and financial eligibility of the project for which support was being sought. The emphasis of the appraisal conducted by the SMARTCymru team was on the RD&I project rather than on conducting an extensive due diligence exercise on the business making the application for support. The technical appraisal therefore covered such matters as the State Aid position of the business, the policy and strategy 'fit' of the project and the appropriateness of the project to meet the requirements of the phase of the SMARTCymru support being applied for, while the financial appraisal typically covered the adequacy and availability of the project funding and the likely ability of the business to be able to meet the monitoring and reporting requirements associated with the SMARTCymru award.

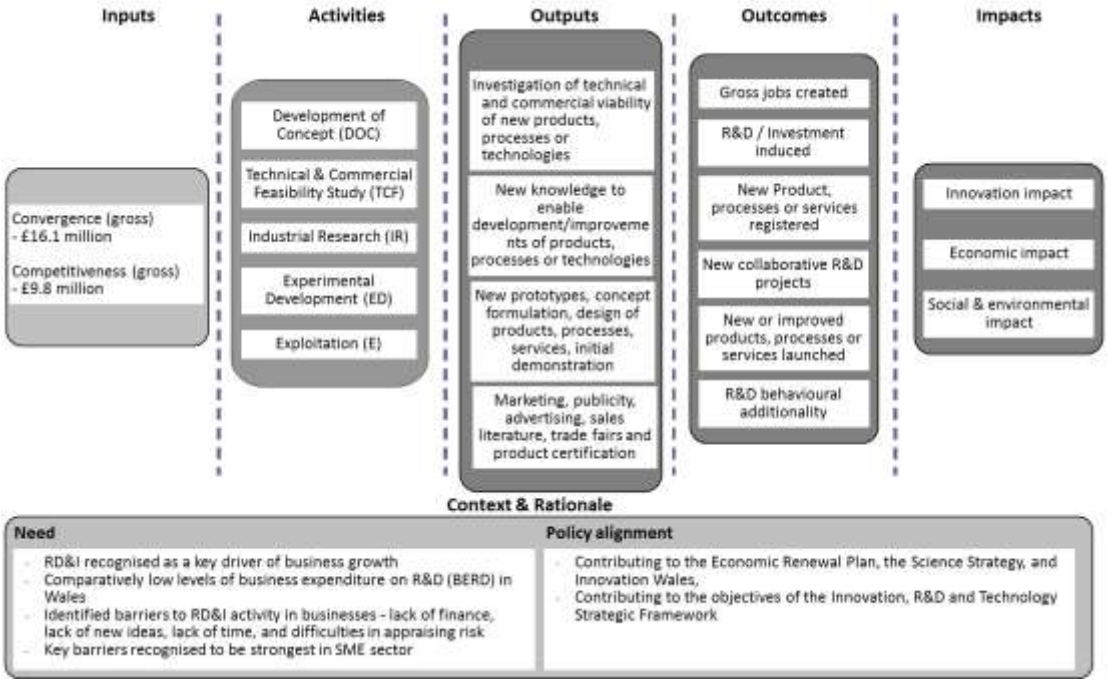
Final approval was made by the senior programme manager, with formal approval set out in a formal offer letter.

Once the project was underway the SMARTCymru monitoring team was the prime point of contact with the SME in order to monitor and quantify project expenditures and project benefits. The Innovation Specialists also sought to maintain contact with the businesses, with a particular focus on assisting with any future innovation support requirements (for example, a subsequent phase of SMARTCymru R&D).

Summary

The preceding section sets out the key elements of the SMARTCymru programme, and its underpinning rationale. This is summarised in an integrated (Convergence and Competitiveness) project logic model diagram shown in figure 2 below:

Figure 2. SMARTCymru programme logic model



The SMARTCymru programme model demonstrated a logical flow from an identified need, a set of delivery activities and intended outputs, through to the achievement of outcomes and impacts in both the Convergence and Competitiveness areas. The main weakness in the programme logic model related to the planned support for social and environmental cross-cutting themes/benefits, where it has proved difficult for the programme to address the targets directly. Synergies with the Business Innovation Programme were, however, harnessed to deliver against the cross-cutting themes outputs.

3 Profile of participation and achievements against targets

The Welsh Government's monitoring data provides an overview of programme activity, and highlights the nature of business participation. The following section sets out the programme's final outputs in the Convergence and Competitiveness areas of Wales (to June, 2015).

Overview of business participation

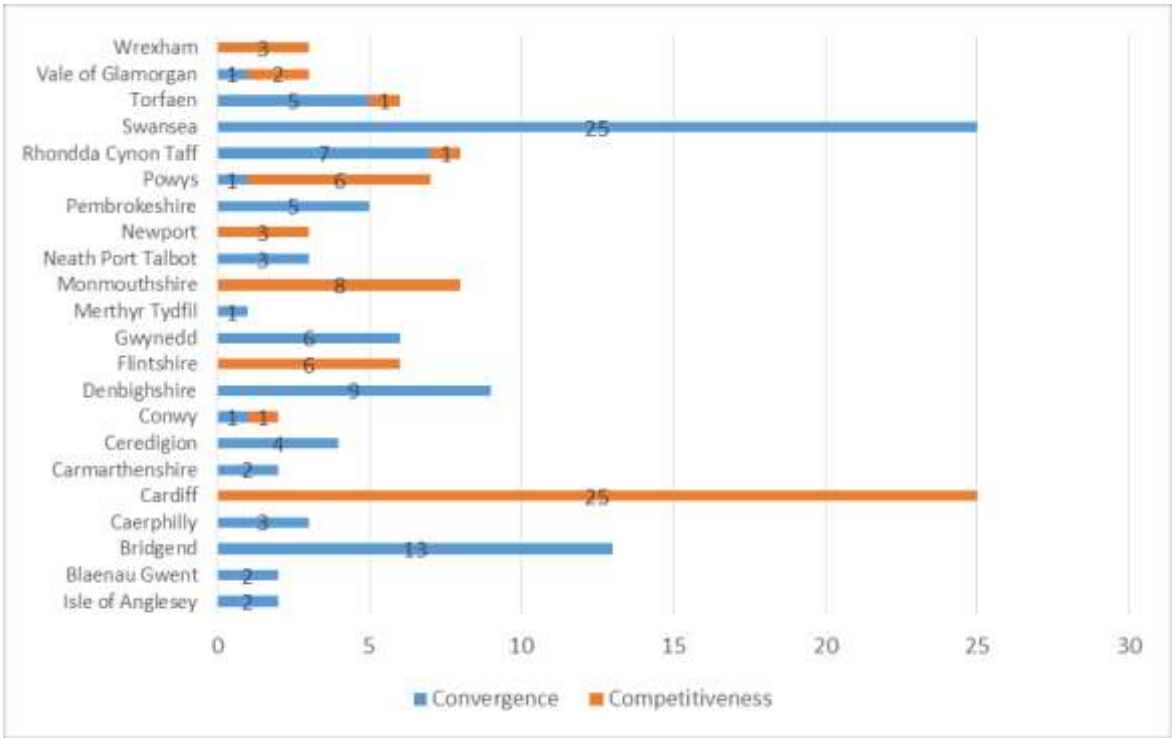
The SMARTCymru programme supported 146 companies with financial assistance. Of these companies 62 per cent (90) were in the Convergence area and 38 per cent (56) in the Competitiveness area.

Geographic location

Figure 3, below, illustrates that the 146 companies were spread across Wales. The most prominent location for SMARTCymru participants in the Convergence area, by some distance, was Swansea with 28 per cent of total participants in the area (25 of 90 Convergence area participants). This was almost double the next most active Convergence area – Bridgend - with 14 per cent (13) of participants. A number of other Convergence areas had more than five participants, including Denbighshire (nine), Rhondda Cynon Taff (seven) Gwynedd (six), and Pembrokeshire and Torfaen (five each). Together these seven locations accounted for 78 per cent of Convergence area participants.

In the Competitiveness area Cardiff, as the area's largest city/county, accounted for almost half of all Competitiveness participants (45 per cent, 25 of 56). This was followed by Monmouthshire with eight participants (14 per cent), and Flintshire and Powys included six participants each (11 per cent each). Three or less participants were located in the remaining areas.

Figure 3. Geographic location of SMARTCymru participants



Equality and diversity

Equality and diversity outputs data for the SMARTCymru programme were, as noted earlier (section 2), held by the Business Innovation Programme (which managed the Innovation Specialists). Findings from the end of programme evaluation of the Business Innovation Programme, however, indicate that five businesses were referred on to external support for cross-cutting themes topics (The Innovation Partnership and CM International, 2015). Indeed, this report noted that:

'Companies are time-limited and do not see these activities as a priority.' (2015)

While it was not possible to identify whether any of these businesses went on to receive SMARTCymru funding it does suggest that the Welsh

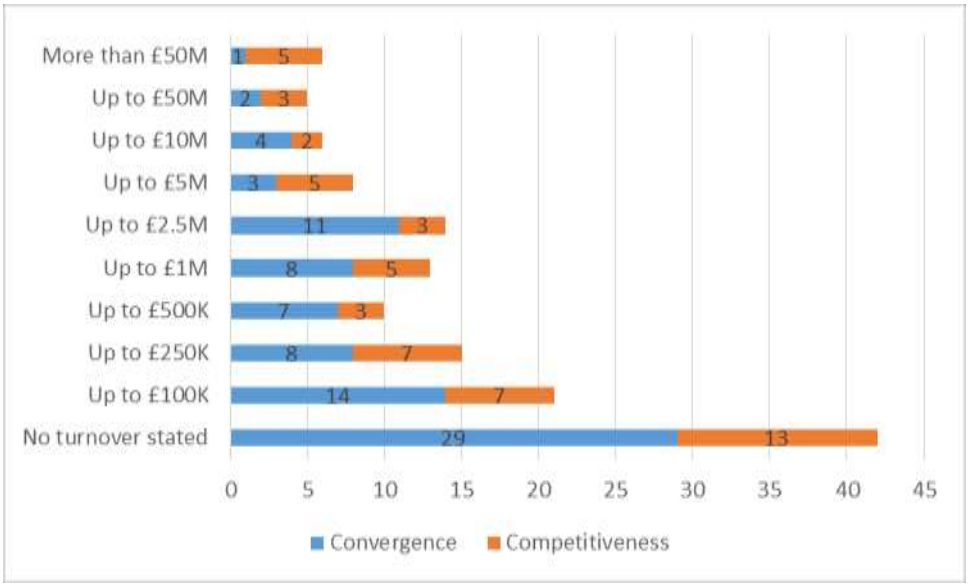
Government's key innovation programmes have struggled to make more than a minor contribution to the overall output targets of the cross-cutting themes. Section 6 explores the overall effectiveness of the SMARTCymru programme in addressing cross-cutting theme objectives in more detail.

Company size

In the Convergence area, as figure 4 below indicates, the majority of participants were relatively small companies. Indeed, a third (29 of 87) of companies had no stated turnover at the time of receiving support while a further 43 per cent of companies had a turnover of less than £1 million. Together this means than 77 per cent (66 of 87) of Convergence area companies had either no stated turnover or a turnover of less than £1m at the time of receiving support.

In contrast, figure 4 also points to the comparatively larger size of companies in the Competitiveness area with nine per cent of companies (five of 53) recording a turnover greater than £50M at the time of receiving support. Another nine per cent were from companies reporting turnover figures greater than £5M. This is consistent with the relative prosperity of the Competitiveness area.

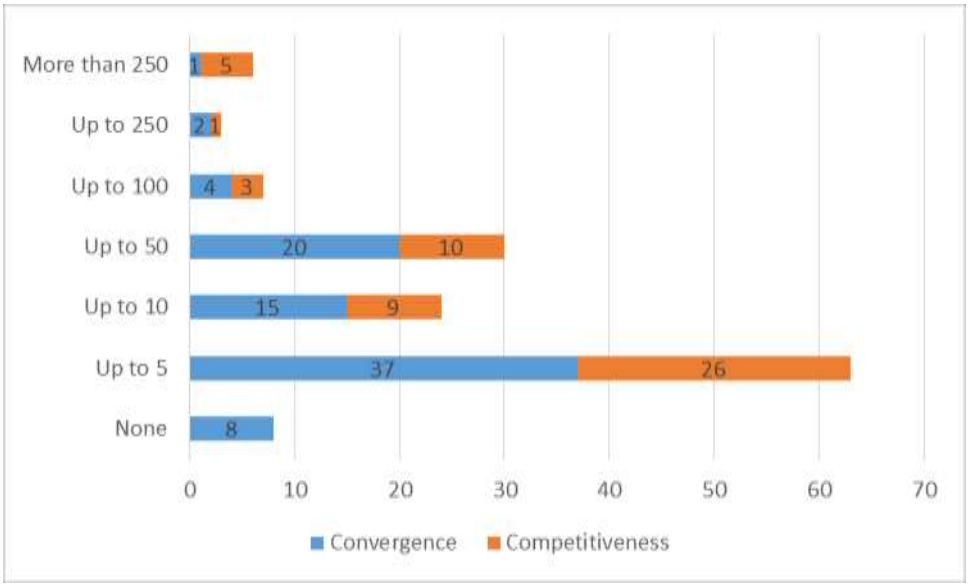
Figure 4. Company turnover



The employment profile of the SMARTCymru participants provides a further indication of business size. Here, figure 5 shows that, at the time of receiving support, nine per cent (eight of 87) of Convergence area companies had no employees while a further 43 per cent (37 of 87) had five or fewer employees. Furthermore, an additional 40 per cent of Convergence participants were companies that can be categorised as micro or small-sized enterprises – i.e. they had up to 50 employees. This meant that 92 per cent of participants in the Convergence area were micro or small-sized enterprises.

Similarly, nearly half the Competitiveness area participants were companies employing five or fewer employees (48 per cent or 26 of 54) while a further 35 per cent were companies employing up to 50 employees. This means that 83 per cent of companies in the Competitiveness area were micro or small-sized enterprises. However, nine per cent of Competitiveness area companies (five of 54) had more than 250 employees (figure 9) compared to only one percent of Convergence area companies in the same category.

Figure 5. Employees



Taken together the employment and turnover data confirms that the vast majority of companies participating in SMARTCymru were classified as

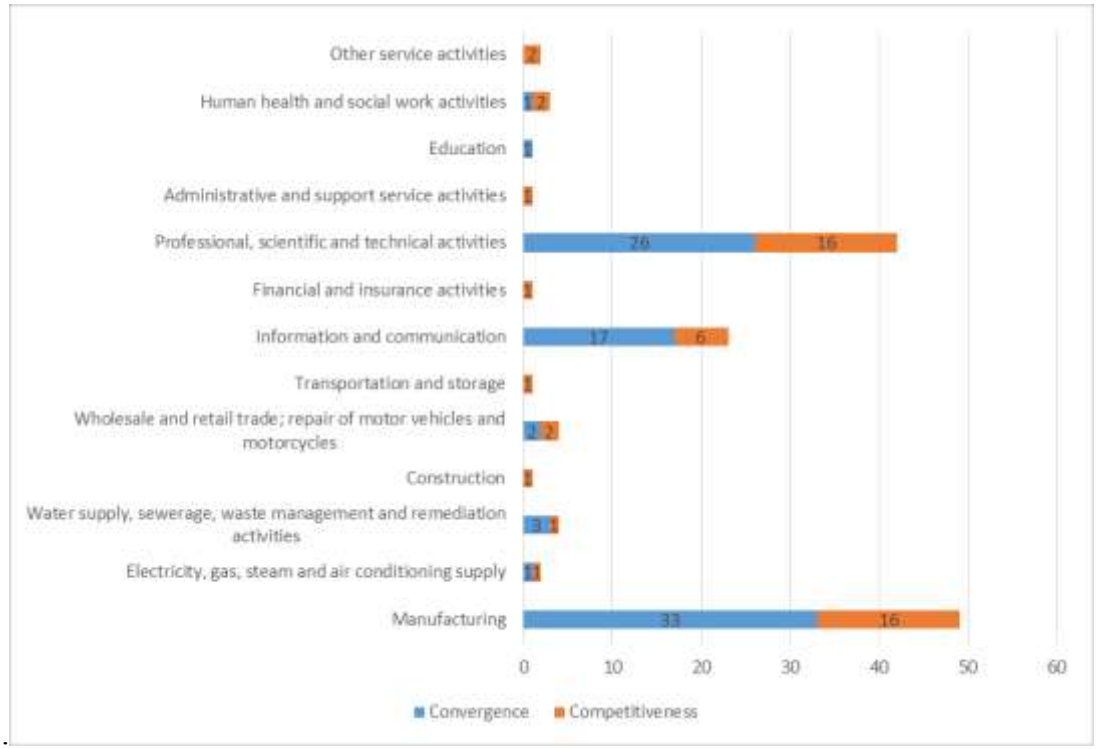
SMEs[12], with only six participants (4 per cent) falling into the large sized firm category (i.e. more than 250 employees). It also illustrates a contrast between Convergence and Competitiveness business participants with the latter generally larger in size.

Industry sectors

The profile of participation is further illustrated by the industry sectors of SMARTCymru companies. Figure 6 illustrates that the vast majority of programmes participants were from the manufacturing, professional, scientific and technical activities sector, and information and communication sectors. Manufacturing sector businesses accounted for 39 per cent of participants in the Convergence area and 32 per cent in the Competitiveness area. This was closely followed by the professional, scientific and technical activities sector with 32 per cent of Competitiveness participants and 31 per cent of Convergence participants in this sector. Finally, 20 per cent of participants in the Convergence area and 12 per cent of participants in the Competitiveness area were in the information and communication sector. Together, these three sectors account for 90 per cent of Convergence area companies and 76 per cent of Competitiveness area companies.

[12] According to European Commission definitions (European Commission, n.d.)

Figure 6. Industrial Sectors



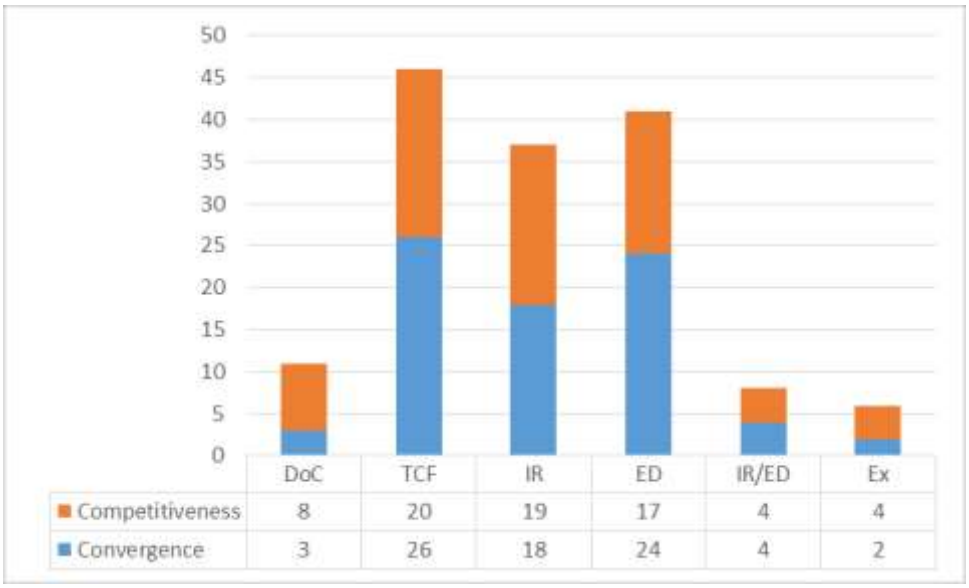
RD&I Phase

The SMARTCymru programme funds projects in different stages of development. These stages are called 'RD&I phases', with companies expected to make their way through the phases in a sequential manner. Figure 7 suggests this has been the case with companies progressing through the TCF, IR and ED phases.

While, at the mid-term evaluation stage, the balance of participation was towards the earlier RD&I phases such as TCF and IR, Figure 7 suggests that there has subsequently been a growth in later phase projects with a number of ED projects. As a consequence, the number of projects in these phases were relatively equal with the Convergence projects including 26 TCF projects (34 per cent), 18 IR projects (23 per cent), and 24 ED projects (31 per cent) while Competitiveness included 20 TCF (28 per cent), 19 IR (26 per cent) as well as 17 ED projects (24 per cent). There were also a number of joint IR/ED

projects with four each in the Convergence and Competitiveness areas, as well as six commercial exploitation (Ex) projects and 11 DoC projects.

Figure 7. RD&I Phase[13]



	DoC	TCF	IR	ED	IR/ED	Ex
Competitiveness	8	20	19	17	4	4
Convergence	3	26	18	24	4	2

Profile of funding and expenditure

Income

This section reviews the funding and expenditure of the SMARTCymru Convergence and Competitiveness area projects against their forecasts, and identifies the relative financial contribution of ERDF, Welsh Government and private match funders.

SMARTCymru received income from a combination of ERDF funding and match funding contributions provided by Welsh Government and various private match funders. The agreed total funding for the programme was as follows:

- Convergence area - £16.2m
- Competitiveness area - £10.1m

[13] A complete record of phases undertaken by beneficiary businesses was not available at the time of the evaluation. The data contained in figure 7 should therefore be treated as indicative.

Table 4 below indicates that the income received was based on an ERDF intervention rate of 47 per cent for the Convergence area project and 43 per cent for the Competitiveness area project. In terms of match funding, private match funders contributed 51 per cent and 54 per cent to the Convergence area and Competitiveness area project costs respectively, while Welsh Government provided a 3 per cent funding contribution to each project.

Table 4. Convergence and Competitiveness project income, June 2015

Organisation	Convergence		Competitiveness	
	Actual Income Contribution (Eligible)	% Of Budget Contribution	Actual Income Contribution (Eligible)	% Of Budget Contribution
ERDF funding	£7,559,278	47%	£4,346,414	43%
Welsh Government	£408,687	3%	£276,057	3%
Private sector match funders	£8,196,907	51%	£5,449,173	54%
Total Income	£16,164,872		£10,071,644	

Table 5 shows that income for Convergence area projects was received in line with the forecast. However, broken down to the different funding organisations, this table shows that circa £300k more was received from private match funders and circa £300k less from Welsh Government. In broad terms, this is in line with more projects being undertaken at the latter phases of the RD&I process (i.e. ED), where the intervention rates were lower (e.g. 25 per cent to 45 per cent for ED projects, compared to 65 per cent to 75 per cent for TCF projects).

Table 5. Convergence project income against forecast, June 2015

Organisation	Actual Income Received (Eligible)	Forecast Income Received (Eligible)	Variance	% of Forecast Income Received
Various Private Match Funders	£8,196,907	£7,864,083	£332,824	104 per cent
Welsh Government	£408,687	£741,510	-£332,823	55 per cent
ERDF Funding	£7,559,278	£7,559,278	£0	100 per cent
Total Income	**£16,164,872**	**£16,164,871**	**£1**	**100%**

As for the Competitiveness area, table 6 shows that circa £1.4m less income was received than expected with only 88 per cent of the forecasted income received. Based on the proportion of forecasted income received from each organisation, table 6 shows that a far greater proportion of forecasted income was received from private match funders (96 per cent) than from Welsh Government (34 per cent). Again, this is linked to the balance of projects, phases and organisations funded.

Table 6. Competitiveness project income against forecast, June 2015

Organisation	Actual Income Received (Eligible)	Forecast Income Received (Eligible)	Variance	% Of Forecast Income Received
Various Private Match Funders	£5,449,173	£5,701,000	-£251,827	96%
Welsh Government	£276,057	£823,711	-£547,654	34%
ERDF Funding	£4,346,414	£4,944,437	-£598,023	88%
Total Income	**£10,071,644**	**£11,469,147**	**-£1,397,504**	**88%**

Expenditure

Total project expenditure by the SMARTCymru programme was £26.2m. This figure was split between the two European projects as follows:

- Convergence - £16.2m
- Competitiveness - £10.1m

Tables 7 and 8 below provide further details on the main areas of expenditure and compares the actual programme expenditure against the forecasted spend, illustrating the performance against the budget.

In terms of the Convergence area project, there were minor overspends in administration costs and grants provided but this was balanced by minor underspends in legal & professional, staff, and travel & transport costs.

Table 7. Convergence project expenditure breakdown by expenditure type, June 2015

Expenditure Type	Actual Spend (Eligible)	Forecast Spend (Eligible)	Value of Budget Underspent / Overspent	% Of Budget Spent
Administration	£328	£207	£121	158%
Grants	£15,560,952	£15,469,558	£91,394	101%
Legal & Professional	£89,793	£117,030	-£27,237	77%
Staff	£504,197	£563,917	-£59,720	89%
Travel & Transport	£9,602	£14,160	-£4,557	68%
Total Expenditure	£16,164,872	£16,164,871	£0	100%

Table 8 provides details of expenditure in the Competitiveness area project. This shows slight overspends on administration and legal & professional costs in addition to a slight underspend in staff and travel & transport costs. There was, however, an overall underspend of circa £1.4m. This underspend is

associated with the lower than anticipated demand for the programme (resulting in a lower level of grant expenditure).

Table 8. Competitiveness project expenditure breakdown by expenditure type

Expenditure Type	Actual Spend (Eligible)	Forecast Spend (Eligible)	Value of Budget Underspent / Overspent	% Of Budget Spent
Administration	£160	£80	£80	201%
Grants	£9,772,675	£11,166,133	-£1,393,458	88%
Legal & Professional	£88,550	£81,787	£6,763	108%
Staff	£207,902	£216,355	-£8,453	96%
Travel & Transport	£2,357	£4,793	-£2,436	49%
Total Expenditure	£10,071,644	£11,469,148	-£1,397,504	88%

Overall, £26.2m was spent in the Convergence and Competitiveness areas compared to a forecast of £27.6m. From an overall perspective some 95% of the overall budget was spent, corresponding to underspend of £1.4m.

Gross outputs achieved against targets

Tables 9 and 10, below, illustrate the primary outputs and results achieved by the SMARTCymru programme against its targets. The tables present the re-profiled targets agreed at the mid-term stage. For comparison purposes these are shown alongside the original targets, in brackets.
The 'Achieved' columns for the Convergence and Competitiveness areas include monitoring results achieved by the end of the programme (June 2015). These data show the programme has been successful in achieving many of its targets, particularly in the Convergence area.

Convergence businesses achieved comparatively stronger outputs than those in the Competitiveness area, with the targets for gross jobs created and investment induced exceeded by some distance. This also included strong achievement in relation to gross jobs (124 per cent of target achieved) and particularly strong achievement of investment induced (687 per cent of the target achieved).

The strong performance by the Convergence area programme output was achieved despite only supporting 90 'enterprises financially' (75 per cent of the target). This suggests that the outputs were achieved with a high level of efficiency.

Table 9. Convergence outputs achieved (original target in brackets)

KPIs	Achieved	Target	% of target achieved
Enterprises Financially Supported	90	120 (200)	75%
Jobs Created	89	72 (120)	124%
Investment Induced	£5,560,447	£809,208 (£800,000)	687%

Source: (Welsh Government, n.d.)

In addition to the approved ERDF programme outputs noted in table 9 the Convergence programme also achieved the following:

- 100 new or improved products launched
- 49 products, processes or services registered

The Competitiveness projects also achieved positive output results, with the targets for investment induced and new or improved products launched exceeded. Indeed, more than double the target for investment induced was achieved with circa £1.3M achieved compared to a target of £502,414 (263 per cent of target achieved). Similarly, three more products were launched than the target with 48 achieved compared to a target of 45 (107 per cent of target achieved).

However, the remaining indicator targets were not met with only 27 per cent of the products/processes/services registered output indicator for the Competitiveness area achieved (12 compared to a target of 45). Given the

strong outputs associated with the launch of new products this underperformance is likely to be a result of factors such as the difficulty of registering certain projects (services, for example, are difficult to register), or the costs of protecting intellectual property.

Of the other targets, gross jobs created was below the target by 13 per cent (65 created compared to a target of 75). In addition, only 54 enterprises were financially supported against a target of 125 (45 per cent). Like other underperforming targets this was linked to the lower than anticipated demand for the programme.

Table 10. Competitiveness outputs achieved (original target in brackets)

KPIs	Achieved	Target	% of target achieved
Enterprises Financially Supported	56	125	45%
Jobs Created	65	75	87%
New or Improved Products Launched	48	45	107%
Products/Processes/Services Registered	12	45	27%
Investment Induced	£1,320,700	£502,414 (£500,000)	263%

Source: (Welsh Government, n.d.)

Overall, these results suggest positive results were achieved by the SMARTCymru programme with investment induced and jobs created results contributing towards economic impacts. The number of products launched also illustrates the programme's contribution towards RD&I activity. The fact that performance was below forecasted targets in relation to the number of businesses financially assisted, however, reflects, in part, the challenges faced by the programme in stimulating and maintaining demand. It does, however, illustrate that many of the key outputs have been achieved, despite these challenges.

It should be noted that the collection and processing of output indicators relies on Welsh Government's own staff resources. Interpretation of the output indicators is complicated by the long-term nature of the innovation process,

and the likelihood that outputs can take up to four years to deliver and build, according to estimates (PricewaterhouseCoopers, 2009). For this reason, there may well be further impacts resulting from projects undertaken after the closure of the programme. Indeed, evidence from the business survey results (see next section) suggests this to be the case.

Summary

The results of this section suggest that SMARTCymru programme (Convergence and Competitiveness areas) beneficiaries were largely micro and small companies, according to the European Commission definitions. This is consistent with the target group for the project (SMEs). The participants are primarily located in Wales' major urban areas on the M4 corridor, with Cardiff[14] and Swansea[15] accounting for a large proportion of business participants. Sector participation is consistent with the Welsh Government's sector priorities, with manufacturing accounting for the largest proportion of participants (39 per cent in the Convergence area and 32 per cent in Competitiveness) as well as ICT accounting for a number of companies (20 per cent in the Convergence area and 12 per cent in Competitiveness).

Programme expenditure was below the profiled forecast by 5 per cent which points to relative efficiency in the delivery of programme outputs, although this expenditure appears to be relatively high in relation to the numbers of enterprises financially assisted.

Against the output targets far fewer businesses (in both the Convergence and Competitiveness areas) were supported than anticipated. This was linked to the lower demand that was experienced, as a result of the downturn in the economic context, and policy changes associated with the ERP. Despite the difficulties in demand generation the programme has produced positive results against key targets such as gross jobs created and investment induced. The number of products launched also illustrates the programme's contribution towards RD&I activity.

[14] 4 per cent of all Competitiveness area businesses.
[15] 28 per cent of all Convergence area businesses.

4 Beneficiary experiences and achievements

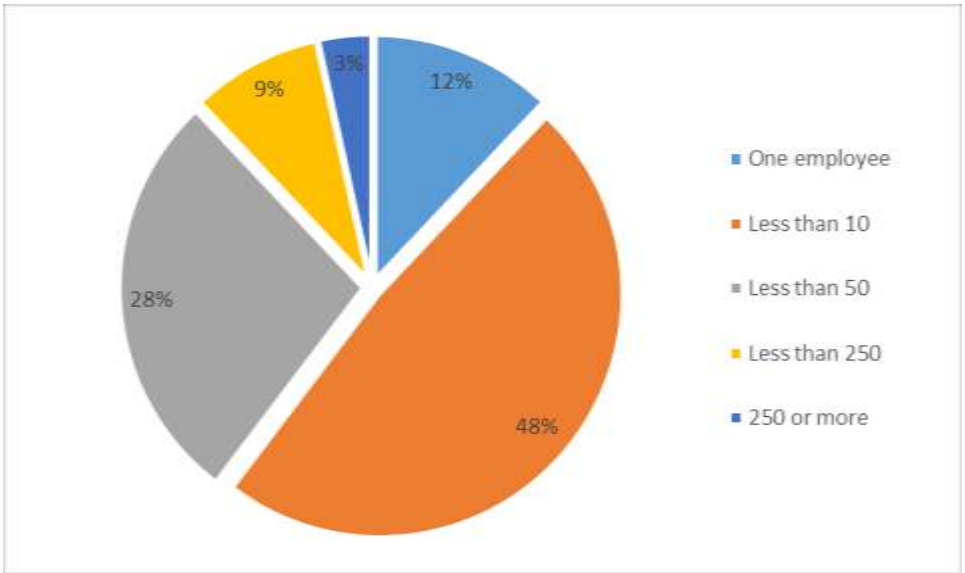
In order to supplement evidence from the monitoring data, a survey of business participants was carried out. This exercise gathered evidence on businesses' R&D activity prior to their project; other results and benefits received from the projects; additionality of the support; and finally areas for SMARTCymru development.

Sample

A total of 61 companies were either interviewed or completed an online survey, representing 42 per cent of all SMARTCymru business beneficiaries. Of these, respondents 69 per cent were based in the Convergence area and 31 per cent based in the Competitiveness area. This is similar to the actual spilt of participants by Convergence / Competitiveness area (63 per cent and 38 per cent respectively).

Figure 8 shows the size of companies participating in the business survey according to number of employees. It shows that the survey sample broadly reflects the population as a whole with 60 per cent of respondents including less than 10 employees (i.e. microenterprises) and an additional 28 per cent employing fewer than 50 employees (i.e. small-sized enterprises).

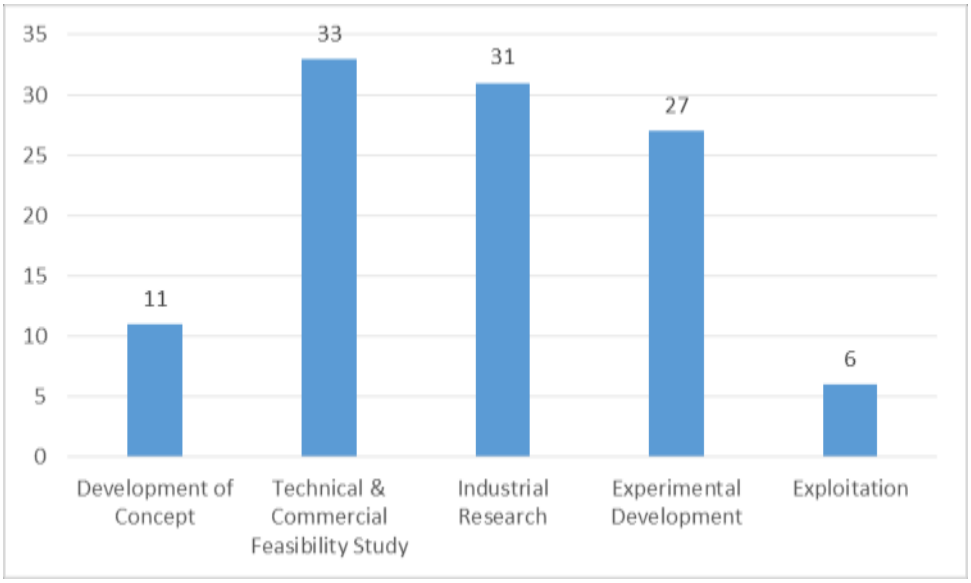
Figure 8. Size of business (employees)



Source: CMI-TIP survey results

In terms of the RD&I phases participation by the sample, figure 9 shows a similar number of respondents across the key phases of TCF (33), IR (31) and ED (27). Consistent with the total beneficiary population, relatively few companies had participated in the DoC (11) and the Exploitation phase (six).

Figure 9. RD&I phase

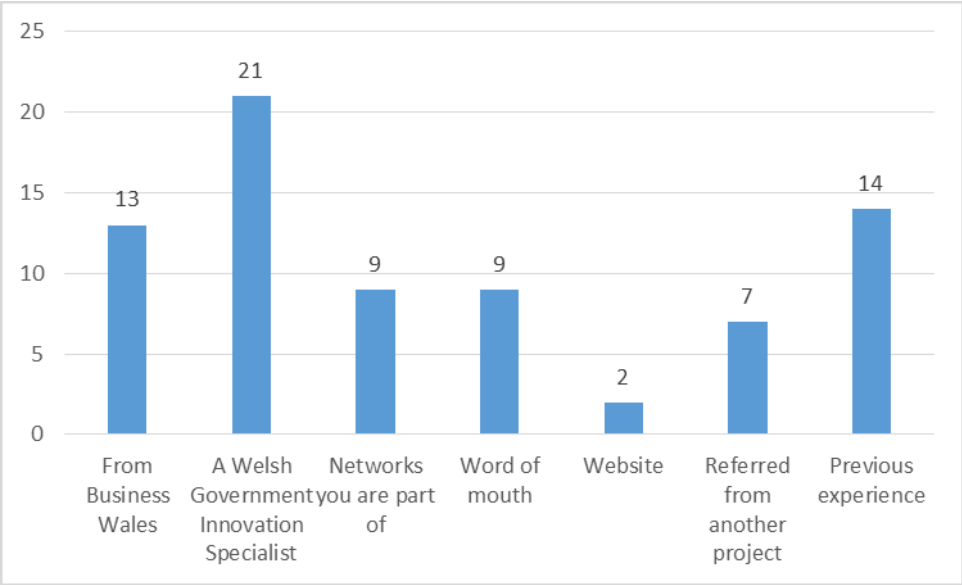


Source: CMI-TIP survey results

Before SMARTCymru

As illustrated by figure 10, surveyed businesses became aware of the SMARTCymru support through various sources. The most frequent route was, unsurprisingly, through Welsh Government with 21 indicating they were informed by an Innovation Specialist, and 13 by Business Wales. In addition, some respondents reported that they became aware of the support through Finance Wales.

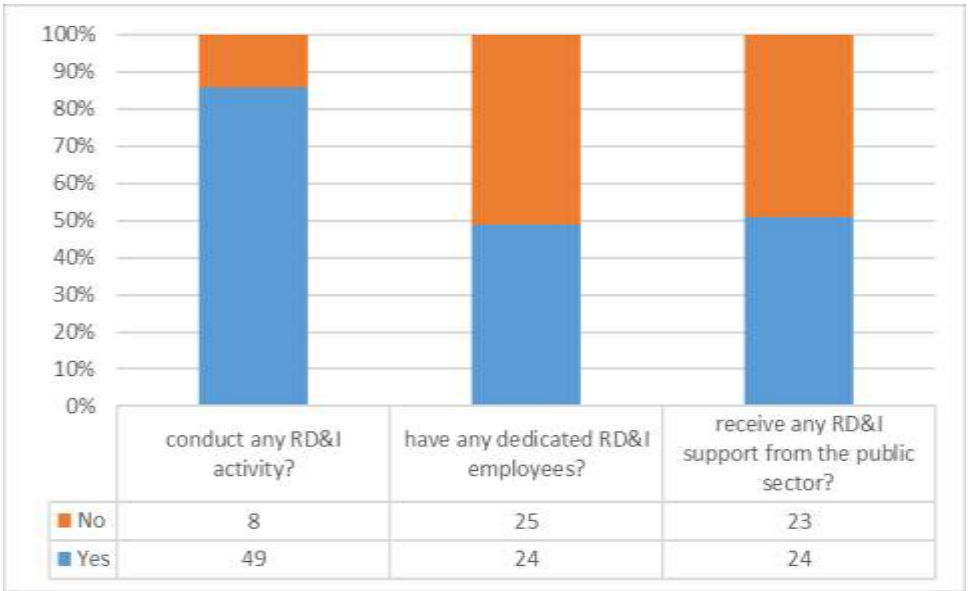
Figure 10. How did you become aware of the SMARTCymru programme?



Source: CMI-TIP survey results

Prior to engaging with SMARTCymru, the vast majority of companies (49 of 57 respondents - 86 per cent) were active in conducting RD&I activity. Around half the companies reporting prior RD&I activity (24 of 49 or 49 per cent) had dedicated RD&I employees and employed, on average, six RD&I employees each. Slightly over half of RD&I experienced companies (24 of 47 or 51 per cent) had received RD&I support from the public sector prior to SMARTCymru. The companies cited several support programmes with SIF and the Innovation Vouchers mentioned most frequently (cited by seven and four respondents respectively). Other programmes mentioned include the Manufacturing Advisory Services, TSB (now Innovate UK), European Framework Programmes, NHS Health Technology Devices scheme A4B projects, KTP support, R&D tax credits, DTI's Innovative Manufacturing Initiative (IMI), East Midlands Development Agency R&D Grant, and SMART Scotland.

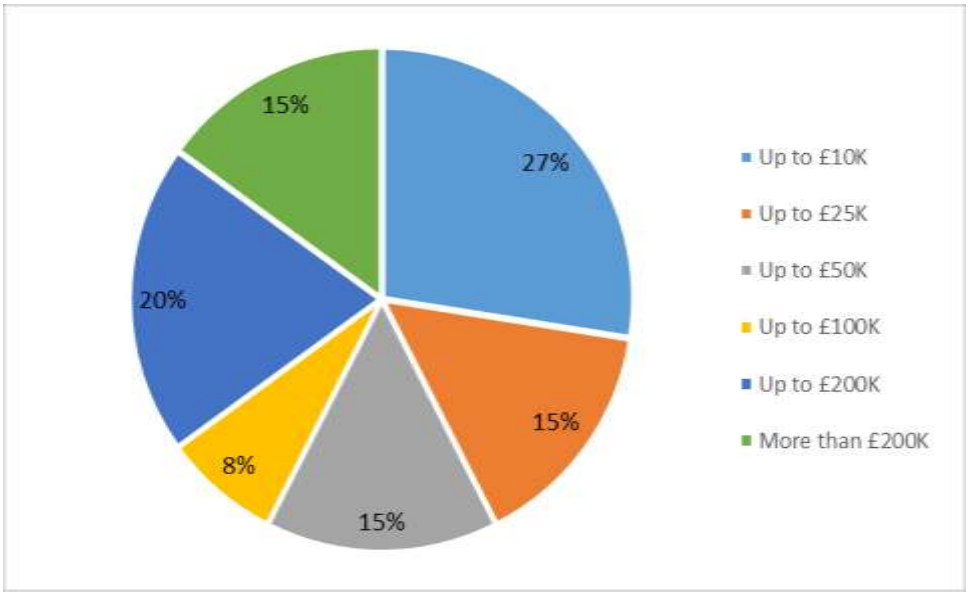
Figure 11. RD&I activity prior to SMARTCymru



Source: CMI-TIP survey results

Figure 12 illustrates that the amount invested in RD&I by the surveyed companies varied substantially - from 27 per cent reporting they invested a relatively small amount of up to £10K in the last financial year before SMARTCymru, to some 15 per cent reporting they invested more than £200K.

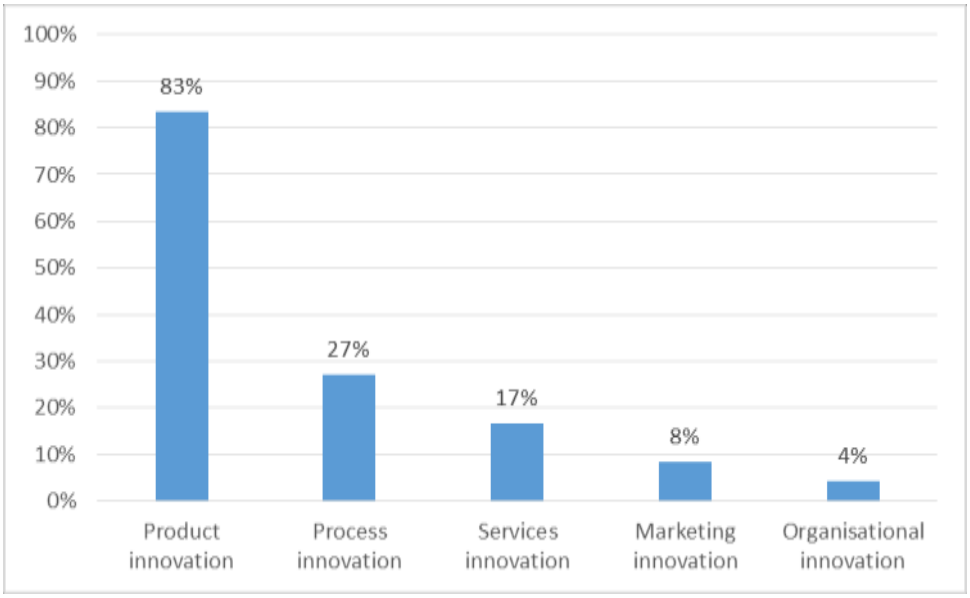
Figure 12. How much was invested in RD&I in the last financial year before your SMARTCymru programme?



Source: CMI-TIP survey results

The vast majority reported their prior RD&I activity involved product innovation (83 per cent) (see figure 13). Over a quarter (27 per cent) also reported experience in conducting process innovation, while 17 per cent had previously conducted services innovation. This breakdown is consistent with the overall importance of manufacturing projects supported by SMARTCymru.

Figure 13. What type of RD&I activity did your business conduct prior to SMARTCymru?



Source: CMI-TIP survey results

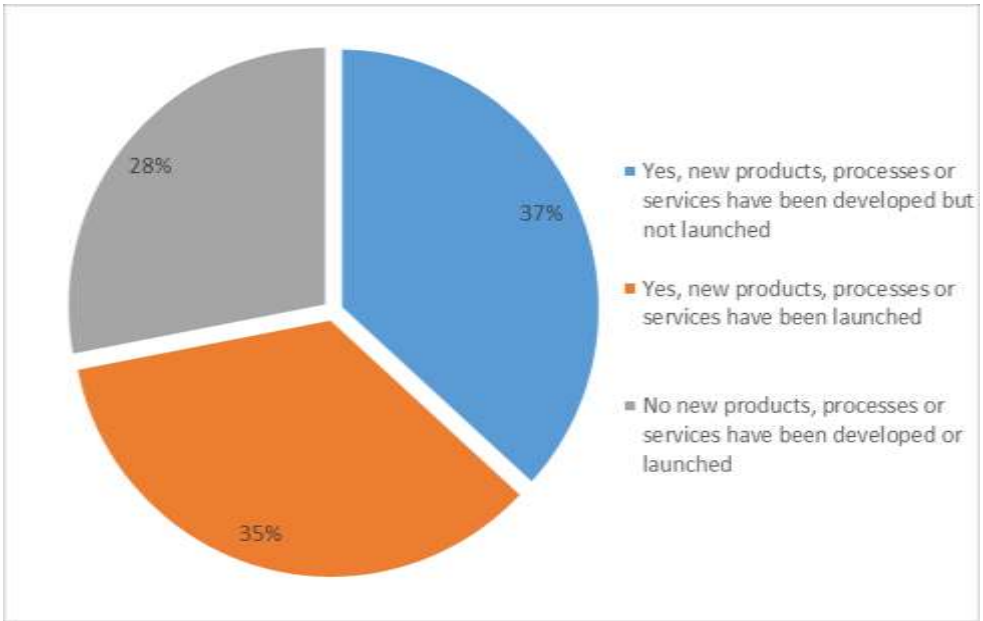
These results suggest that a high proportion of interviewed companies were 'R&D experienced', with dedicated R&D budgets and employees. The results also indicate that around half the companies had received support from the public sector to undertake these activities and were continuing with that strategy through SMARTCymru support.

Results and Impact

Findings from the survey suggest that many positive results and impacts have been achieved by the participating companies. For example, as figure 14 illustrates, 72 per cent of the survey sample reported they had either developed or launched new products, processes or services as a result of their SMARTCymru programme. This included 37 per cent reporting that their

innovations had been launched onto market. Some 35 per cent had their innovations in development, highlighting potential for future impacts.
In total, 64 new products, 18 new processes, and 11 new services were reported as being launched or developed.

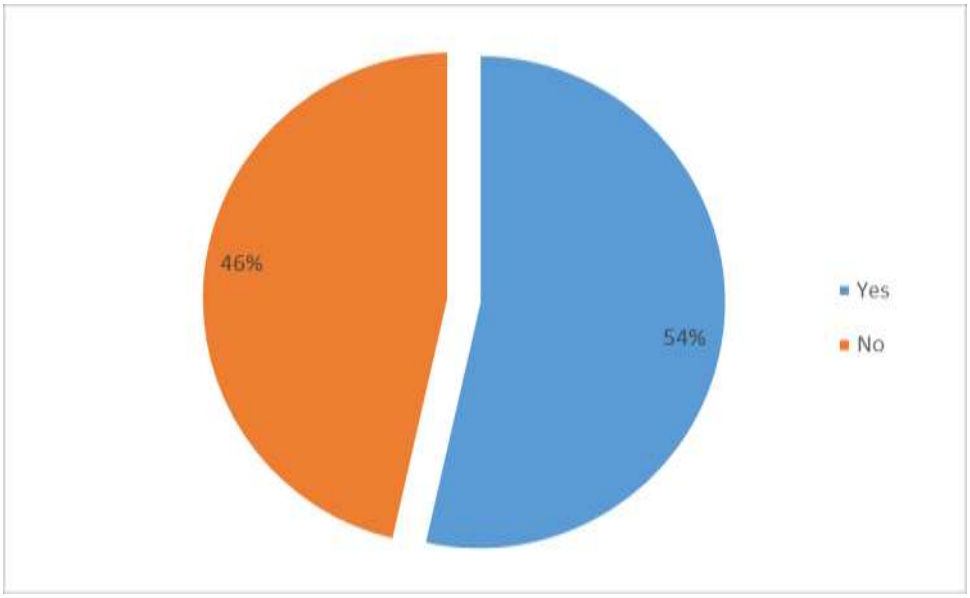
Figure 14. Have any new products, processes or services been developed or launched as a result of SMARTCymru?



Source: CMI-TIP survey results

In addition, nearly all of the respondents reported they expected to introduce new or improved products, processes or services in the next three years (94 per cent). Many of these companies reported that the new innovations related to the SMARTCymru programmes in development, while others were hoping to develop and launch 'offshoots' of their SMARTCymru development projects. This suggests good potential for future impact from the SMARTCymru programme.
Protection of innovation is a key feature of many SMARTCymru programmes. Here, figure 15 indicates that 54 per cent of respondents (30 of 56) had created some form of IP. Of these, some 23 respondents reported they had either registered or applied for a patent, four reported they had created a trademark.

Figure 15. Has your business created any intellectual property since participating in the SMARTCymru programme?

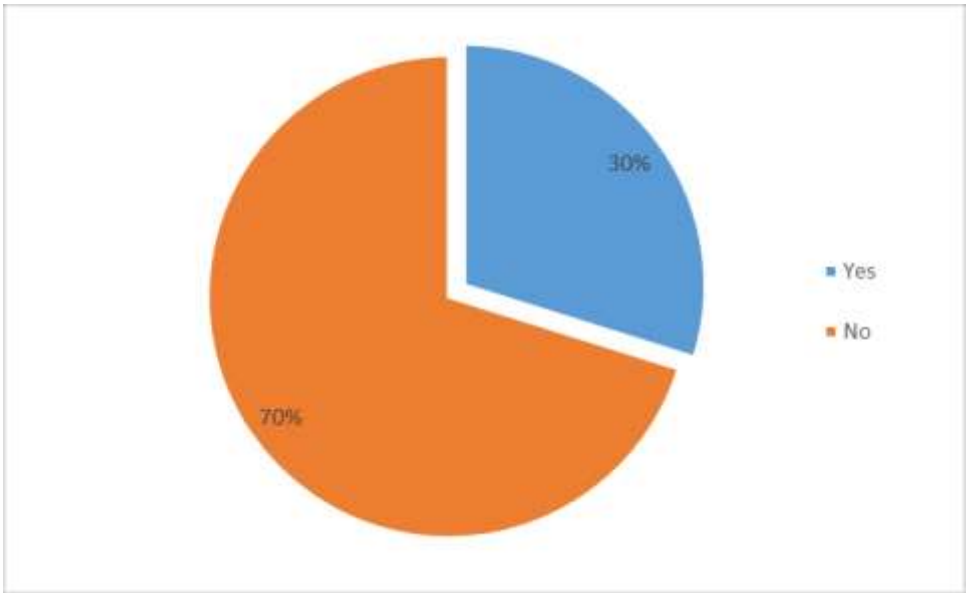


Source: CMI-TIP survey results

A total of 30 per cent of respondents (17 of 57) reported that their SMARTCymru projects had already led to an increase in sales for their business, as figure 16 illustrates. Some 15 of these respondents provided an estimate as to how much their sales had increased and reported a total value of circa £15M. This suggests that, on average, companies receiving additional sales from their participation in the SMARTCymru programme received circa £1M. However, this finding is heavily skewed by one business reporting £9M of additional sales generated from their project. Without this response the average for the other 14 respondents was circa £420K of additional sales to date.

In addition to sales generated to date, the companies reported they expect the additional sales generated to persist for a further 11 years, on average.

Figure 16. Has your SMARTCymru programme directly led to any increase in sales for your business to date?



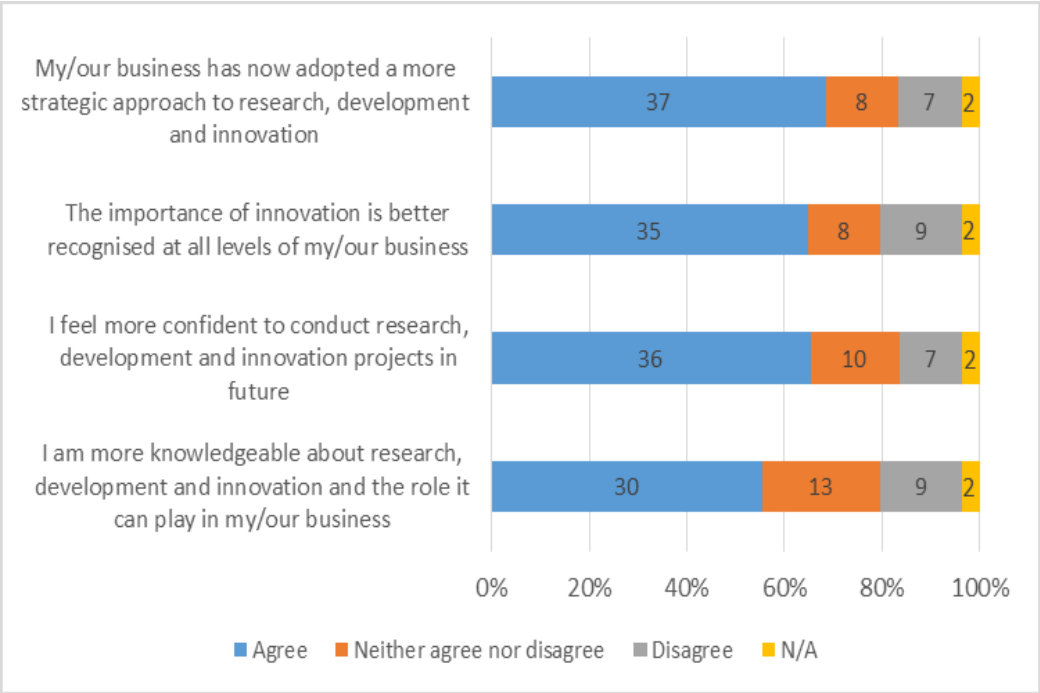
Source: CMI-TIP survey results

Evidence from the business survey results suggests that the programme has had a positive impact on beneficiaries' attitude and confidence towards RD&I activity, including promoting strategic thinking on future RD&I activity. As figure 17 illustrates, 69 per cent of respondents (37 of 54) agreed that their businesses had adopted a more strategic approach towards RD&I as a result of their SMARTCymru programme. Similarly 65 per cent reported that they felt more confident to conduct RD&I projects in future and that they better recognised the importance of innovation at all levels of their business as a result of the support. A majority also agreed they were more knowledgeable about RD&I and the role it can play in their business (56 per cent).
Elaborating on their answers further, one business reported they were more 'open-minded' about other RD&I projects following SMARTCymru support. Similarly, another reported this was their first RD&I project and they wouldn't have pursued it on their own but they now felt more confident in doing so in future. Another business reported they had developed an 'RD&I culture' and that public sector support had become increasingly important in their strategic approach as they aim to get products to market as quickly as possible.

Of those who felt that their approach to RD&I had not been significantly influenced by the SMARTCymru programme, some 12 companies reported their attitudes, strategy, or confidence in undertaking RD&I activity hadn't changed because they already had significant experience of RD&I at either a personal or business level. Indeed, many of the companies were RD&I intensive in their nature e.g. medical devices. As one business put it, 'we were clued up to spot innovation opportunities already' or simply put by another business, 'we're a technology business - it's the norm'.

Many of the respondents were also experienced entrepreneurs having started a number of innovative companies or had previous roles.

Figure 17. To what extent would you agree with the following statements, based on your SMARTCymru programme:



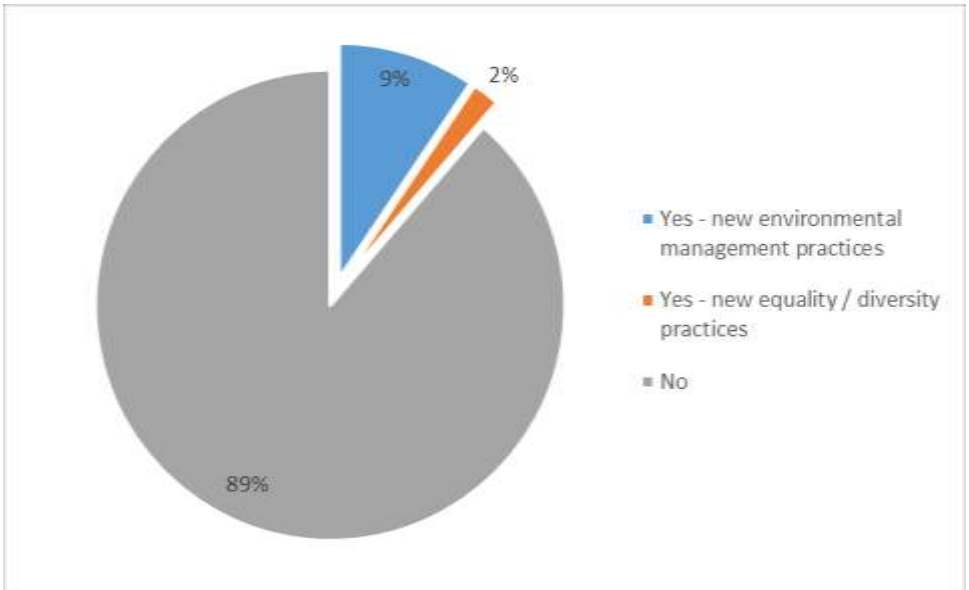
Source: CMI-TIP survey results

A further result evident from the survey was the generation of collaborative research links established between participating companies and other organisations. Here 45 per cent (25 of 55) reported that new collaborative research links had been established. This principally included links to universities in Wales and beyond: Swansea University, Bangor University, Aberystwyth University, Cardiff University, USW, Glyndwr University, Bristol University, Heriot-Watt University and Brunel University. A number of business collaborations were also cited in addition to other organisations such as the NHS, hospitals, Public Health England, and the National Composite Centre.

A small number of equality/diversity and environmental benefits were evident with five respondents (9 per cent) reporting that they had established new environmental management practices as a result of SMARTCymru. Only one (2 per cent) business reported equality/diversity practices had been

established. These results are consistent with the overall low level of cross-cutting theme practices reported in the programme's output monitoring data[16].

Figure 18. Have any new environmental management or equality / diversity practices been established as a result of your SMARTCymru programme?



Source: CMI-TIP survey results

Of the companies (3) that reported they were developing / had launched new environmental systems, examples cited include the development of waste and recycling procedures, and development of new environmental policies.

Of those who had not established new practices, 64 per cent (29 of 45) reported that support was not offered by the Welsh Government. Most of those who were offered the support but rejected it reported they either did not think the support was relevant to them (six respondents reported this) or they already had well-established practices (five respondents reported this).

Several companies mentioned unexpected benefits from participating in the SMARTCymru programme including seven companies reporting networking benefits. This led to some companies gaining new clients, for example one business reported that their SMARTCymru programme involved running trials with prospective clients which, after seeing the technology developed, subsequently led to actual client relationships. Another reported that they

[16] For the Business Innovation Programme.

‘broadened the community of companies that we deal with’ while another reported the credibility gained from being awarded a SMARTCymru grant was important in developing links to major pharmaceutical companies. Another business reported that their relationship with the Innovation Specialist had been very beneficial as they gained access to information on other EU or Welsh Government funding opportunities.

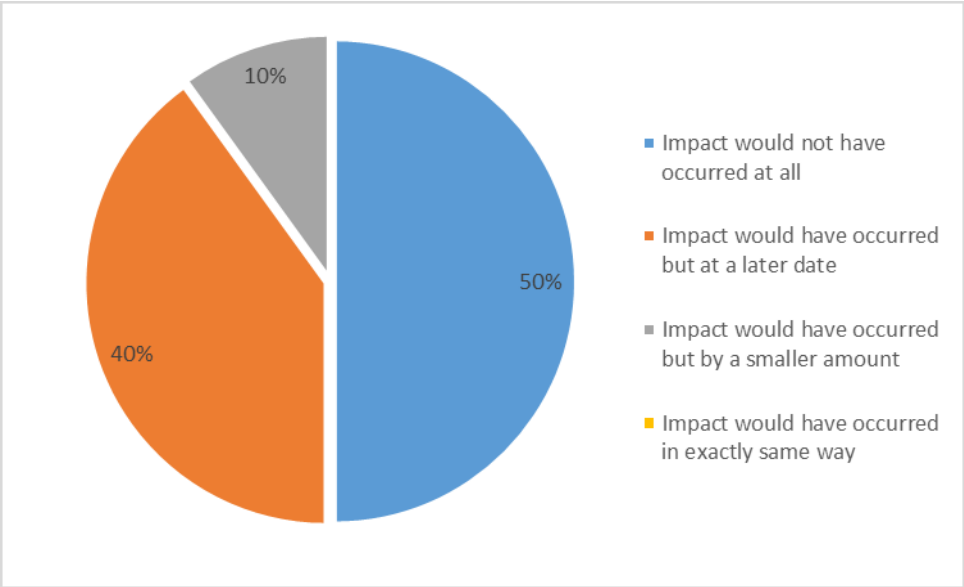
Four companies reported that their projects helped to increase credibility with other investors. Indeed, one business reported that the project was ‘essential’ in enabling them to secure £2M of funding elsewhere (£1.3M from Innovate UK and £0.7M in private equity). Another reported the support was ‘critical’ for raising £80K in equity finance.

Finally, three companies reported other unexpected benefits in identifying new market applications for their technology developed during their SMARTCymru programme. Another reported their experience had been positive as they were able to develop their links to Welsh Government.

Additionality

Results from the business survey suggest that there has been a high degree of additionality with half of respondents (25 of 50) reporting that without SMARTCymru none of the impact they have experienced would have occurred (see figure 19). The other half reported that there would only have been a partial impact, with 40 per cent reporting it would have occurred at a later date and 10 per cent reporting it would have occurred by a smaller amount. No respondents reported the impact would have occurred in exactly the same way. These findings indicate that in the absence of SMARTCymru funding, impacts would be reduced significantly.

Figure 19. Thinking about the project impacts that have been experienced as a result of the SMARTCymru programme, what would have happened if your business had not engaged with it?

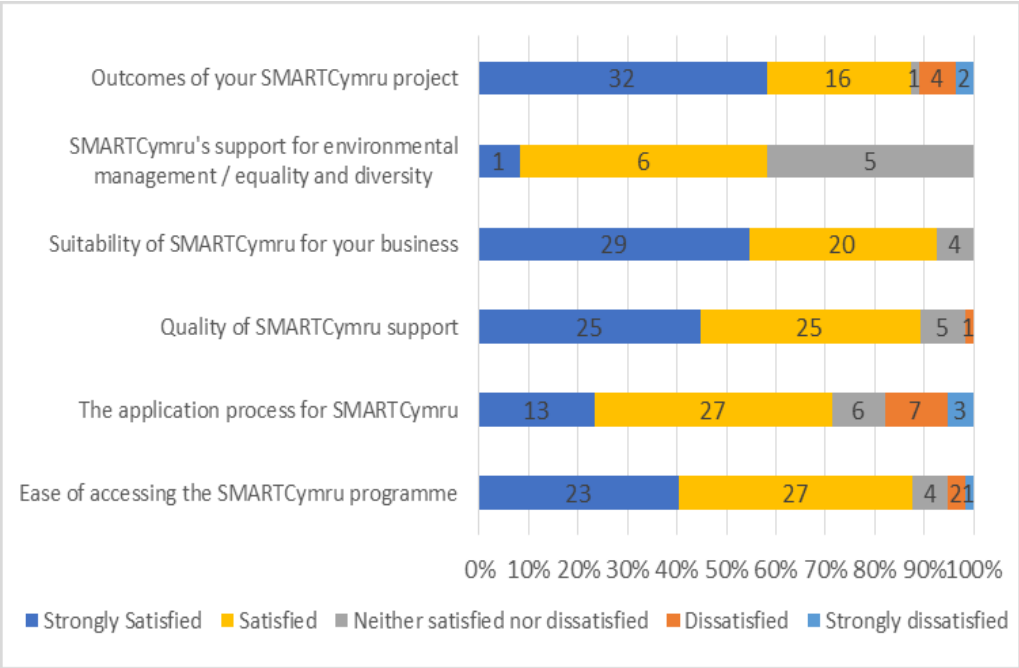


Source: CMI-TIP survey results

Satisfaction and areas for development

The results of the survey provide a positive picture in relation to satisfaction with the support provided by SMARTCymru (see figure 20). Between 87 per cent and 92 per cent of respondents reported they were satisfied to some extent with the ease of accessing SMARTCymru, the quality of support, suitability of the support, and outcomes of the project. The element of support beneficiaries were most dissatisfied with was the application process, with 71 per cent satisfied and 18 per cent dissatisfied.

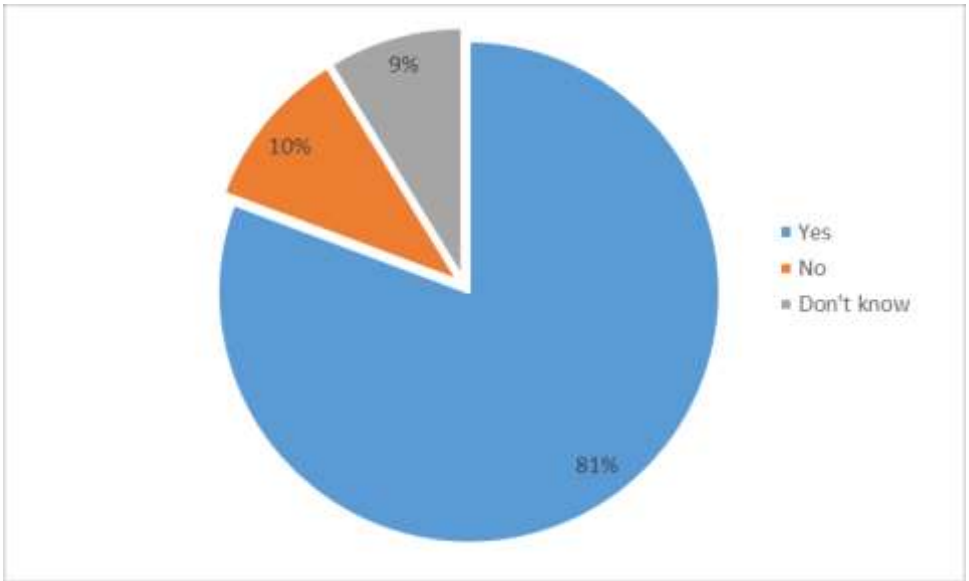
Figure 20. Overall, how satisfied are you with the SMARTCymru programme?



Source: CMI-TIP survey results

Positive satisfaction results are also reflected in the high proportion of businesses that intend to use SMARTCymru funding again in the future (81 per cent of companies, 46 of 57).

Figure 21. Does your business expect to use the SMARTCymru programme in future?



Source: CMI-TIP survey results

In terms of improvements that could be made, the programme was described as being 'administration intensive'. As a consequence, the primary area for future development cited was streamlining of programme processes. Many respondents were specifically dissatisfied with the claims process, indicating that it required an 'unrealistic' level of detail as the projects were highly innovative and it was difficult for many to forecast the costs. One business reported there was a 'staggering' amount of 'trivial' data required for their project and the amount of time taken to do the administrative work caused delays in getting the product to market. Other companies reported that delays as a result of the 'administrative burden' had caused cash flow issues. Another respondent reported that the requirement of having a registered auditor, rather than using their own accountant, made it difficult, and was often inappropriate for small companies. Another still reported 'each time we claimed money we had to produce an accountant's letter which wasn't cheap'. A number of respondents indicated that the programme should develop a quicker and more responsive application process. As one business put it 'the delay meant that additional personal funds needed to be injected', while another had to seek additional investment from their investors.

Transparency was highlighted as an area for development by two respondents. Here, it was reported that the application process was akin to sending the application 'into a black box', and that monitoring progress was difficult.

In the area of claims, several respondents reported dissatisfaction with the requirement to secure three quotations for all likely expenditure during the application process. Here it was reported that this was an impractical requirement for an innovative project, and that removing it would save considerable time for businesses.

Another area for development cited frequently by respondents was around continuity between phases. Here respondents reported that the transition process between phases should be made smoother, without delays which can disrupt the innovation process.

Case-study findings

Detailed evaluation case study interviews were undertaken with 10 SMARTCymru enterprises.

The aim of the case study interviews was to gain a detailed understanding of the experiences and results achieved by a sample of projects, and to identify business benefits, as well as wider impacts where identifiable (economic, environmental, social, innovation and so on) at the end of the programme.

The following section provides an integrated overview of the case study results, drawing on interviews. These case studies were selected to reflect the diversity of project activity supported by SMARTCymru, and include evidence from projects of different phases, size, sectors and geography:

1. MC Diagnostics
2. KIGG Ltd
3. Concrete Canvas
4. ADC Biotechnology
5. Telluric Land Reclamation
6. Writemedia Partnership
7. Spectrum Technologies
8. Haemair
9. Microsemi Semiconductor
10. Callen-Lenz and Environment Systems

The full results of the case studies can be found in the annex E summary of key findings from the case studies is set out below:

The case studies illustrate a number of areas of successful commercialisation with examples of businesses introducing new products, processes and services. These examples include Concrete Canvas' introduction of a new shelter for the military sector, WriteMedia Partnership's athlete development software sold to the schools and sports sector, Spectrum Technologies' next generation laser wire marking system for the aerospace sector. Other examples include Microsemi Semiconductor's communications service band radio module for medical implants, Telluric's DCL Biosolv product for the treatment of contaminated lands, and MC Diagnostic's new automated platform for molecular diagnosis in the medical sector.

Many of the case studies confirm the iterative and long-term nature of the innovation process. In this respect a common theme in many of the case studies is the role of the SMARTCymru programme in supporting the development of new opportunities, but with further work often required to achieve full commercialisation (e.g. ADC Biotechnology, Callen-Lenz and Environment Systems, Haemair and KIGG). This is consistent with the pre-market nature of support (and the State Aid Framework rules in place).

Behavioural additionality is also evident in the case studies, with most companies reporting that their projects helped them to develop their knowledge of, and confidence in undertaking innovation, as well as

recognising the strategic importance of innovation across their companies (e.g. KIGG and ADC Biotechnology). This was illustrated at the ongoing innovation activity undertaken, as well as the access to further sources of funding from organisations such as Finance Wales and Innovate UK (e.g. Haemair).

The innovation impacts noted in the case studies illustrate the role of the SMARTCymru programme in producing not only innovation benefits, but also wider social/health benefits, and potential environmental sustainability benefits. These are areas of impact that have relevance to important strategic and societal challenges (e.g. environmental degradation -Telluric Land Reclamation; health issues - Haimar's artificial lung and Microsemi Semiconductor's products for medical implant devices), and the cross-cutting themes objectives, as well as indicating the potential for the programme to contribute towards a wider range of Welsh Government objectives.

The case studies illustrate important challenges and barriers faced in exploiting new ideas for commercial benefit. Here, the SMARTCymru programme addresses key imperfections in the innovation process, notably the provision of funding that encourages businesses to take risks, and by conducting innovative projects which might not otherwise be funded by the market. Haemair, for example, described the uncertainty that can act as a barrier to a project:

'For these research activities when we really do not know the answer before we set out, it is very difficult to secure equity funding'.

Microsemi Semiconductor reported the support was 'pivotal in convincing the parent business to undertake this project', while Telluric Land Remediation felt the project would have been 'too risky' without financial support. This is also evident in both the testing of concepts, their feasibility and further development through research and prototyping etc.

Case study businesses were generally satisfied with the support available from SMARTCymru and would value its continuing availability. They would, however, value a more streamlined 'paperwork' process for the programme e.g. Concrete Canvas. In this respect several case studies indicate that this

impacted on the cost of delivering the projects, and, in a small number of cases, decisions not to engage in future.

On the question of project additionality, the evidence from the case-studies suggests that the majority would not have been undertaken without the support of SMARTCymru. Haemair, for example, would have found it difficult to raise the necessary equity without SMARTCymru support, as it helped with credibility. Telluric would have found it 'financially difficult' to undertake the RD&I activity without SMARTCymru support while Concrete Canvas and ADC Biotechnology would have taken much longer to fund their RD&I activity. This points towards low levels of deadweight, and indicates effective targeting of support.

Counterfactual survey findings

A counterfactual survey was undertaken to analyse comparative performance of businesses who had contacted the SMARTCymru programme, but had not proceeded with a project. These results can be found in greater detail in annex C of this report.

The counterfactual survey was delivered as an online survey, achieving 18 responses - a 41 per cent response rate. The sample included more companies from the Competitiveness area with 61 per cent located in the area compared to 31 per cent for the business beneficiary survey. The findings for the counterfactual sample should therefore be treated with a degree of caution.

The counterfactual survey results suggest that following their approach to SMARTCymru, the majority of counterfactual companies went on to conduct RD&I. Here, some 61 per cent of the companies had conducted RD&I following their approach to the programme, with 56 per cent of them investing more than £200K in their project activity. The results also suggest that the majority of those who conducted RD&I without SMARTCymru funding obtained support from other public sector programmes (64 per cent).

The survey findings further indicate that the counterfactual group of companies achieved far fewer results compared to those achieved by the SMARTCymru beneficiaries. For example, 61 per cent of the counterfactual

sample companies had either launched or developed new products, processes or services, while 56 per cent expected to introduce new or improved products, processes or services in the next three years. This can be compared to 74 per cent of beneficiaries reporting they had launched or developed new products/processes/services as a result of the SMARTCymru support, and 94 per cent reporting they expected to introduce products/processes/services in the next three years.

In addition, 28 per cent of the counterfactual companies had created IP compared to the 54 per cent of beneficiaries reporting the creation of IP as a result of their support.

As for increases in sales as a result of RD&I activity, 17 per cent of counterfactual companies who had conducted RD&I reported increases compared to 30 per cent of SMARTCymru beneficiaries.

A summary of how the counterfactual results compare to those of the SMARTCymru beneficiaries is set out in the table below:

Table 11. A comparison of results achieved by SMARTCymru and the counterfactual companies

	Counterfactual Sample	SMART Cymru	% Difference (Absolute)
Average RD&I expenditure	£14,250	£48,800	£34,550
Number achieving new sales	17%	28%	+11%
Those making new collaborative research links	22%	41%	+19%
Establishing any new environmental management or equality / diversity practices	6%	11%	+5%
Creating any intellectual property	28%	40%	+12%
Development of new products, processes or services	61%	67%	+6%
Conducted service innovation	44%	13%	-31%
Conducted product innovation	33%	66%	+33%
Conducted process innovation	16%	21%	+5%

Source: CMI-TIP survey results

The results in table 11 indicate that:

- **Targeting**. Counterfactual businesses are more likely than SMARTCymru beneficiaries to be microenterprises and come from the competitiveness region.

- **Referral**. There is a reasonable likelihood that many of those who do not proceed might be seeking similar funding elsewhere.

- **RD&I Intensity**. 39% of the counterfactual sample have not undertaken RD&I activity since contacting SMARTCymru.

- **Innovation Type**. Looking at the kind of innovation undertaken by the counterfactual sample businesses since contacting SMARTCymru, the

businesses are quite oriented towards services (note the figures in brackets refer to previous innovation undertaken by the SMARTCymru businesses so should be treated with caution).

  - 44% conducted service innovation (13%).
  - 33% product innovation (66%), and
  - 16% process innovation (21%).

In other words SMARTCymru applicants are twice as likely to be product innovators, less than three times likely to be service innovators. Service innovators are less likely to succeed in SMARTCymru applications than product and process innovators.

- **Service Innovation**. Both cohorts seem almost as likely as each other to develop or launch new products, processes or services since contacting the SMARTCymru programme (67% of SMARTCymru business and 61% of counterfactual businesses). That said, every counterfactual service innovator except one went on to develop a new product or service since contacting the SMARTCymru programme.

- **SMARTCymru Applicant Features**. SMARTCymru applications are more likely than the counterfactual sample to:
  - Create any intellectual property (e.g. patents, copyrights, trademarks) – 40% compared to 28% of the counterfactual sample had done so
  - Make new collaborative research links – 41% SMARTCymru applications are more likely than the counterfactual (22%).
  - Establish any new environmental management or equality / diversity practices - 6% compared to 11% of the counterfactual sample had done so
  - Achieve new sales 17% compared to 28% of the counterfactual sample had done so

- **RD&I Expenditure Intentions**. Looking at investment in RD&I since engaging with RD&I the counterfactual sample spent £14,250[17] whereas the SMARTCymru beneficiaries spent £48,800 (nearly three and half times more) in the last financial year before their SMARTCymru programme. RD&I expenditure intentions might be a good screening indicator for potential applicants. Note given the slightly differing timescales and relatively small numbers these figures should be treated with caution.

- **Customer Intentions and Support**. Nearly half of unsuccessful applicants expect to use SMARTCymru in the future. Perhaps this cohort could be directed to less intensive preparatory measures. In other words some of the firms in the counterfactual sample are highly likely to be potential future customers and should not be discounted as a 'lost cause'.

Awareness survey findings

In addition to the beneficiary and counterfactual surveys, a further short survey was undertaken of businesses in Wales to assess current levels of awareness of SMARTCymru. This achieved 180 responses, representing a 6 per cent response rate. Results from the survey can be seen in greater detail in annex D of this report.

The survey results show that only 16 per cent of respondents were aware of the SMARTCymru programme. However, among businesses that were RD&I active (i.e. had conducted RD&I activity in the last three years) awareness was slightly higher with 24 per cent aware of SMARTCymru.

Of those who reported they were aware of the programme, 74 per cent accurately described SMARTCymru as a funding scheme that subsidies businesses for undertaking RD&I activities. The remaining 26 per cent thought SMARTCymru was either a support programme that provides advice and training to businesses, or a brokerage scheme that puts businesses in Wales in touch with Universities.

[17] Note one outlier figure was moderated.

The survey results also suggest that there is a high level of interest among Welsh businesses in SMARTCymru with 76 per cent requesting further information about the programme. This indicates a strong level of interest in finding out about the programme, and potentially applying.
Overall, the awareness survey shows a reasonable level of RD&I active companies (46 per cent) overall – but there is low awareness overall (16 per cent) of SMARTCymru though one quarter RD&I active companies (24 per cent) are aware of the programme.

Summary

The findings from section 4 suggest that the majority of SMARTCymru programmes were undertaken by small businesses experienced in undertaking RD&I. Innovation Specialists played an important role in raising initial awareness of the programme and supporting the application process.
A high level of the businesses surveyed reported the development or introduction of new products, processes or services, with a similarly high proportion indicating that they would be innovating further in the next three years. This was supported by strong evidence of behavioural additionality with respect to R&D, and new research-based collaborations and networking.
The innovation activity undertaken by businesses has helped to produce economic benefits, including positive sales benefits, alongside the creation of new jobs (reported in section 3). Low levels of equality, diversity and environmental practices were evident, with the majority of such benefits linked to the products, processes and services developed.
In many instances, however, full commercialisation will require further development by the companies. This highlights the potential for future RD&I benefits, and is supported by companies raising additional finance from schemes such as Finance Wales and Innovate UK.
Without SMARTCymru, half of respondents indicated that they would not have been able to achieve these impacts without funding. This points to a high degree of additionality.

Overall beneficiary satisfaction levels reported were strong, although SMARTCymru businesses would value streamlining of the administration processes of the programme.

Results from the counterfactual survey indicate that while many companies were able to go on to undertake R&D, some 39 per cent didn't conduct any further RD&I activity at all, with no results or impacts achieved. SMARTCymru beneficiaries were also more likely to create intellectual property, establish new collaborative links, and introduce environmental management or equality and diversity practices. They also tended to spend more on RD&I.

The wider population of businesses in Wales are, however, are generally unaware of SMARTCymru and the support available. Some 76 per cent, however, indicated their interest in receiving further information and potentially applying for support.

5 Impact analysis, including cross-cutting themes

In light of the gross outputs reviewed above the following section assesses the potential for (net) impacts in the following areas:

- Economic
- Innovation
- Environmental and social (cross-cutting themes)

Identified impacts

This analysis uses established impact calculation methods (full details of the methods can be found in annex A).

Economic impacts

A key aim of the SMARTCymru programme is to support RD&I, with the potential to ultimately benefit the Welsh economy. An assessment of economic impact was undertaken comprising:

- Employment impacts to date (with some persistence) and total impacts
- The impacts of SMARTCymru Programme (Convergence and Competitiveness Programmes)
- Total public cost impacts
- Employment related GVA impacts
- Gross and net impact

The net impact is the difference between what would have happened anyway and the benefits generated by the support, adjusted for displacement, leakage, substitution, and multiplier effects. In order to move from gross impacts to net impacts, a number of questions were asked to identify deadweight and displacement with benchmarks used to calculate other adjustments.

The analysis is based on (a) reported job creation outputs (and safeguarded jobs) and (b) business survey responses from 61 of the SMARTCymru funded projects.

A summary of the analysis method is provided in the following table. Further technical detail about the assumptions underpinning the economic impact assessment is provided in annex A.

Table 12. Additionality Logic Chain

Term	Definition
The Intervention Option	This is the level of gross impacts generated through the intervention (in this case employment creation impacts of both Competitiveness and Convergence programmes – both jobs safeguarded and created).
Deadweight	The proportion of total employment impact that would have occurred anyway. An additionality factor was applied to account for various degrees of pure, scale and time additionality. This was informed by the survey findings.
Displacement	The number or proportion of impacts that reduce value elsewhere in Wales. A displacement factor was applied to account for the number of firms or demand affected. This was informed by the survey findings.
Leakage	The number or proportion of impact that benefits economies outside Wales (using a benchmark).
Substitution	This is a negative effect that arises when a firm substitutes one activity for another to take advantage of public sector support (again a benchmark was used for this adjustment factor).
Multipliers	This is further economic activity associated with additional income to those employed by the beneficiaries, with local supplier purchases and with longer term development effects. This was informed by the survey findings.
Persistence	The persistence of the employment impacts generated by the programmes. This was informed by the survey findings.

The impacts have been calculated for all public sector investment. The following sections look at the employment impacts using the employment - jobs created and safeguarded and combined - for each of the two programmes.

The Convergence Programme has created or safeguarded 476 net jobs (including persistence). This, it is estimated, will generate GVA employment impacts of some £17.3m giving a total cost Return on Investment (RoI) of 1:1.07 (total costs to date amount to £16.2m).

Table 13. Summary Employment and GVA Impacts: Convergence

	Gross Jobs Created	**Gross Jobs Safeguarded**	**Total Jobs Created and Safeguarded**
Total Gross Jobs	**89.0**	**85.0**	**174.0**
Less Deadweight	66.8	63.8	130.5
Less Displacement	60.1	57.4	117.5
Less Leakage	54.1	51.6	105.7
Less Substitution	40.6	38.7	79.3
Plus Multipliers	60.8	58.1	118.9
Plus persistence at 4 years	243.3	232.4	475.7
Total Net Jobs	**243.3**	**232.4**	**475.7**
GVA	**£8,845,070**	**£8,447,539**	**£17,292,609**
Total Expenditure to date			*£16,164,872*
RoI			**1:1.07**

The Competitiveness Programme has created or safeguarded 293 net jobs (including persistence). This it is estimated will generate GVA employment impacts of some £10.6m (total costs to date amount to £10.1m giving a total cost RoI of 1:1.06).

Table 14. Summary Employment and GVA Impacts: Competitiveness

	Gross Jobs Created	Gross Jobs Safeguarded	Total Jobs Created and Safeguarded
Total Gross Jobs	**65.0**	**42.0**	**107.0**
Less Deadweight	48.8	31.5	80.3
Less Displacement	43.9	28.4	72.2
Less Leakage	39.5	25.5	65.0
Less Substitution	29.6	19.1	48.8
Plus Multipliers	44.4	28.7	73.1
Plus persistence at 4 years	177.7	114.8	292.5
Total Net Jobs	**177.7**	**114.8**	**292.5**
GVA	**£6,459,883**	**£4,174,078**	**£10,633,961**
Total Expenditure to date			*£10,071,644*
RoI			**1:1.06**

The table in annex A summarises the economic impact methodology.

Table 15. Summary Employment and GVA Impacts: Programme Wide (Competitiveness and Convergence)

	Gross Jobs Created	Gross Jobs Safeguarded	Total Jobs Created and Safeguarded
Total Gross Jobs	**154.0**	**127.0**	**281.0**
Less Deadweight	115.5	95.3	210.8
Less Displacement	104.0	85.7	189.7
Less Leakage	93.6	77.2	170.7
Less Substitution	70.2	57.9	128.0
Plus Multipliers	105.2	86.8	192.0
Plus persistence at 4 years	421.0	347.2	768.2
Total Net Jobs	**421.0**	**347.2**	**768.2**
GVA	**£15,304,953**	**£12,621,617**	**£27,926,570**
Total Expenditure to date			*£26,236,516*
RoI			**1:1.06**

The SMARTCymru Programme (Competitiveness and Convergence) has created or safeguarded 768 net jobs (including persistence). This, it is estimated, will generate net GVA employment impacts of some £27.9m (total costs to date amount to £26.2m giving a total cost RoI of 1:1.06).
The Return on Investment produced by the programme compares favourably the other similar schemes across the UK. This suggests the programme has been comparatively successful in targeting business projects with strong economic impact potential.

Table 16. Comparative return on investment

Name	Programme Details	Estimated RoI	Period
SMARTCymru	RD&I grant funding Budget: £16.2m (Convergence) £10.1 (Competitiveness)	1:1.06 – 1:1.07	2010/11 to 2015
UK Grant for R&D	RD&I grant funding for business Budget: £239m Business supported: 4,215	1:0.4[18]	1998-2008
Scottish Grant for R&D	Large business RD&I grant funding Budget: £18m Businesses supported: 55	1:0.08	2004/5 - 2008/9
Invest NI Start	Industrial Research grant funding Budget: £57m Businesses supported: unknown	1:0.55	1996 - 2007

Sources: (PACEC, 2009) (Frontline Consultants, n.d.) (CM International, 2011)

Innovation impacts

Research, development and innovation impacts represent a key focus for the SMARTCymru programme. This area of impact contributes towards economic and wider impacts discussed in this section of the report, and are confirmed by the programme logic model(s) set out in section 2.

The results of the surveys indicate that the results of SMARTCymru programmes have generated:

- Launch of new products, processes and services (35 per cent)
- Registration of IP (54 per cent)

In addition to these current innovation impacts, the business survey results indicate the potential impacts of the next three years, with some 94 per cent of respondents indicating they intend to launch one or more products, processes or services in the next three years.

The results from the survey are further underpinned by evidence of behavioural additionality, with:

- 69 per cent of respondents indicating that their business had adopted a more strategic approach towards RD&I

[18] With multiplier effects included.

- 56 per cent indicating that they were more knowledgeable about RD&I and the role it can play in their business.

This survey data gives some confirmation to the research, development and innovation process being a medium-to-long-term activity. In this respect the evidence of attitudinal change, experience developed and investment all point towards the potential for such impacts to emerge.

Environmental and social impacts – cross-cutting themes

A range of potential environmental and social impacts from the SMARTCymru programme are evident from the case studies. These suggest examples of projects which are addressing key environmental and societal challenges in areas such as:

- addressing environmental degradation through support for environmental friendly reclamation processes
- supporting important health issues, such as the development of a new artificial lung and anti-cancer drugs.

It also sought to encourage participation by Welsh Language speakers, through the production of bilingual promotional materials and application forms. The context for the programme (and that of the other Welsh Government Innovation programmes, including Business Innovation Support and Academic Expertise for Business), however, is the prevalence of English as the national / international language of science[19].
The importance of English language in scientific disciplines was further emphasised by the fact that while some 12 per cent of SMARTCymru companies had an owner who spoke Welsh (compared to the Census

[19] http://www.researchtrends.com/issue6-july-2008/english-as-the-international-language-of-science/

average of 19 per cent[20]) no applications were received using the Welsh language form.

The programme's overall impact on the cross-cutting themes is, however, likely to be limited as very few companies went on to develop new equality and diversity or environmental management practices.

Summary

The findings from section 5 suggest the following impacts from SMARTCymru at the end of programme stage.

- Development of new and improved products and process, IP protection and evidence of improved behavioural and attitudinal changes towards RD&I.
- Innovation impacts were further reflected in evidence of continued development of new products, processes and services, and new collaborations / networking. This alongside evidence of continued RD&I activity point towards the role of the programme in helping to build RD&I capacity in its beneficiaries.

Evidence of environmental and social impacts is illustrated by the results, with some SMARTCymru programmes addressing important environmental and societal challenges. The programme's support for these projects has not, however, been complemented by wider activity to address the cross-cutting theme targets.

Economic impacts have been identified:

- £17.6 million (Convergence) and £8.9m (Competitiveness) net additional GVA
- 484 net jobs (Convergence) and 243 (Competitiveness) net additional FTE jobs created or safeguarded.
- return on investment of 1:1.06.

[20] http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-286268

6. Value for money

This section of the report considers the value for money of the SMARTCymru programme using the so-called '3 Es' approach:

- **Economy** - How much has the intervention cost; how was this decided on; have the funds been used for the stated activities and, what additional funds have been leveraged?
- **Efficiency** - Have activities been delivered in line with expectations including: were the funded activities delivered in line with the plan; what additional activities were delivered; was the cost of delivery as expected?
- **Effectiveness** - Have the funded activities achieved the expected results or outcomes; what additional outcomes have been achieved, if any; and, how has effectiveness been maximised?

Economy

The SMARTCymru programme was delivered to a total cost of £26.2m (based on eligible expenditure - Convergence - £16.2m, and Competitiveness - £10.1m), equivalent to £179,452 per business financially supported. The Welsh Government's contribution to the overall programme costs was £684,744, equivalent to £4,690 per project supported. Public sector contributions (Welsh Government and ERDF) represent 48 per cent of the overall programme cost. This figure is consistent with the profile of projects supported.

The budget for the programme was determined by the SMARTCymru team based on their experience of previous programmes, and a new assessment of need and demand[21]. The business plans for the Convergence and Competitiveness area programmes suggest that reasonable steps have been taken by managers to ensure the accurate planning of the programme and its 'economy'. This included the following:

[21] See, for example the business plans for both Convergence and Competitiveness programmes.

- funding was fixed in terms of public grant aid application through WEFO
- positive synergies were sought with the Business Innovation programme, for example through the use of the Innovation Specialists
- intervention rates were set according to balance the need to address market failures in business R&D expenditure.

Despite the challenges faced by the programme, notably in the first half of the programme, adjustments that were requested and approved to the Convergence area programme budget and targets to respond to the lack of take-up and capacity represented sensible steps to improve the economy of the SMARTCymru programme delivery. Similar reprofiling of the Competitiveness area was not approved and CMI note that this programme has a substantial underspend of £1.4m.

Efficiency

A key indicator of overall programme efficiency is its **return on investment**. Here the evaluation results suggest that based on total programme expenditure[22] of (£26.2m), the cost-benefit ratio based on the GVA is 1:0.06. This means that for every £1 invested in the programme £0.06 is likely to be returned to the Welsh economy.

The GVA performance of SMARTCymru is comparable with other R&D grant programmes across the UK. It is important to recognise, however, that the primary aim of the SMARTCymru programme is not necessarily to create jobs but to increase R&D activity and produce new/improved products and processes.

In relation to **programme efficiency**, a key challenge for all programmes is to deliver the benefits and to manage the delivery process in a more or less efficient manner, making adjustments to the delivery process as delivery experience accumulates and is monitored.

The SMARTCymru management and delivery process involved a relatively complex series of stages, a number of which were adjusted and modified

22 ERDF grant plus Welsh Government and private sector match funding.

across the lifespan of the programme. These changes, such as the introduction of DoC funding helped to ensure that the availability of the programme was maximised through efforts to address key barriers to participation. Further, it is recognised that steps were taken to minimise the risk to public funds and to acquire and make use of the high level of skills needed to conduct both financial and technical delivery of the programme. This highlights the importance of striking a balance between the aim of a 'light' administrative process with the need for good practice in managing public expenditure.

The SMARTCymru delivery process can described as having four areas of activity – marketing of the scheme; development of appropriate applications; appraisal of applications and, making an offer of support and the monitoring of projects.

In the marketing of the SMARTCymru programme, a number of recommendations were made at the mid-term evaluation stage including that the 'Welsh Government should prioritise demand stimulation measures…' and that the 'Welsh Government should seek to ensure businesses and stakeholders are aware that SMARTCymru is available and open to applications.'

In the latter stages of the programme, however, no dedicated marketing resources were available to the programme managers. Further, the SMARTCymru team believe that the changes made to the programme in its early stages as a result of the requirements of the ERP and shift to repayable grant funding had an immediate short term impact on demand for support, and that the temporary 'loss' of the 'SMART' brand during the ERP period continued to have a detrimental effect on awareness and demand in general for the remainder of the programme period.

The findings of the awareness research conducted as part of the end of programme evaluation (described in section 4) tend to confirm that there is a relatively low level of brand awareness for SMARTCymru amongst companies in Wales and that additional marketing efforts will be required to support levels of demand for future programmes.

In respect of the development of applications and the appraisal process employed under the SMARTCymru programme, there was positive feedback

from beneficiaries on the role of the Innovation Specialist in providing advice and guidance (see section 4), however, a majority of companies surveyed felt that the application and appraisal process was overly 'long winded'. While, for some, this was merely an inconvenience, others highlighted the potential implications for both project and business success or failure. Such problems were felt to be potentially detrimental for projects in fast moving, innovative markets.

Following the mid-term evaluation, the programme managers' encouraged applications at the DoC phase as a means of speeding up the application process and responding directly to the recommendation to prioritise 'demand stimulation measures'. This is seen to have had a positive effect, although there remain concerns within the programme team regarding the relatively small size of the awards compared with the scale of the offer letter and subsequent monitoring that the phase requires.

Further, the eligibility rules with regard to the Exploitation stage of the SMARTCymru scheme were relaxed to allow for the concept of 'an equivalent stage of research' that would match the Industrial Research stage within the scheme. This was intended to allow more companies to gain support with their exploitation for innovations without being restricted because they had not previously carried out the Industrial research stage.

In regard to the monitoring processes, managers estimated that about one third of the appraisal effort had gone into the technical appraisal of SMARTCymru applications with the remaining two thirds being expended on the financial appraisal. This, specifically, involved the SMARTCymru team working on various aspects of the financial position and administrative capacity of the applicant business that would, should the application be approved, enable the business to be prepared for the administrative effort required to meet the, post–approval, SMARTCymru reporting, record keeping and auditing requirements. SMARTCymru managers have regarded this as essential so that approved projects are able to successfully move through to implementation of their projects and to receive final payment of the SMARTCymru support.

It was noted during the evaluation research that the SMARTCymru management team was in discussion with their Welsh Government and

WEFO colleagues to develop appropriate processes and procedures for the proposed new SMARTCymru programme and associated programmes (SMARTExpertise and SMARTInnovation (WEFO, 2015)). It is understood that one main area of focus for these discussions has been the length and complexity of the proposed offer letter. Here, it is understood, to meet WEFO guidelines and to deal with EC audit requirements, the standard SMARTCymru offer letter may, in the future, increase from around nine pages to as much as 38 pages or even more. Any significant increase in paperwork and administration effort, such as implied by the suggested size and complexity of the offer letter, is likely to further exacerbate beneficiaries' concern, on the basis of the comments received from SMARTCymru beneficiaries as part of this evaluation that relate to the application and monitoring process.

Notwithstanding these factors, the SMARTCymru programme has been delivered efficiently with regard to return on investment. Furthermore, the programme managers have been diligent in their drive to make improvements to assist in the efficient delivery of the programme as circumstances have changed and delivery experience and feedback from beneficiaries accumulated.

A number of areas of good practice can be identified in the delivery and processes used by the SMARTCymru programme, including activities in three areas in particular:

- The adjustment of the programme to enable businesses to apply for DoC awards has enabled companies – both serial innovators and new innovators – to adopt a more speculative, desk research-based approach to their innovation 'portfolios'. Although the DoC phase has only been in place in the latter phase of the programme, and demand has not been as buoyant as would be wished, if the issue of excessive administration and paperwork can be dealt with, it is possible that the DoC approach could be pivotal to demand stimulation.

- The development of the ‘triage’ process to aid the early identification of potential ‘fast track’ opportunities for support and to give an advance warning of potential bottlenecks in the smooth process of applications and appraisals is a good practice step of potential significance. The potential for delays to occur between the ‘logging’ of an initial idea for an application and the lodging of a full application for support is a period when, for many support programmes, there is a high ‘drop-out’ rate of good quality applications as administrative procedures become a source of frustration or, conversely, a period when the expectations of applicants may be raised unreasonably because their applications have not been fully completed. In both instances the support programme may lose opportunities and the frustration of applicants may damage the overall brand image of the support programme itself.
- The SMARTCymru programme managers have recognised that external assistance and perspectives can help sharpen and enhance the service delivery process. A two-day workshop for delivery staff facilitated by the PDR at Cardiff Metropolitan University was undertaken to identify areas where beneficiary expectations of service delivery could be met by adjustments to the SMARTCymru delivery process. A number of adjustments in the programme under review were made or have been incorporated into the delivery process for any future SMARTCymru programme.

The evaluation results also point to a number of key lessons which are important to the future success of business R&D grant programmes:

- Effective appraisal of R&D projects requires an appropriate blend of technical and financial skills within the SMARTCymru team.
- Innovation Specialists, with strong regional linkages and local knowledge, are key to supporting companies throughout the RD&I process, and signposting to related support.
- Efficient operation of the programme relies on the ability of managers to maintain line management control of key staff and

SMARTCymru activities, such as promotion of the programme, and monitoring of projects and claims.

- Brand awareness, and effective and consistent promotion and marketing resources are necessary to raise overall demand for the programme.
- Strategic partners such as the universities and Finance Wales offer important benefits with respect to raising awareness and generating demand for the programme.
- While a phased approach to SMARTCymru R&D funding encourages companies to follow a robust and planned approach to innovation projects, there is a need to ensure that blockages in the pipeline of projects do not occur to the detriment of achievement of impacts or profile of private sector funding.
- Demand for the programme is likely to come from the main science and technologically R&D intensive sectors such as Advanced Materials and Manufacturing, and while demand is also likely to exist in other sectors, this will be more difficult to stimulate.
- In the current and recent economic climate, without Welsh Government business R&D funding companies are likely to underinvest in R&D.

Effectiveness

Against the original objectives of the SMARTCymru programme the results of the end of programme evaluation suggest that it has, in spite of the economic context and various policy and organisational challenges faced, been able to produce generally strong outputs and impacts:

- **Creation of high quality R&D related jobs**

The programme has created or safeguarded 768 net jobs (475.7 Convergence and 292.5 Competitiveness). These new jobs have been created in R&D intensive companies, and are likely to be high quality in nature.

- **Increased businesses expenditure on R&D through the provision of financial support to undertake innovative research and technological development with commercial potential, leading to new products, processes and technologies**

The programme has produced induced investment of £6.9 million (£5.6 million in the Convergence area and £1.3 million in the Competitiveness area).

- **Encourage and support industry collaborations with other partners with research-based organisations in carrying out industrial research and experimental development activities**

The programme has produced R&D collaborations between companies and research based organisations, with 45 per cent of respondents of the business survey indicating such outputs. Given the relatively small number of collaborative projects funded by the programme (one), this number is relatively high, and points to the collaborative nature of RD&I and the availability of other support mechanisms for research—industry collaborations in Wales, for example the A4B programme, the Innovation Voucher scheme, and the Knowledge Transfer Partnership programme.

- **Measure the return on investment of supported R&D projects and provide continuous improvement of the project management of R&D in companies supported**

Given the long term nature of the innovation process, capturing return on investment for RD&I projects is typically undertaken some years after the initial intervention. For this reason no ongoing measurement of return on investment is carried out by the Welsh Government. The results of the evaluation, however, suggest that programme produced 1:0.6. This corresponds to a return of £0.06 for every £1 spent on the programme.

- **Enable business links to other business support to optimise commercialisation**

This is an area where strong synergies were developed with the Business Innovation programme. These linkages helped to ensure applicants to SMARTCymru were able to access support from the Innovation Specialists, for example, in identifying companies and helping the development of application forms is clearly important in shaping projects. Similarly, the

ongoing support from the Innovation Specialists providing ongoing advice, and support to access further RD&I support (Welsh Government and beyond) and funding after a SMARTCymru programme has been completed. Synergies also existed with Finance Wales and its early stage development funds. Links to the Welsh Government's other commercialisation programme – Academic Expertise for Business were, however, limited despite Welsh Government's attempts to better promote the scheme in the HE sector.

- **Launch new or improved products, processes and services**

The results of the evaluation suggest that 148 (100 in the Convergence area and 48 in the Competitiveness area) new products, processes or services were launched as a consequence of the SMARTCymru programme. Given that survey results suggest 94 per cent of businesses intend to launch new or improved products, processes or services in the next three years, there is a strong likelihood that such outputs will increase in future.

The cross-cutting themes of equality and diversity, and environmental sustainability form an underpinning set of objectives for all European-funded projects. The results of the evaluation suggest that the primary contribution of the programme in this area is through its support for new products, process and services which have the potential to provide environmental or equality benefits. While this cannot be described as a driving force for the programme, the case studies reveal a number of examples where there are potential cross-cutting theme impacts. It also points to 11 per cent of the surveyed companies introducing a new environmental management practice or equality / diversity practice as a result of the programme. This result, while positive, is likely to be related to the work of the Innovation Specialists and not that of the programme directly.

Summary

In summary, the results of the evaluation analysis suggest that it was delivered to a total cost of £26.2m and that sensible steps were taken to ensure economy.

The programme achieved a return on investment of 1:0.06, comparable to other UK R&D grant programmes.

Against its key objectives the programme has produced important economic and innovation-related results. These results would generally not have been achieved had it not been for the Welsh Government's support. This suggests that SMARTCymru funding is largely additional, and a good use of public funding. Demand for the SMARTCymru programme is therefore evident, however, greater awareness and promotion is needed for final targets to be achieved.

Areas of good practice can be identified in the delivery practices and processes used by the SMARTCymru programme including: the introduction of DoC, the development of a 'triage' process to aid early identification of potential fast track projects, and the use of external perspectives to refine the delivery process.

The evaluation results also point to a number of key lessons which are important to the future success of the programme. The remaining section of the report draws on these, and earlier findings, in setting out conclusions and recommendations.

7 Strategic added value

The concept of Strategic Added Value (SAV) seeks to identify the effects of the wider co-ordinating, catalytic and influencing role of a project, which is not captured in the outputs of direct project support.
The key aspects of SAV primarily apply to the work of regional economic development agencies, and can be summarised as (Department of Trade and Industry, 2006):

- **Strategic leadership and catalyst**: Articulating and communicating regional development needs, opportunities and solutions to partners and stakeholders in the region and elsewhere.
- **Strategic influence**: Carrying out or stimulating activity that defines the distinctive roles of partners, gets them to commit to shared strategic objectives and to behave and allocate their funds accordingly.
- **Leverage**: Providing financial and other incentives to mobilise partner and stakeholder resources – equipment, people as well as funding.
- **Synergy**: Using organisational capacity, knowledge and expertise to improve information exchange and knowledge transfer and coordination and/or integration of the design and delivery of interventions between partners.
- **Engagement**: Setting up the mechanisms and incentives for more effective and deliberative engagement of stakeholders in the design and delivery of regional and sub-regional priorities and programmes.

The SMARTCymru programme arguably plays a strong role in helping to address and support each of the main categories of SAV. This includes supporting the innovation process in Wales, helping to support the integrated

delivery of the Welsh Government's core innovation programmes. These strategic linkages and synergies are summarised below.

The **Business Innovation Programme** (Welsh Government, 2012) had direct links to SMARTCymru, via its funding of the Innovation Specialists. These Specialists, as noted earlier, provide advice and support to the application process, and ongoing support for the business, as part of their wider role within the Business Innovation Programme. The Business Innovation Programme also provides access to Innovation Vouchers for university projects.

SMARTCymru was also aligned to the **A4B programme** (Welsh Government, 2012). While academics are not able to initiate a SMARTCymru programme, or be a formal partner, there was potential for them to participate in business-led projects. In this respect there were a number of attempts to strengthen the referral potential between the two programmes.

Outside of the Welsh Government's Innovation team, **Finance Wales** (Finance Wales, n.d.) was an important stakeholder for SMARTCymru. Finance Wales has made investments in a number of companies with earlier SMARTCymru funding. This illustrates the synergy between SMARTCymru's project focus, and Finance Wales' equity funding (typically, a £150,000 to £500,000 first time investment) to support the development of high growth potential businesses. Finance Wales indicates that a SMARTCymru programme can help to 'give confidence' with respect to their investments, particularly where the business's turnover/profit growth predictions are not rapid enough to be attractive to mainstream funders.

Other programmes providing support for R&D in Wales include the university-led **ASTUTE** project. This project supports technological development, sustainability and growth in businesses in the aerospace, automotive and high technology sectors (in West Wales and the Valleys). Comprising a partnership of Wales' universities in the Convergence area, ASTUTE provides support to manufacturing companies to create sustainable, higher value goods and services and bring them to a global market. This support is provided on a 50 per cent contribution basis, although under the European Commission 'di-minimis' (Welsh Government, n.d.) arrangements this does not necessarily require a direct cash contribution for small levels of assistance (under

€200,000 over a three year period). Given the potential to offer financial support for relatively small projects in the Convergence area, there is some potential for ASTUTE to overlap with SMARTCymru. This, however, is likely to be greater with respect to other programmes such as the Innovation Voucher scheme, or A4B, which have a more research-industry focus
Finally, the SMARTCymru support for Leverage was evident in its role of providing funds for business R&D, which in many cases can help them to access follow on funding (in addition to the original match funding provided by businesses). This leverage was often a key indicator of successful development of product, process and services.

Summary

The findings from this section suggest that the programme delivered a positive strategic added value, based on its core position as the primary funding programme for business RD&I, and its alignment to complementary Welsh Government and other programmes design to support additional commercialisation and innovation activity. It also contributed towards a high level of R&D expenditure and helping businesses to raise additional funding.

8 Conclusions and recommendations

This report provides a summary of end of programme evaluation conclusions and recommendations for the delivery of future of Welsh Government R&D funding programmes. The results of this analysis suggest that the programme was established with a sound programme logic model, based on an identified need, clear objectives and grant activities focused on the different RD&I phases, and anticipated targets both informed by early programme experience, and aligned to the objectives. Its delivery model was adapted at a number of points, allowing changes in demand and the needs of companies to be addressed. Clear links to maximise the potential for follow-on support and access to academic expertise and so on were also embedded in the model.
The SMARTCymru programme offered all-Wales support (Convergence and Competitiveness areas) for businesses at different stages of the RD&I process, including Development of Concept (DoC), Technical and Commercial Feasibility (TCF), Industrial Research (IR), Experimental Development (ED), and Exploitation. It represented the Welsh Government's core support for business R&D, and operated alongside other Welsh Government programmes such as the Business Innovation programme and the Academic Expertise for Business (A4B) programme.
The implementation of the programme logic model faced a number of challenges from external factors. These made it difficult for the programme team to organise itself efficiently and to secure consistent demand. These factors include:

- The economic downturn precipitated a R&D activity fall in Wales (and elsewhere), indicating a lower propensity towards risk in the business community for such activities.
- The introduction of the ERP, leading to reorganisation within the Welsh Government, and the loss (for a period) of key resources such as the Innovation Specialists.

- The proposed (but not implemented) move towards repayable finance, and the difficulties in developing the new SMARTCymru programme 'repayable grant' offer.
- Difficulties in raising awareness and promoting the RD&I Financial Support for Business brand, necessitating the rebranding of the programme as 'SMARTCymru'.

In spite of these challenges, the programme supported 146 enterprises with financial assistance (62 per cent in the Convergence area, and 38 per cent in the Competitiveness area). These projects were typically SMEs, although a small number of large companies were supported in both the Convergence and Competitiveness areas. All projects supported were consistent with the SMARTCymru quality criteria – defined by a robust technical and financial due diligence processes.

The performance indicators established for SMARTCymru largely reflected those available to ERDF projects, including:

- enterprises financially supported (number)
- gross jobs created (FTE)
- investment induced (GBP)
- collaborative R&D (number)
- new or improved products, processes or services launched
- products, processes or services registered

These were activity driven indicators (enterprises financially supported) and output indicators. In this respect the indicators were focused on capturing economic benefits (gross jobs, investment induced), innovation benefits (investment induced, collaborative R&D), and longer term innovative results (new products, processes or services). While these indicators were consistent with the programme logic model set out in section 2, they were, by their nature, quantitative. This presents challenges for all programmes, particularly those with a focus on behaviour change (e.g. R&D behavioural additionality),

and suggests the importance of additional evaluation research to understand these impacts, and the potential for spillovers.

Implicit in the indicators was the long term nature of the RD&I process. By capturing and reviewing indicators both during and at the end of a programme, there is a danger that the indicators will underplay the true (potential) extent of impact. This gives support to the Welsh Government's decision to establish an Innovation Impacts team to explore such issues through case studies.

The programme had difficulties collecting cross-cutting themes indicator data. This is a challenge that is shared by its partner programme – the Business Innovation Programme, and suggests the need for cross-cutting themes considerations to be introduced as a core part of the programme's future planning, with consideration given to both referral mechanisms, and more targeted support for projects addressing the cross-cutting theme areas.

A related challenge is one of attributing cross-cutting theme results specifically to SMARTCymru. This is problematic, at present, given that the data is collected by the Business Innovation Programme. This, again, is an area where joint discussion and action is needed.

Programme impacts at the end of programme stage are both economic and innovation-related. Based on findings from the business survey and case study interviews, these impacts have been achieved with a low level of survey findings. They also suggest that the Welsh Government is funding projects that are strategically important to the companies.

Innovation impacts are a key focus of the programme. Here the SMARTCymru monitoring data points to 100 new products, processes and services launched as a result of the programme. The survey findings also point to a large proportion of companies (94 per cent) indicating that they propose to launch one or more products, processes or services over the next three years. These future plans are also evident in the case studies, and highlight the medium to long term nature of the RD&I process.

The business survey results do, however, point to the strong level of IP protection (54 per cent). Positive impacts of business attitudes towards RD&I are also evident with companies reporting that they had adopted a more strategic approach towards RD&I (69 per cent), felt more confident to conduct

RD&I projects in future (65 per cent), and were more knowledgeable about RD&I (54 per cent). Further collaborative research links between the companies and partners such as universities were also reported (45 per cent). At the end of the programme, the following economic impacts have been identified:

- £27.9m net additional GVA (£15.3m (Convergence) and £12.6m (Competitiveness)).
- 768 net additional FTE jobs created or safeguarded (476 net jobs (Convergence) and 293 (Competitiveness).

The return on investment produced by the programme – 1:0.06 - compares favourably the other similar schemes across the UK. This suggests the programme has been comparatively successful in targeting business projects with strong economic impact potential.

These economic impact results have been achieved with a relatively low level of deadweight (that is they would not have achieved the same results had it not been for the programme). This suggests that the projects funded by Welsh Government are strongly additional.

Results from the counterfactual survey indicate that the counterfactual sample businesses were more likely than SMARTCymru businesses to be micro enterprises, with some 39 per cent not undertaking RD&I activity since their initial contact with SMARTCymru. In comparison to SMARTCymru beneficiaries, however, businesses in the counterfactual sample spend on average less on RD&I (£34.5K lower), achieve fewer sales (11 per cent lower), create fewer new collaborative research links (19 per cent lower), establish fewer new environmental management or equality / diversity practices (4 per cent lower), create less intellectual property (22 per cent lower) or development new products, processes and services (6 per cent lower).

Results of the awareness survey of a wider population of businesses in Wales suggest that awareness of SMARTCymru and the support available is generally low (16 per cent). Some 76 per cent, however, would like to receive further information and potentially applying for support.

The recommendations are summarised below.

Recommendation 1: Welsh Government should prioritise awareness raising in the new SMARTCymru programme.

In light of the difficulties of promoting SMARTCymru linked to uncertainties regarding grant availability and the evidence from the awareness survey research conducted in the evaluation research, action is needed to boost brand awareness and maximise SME participation in any new programme. This will require the programme team to continue to work with strategic partners to raise awareness (see recommendation 2). Demand for the programme is likely to come from the main science and technologically R&D intensive sectors such as advanced materials and manufacturing, and while demand is also likely to exist in other sectors, to stimulate this will require more concerted actions.

Recommendation 2: Welsh Government should seek to maximise synergies and knowledge exchange with key stakeholders such as universities and Finance Wales.

The SMARTCymru programme forms part of a wider policy ecosystem for innovation support in Wales. While SMARTCymru operates in a clear niche – providing financial support for business RD&I - there are clear synergies with other projects. While, during the course of the programme, efforts were made to strengthen synergies and referrals, the development of a new suite of programmes offers the opportunity to establish clearer referral paths by working with partners to raise awareness and ensure that businesses are presented with clear pathways through the innovation ecosystem.

Recommendation 3: Welsh Government should prioritise greater delivery efficiency by 'smoothing' the progress of businesses through the R&D phases

The evaluation suggests that companies can be frustrated by the time taken to progress through the stages of the programme. In this respect it is important that any blockages in the SMARTCymru process do not develop to the detriment of achieving impacts or managing the profile of private sector funding. SMARTCymru should continue to refine the 'triage' system

developed to fast track projects, and where appropriate draw on lessons from existing experience as well as any relevant findings from the recent PDR review.

Recommendation 4: Welsh Government should closely review the the DoC phase in the new programme.

The DoC phase was introduced at a late stage in the SMARTCymru programme. The concept of the DoC was sound - to minimise the risk to companies of exploring early stage ideas. Such risks (real or perceived) are particular barriers to companies new to the innovation process. The implementation of the DoC, however, has been hampered by the need to carry out the same level of appraisal and monitoring as required by other (larger) phases. Despite these weaknesses, there is potential for the DoC to complement the offer of SMARTCymru positively, and help to attract more companies to undertake RD&I projects for the first time. To achieve this potential, it will be important for the new programme to ensure that it balances the support for companies to explore new ideas with funding, against the need to monitor them through 'lighter' monitoring.

Recommendation 5: The SMARTCymru team should, alongside other core RD&I programmes supported by the Welsh Government, develop a far stronger and proactive response to the cross-cutting themes.

Given that the Business Innovation Programme (via its Innovation Specialists) has acted as the front line for business applicants, SMARTCymru has found it difficult to address the cross-cutting themes of equality and diversity and environmental sustainability. The results of the evaluation, however, suggest that there is substantial potential for SMARTCymru and the other Welsh Government Innovation programmes to more directly target RD&I projects that have the potential to contribute towards the cross cutting themes. The potential to introduce thematic calls should be explored and specific promotional material developed.

Recommendation 6: Welsh Government should continue to review longer term innovation impacts through its Innovation Impacts programme, complementing regular programme evaluation.

Programme spend to date is consistent with the lower than expected demand for the programme. The high proportion of projects in the early RD&I phases is also contributing towards higher than anticipated match funding demands for Welsh Government contributions.

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10 Annexes

A. Detailed methodology

The evaluation of SMARTCymru incorporated a range of methodological stages. This included a number of work packages designed to review the management and delivery process, impacts achieved, and their value for money. The main focus was to make use of the available documentary and monitoring information collected by the programme, and to supplement this with fieldwork to establish the final impact of the programme. This approach formed part of the Welsh Government's requirement for the end of stage evaluation.

The evaluation included a series of stakeholder interviews including Welsh Government SMARTCyrmu programme managers and other relevant staff: including Brian Thorne (Programme Manager), Peter Ireland and Haydn Gregg Williams (Technical Appraisal). These interviews were designed to identify the key features of the programme logic model, and to understand evolution and context changes facing the programme (since the mid-term). A subsequent half-day workshop was facilitated with the main delivery staff for the programme (the Innovation Specialists, appraisal, finance and monitoring staff).

The stakeholder interviews and management and delivery workshop were complemented by a documentary review. This comprised analysis of programme documentation, including the SMARTCymru business plans (Convergence and Competitiveness), appraisal and monitoring forms, and so on. Alongside this analysis comparator impact data was collected to contextualise the economic and innovation impact results.

The monitoring data collected by the Welsh Government was analysed to identify outputs. This included both economic and innovation performance output indicators, as well as programme spend/income data, including (Welsh Government, n.d.):

- enterprises financially supported (number)
- gross jobs created (FTE)
- investment induced (GBP)
- collaborative R&D (number)

- new or improved products, processes or services launched
- products, processes or services registered

This monitoring data was used in developing an understanding of the final profile of participation in SMARTCymru, as well as achievements against the forecasted output targets.

A number of surveys were undertaken as part of the evaluation, including a survey of business beneficiaries, a counterfactual group, and a wider awareness survey of RD&I active businesses.

The survey of business beneficiaries was conducted with all participants. A total of 61 companies were either interviewed or completed an online survey, representing 42 per cent of all SMARTCymru beneficiaries. The counterfactual survey was undertaken with businesses that had applied to the programme but had either withdrawn their application or been rejected. This analysis was used to assess the additionality of the impacts achieved. The counterfactual survey achieved 18 responses, representing a 41 per cent response rate. The awareness survey was undertaken to identify the proportion of businesses that were aware of SMARTCymru and interest in potential engagement. It was disseminated to 2,876 RD&I active businesses in Wales, using data supplied by Experian. This achieved 180 responses, representing a 6 per cent response rate.

Economic impact calculations

The economic impact method draws on good practice guidance provided by a range of EU, UK and Welsh organisations. These economic impact calculations are based on jobs created and safeguarded by the SMARTCymru programme, and the resulting GVA generated. GVA is a composite measure and is considered to be the primary indicator of sub-national economic performance in the UK. The table below provides further details. For research, development and innovation programmes, however, this indicator should not be treated in isolation, and should be viewed alongside the research, development and innovation impacts generated.

Table 17. Technical Note on Key Aspects of the Net Impact Methodology

Aspect	Approach
Employment Impacts	Companies provide their job creation impacts to the SMARTCymru team (jobs created and safeguarded). These figures have been used.
Additionality	Survey respondents were asked about the degree to which the impact would have happened anyway. From these answers an assessment was undertaken on the indicative level and type of additionality from pure additionality (where none of the impacts would have occurred) to scale and time additionality (they would have occurred at a smaller scale or later date) or instances where no impacts would have occurred at all. The answers were converted to an appropriate additionality factor.
Persistence	Jobs were assumed to last 4 years – there was some survey evidence on the persistence of impacts but this was capped at 4 years.
Displacement	The displacement effects were calculated using intelligence from the survey about the perceived degree to which other firms or demand might be affected elsewhere in Wales. The displacement effects were generally found to be very low.
Substitution	There are expected to be some substitution effects but a relatively limited amount and were assumed to be low (at 25 per cent) using a benchmark.
Leakage	Using English Partnerships Guidance (English Partnerships, 2008) the leakage effects were assumed to be low (at 10 per cent).
Multiplier	Using intelligence from the survey about supplier this was assumed to be low (generating a multiplier of 1.3). Whilst other adjustments are taken away from the gross estimates, multipliers are the only adjustments generating additional impacts.
GVA	GVA per employee has been calculated using regional level BRES data and Regional Gross Value Added NUTS1 ONS data for Wales for high tech industries.

B. The programme context

The implementation of the SMARTCymru model has faced a number of contextual challenges since its introduction in 2010/11. This has included challenges associated with the economic recession, and significant management issues linked to the introduction of the ERP by the Welsh Government in 2010 (Welsh Government, 2010).

The economic and business innovation context

In relation to the economy, SMARTCymru was implemented during a period of economic recession, followed by slow recovery. Regional GVA is the UK's preferred measure of economic value at the regional level. On a 'per head' basis estimates produced by National Statistics (see table 18 below) suggest that GVA in Wales, in 2012, was 72.3 percent of the UK average, and the lowest amongst the devolved countries and English regions. Like the other parts of the UK, Wales also suffered from the global economic slowdown in the early part of the programme's introduction. This saw Wales' GVA per head fall between 2008 and 2009, recovering in 2010 and 2011.

Table 18. Workplace based GVA at current basic prices

GVA per head (£)[2]	2007	2008	2009	2010	2011	2012
United Kingdom	*20,643*	*21,026*	*20,472*	*21,023*	*21,368*	*21,295*
North East	15,569	15,694	15,294	15,723	15,842	16,091
North West	17,206	17,408	16,973	17,532	17,754	18,438
Yorkshire and The Humber	16,922	16,999	16,458	16,862	17,037	17,556
East Midlands	17,820	17,887	17,355	17,832	18,083	17,488
West Midlands	17,125	17,190	16,691	17,218	17,486	17,429
East of England	19,390	19,338	18,579	19,025	19,355	19,658
London	33,744	35,046	34,910	35,422	35,638	37,232
South East	21,636	21,877	21,266	21,898	22,369	23,221
South West	18,400	18,632	18,244	18,798	19,093	19,023
England	*20,681*	*20,992*	*20,531*	*21,054*	*21,349*	*21,937*
Wales	*15,097*	*15,179*	*14,794*	*15,407*	*15,696*	*15,401*
Scotland	*19,653*	*20,124*	*19,789*	*20,314*	*20,571*	*20,013*
Northern Ireland	*16,093*	*16,117*	*15,635*	*16,203*	*16,531*	*16,127*

Source: (Office for National Statistics, 2013)

Business R&D expenditure data provides further evidence on the context facing the SMARTCymru programme. Here the latest National Statistics data shows that business expenditure on R&D in Wales is now one of the lowest amongst in the UK regions and devolved administrations. Table 19 below, for example, indicates that business R&D expenditure in Wales was flat in the 2008-2009 period, before declining in 2010. Despite recovery in 2011 and 2012, Wales' business R&D expenditure continues to lag behind other regions and devolved administrations as a proportion of regional GVA -1.17 per cent, against the UK average of 2.04 per cent.

Table 19. Business expenditure on R&D

Business Expenditure on R&D (£ million)	2008	2009	2010	2011	2012
United Kingdom	15814	15532	16053	17408	17107
North East	318	315	308	259	282
North West	2130	1926	2074	2260	1784
Yorkshire and the Humber	433	454	488	543	603
East Midlands	976	992	1137	1149	1203
West Midlands	886	847	886	1237	1461
East	4182	3812	3851	3638	3449
London	1109	907	877	1142	1477
South East	3466	3758	3798	4528	4086
South West	1345	1349	1454	1358	1364
England	14847	14360	14873	16113	15708
Wales	243	243	234	255	272
Scotland	554	631	622	689	707
Northern Ireland	171	297	324	352	420

Source: (Office for National Statistics, 2013)

The policy and organisational context

The policy and organisational context for SMARTCymru has undergone a significant period of change in the period since its launch. Much of this turbulence was associated with the publication and implementation of the ERP in 2010. This document set out the Welsh Government's strategy for economic development, and identified its priorities for future years. Within the ERP, 'Encouraging Innovation' was identified as an important priority, with the objective of promoting the importance of innovation (R&D, product and service innovation) for business.

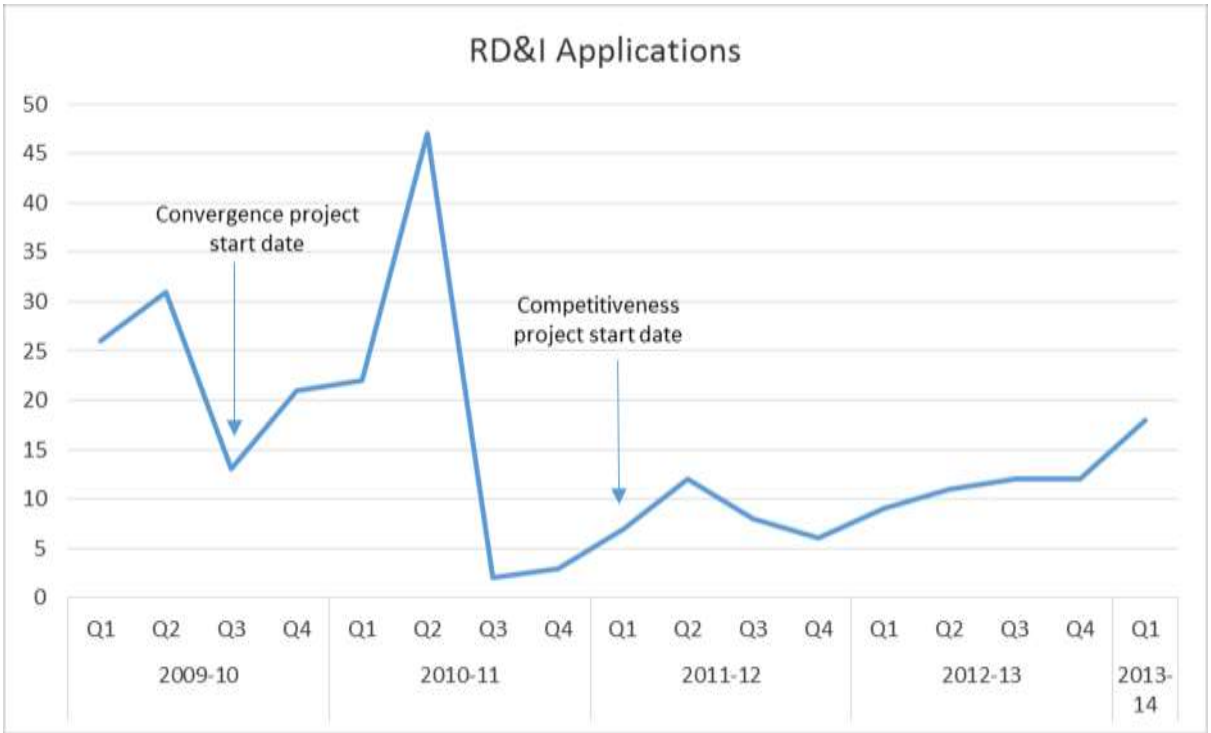
While SMARTCymru is consistent with the objectives of the ERP, other changes linked to the implementation of the new strategy had significant implications for the programme, most notably the requirement for all business finance (including grants) to be repayable. The implication of this policy change was that the SMARTCymru programme was no longer able to offer support in the anticipated format (grant). This change resulted in a period of internal review to determine whether a repayable grant was possible under

the terms of the ERDF funding scheme, which continued until the 2011-2012 period.

The ERP also established a number of priority sectors (six, subsequently increased to nine). To maximise the focus on the needs of these sectors, the former Welsh Government department for Business, Enterprise, Science and Technology (BETS) (now Economy, Science and Natural Resources) was reorganised into sector teams. While the Innovation team was positioned outside the sector teams, the Innovation Specialists were reassigned to the sector teams.

The implications of these changes were significant. The confusion and difficulties associated with the transition to repayable finance, for both businesses and Welsh Government staff, resulted in the short term growth of applications under the old grant regulations (as companies sought to begin their projects before repayable finance was introduced), before a substantial decline after the change was implemented in Q3 2010-11 (see figure 22). Alongside this, the reorganisation of the Innovation Specialists meant that direct line management responsibility moved from the Welsh Government Innovation team, to the Sector teams. In practice, this led to the focus of the Innovation Specialists moving from a regional to a sectoral focus (irrespective of geography). The Innovation Specialist interviews conducted for this evaluation revealed that regional stakeholder contacts were damaged in the process.

Figure 22. SMARTCymru programme applications



Source: (Welsh Government, n.d.)

A further implication of the move towards Sector teams was the transfer of promotional responsibility to the sector teams. This hindered the ability of the Innovation team in promoting the programme directly, without the Sector team, and is likely to have contributed to the decline in applications in the subsequent period.

Programme branding was reviewed at the same time as the introduction of ERP. In this respect the programme had been launched as part of the Single Investment Fund. This, however, replaced the well-established brand of SMART, which had been used for a number of years, and was shared by the UK scheme operated by TSB. Interviews with the SMARTCymru staff indicate that the lack of a recognisable brand further contributed to confusion surrounding availability of the programme, and the subsequent decline of applications.

The election of a new Welsh Government in 2011 marked a turning point for the ERP inspired changes, with the subsequent announcement by the new Minister that grants would no longer need to be 'repayable'. While this allowed

the Innovation team to ‘re-open’ the programme to applications, ongoing confusion within the business sector, and lack of regional Innovation Specialist capacity meant that take-up was not as swift as might be expected. To address these weaknesses, the programme was re-branded as SMARTCymru (RD&I Financial Support for Business) in order to raise awareness of its availability. The line management responsibility for the Innovation Specialists, was also switched back to the Innovation team.

While these changes have helped to encourage greater take up, interviews with a number of Innovation Specialists suggests that the removal of a regional focus to their work during the ERP period damaged regional linkages and network relationships. The implication of these factors is that levels of demand for SMARTCymru continue to be lower than they were before the ERP process. Indeed, the Innovation team point to ongoing limitations in awareness of SMARTCymru’s availability in Wales (companies and potential referral bodies such as universities). The presence of other sources of grant funding such as the Welsh Government’s own Economic Growth Fund, and other ERDF–funded projects such as ASTUTE (ASTUTE Wales, n.d.), may have also taken some demand away from SMARTCymru, although there is no firm evidence of this in practice.

To counter the ongoing weakness in demand the programme team have, in recent months, sought to raise awareness in the universities, with the objective of encouraging referrals and greater engagement in SMARTCymru programmes.

C. Counterfactual survey findings

A counterfactual survey was undertaken with businesses who had contacted SMARTCymru but had not proceeded with a project. The purpose of this survey was to analyse comparative performance of businesses who hadn't received SMARTCymru support in order to gain further evidence of the outcome, and potential long term impacts, of withdrawal of future project funding for beneficiaries of the programme.

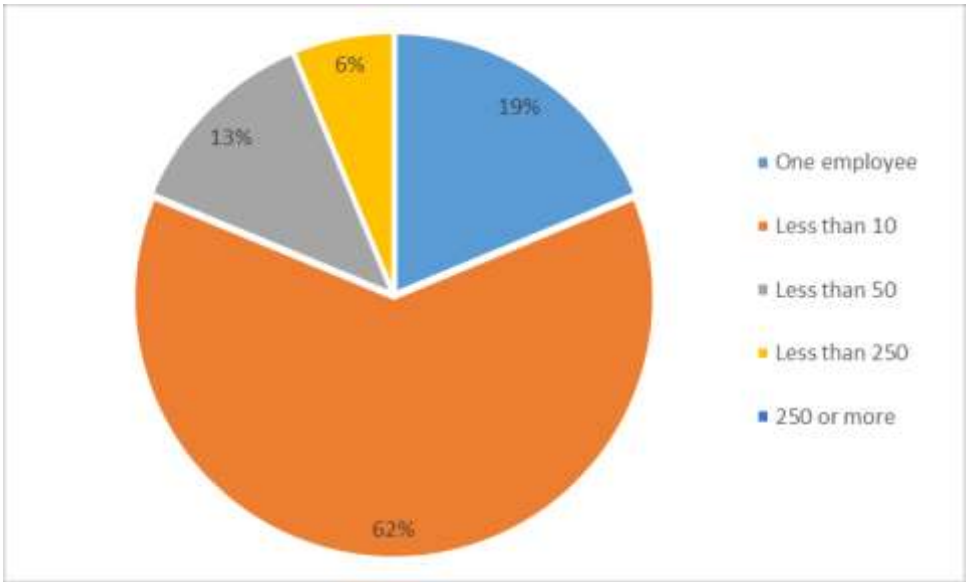
It should be noted that the counterfactual sample was comparatively small, with 18 respondents compared against 61 SMARTCymru beneficiary responses. The findings for the counterfactual sample should therefore be treated with a degree of caution.

Sample

61 per cent of companies responding to the counterfactual survey were from the Competitiveness area, which is a far greater proportion than SMARTCymru beneficiaries where only 38 per cent of projects were from the Competitiveness region.

However, in terms of their size the sample of counterfactual companies are in fact smaller than SMARTCymru beneficiaries. The vast majority of companies responding to the counterfactual survey were microenterprises with 81 per cent including less than 10 employees (see figure 23 below). This can be compared with SMARTCymru beneficiaries where only 66 per cent can be defined as microenterprises with the remaining 34 per cent having 10 or more employees.

Figure 23. Size of business (employees)



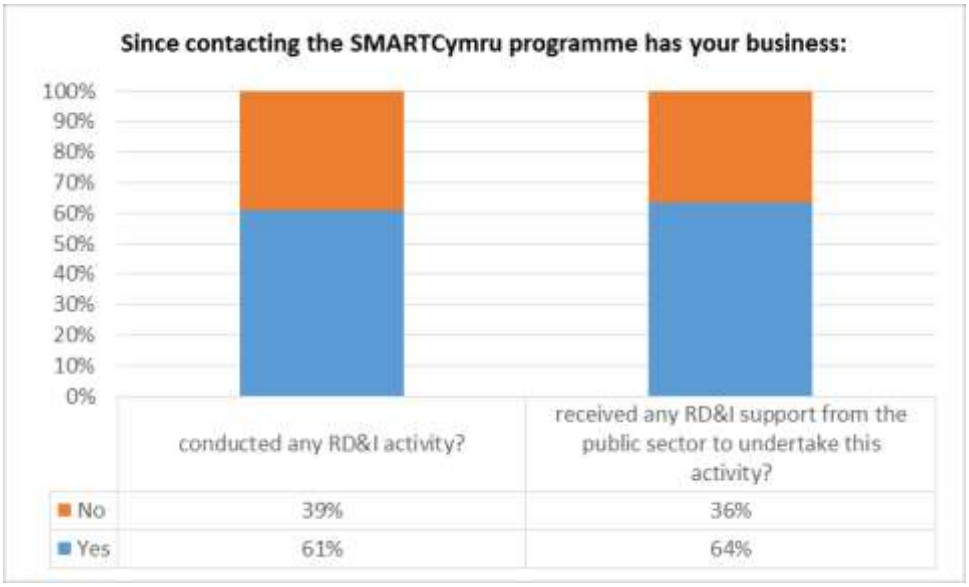
Source: CMI-TIP survey results

All counterfactual companies reported that they are currently trading.

RD&I activity since contacting SMARTCymru

As figure 24 illustrates, 61 per cent of counterfactual companies reported they had conducted RD&I activity since contacting SMARTCymru. However, although the majority have undertaken RD&I activity, since contacting SMARTCymru, 39 per cent of companies have not which suggests a high level of additionality for the programme.

Figure 24. RD&I activity since contacting SMARTCymru

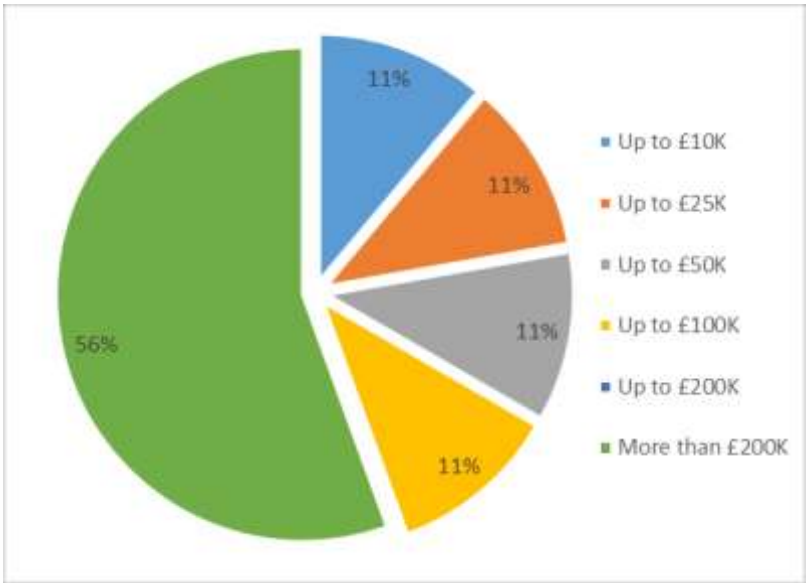


Source: CMI-TIP survey results

Of those counterfactual companies that did undertake RD&I activity after contacting SMART, 64 per cent used RD&I support from other public sector programmes to undertake this activity. Three reported they had received support from Innovate UK while one received Innovation Voucher support and another R&D Tax Credit.

The survey results suggest that most companies that didn't receive SMARTCymru support but went on to conduct RD&I activity anyway have invested substantially in this activity with 56 per cent reporting they invested more than £200K (see figure 25).

Figure 25. How much has been invested in research, development or innovation since contacting the SMARTCymru programme?



Source: CMI-TIP survey results

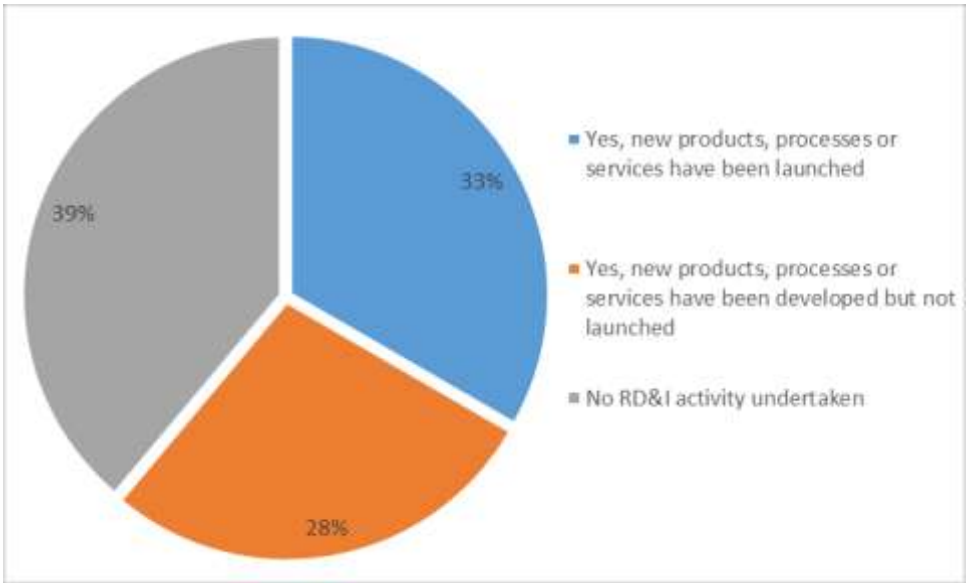
These results suggest that following their approach to SMARTCymru, the majority of counterfactual companies did conduct RD&I, most of whom through public sector support, and have invested substantially in the activities. However, the results also show that 39 per cent of businesses have not conducted any RD&I after their SMARTCymru programme failed to transpire.

Results and Impact since contacting the SMARTCymru programme

Results from the counterfactual survey suggest that of the companies that did conduct RD&I activity following their contact with SMARTCymru, a high level of results and impacts were received.

As figure 26 illustrates, the 61 per cent of counterfactual companies who have conducted RD&I activity since contacting SMARTCymru have all either launched or developed new products, processes or services.

Figure 26. Have any new products, processes or services been developed or launched by your business since contacting the SMARTCymru programme?



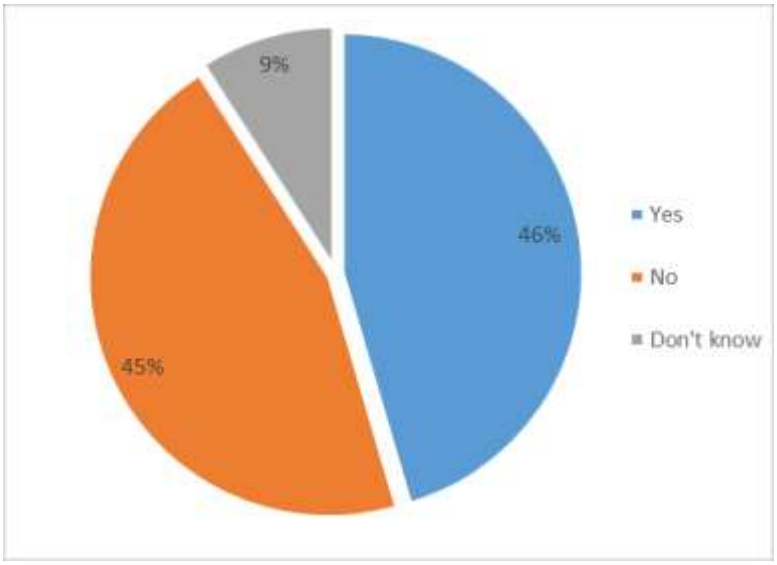
Source: CMI-TIP survey results

In total 16 new products, four new processes and three new services were reported in either development or launched onto market. That translates to an average of 2.3 new products, 2 new processes, and 1.5 new services developed or launched for each counterfactual business reporting these results.

In addition, all but one business that had conducted RD&I since contacting SMARTCymru reported they expected to introduce new or improved products, processes or services in the next three years while one reported that they 'don't know'. This represents 56 per cent of the cohort as a whole reporting they expect to launch these innovations within the next three years.

Of the counterfactual companies who have undertaken RD&I activity since contacting SMARTCymru, five reported they had created IP while five hadn't and one wasn't sure (see figure 27). In terms of the total number of counterfactual companies, this represents only 28 per cent reporting they had created IP since contacting the programme (five of 18 counterfactual respondents).

Figure 27. Has your business created any intellectual property since contacting the SMARTCymru programme?

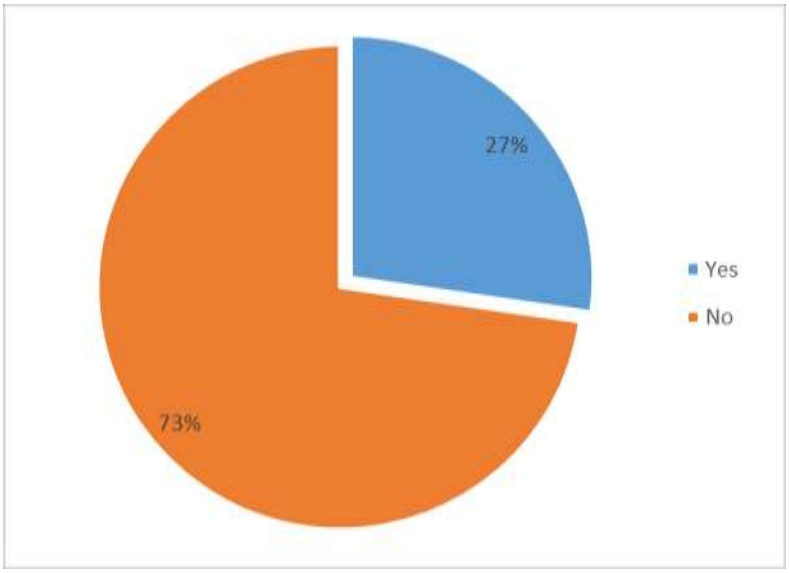


Source: CMI-TIP survey results

Only 36 per cent of counterfactual companies that have conducted RD&I since contacting SMART reported they had established collaborative RD&I links (see figure 28). This represents just 22 per cent of the cohort as a whole. Of those that did report collaborative links, Innovate UK was cited by two respondents while others cited various HEIs.

Only 27 per cent of counterfactual companies reported their RD&I activity undertaken since contacting SMARTCymru has led to new sales with one reporting £2M of new sales generated and another reporting only £13K of new sales generated. In terms of the cohort as a whole, this means that only 17 per cent of companies that didn't receive SMARTCymru support have gone on to generate additional sales from RD&I activity.

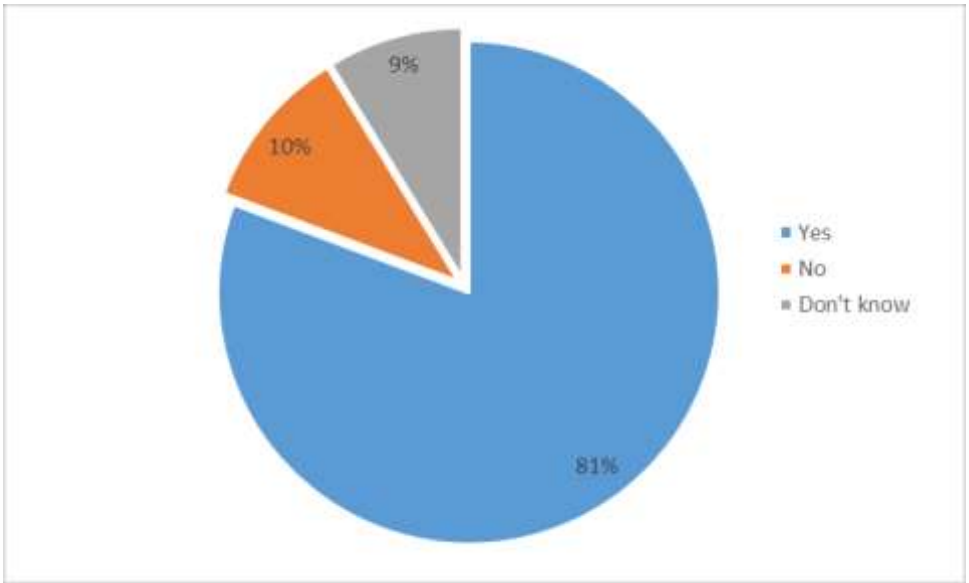
Figure 28. Has your SMARTCymru programme directly led to any increase in sales for your business to date?



Source: CMI-TIP survey results

45 per cent of respondents to the counterfactual survey expect to use SMARTCymru support in the future while 33 per cent reported they didn't expect to use it and 22 per cent weren't sure. Excluding the 'Don't know' responses, 57 per cent of this cohort anticipated using SMARTCymru support in future.

Figure 29. Does your business expect to use the SMARTCymru programme in future?



Source: CMI-TIP survey results

The respondents were also asked to suggest improvements to the Welsh Government's support for RD&I and IP exploitation. Unsurprisingly for companies who contacted SMARTCymru but didn't go ahead with their projects, the main improvement cited was around paperwork and the application process more specifically.

The main barrier that prevented respondents progressing with their SMARTCymru programmes was the amount of time it took to go through the application and appraisal processes. This was especially the case for microenterprises with one respondent reporting:

> 'If you are a micro businesses the paperwork takes up a lot of time and makes it impossible to continue with your own work'.

Another reported that 'the amount of effort outweighs the benefit.'

In addition to the feeling that the heavy burden of applying for support disrupted their day to day business activities, other respondents reported that the amount of grant offered was outweighed by the effort required. According to one respondent:

> ‘We only required the funding to undertake a small bit of work, but the amount of application paperwork needed to be filled in would have taken us longer than to do the work ourselves, therefore we withdrew the application.’

Others reported the process was ‘too slow’ and took ‘far too long’ with one reporting that by the time the funding had been awarded, the activity they requested funding for had already been completed.

Two companies reported that there should be support to fill in the application form for microenterprises with one respondent specifically reporting the need to provide three quotes as a ‘heavy burden’. It was also said that the process can be ‘quite complicated’.

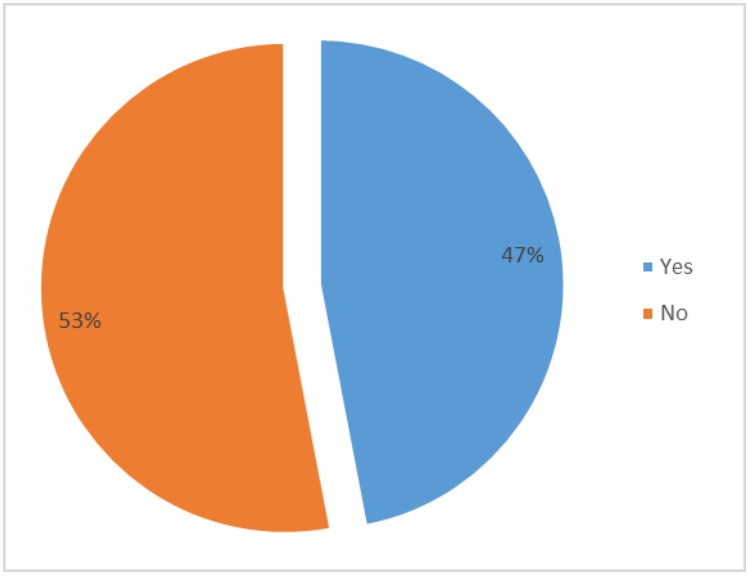
Three other respondents suggested that there should be improvement in relation to communication, with one reporting they hadn't received a response from the programme after submitting their application and assumed it was rejected. Another reported that the contact points should be made ‘clearer’ and ‘more readily available’ while another reported ‘business owners need to be informed of what is on offer’.

D. Awareness survey findings

In addition to the business and counterfactual surveys, a further survey was undertaken of businesses in Wales to assess current levels of awareness of SMARTCymru, with 180 responses received.

Of these businesses, around half were RD&I active with 47 per cent reporting they had undertaken RD&I activity in Wales in the last three years (see figure 30).

Figure 30. Has your business been active in undertaking any RD&I activity in Wales, over the past three years?

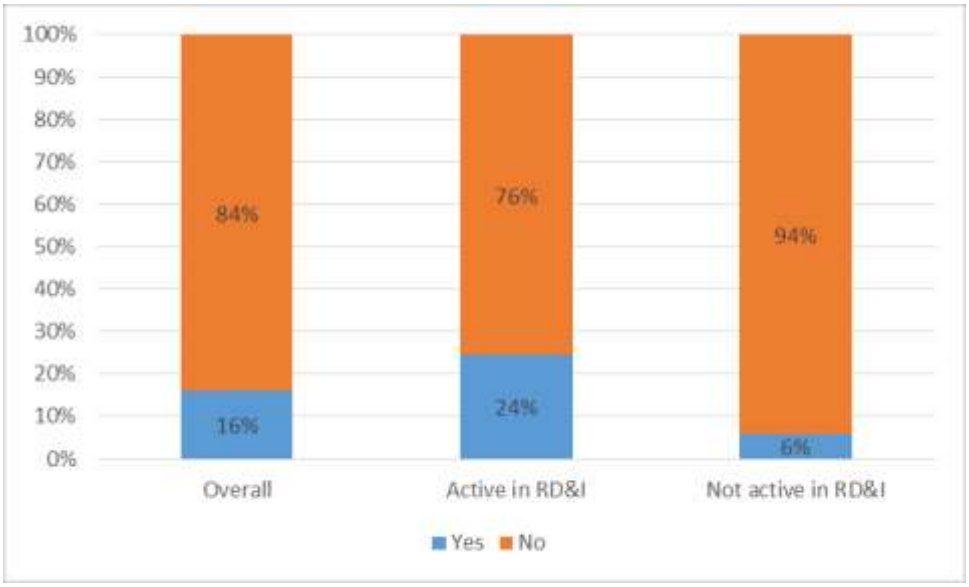


Source: CMI-TIP survey results

As figure 31 illustrates, only 16 per cent of respondents, overall, reported they were aware of the SMARTCymru programme with 84 per cent unaware of the opportunity for support.

The results do suggest however that awareness of the programme among RD&I active businesses is much higher with 24 per cent aware of SMARTCymru compared to just 6 per cent of non-RD&I businesses.

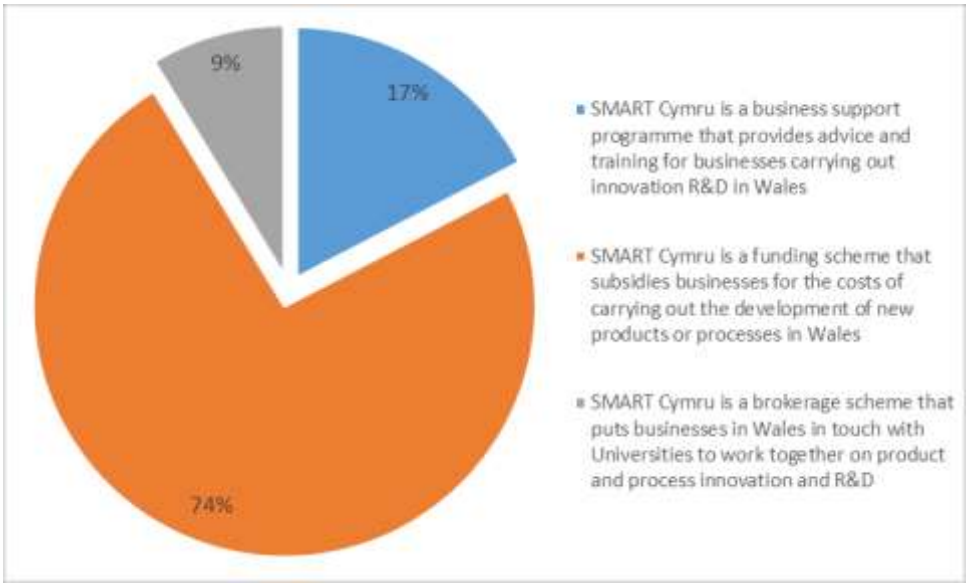
Figure 31. Are you aware of the Welsh Government SMARTCymru programme?



Source: CMI-TIP survey results

Of those who reported they were aware of the programme, the vast majority were familiar enough with it to accurately describe the programme as a funding scheme that subsidies businesses for undertaking RD&I activities. 74 per cent of respondents reported this while the remaining 26 per cent thought SMARTCymru was either a support programme that provides advice and training to businesses, or a brokerage scheme that puts businesses in Wales in touch with Universities (see figure 32).

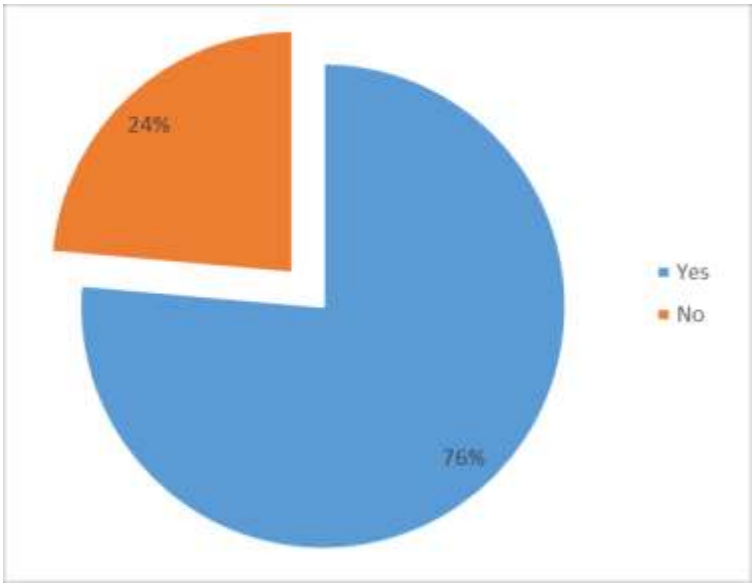
Figure 32. Which of these descriptions best matches your understanding of what SMARTCymru is able to offer?



Source: CMI-TIP survey results

The survey results also suggest that there is a high level of interest among Welsh businesses in SMARTCymru with 76 per cent requesting further information about the programme. These contacts were handed over to the SMARTCymru team.

Figure 33. Would you like further information regarding how SMARTCymru can help you?



Source: CMI-TIP survey results

E. Case studies

Company name: ADC Biotechnology Limited
SMARTCymru R&D Phases: TCF, IR, ED

ADC Biotechnology was established in 2010 to develop new process technology to assist in the manufacture of the latest generation of anti-cancer blockbuster drugs - Antibody Drug Conjugates (ADCs). ADCs target tumour cells directly without the side effects common in conventional chemotherapy and have received stellar results in recent clinical trial programmes.

Since formation, the Company's aim was to devise and develop a technology platform for the synthesis of ADCs – named and branded as 'Lock-Release'. Specifically, the Company focused planned and structured research to invent a new paradigm in the way ADCs are developed and manufactured.

The new processes developed by ADC Biotechnology aims to speed up, simplify and significantly lower the production costs for some of the latest ADC-based anti-cancer drugs. In this respect the concept offers the potential for biotechnology & pharmaceutical companies to make new antibody-based drugs more efficiently and at a lower cost.

Therefore, the Company's technology has the potential to positively impact the accessibility of ADC drug candidates for patients by helping to contain ADC production complexity and cost. The Company's patented 'Lock-Release' technology results in fast, simple and robust conjugation processes, with the potential to eliminate several process steps whilst enhancing product quality. The technology also has a positive environmental impact through minimising waste when compared to current industry methods to produce ADCs.

New ADCs are, however, extremely complicated and therefore costly to make. ADC Biotechnology's mission is to address these challenges through

new approaches and processes relevant to the full pipeline of anti-cancer drug development, scale-up and eventual product commercialisation.
In parallel to the development of new ADC process technologies, the Company has also developed a technical service element to its offer. Operating globally, the Company generates revenues through the synthesis of pre-clinical materials for ADC developers. In the future, the Company will operate a licencing model to access 'Lock-Release' technology to ADC developers looking to employ the technique in research programmes or cGMP manufacturing.

Support provided by SMARTCymru

Established in North Wales at the Optic Technium facility, the Company utilised the SMARTCymru programme to undertake the development of its new product - 'Lock-Release'.

The development of the new product occurred in parallel to the establishment of the Company, and benefited from technology developed at the owner's previous Company – Reaxa. Using the support of the Welsh Government Innovation Specialist, the Company was able to secure TCF funding to undertake a review of the IP context for the product. This exercise revealed the feasibility for moving on to the IR phase.
The IR funding enabled the Company to undertake practical research concerning the development of a working process. This included research to establish the method to make bio-conjugates with antibodies. This resulted in the filing of a first patent application in 2012 ('new process for antibody conjugates'). The ED phase followed in 2013, and resulted in the successful development of a working production process for the synthesis of antibody conjugates.
Following completion of the SMARTCymru programmes, the Company advanced a patent portfolio around the concept.

The ‘Lock–Release’ model has enabled the Company to demonstrate speed and implication in both the conjugation and purification processes, while reducing the number and cost of steps required in more conventional, solution-phase processing.

The Company described itself as being ‘very satisfied’ with all phases of the SMARTCymru programme and support provided by the Welsh Government, and highlighted the particular role of the Innovation Specialist and his technical expertise in helping to guide and facilitate access to funding.

Achievements and impacts

Research and innovation

With the support of the SMARTCymru programme the Company has developed a working process model of the ‘Lock-Release’ concept and begun to use it as part of its technical services & consultancy activities within the drug development sector – principally in Europe and North America. The use of the ‘Lock-Release’ model in the Company’s technical services work has allowed it to ‘soft launch’ Lock-Release. The Company is now seeking to progress to full commercial launch. To this end, it is planning to apply for ‘Exploitation’ funding from SMARTCymru. This will enable the Company to progress to full release of the product to market.

In parallel to the support of SMARTCymru, the Company has also accessed funding from a number of sources including; the Innovation Voucher scheme and another EU-funded programme, Export Assist.

To meet rising demand for technical services to support ADC in pre-clinical development, the Company has significantly expanded its lab capabilities. The latest in a series of upgrades since 2012, a new £100,000 R&D lab is dedicated to continuing development and commercialisation of the Company’s ‘Lock-Release’ bio-conjugation technology. A second lab concentrates on small scale bio-conjugation and toxin-linker synthesis and the third on large-scale ADC manufacturing.

Economic

While the Company's 'Lock-Release' product has yet to be fully launched it has experienced strong demand for its consultancy and R&D services for both development and scale-up phases. This has enabled the Company to achieve profitability in the past year, with further plans to exploit its product in the future.

Based on the support of SMARTCymru, the Company has been able to employ five additional staff members, and secure additional sales.

Employees within the Company are all highly skilled and technically qualified. All staff have a minimum of a BSc degree and >90 per cent of staff having a PhD qualification.

Cross-cutting

The Company's product is intended to facilitate faster, more robust processing in fewer steps, at lower cost and with the added benefit of a reduced environmental footprint. As a consequence the process allows clients to minimise the risk to high value drug components, lower costs and reduce environmental impacts.

Other

The Company believes that SMARTCymru has helped to improve the Company's confidence to conduct R&D in the future, as well as improve recognition of the importance of R&D within the wider Company.

In 2014, it was announced that ADC Biotechnology won the UK national 'Best for Innovation' Award in the British Private Equity and Venture Capital Association's (BVCA) Management Team Awards.

The Company are members and participants in forums for BioNow, Bio Industry Association and the All-Party Parliamentary Group for Life Sciences.

The Company regularly attends international conferences specialising in ADCs and biotechnology innovation. In 2014, the Company sponsored an ADC workshop forum for KTN (Innovate UK). The Company senior managers regularly present at industry relevant conferences.

Ongoing innovation activity

The Company as noted above has a strong focus on R&D and innovation, benefiting from its existing laboratory infrastructure and specialist staff. The Company is committed to the full scale launch of the product and the further development of its technical services.

In the next three years it anticipates that it will continue to improve its process to produce ADCs.

The Company is committed to allocate resources to new R&D projects to support internal research or compliment market trends.

Additionality

In the absence of SMARTCymru funding, the Company indicated that it may have gone ahead with its project, but that the impact would have occurred at a later date. It also indicated that it may not have produced benefits for Wales.

Areas for development

While highlighting the Company's overall satisfaction with the SMARTCymru programme and wider innovation support, it indicated that potential improvements could be made to the promotion of the scheme, particularly in the area of its website and the clarity of information on how to access the programme. Any improvement to the time needed to manage the programme's requirements would also be valued. Furthermore, ADC indicated the process time from an application submission to decision / offer letter should be improved.

http://www.adcbio.com/

Company name: Concrete Canvas Ltd.
SMARTCymru R&D Phases: ED

Concrete Canvas® Ltd moved to South Wales in 2007 to manufacture its revolutionary concrete products; Concrete Canvas® GCCM (CC) and Concrete Canvas Shelters (CCS). The shelters are a rapidly deployable concrete structures that require only water and air for construction, while the Concrete Canvas is a essentially concrete on a roll, and has widespread use in the civil infrastructure, mining and petrochemical sectors.

Support provided by SMARTCymru

The specific focus of the SMARTCymru project was to develop a new variant of the CCS. The initial shelter developed was suitable for humanitarian purposes, and the company wanted to adapt this to achieve sales in the military sector. It included the test and development of an eight man variant of the CCS that could be buried in earth for improved thermal performance, visual appeal and provide force protection for the military. Using SMARTCymru Experimental Development support (it had undertaken its own TCF) the company designed, tested and developed the new shelter variant at its site in South Wales to a point where it was ready for commercial launch. WG provided a range of other business support to Concrete Canvas Ltd. This included both capital grants (for new equipment) and Innovation Voucher funding enabling the company to improve the speed and efficiency of its production process, as well as improving the quality and recycling capacity of

the company. These elements, however, were outside of the scope of SMARTCymru.

Achievements and impacts

Research and innovation

The company was able to develop and test its CCS product through the SMARTCymru programme. This included support to test out the initial feasibility of the product and to develop a prototype shelter. The development work included in-house CAD to develop and test a new rib design, installation of a new clamping system and ribbing table, production of new CC rolls with the necessary reinforcements, and prototype testing through static loading trials and deflection measurements.

While some initial support for the original shelter concept had been provided by the (former) East Midlands Development Agency, the SMARTCymru project enabled it to test out the potential for the shelters to provide protection against small arms fire and shrapnel.

While the project had been a success, enabling the company to launch a new variant of the shelter with propensity for it to be 'bermed', the overall impact on innovation attitudes at the company was felt to be limited. This, in part, was due to the pre-existing R&D activity, which had seen the company develop its expertise and capability. Indeed, prior to SMARTCymru the company employed technical R&D staff and had a budget of some £100K to £200K.

Economic

Concrete Canvas has seen turnover roughly double year on year, with exports making up 85 per cent of the company's turnover, selling to over 40 countries around the world.

The company reports that it has been able to increase sales by £9 million since it began its SMARTCymru project, and estimates that some 20 per cent is accounted for by developments that were supported by the programme. On that basis SMARTCymru has helped generate £1.8million in additional sales for the company.

Cross-cutting

No environmental process or equality and diversity processes have been introduced by the company, although some support was offered by Welsh Government this was not felt to be relevant to what was principally a technical product development project.

Other

Concrete Canvas Ltd has won a number of awards for its innovation, including a Queens Award for Enterprise and Innovation, 2014.

Ongoing innovation activity

In the next three years the company intend to develop and launch a containment version of Concrete Canvas with improved impermeability, which will expand the potential use of the product in the petrochemical sector. It expects to use SMARTCymru in the future to support these and other R&D activities.

Additionality

Without SMARTCymru funding the company believe it would have been able to achieve the same impacts. This is supported by its prior R&D activity. It argues, however, that it would have taken much longer to achieve without Welsh Government funding.

Areas for development

While the company indicated that it was satisfied with the support provided by Welsh Government, it was dissatisfied with the application process. In this respect the main areas for development cited relate to the streamlining of the application process, and reduction of associated paperwork. Other areas for

development cited include providing a better balance between proving an innovative component and mitigating risk. Here it was argued that the programme could benefit from greater freedom for applications to enable ‘blue skies’ research.

www.concretecanvas.com

Company name: Environment Systems and Callen-Lenz
SMARTCymru R&D Phases: TCF, IR, ED

This project was one of the few collaborative projects funded by the SMARTCymru programme. It evolved from work originally developed by Aberystwyth University and the partners, alongside experts from the Institute of Biological, Environmental and Rural Sciences (IBERS). The project team brought together complementary expertise including Environment Systems' geographic information and digital mapping services expertise along with Callen-Lenz's operational support for the aviation-related aspects of the project[23], and these two companies acted as overall project leaders.

The aim of the project was initially to develop an Unmanned Aerial Vehicle (UAV) platform for the delivery of high resolution hyperspectral ground images. It was intended that the final product could be targeted at the environmental and agricultural sector, and provide the ability to conduct wide-scale field trials in partnership with the agricultural supply chain.

Prior to the project, both companies had experience of R&D, and the SMARTCymru project represented a continuation of development work that had been underway before the SMARTCymru programme became operational.

Support provided by SMARTCymru

The partners first became aware of SMARTCymru through a combination of contact with their Innovation Specialist, previous experience of the predecessor programme (SIF in 2008), and knowledge of the team.

[23] An academic from IBERS provided technical direction to the project.

The partners sought support for a number of R&D phases beginning with a TCF. This examined the feasibility of the development of an UAV equipped with specialised sensors, including data analysis and presentation and a test flight.
A subsequent IR project focused on technical research and development to develop a platform and associated agricultural remote sensing capability. This ED project then assisted with the design and development of a platform capable of operating with multiple sensors, the operation the UAV over two growing seasons, and multiple crop types, and development of the associated software.
Overall, the partners described themselves as being satisfied with the support provided by SMARTCymru, including the ease of accessing the SMARTCymru programme, the application process, quality of support and suitability for its business.

Achievements and impacts

Research and innovation
The results of the SMARTCymru project helped the partners develop both a product and service based on the UAV platform, sensors and software package. This was based on extensive development and testing in multiple environments, and was able to produce a product and service with the potential to be sold or delivered as a consultancy or hire arrangement.
Over the course of the project, developments in both UAV technologies, the emergence of a wide range of UAV operators, and new sensor technologies has led the partners to develop a multifaceted agriculture service offering. This is will allow the company to offer specialist services and technology offering adaptation to the needs of different crops and agriculture stakeholders. This has the potential to make use of a range of different UAV and sensor technologies, alongside remote sensing capabilities, and analytical software capable of processing and quickly analysing large volumes of vegetation data.
The company has continued to undertake R&D on its service/technology concept, including establishing a partner network to extend the reach of its

offer across the UK. Its service, however, has yet to be fully commercialised, although it plans to launch an agricultural information services through a new spin-out company, URSULA Agriculture, in the coming year. (http://www.ursula-agriculture.com).

In addition to these developments, the two partners also report the development of positive attitudes towards research, development and innovation, greater confidence in implementing innovative projects, recognition of this across all levels of the company, and a more strategic approach towards innovation.

The partners have also maintained links to Aberystwyth University.

Economic

The findings of the project suggest that while UAV's can have economic advantages over other platforms, all may play a role in providing agricultural analysis services to farmers and other stakeholders. As the project has yet to be fully commercialised, no additional jobs or sales benefits were reported.

Cross-cutting

The project was focused on addressing the increasing need for UK, European and Global food security, to increase crop yields in an environmentally and economically sustainable way.

Support for cross-cutting strategies was offered but not felt to be relevant to the needs of the partners.

Other

A Trade Mark has been secured for the product, but the overall IP is held as a 'trade secret'.

Unexpected benefits were also noted with respect to increased profile in the public sector, and their ability to develop other collaborative projects in other sectors through Innovate UK.

Ongoing innovation activity

The spin-out company established to exploit the technology developed during the project (Ursula Agriculture) will develop this project further with a view to commercialisation in the coming year.

Additionality

Had it not been for SMARTCymru support, the partners believe that the project impacts would have occurred at a later date and/or to a significantly lesser extent. This suggests the project was targeted effectively, and points to a strong level of additionality.

Areas for development

The partners noted that the project application process was 'not as streamlined as that of TSB', and was said to 'introduce more uncertainty as to what is required by the applicant' (Callen-Lenz). Indeed, Environment Systems argued that:

> 'The programme should develop a quicker and more responsive application process…it was too slow, and caused us business planning challenges. I would say, though, that while the claims team do a good job, they are insufficiently resourced.'

http://www.callenlenz.com/ (Callen-Lenz)
http://www.envsys.co.uk/ (Environment Systems)

Company name: Haemair Limited
SMARTCymru R&D Phases: Two ED projects

Haemair Limited was set up as a R&D company in 2005 and operates in the medical devices sector. The company, based in Swansea since it started trading in 2006, currently has nine RD&I employees. A long-term collaboration has been established with the University of Swansea where the development work has been, and will continue to be concentrated.

Haemair owns patented technology to develop a prosthetic lung and has registered patents in the UK, Japan and US with several other patents awaiting formal opinion from the patent office. The devices in development will support respiration for patients with failing lungs. The long-term goal is to develop a full alternative to lung transplant. The devices build on Extracorporeal Membrane Oxygenator (ECMO) technology, in which oxygen is transferred directly to the blood rather than forcing compromised lungs to work harder.

Haemair is currently in a pre-launch phase, has raised almost £2.3 million in equity and has attracted a similar sum in grants since being established. These grants include several SMARTCymru Awards, a Health Technology Devices (HTD) Award, a CIRP A4B grant, an Innovation Voucher, and more recently an Innovate UK BioMed Catalyst Late Stage Award.

Support provided by SMARTCymru

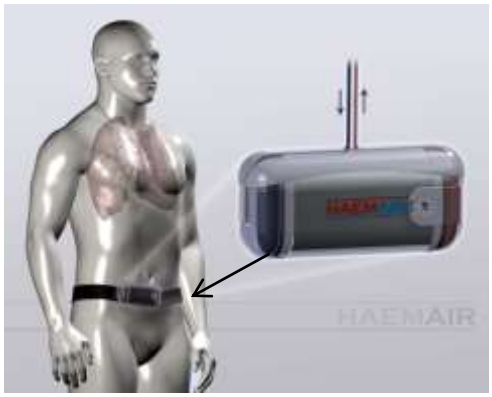
Initially, Haemair received a £152,000 SMARTCymru grant in 2006 to prove the feasibility of the device and to produce small-scale laboratory prototypes. This kick-started the RD&I activity and enabled the company to obtain a £292,000 Health Technology Devices (HTD) award in 2009 which refined the device design having tested initial prototypes. In 2013 a second SMARTCymru award was received with a £107,069 repayable grant received

to develop 30 beta prototypes. A complete manual assembly line was also developed as part of this project. The following year saw a further SMARTCymru award received to move towards an automated production process.

The company's manual assembly line developed in its second SMARTCymru project was a suitable manufacturing process for prototype production but it was very labour intensive. Further, SMARTCymru support was therefore sought in its most recent project to move towards an automated development process. A means to automate each step of the production line had been identified with the exception of a component to automate the construction of fibre bundles. This project aimed at designing a component which would enable the company to have a fully automated manufacturing process, a "crucial" step towards product launch.

Achievements and impacts

Research and innovation



The SMARTCymru Award received at the outset enabled the company to initiate its RD&I activity by undertaking a project to assess the feasibility of the concept. This was successfully undertaken with the findings giving confidence to develop the product further.

The product and manufacturing processes were further developed through two SMARTCymru ED Awards in 2013 and 2014 – the first of which developed 30 beta prototypes and a complete manual assembly line while the second developed a design to automate a key element of the manufacturing process.

As a result of their most recent SMARTCymru project, the company has progressed with its design and now understands how to develop an automated jig – which was the missing component in the automated manufacturing process. Haemair has paid a preliminary amount to two automation companies for a more detailed design and expects to receive a response in September or October 2015. Following this, the company will be

able to establish a manufacturing facility to develop its products. The company is very confident that it will be able to develop this component which is a crucial part of the process.
The company is also confident that their new automated process will decrease the reject rate from 20 per cent, which was the case with the manual assembly used to develop the beta prototypes, down to 10 per cent. This is crucial to make the product economic.

Economic
SMARTCymru support has brought many economic benefits to Haemair; it has been “essential” in securing private equity and grants from other support providers. Based on the prototypes and manufacturing processes developed in its SMARTCymru projects, Haemair has recently been able to secure £1.2m of funding from an Innovate UK BioMed Catalyst Late Stage Award which will be used to set up a manufacturing facility in Swansea. In addition, the company has been able to leverage £800k investment in private equity. According to the company, the prototypes and processes developed during its SMARTCymru projects served to provide Innovate UK and potential investors with confidence that Haemair could undertake every step of the production process.
Haemair has outlined the sales potential based on the assumption that it will manufacture and distribute the final combined device. In its first year post launch of the product, Haemair expects to generate just under £1M in sales. It expects this to increase to £3.7M in the second year, £11.4M in the third year, £26.7M in the fourth year, and £48M in the fifth.
The company also revealed that in the future it aims to employ 20+ staff, on long term contracts, to help with the manufacturing and distribution of the product.

Cross-cutting
No cross-cutting theme achievements were delivered by this project.

Other

As part of its SMARTCymru RD&I projects, the company discovered that the technology could be applied in other areas apart from lung diseases/infections treatment. Haemaflow was established in 2008 to develop inventions that arose as a spin-out from the Haemair work on supporting people with lung disease or lung damage. The products under development by the subsidiary company will allow better storage in blood banks and increased efficacy and safety of blood transfusions. This could be extended to battlefield casualties requiring substantial transfusions. Haemaflow is 100 per cent owned by Haemair Ltd, but trades independently. It is currently at an early stage but it has the potential for significantly greater sales than Haemair's ECMO product.

These SMARTCymru projects are likely to benefit Wales as they have led to the process of developing a high-tech manufacturing facility and have created cutting edge R&D opportunities in Wales. The product will also be manufactured in Wales leading to jobs in the area.

The projects have also developed research capability at Swansea University and contributed towards the University's ambition of being a centre for innovation in Life Sciences and related fields. This has had a positive impact on the University's profile and will make it easier to attract academic staff.

Ongoing innovation activity

Having recently received an investment of £2M from a mixture of private equity and a grant from Innovate UK, Haemair intends to set up its manufacturing facility in November 2015. It is currently awaiting a response from two automation companies who are developing the design for its automated manufacturing process. Once this is received the company plans to manufacture around 200 devices and aims to launch the product in 2017. It anticipates that the regulatory approval for the device will be "straightforward"

because: “although novel, in many ways it can be viewed as a logical evolution of current technology”.

Additionality

It would have been very difficult for Haemair to raise the necessary equity without SMARTCymru support as the due diligence undertaken by the programme made the company's proposition more credible and gave confidence to investors. Also, SMARTCymru has ensured that the company can develop the more innovative aspects of the project which private investors would have been reluctant to do. According to company Director, William R Johns:

> “The SMART grants… might seem like small beer. However, for these research activities when we really do not know the answer before we set out, it is very difficult to secure equity funding and we would have gone under years ago without being able to access grant funding for each of the more innovative steps of our development.”

Areas for development

Haemair has had positive experiences with SMARTCymru through a number of projects and has been very satisfied with the support. However, the company would like to see the upper limit for grant funding increased as they have had to go to other support providers, such as the Wellcome Trust and Innovate UK. According to the company, these other support providers:

> “have very long lead times in securing support during which time opportunities can be lost and substantial staff costs incurred. The relatively short lead times for SMARTCymru are of real benefit to small fast-moving high-tech companies.”

http://www.haemair.com/

Company name: KIGG Ltd
SMARTCymru R&D Phases: DoC

KIGG Ltd is a leading designer, developer and manufacturer of electrical and electronic systems for private industry. It comprises an international group of companies, with its headquarters located in Sully near Cardiff, employing five members of staff. The company provides services to a range of clients including companies, governments and non-governmental organisations globally. KIGG Ltd's core product range is the design and manufacture of electricity Smart Meters, which send electronic meter readings to the energy supplier automatically, and provides subsequent factory start-up services to government and private investors worldwide.

Single Phase BS1 PH Meter

In recent years, the company has responded to trends towards digital metering technologies, by developing its technical expertise and product range in relation to smart meters and services for electricity, water and environmental monitoring (greenhouse gases). In doing this it has benefited from a significant collaboration with the University of South Wales and the acquisition of the latest international communications standards required for 'smart products' (International Electro-technical Commission (IEC 61850). This collaboration has seen it engage in two KTP projects, allowing the recruitment of graduate engineers and the involvement of expert staff from the Centre for Electronic Product Engineering (CEPE) at the University of South Wales.

Support provided by SMARTCymru

The company sought SMARTCymru funding to expand its product range with a low power, robust and disposable communication device for the disaster relief market. This product was intended to build on the company's existing smart products and technological expertise, and provide an opportunity to diversify into related markets.

At the time of application, the SMARTCymru programme was in its latter stages. This meant that it was not able to submit an application for a longer term R&D project. Development of Concept (DoC) funding[24] was secured and was viewed by the company as the initial stage of a long-term process of development. The DoC funding allowed an initial paper-based testing of the concept, and included the review of existing communication technologies, and their applicability to a range of disaster scenarios.

It was broadly satisfied with the support provided during the DoC phase but believed, in retrospect, that it was 'hard to justify' the effort required, relative to the comparatively small size of grant available, as 'no follow on phases were available'. In this respect it believes that it was more likely to make use of later phases (e.g. TCF) in future.

Achievements and impacts

Research and innovation

The results of the DoC, as noted above, were deemed to be a success and the company intends to further develop the concept with a TCF. Since completing the DoC the business priorities of the company have meant that an application to SMARTCymru is unlikely in the short-term. It is, however, still progressing with the technical innovation, though at a much reduced rate. It has also lost some of its R&D capacity (the former KTP Associates) meaning that it would need to re-adjust the R&D approach and focus on its collaboration with CEPE, which has the necessary knowledge and experience.

[24] Towards the end of the SMARTCymru programme only DoC projects (short-term) were able to be undertake and completed in the remaining time period.

Economic

There have been no immediate economic impacts from this project due to it being at an entirely early stage. However, it is clear from the work undertaken that the technical innovation and resulting capability would be a substantial positive contributor to the growth of the company.

Cross-cutting

No cross-cutting theme achievements were immediately delivered by this project, however it has become apparent to the company that the knowledge and experience it is slowly developing will relate to many areas, including Smart Grid and also across other areas of automation, communication and control within the utilities sector.

Other

A positive impact was noted by the company in terms of attitudes towards R&D, with it indicating that its project had helped to reinforce existing positive attitudes, confidence and more strategic approaches to innovation. The company's existing links to the University of South Wales have also been maintained and there is an on-going effort to ensure this continues to flourish.

Ongoing innovation activity

KIGG do intend to continue their RD&I activity around this project but that will happen beyond the short-term.

Additionality

The company had undertaken earlier R&D activities prior to SMARTCymru (KTP). This support, however, was aided by public funding, and the company argued it would have been unlikely to have progressed them due to cost and risk factors.

Areas for development

The company described itself as being satisfied with all aspects of the SMARTCymru programme, including the ease of access / application, quality of support, its suitability for the business and overall outcomes.

While the company intends to make use of SMARTCymru in future, much will depend on it being able to raise sufficient funds / recruit the necessary resources to conduct the development of its disaster relief project.
http://www.kigg.com/

Company name: MC Diagnostics
SMARTCymru R&D Phases: TCF, IR, ED

MC Diagnostics, a molecular diagnostics design and development company, is based in the Technium OpTIC, St Asaph. The company specialises in the automation of multiplexed molecular assays and custom designed image analysis and interpretation software. Its diagnostic platform represents a new approach to assay processing and results analysis, with the first application being tissue typing for organ matching in transplantation.
The company was launched in 2006 and has had success in manufacturing products used in tissue matching for clients including German company BAG Healthcare. In this period it has grown its product offering and market reach, and currently employs 13 people.

Support provided by SMARTCymru

Prior to its SMARTCymru project the company described itself as having no experience of RD&I activity. However, MC Diagnostics has participated in numerous SMARTCymru projects since its launch including the TCF, IR and ED phases. This has enabled it to assess the viability of the development of its platform (the TCF), undertake the necessary research and development to prove its concept technically (IR), and to produce a working prototype of the platform (ED).
The company described itself as being very satisfied with the support provided by SMARTCymru, including the ease of accessing the programme, its application process, and overall suitability for the company.

Achievements and impacts

Research and innovation

Following successful completion of its SMARTCymru project, the company has been able to develop a new automated platform for molecular diagnosis (see figure), and associated software.

It is now looking at different applications for the platform through collaborations. This includes looking to develop new collaborations, to offer allergy screening, autoimmune disease screening, microbiology and genetic disorder screening across Europe.

Economic

The company reports that it has achieved an increase in turnover of £1.4 million as a result of SMARTCymru, and employs 13 staff.

Cross-cutting

The company felt that the cross-cutting themes support offered by the programme was not relevant to its business and project activity, as a result of its size and technology focus.

Other

The company is currently planning to license its platform technologies.

Ongoing innovation activity

Based on its experiences of the SMARTCymru project, the company reports a positive impact on its attitudes towards RD&I (recognition of the importance of innovation at all levels of the company). It also indicates that it intends to develop an extension of the processes available for use on the new platform in the next three years.

Additionality

Without the initial funding, the company probably wouldn't have developed its product. Indeed funding from the Welsh Government was said to have helped it to manage the risk and develop the product with the 'invaluable advice and expertise' from its Innovation Specialist.

Areas for development

The company indicated that the administration and grant claims process was a major disincentive to future participation in the programme. In this respect it felt that the claims process contained substantial hidden costs, and ones that had to be repeated for each phase claim. The requirement for an accountant letter, in particular, was felt to be onerous.

As a consequence the company indicated that it wouldn't use the programme in the future. This decision was based on the availability of R&D tax credits – a scheme that was felt to be more accessible and easier to administer, particularly for companies with sufficient cash flow to fund R&D. Despite this decision the company did note that without the initial funding of SMARTCymru it wouldn't have achieved what it has.

Company name: Microsemi Semiconductor Ltd
SMARTCymru R&D Phases: IR

Microsemi Semiconductor operates from its 30,000-square-foot Caldicot facility and employs 90 people locally. Since 2011 the company has been a wholly owned subsidiary of U.S.-based Microsemi Corporation, which employs over 3,600 people worldwide.

At its facility in Caldicot the team designs, develops and manufactures advanced microelectronic technologies focused on miniaturisation, low power wireless communication and high temperature electronics. The main activity of Microsemi Semiconductor's Welsh subsidiary is to supply medical implantable radio modules using silicon integrated circuits to medical implant original equipment manufacturers (OEMs). Although the company primarily sells into the medical devices sector and more specifically the implant market, it also targets other areas such as security and harsh environments like space.

Jim Ryan heads up the Welsh subsidiary company which was first known for supplying semiconductor-based hybrid modules into telecom OEMs. Shortly after he joined the company it was restructured toward focussing on wireless medical communications, where the team was able to combine its communications knowledge and high value medical assembly expertise. The semiconductor company operated under the name Zarlink Semiconductor until it was acquired by Microsemi Corporation (Nasdaq: MSCC) in 2011.

Microsemi Semiconductor is a highly innovative company with customers constantly looking for smaller products. The company subsequently spends a lot of time and investment in research, development and innovation (RD&I) activities, securing £500,000 of investment in the last financial year before receiving SMARTCymru support. The European Framework and Innovate U.K. programmes are regularly used to support Microsemi Semiconductor's

RD&I activities but the SMARTCymru project undertaken in 2014 was its first venture into Welsh Government innovation funding. The company had considered SMARTCymru previously but found the process “too bureaucratic” for the small amount of funding offered at the time. However, the company considered the programme to be “much more business-friendly” than it previously had been (specifically to do with providing less supporting information on overheads that were relatively small and much more proactive help from its Innovation Specialist) and consequentially decided to seek support as a result of the less onerous process.

Support provided by SMARTCymru

Microsemi Semiconductor received support from SMARTCymru in an Industrial Research (IR) project, as well as further support from European Framework and Innovate U.K. projects, in order to upgrade its existing range of products. The project involved designing and developing a Medical Implant Communications Service band radio module with equivalent functionality to the existing range of products, whilst reducing its volume 40 per cent. This project was necessary as the implantable market is driven by size reduction, portability enhancement and functionality improvement to drive greater patient comfort and better therapy. However, in addition to improving products for customers in its existing medical implant market, the creation of a smaller module has the potential to open routes to new markets and applications such as in neurostimulation.

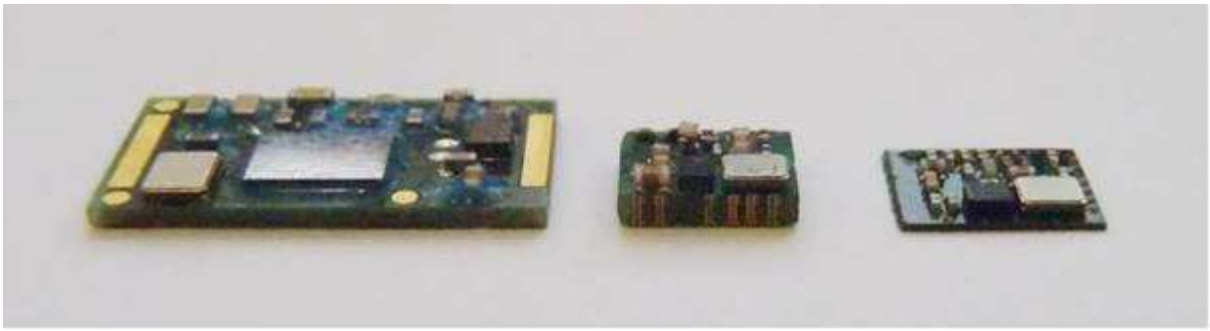
Achievements and impacts

Research and innovation

The ‘embedded die’ technology developed by Microsemi Semiconductor reduces the size of electronics by hiding the chip inside the substrate, reducing the overall size of the implanted device.

A pacemaker circuit, for example, which is typically 2 millimetres (mm) thick, can be made thinner with this technology as the circuitry will be compressed (around 1mm thick). This brings benefits to users in terms of comfort level and

health benefits such as a reduced risk of infection and quicker healing after incision.
The figure below illustrates the advance of the resulting technology from the SMART award on the right hand side. These modules are functionally the same.



This technology can be applied to any application that needs small form factors and the company is looking at developing its market in areas outside of medical devices such as in security and harsh environment electronics. These have “good potential” as the silicon chip requires extra protection in harsh environments and the embedded die technology provides this by hiding the chip inside the substrate as explained above.

Economic

Microsemi recently launched its first product based on its embedded die technology and this has already led to sampling with four new companies, including a large European implant company. The Caldicot subsidiary expects to grow once the products are established by up to 10 per cent.
The company expects its next generation products to be sold to its existing customer base, but also to new customers and markets with particular interest in the growing neurostimulation industry where more and more start-ups are being established.

Cross-cutting

The creation of smaller and thinner modules will have a number of positive environmental impacts by reducing power consumption as well as allowing physicians to use less invasive procedures. The innovations will also reduce the cost of healthcare and allow patients increased mobility.

Other

The project has benefited Wales as “innovative and world breaking technology” developed in the country. It has also created eight jobs at the Caldicot facility which brings positive economic impacts to the country.

Ongoing innovation activity

Innovation is key to the company due to the nature of the market it operates in. Consequentially, innovation will remain a core activity for the company.

Additionality

Without support from SMARTCymru the company notes that the project would have been unlikely to go ahead, as the support was “pivotal in convincing the corporation to undertake this project.” Also, the company was competing internationally to develop these products and had it not been for SMARTCymru it would have “lost out” to overseas competitors.

Areas for development

Overall Microsemi Semiconductor was very satisfied with the support and was especially satisfied with the pragmatism shown by Innovation Specialists during the application process. However, in terms of areas for development, it was reported that small amounts of grant funding through innovation awards work well for small scale projects, but there should be more obvious grant funding on a larger scale aimed at innovation projects that could generate much higher gross domestic product (GDP) growth.

http://www.microsemi.com/

Company name: Spectrum Technologies
SMARTCymru R&D Phases: ED

Spectrum Technologies, headquartered in Bridgend, is a world leader in laser wire marking solutions with more than 25 years of experience in the industry. Established as a subsidiary of BAE Systems in 1989, the company has built on research undertaken by company Director Peter Dickinson while head of BAE Systems' industrial laser research group. The company developed an ultra violet (UV) laser wire marking process as a replacement to ink based hot stamping and subsequently introduced their first product, the CAPRIS® UV laser wire marker.

Spectrum provides equipment for the measuring, marking and cutting to length of high performance electrical wire and cable used in the manufacture of complex aerospace electrical wiring interconnect systems (EWIS); as well as applications in other areas. Its products are sold to customers around the world including aircraft manufacturers, maintenance repair and overhaul (MRO) organisations, and military maintenance. Their products are used within several industries including aerospace, defence, rail, automotive, medical devices, telecoms, and electronics.

The company has grown substantially since it started its operations in Bridgend with four employees. Today, Spectrum has sixty-five employees including fifty at their Bridgend HQ and also has subsidiaries and offices in Fort Worth, Texas, USA and Shanghai, China. Throughout the 1990s, Spectrum established markets in North America, Europe, Asia Pacific, and South America with exporting typically accounting for 95 per cent of turnover including 65 per cent to North America. In 2013/14 the company recorded a turnover of £7.6M with profit for the financial year slightly under £300K. Over time Spectrum has exported over £100M worth of equipment.

Support provided by SMARTCymru

In order to maintain a technological and market advantage over its competitors, the company wanted to develop an automated wire processing system for the coiling, application of labels to coils and collection of wire processed on its CAPRIS laser markers. The system was designed to be retro-fittable to all of Spectrum's top end laser wire marking systems currently in use around the world. The aim of the system was to remove the need for an operator to run the machine and to unload processed wires from the marker thereby allowing the machine to run unattended for significant periods of time (several hours), thus providing its customers with a solution which would improve productivity and save them time and money. The project was part of the company's 'continuous improvement' policy which aims to ensure that the company retains its position as the world's No. 1 aerospace laser wire marker supplier.

Spectrum received support from SMARTCymru to create a pre-production prototype of the product. Grant funding of circa £44K was provided by SMARTCymru, which was expected to cover capital costs i.e. instruments, equipment, buildings and land, as well as revenue costs i.e. obtaining, validating and defending patents; costs for secondment of highly qualified personnel, and for innovation advisory and support services.

With Welsh Government backing, Spectrum was able to develop a system that fully automated the initial production process, therefore increasing their customers' productivity in this very labour intensive area of manufacturing.

Achievements and impacts

Research and innovation

Through SMARTCymru the company brought to market the Nova Pegasus system (shown to the right of the Nova 860 wire marker module) which fully automates the processing of wires and cables during the production of complex

aerospace electrical wiring systems. Although the company has a track record of successfully bringing innovative products to market, as an SME it required support for this project to bring this next generation of products to market as quickly as possible and to expedite the development process.
As Dr Peter Dickinson, founder and Managing Director of the company, put it: 'Without the Welsh Government funding and similar schemes, Spectrum Technologies would be making its current advances next year or the year after, by which time our competitors would be making them too. Over time SMARTCymru support has helped accelerate our development programmes and grow the business faster to get ahead, making us the world market leader in laser wire marking technology.'

Economic

The latest products launched into market have generated further sales from the company's established customer base as well as from new customers, both in the aerospace and rail sectors. In particular, with the help from SMARTCymru support, Nova Pegasus has generated $500K of additional sales - "SMART provides added value in accelerating the time-frame of launching products". These sales have helped to maintain revenues for Spectrum's core product stream, which would otherwise be likely to tail off in the medium term. The sales and support received by SMARTCymru have also enabled the company to create two new jobs as well as safeguarding twenty of their existing jobs.
In the absence of funding, projects would at best be delayed and timescales would increase, risking competitors taking market share and a resultant decline in the company's revenues and market position.

Cross-cutting

No cross-cutting theme achievements were delivered by this project.

Other

Spectrum acts primarily as a design, assembly, test and commissioning operation with all direct manufacture of parts subcontracted out, largely to a local supply base. There have therefore been ongoing supply chain benefits

within Wales as part of the manufacturing process of the new product. In addition, the company's customers reported a 25 per cent increase in productivity as a result of the solutions developed.

Ongoing innovation activity

The company continues to seek support from SMARTCymru and other support programmes as part of their 'continuous improvement' policy and to bring products to market quicker than their competitors.

Additionality

Without support from SMARTCymru the company would have taken longer to launch their product. This would have allowed competitors to take market share and would have a detrimental effect on the company's market position and revenue.

Areas for development

Spectrum Technologies did achieve their objective of creating a pre-production prototype of the Nova Pegasus system and taking this forward into a saleable production unit. However, they noted a number of areas where they felt SMARTCymru could be improved for the future.

Firstly, the company noted that high tech R&D projects are notoriously difficult to plan and keep on schedule. They felt that it would be helpful if the scheme could offer more flexibility in allowing for project delays and slippages to avoid the potential for missing out on claiming the full grant funding offered.

Secondly, they noted that time to market was a key issue. In relation to this they felt that an important area was the ability to transition quickly between the different R&D phases supported by the scheme, i.e. Technical and Commercial Feasibility, Industrial Research, Experimental Development and Exploitation. Spectrum went on to explain that facilitating a company's ability to undertake R&D and bring a product to market quickly and efficiently relies on scheme rules that allow applications for moving to the next phase to be submitted and processed without introducing long delays between phases. Otherwise, as the company explained, engineers who have been working on

a project have to stop work and be re-designated to other tasks, contract engineers may leave, and there is a danger of losing momentum.
Thirdly, Spectrum has concerns that scheme rules limit companies to one SMART grant at a time, regardless of how innovative they may be. They believe that Welsh SME firms could grow faster and create more jobs if there was the possibility to have more than one grant at a time and that would have real benefits for the development of the Welsh economy.
http://www.spectrumtech.com/

Company name: Telluric Land Remediation Ltd
SMARTCymru R&D Phases: IR, EX

Telluric Land Remediation Ltd is a Cardiff based company specialising in the remediation of contaminated land and is 'one of the most experienced remediation contractors in the UK'. Telluric use a range of remediation techniques to treat contaminated land and groundwater including physical, chemical and biological techniques depending on the requirements of the site. The company was established in 2003 and currently employs five people. Mike Holroyd is the company's Technical Director and he has extensive experience of treating contaminated land since his first role with a biotechnology company in 1989 as part of his MSc in the biodegradation of environmental contaminants.

Telluric is a highly innovative company with a strong focus on finding 'new ways of addressing specific problems'. The company also places emphasis on innovation in order to remain competitive and to continually improve the efficiency of their techniques as it is a highly competitive industry.

Support provided by SMARTCymru

The company identified a need to develop a bioremediation product that could be used on certain types of sites. The product was needed to treat soil and groundwater contaminated with chlorinated solvents and other contaminants such as pesticides. This contamination is common in various industrial sites including metalwork and dry cleaning sites where there have been historical spillages.

The company wanted an effective product to treat this contamination, while there was also an opportunity to develop an 'environmentally friendly' solution. This contrasted with some of the traditional energy intensive techniques involving large plant and machinery to physically remove contamination.

As a small company it would have been ‘financially difficult’ to develop the product on their own and for this reason SMARTCymru support was accessed to counter the costs and high risk of developing a new product. The company had already developed their idea and, after presenting it to SMARTCymru, received grant funding support in the IR phase, with 70 per cent of the project funded through Welsh Government. The company subsequently received further grant funding from SMARTCymru in the exploitation phase.

Achievements and impacts

Research and innovation

In the IR phase Telluric was able to use the grant funding to develop a prototype concentrated liquid product. The company subsequently undertook laboratory simulations to evaluate treatment efficiency under a range of conditions. It then conducted a field trial using the product to treat a solvent contaminated site in Hampshire.

The findings were very positive, both in terms of the product’s handling characteristics and in terms of its ability to efficiently promote the biodegradation of a range of common environmental pollutants under field conditions. Additionally the product proved to be ‘very stable’ with a ‘long shelf-life’. In the Exploitation phase the company received further grant support to develop a brand for the product. Using this support the company was able to commission a marketing company to develop their brand – DCL Biosolv, and market the product through a new logo, website, social media, and launch plan.

The new product is claimed to have several benefits relative to the company’s other solutions. Firstly the product is far more environmentally friendly as it is ‘non-destructive to the sites’ as no plant and equipment is required and there is no on-going power consumption. Following injection of the product, there is no requirement for any equipment on site which provides ‘significant cost savings compared to alternative remediation technologies’.

The product is claimed to be highly innovative as it is the only product of its kind manufactured in the UK. There are American products that can be

imported, and provide a similar mode of action, but the company is able to manufacture DCL Biosolv themselves thus saving substantial costs.
Mike Holroyd described himself as being satisfied with the SMARTCymru support and reported the company 'achieved everything we set out to do'.

Economic

The product is said to provide significant cost savings compared to alternative remediation technologies, and has been used to treat a number of sites (see picture below). This has led to upwards of £100k in additional sales to date. According to the company, this impact is entirely additional to what would have been achieved without SMARTCymru support - as the product wouldn't have been developed were it not for SMARTCymru. This solution will also be part of the company's offer in the long term and will therefore generate further additional sales for the foreseeable future.

At present, the product is only used internally as part of the package of land remediation solutions provided by the company. The company did suggest, however, that they would like to sell the product to other land remediation specialists eventually but it would take time to build its profile and reputation. This provides further opportunity for economic impact.

Cross-cutting

DCL Biosolv is the company's most environmentally friendly product and is expected to have positive environmental impacts.

Other

The company received Innovation Voucher support to register a patent for this product. The UK patent was granted on 18th March 2015, patent number GB2508232.

Ongoing innovation activity

The company cited potential for further innovation activity around this project through modification of their product. The company reported that they 'may' launch an offshoot to offer a different type of solution based on the same technology. The new solution under review may contain naturally occurring surfactants which could potentially aid mobilisation of contamination under certain geological conditions.

Additionality

Without support from SMARTCymru the company 'wouldn't have developed the product to the same extent if at all'. As a small company the costs and risks involved with developing a new product would have been enough to deter them from undertaking this project.

Areas for development

Overall Telluric were satisfied with the support received.

http://www.telluric.uk.com/

Company name: WriteMedia Partnership Ltd
SMARTCymru R&D Phases: TCF, ED

writemedia

Writemedia is a specialist multi-media and web-based software developer operating in three specific areas; corporate, tourism and sport. In these areas it develops web based software and commercial websites as well as other multi-media products, and own a data centre at its West Wales location, from which their web products are developed.

The company has designed leading edge software solutions for sport specific organisations in the UK. It was established in 1994 and some of the main clients have been in the utility (Welsh Water), tourism (Folly Farm, Southern Tourism) and across sports sectors including Welsh Rugby Union, SCUK (Sports Coach UK), Golf Union of Wales, Welsh Ladies Netball and Welsh Boxing and overseas, The New Zealand Highlanders Super Rugby Champions.

Prior to the project the company had conducted RD&I in software development. This included a number of SMARTCymru awards and Innovation Vouchers, which had underpinned other aspects of its business, including the further development of its CCTV Interrogator product, which had been continually developed in collaboration with Dwr Cymru Welsh Water for analysis in an infrastructure refurbishment.

Support provided by SMARTCymru

The company approached SMARTCymru to develop a software product for the sports sector – the Athlete Development System - SportZone. The overall aim of the project was to develop a system to manage the development of both the physical and mental wellbeing of athletes (amateur and professional), incorporating the following:

1. Coaching module
2. Fitness/S&C

3. Nutrition
4. Psychology
5. Physiology
6. Physiotherapy
7. Medical (Injuries/Sickness Reporting)
8. Notational Video Analysis (the software includes the use of the company's desktop analysis application and the online video streaming software is enabled to import data from all the mainstream desktop analysis providers as well as that created by their own software).
9. Daily Data (Daily Monitoring)

To support the development of the product, SMARTCymru funding was accessed for both TCF and subsequent experimental development products. It reports that it was strongly satisfied with this support, including the ease of applying, the application process, and the support provided by Welsh Government.

Achievements and impacts

Research and innovation

The TCF project reviewed if there was a market for the product, and considered technical issues such as the need to incorporate third party software. This involved close working with a number of potential sports-related clients, as well as a range of sport science professionals including physiotherapists, coaches and biomechanical sports scientist groups.

The subsequent Experimental Development project focused on the development of the technology platform, including development and testing of the GUI framework, design and testing of the range of modules, production of a prototype, and documentation and training. The platform was intended to include synchronisation with a central server and hub, enabling smart phone engagement.

The result of the project was a beta tested prototype Athlete Development System, and associated technical manuals and training documentation. This

has subsequently been launched under the name SportsZone, and has clients across Wales and beyond.
The TCF and ED projects were undertaken by the senior management of the company, and a range of software development staff.
The company has developed several derivatives of their original athlete development product. This has been modified for several other sports with one product, for example, developed for rugby which, as an added benefit, generates annual cycles of sales in comparison to the four year cycle of their original product which is applied at the Olympics. The product line has also been applied in Welsh Boxing at the commonwealth Games in Glasgow.

Economic
The company reports that its SportZone product and its derivatives have led to an increase of £200,000 in overall company sales, of which SMARTCymru was said be significant. The company has also employed a further five additional members of staff following on from this support.
The SportZone product is currently being introduced into schools in Wales to promote young athlete development in partnership with a functional movement project called 3T Gym, and by providing this technology Writemedia hopes to assist the schools in their sports development programmes. When used in schools, SportZone's feature list is tailored and adapted to suit the educational environment.

Cross-cutting
The company was not aware of any equality or diversity, or environmental management process support being offered by the programme.

Other
Involvement in the SMARTCymru project has produced a number of unexpected benefits including access to networking opportunities, enabling the company to meet new clients. Here, the company noted that:

"We've had first class support from Welsh Government in both project development and technology support for employee training that has brought

Writemedia's skills to the forefront in this sector in the last 10 years. Without this support, we would not be delivering our solutions to organisations in Wales and across the globe."

Engagement in SMARTCymru has also enabled it to raise its awareness of the funding and support available from the Welsh Government, which have helped the company to bring products to market quickly.

Ongoing innovation activity

Writemedia is already delivering the product as part of an application for tablet devices for use in schools. It indicates that the SMARTCymru project has helped it to develop an RD&I culture, with R&D and innovation part of a more strategic approach in the company.

Additionality

If the company had not engaged with SMARTCymru it estimates that none of the impacts would have been achieved. In this respect it notes that:

"The company relies on rapid development as we offer bespoke products and need to constantly modify our product to meet our clients' needs. It is important for these modifications to be implemented as quickly as possible in order to satisfy the clients and Welsh Government support enables the company to do this."

Areas for development

The 'only drawback' to SMARTCymru funding from the company's perspective is the 'red tape' involved in the process and the claims processes especially. The work around the claims process slows down the RD&I activity and can delay market entry.

http://www.writemedia.co.uk/