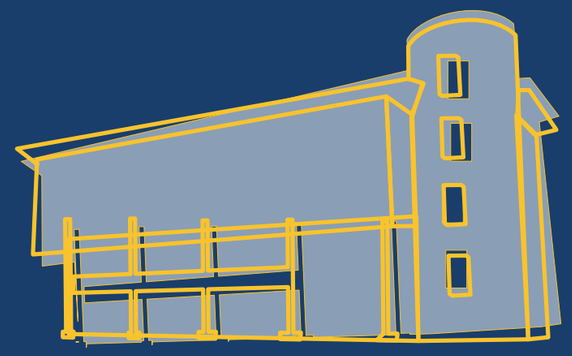


DI4M: Final Summative Assessment - March 2023

Prepared by: BWI, For: Warwick Manufacturing Group

European Union
European Regional Development Fund

CATAPULT High Value Manufacturing

MIDLANDS ENGINE

WMG THE UNIVERSITY OF WARWICK

BWI Evaluation & Consultancy

Contents

Executive Summary 3

1. Project Context 6

2. Project Progress 14

3. Project Delivery & Management 16

4. Project Outcomes & Impact 33

5. Project Value for Money 38

6: Project Legacy 40

7. Conclusions, Recommendations & Lessons Learnt 42

8. Case Studies 46

Executive Summary

Launched in August 2018, Digital Innovation for Manufacturing (DI4M) has been a 5 year, £10.43m Programme supporting SME digital innovation development through raising awareness, short feasibility projects, events, collaborative research and development, access to leading edge workspace, equipment and expertise. As of March 2023, it will have assisted in the creation of 693 new jobs and safeguarded a further 2,544, resulting in Net Additional GVA of over £40m and Net Safeguarded GVA of over £174m.

DI4M is led by the SME Group within Warwick Manufacturing Group and the High Value Manufacturing Catapult (HVMC), part of the University of Warwick. It has been delivered across the 6 LEP areas of Coventry and Warwickshire, Greater Birmingham and Solihull, the Black Country, South East Midlands, Leicester and Leicestershire and Worcestershire.

DI4M has been an exceptionally well designed, managed and delivered project and will achieve its objectives and exceed its outputs. By its closure in June 2023, it will have supported 374 SMEs, 204 of which will have collaborated with the University of Warwick on research and development projects, 51 companies will introduce new to market products, and 224 will introduce new to firm products.

It has directly addressed key market failures of low innovation and digitisation within the regions manufacturing SMEs. DI4M has boosted the regions R&D capacity and capability. It has supported businesses to be more 'innovation active', introduced new to firm and market products, and been the catalyst for over 200 collaborations with the knowledge base. Beneficiaries have adopted new digital approaches and seen major productivity (45%) and efficiency gains (77%).

"Agile, Innovative and a Growth Mindset"

It has been agile in the face of Covid and adapted and responded extremely ably to the global 'black swan' events. It is a project that has practiced what it preached – showing levels of innovation and commercial awareness in delivery that are rare in the public sector and HE.

The project has had a highly competent and experienced senior team, providing genuine strategic leadership, not only connecting to the wider innovation ecosystem – but looking to influence and lead it.

This has also been a highly experienced and effective delivery team, with strong project management and administration capabilities, including in ERDF disciplines. Management processes have been strong and focussed on minimising the burden on business where possible. The decision to recruit industry experts has been pivotal in delivering not only exceptionally high-quality support, but in building the credibility of the group to work with business. It has broken down the barriers that exist between business and academia and has provided a platform for future University collaborations and commercial activity with SMEs.

"Minimising Burden, Maximising Benefits"

Beneficiary feedback is excellent.

"Working with WMG has given Pashley the opportunity to take advantage of skills, expertise and facilities which we would never otherwise have had access to."

Adrian Williams, Managing Director - Pashley Cycles

"We were unsure where to start with our digital transformation, but Liz and the WMG team worked with us and brought in fresh ideas without being 'preachy'."

Martin Harrison, Manufacturing Director - Samuel Heath & Sons Plc

"We had such a positive experience working with Kieran that we have subsequently recommended WMG's digital factory optimisation tools and will continue to do so."

Stephen Blythe, Business Manager - Jaltek Systems Ltd

A streamlined and efficient process minimised the burden on business. Its impact has been profound. It's 373 beneficiaries have a combined total of £1bn of Turnover and employing 9,183 people. This equates to £673.4m of GVA in the economy which has benefitted from DI4M support.

It has generated Net Additional Employment of 660 and Net Safeguarded. Employment of 2659.

This is 3,319 jobs in the economy that wouldn't have existed without the support. This equates to Net Additional GVA of £40m and Net Safeguarded GVA of £174m. This is £214m of GVA in the economy that wouldn't have existed without the support.

The team has shown genuine ambition around creating a deeper understanding of the impact it has had – measuring personal, business, economic, environmental and social impact. There are some impressive headlines:

Behaviour

92% of respondents felt the support had **changed the behaviour** of the business.

Profitability

41% of businesses reported an **increase in profitability** at an average of **26%**.

Collaboration

89% of businesses said the support had **increased their likelihood of collaborating** with the University of Warwick in the future.

77% of respondents experienced a **reduction in time** in either:

Manufacturing Process

Time to Market

Product Design/ Development Process

Productivity

45% of businesses reported an average **increase in productivity** of **22%**.

DI4M has achieved an exceptional **Net Promotor Score** of **60** – far exceeding the average for similar interventions.

"Agile, Innovative and a Growth Mindset"

Value for money is exceptional when compared to established benchmarks. The total public cost per Enterprise Supported is £14,387. Over half the Regeneris[1], benchmark of £34,000. Increased employment is at a public cost of £7,764 per job – a tenth of the Regeneris benchmark mean of £71,000, and significantly lower than the more recent National Evaluation of English ERDF Programme 2014-20: Phase Two Report[2], which includes a gross cost per job for PA1 projects of £45,300 present value[3]. It has delivered £7.58 of GVA for every £1 of public money invested and safeguarded a further £32.42.

[1] England ERDF Project 2014-20: Output Unit Costs and Definitions

[2] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1103535/ERDF_National_Evaluation_Phase_2_Report_-__Interim_Impact_Evaluation.pdf

[3] It is advised that this is used for illustrative purposes only. It should also be noted that Capital projects were excluded from this calculation. It has been included here because the success of the revenue aspect of BRITE was dependent on the capital investment

"Digital as Springboard to Net Zero"

DI4M will leave a significant legacy for WMG, its regional partners, the wider innovation ecosystem and most importantly, the businesses it has supported.

It has raised awareness across the region of digital as a key enabler for increased productivity and competitiveness. It has raised the capability of WMG and the HVMC catapult, broken down barriers between academia and business, and created a platform to build bigger and better projects in the future. Importantly, it has established Digital as a springboard to Net Zero. The link between digital, decarbonisation and productivity has become clearer through DI4M, and has resulted in the establishment of follow on projects such as The Net Zero Innovation Network and The Business Aid Energy Toolkit (BEAT).

Over the past 5 years, DI4M have shown what can be achieved through considered but ambitious design, highly capable, agile and carefully recruited delivery teams, strategic management, which is always looking forwards, access to world class support and facilities, and a passion to generate impact for its businesses, partners, stakeholders and the wider innovation ecosystem within the region.

1. Project Context

1.1. Project Aim

Digital Innovation for Manufacturing (DI4M) launched in August 2018 and has been running for almost 5 years. It is a £10.43m Programme supporting SME digital innovation development through raising awareness, short feasibility projects, events, collaborative research and development, access to leading edge workspace, equipment and expertise. Delivered across the 6 LEP areas of Coventry and Warwickshire, Greater Birmingham and Solihull, the Black Country, South East Midlands, Leicester and Leicestershire and Worcestershire, it has been led by the SME Group within Warwick Manufacturing Group, part of the University of Warwick. The programme is set to support 364 SMEs, and has to date, created 693 jobs and safeguarded a further 2544.

"We are a small to medium-sized business and securing this contract has helped to protect jobs for our staff. The best thing about working with WMG was the unique and easy access to resources, skilled people, and equipment that we couldn't have got elsewhere."

Andy Tomlinson, Director - Total Precision Ltd

1.2. Economic and Policy Context

The main policies in the Full Application underpinning the project rationale were drawn from:

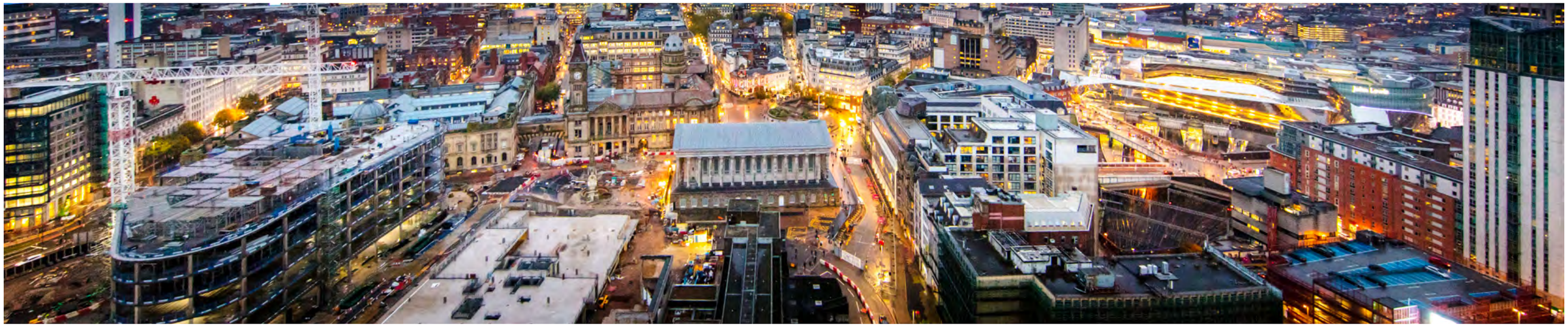
- Coventry and Warwickshire LEP Strategic Economic Plan (SEP) 2016
- Great Birmingham and Solihull LEP Strategic Economic Plan (SEP) 2016-2030
- Black Country LEP Strategic Economic Plan (SEP) 2017
- Black Country ESIF Strategy 2016
- West Midlands Combined Authority Science and Innovation Audit (SIA)

The Coventry and Warwickshire LEP Strategic Economic Plan stated that *"although Coventry & Warwickshire has many characteristics of a high performing economy, such as its strong transport links and presence of world-class universities and R&D institutions, it was recognised that the area's overall economic performance could be described as average."* The Plan sought to improve this performance, through targeted interventions across four thematic areas. One theme was *'Advanced Manufacturing and Engineering sector development'*.

The plan also stated explicit priorities around innovation in the LEP area; "A key priority includes promoting and championing business engagement with the world class breadth of capability and expertise in our R&D and innovation assets to (i) enable business to get ahead and stay ahead and (ii) secure inward investment. It is crucial that we strengthen the competitive advantage of our manufacturing businesses in national and global markets."

The DI4M project was also aligned with the Great Birmingham and Solihull LEP Strategic Economic Plan (SEP) also 2016-2030 which aimed to increase business and workforce productivity and competitiveness, particularly by stimulating demand-led innovation.

The plan went on to state it would support the region's advanced manufacturing supply chain, particularly for transport technologies (automotive, aerospace and rail). It also aimed to support businesses, supply chains and a workforce to equip them to take advantage of the opportunities arising from disruptive and emerging technologies - including digital and open data, intelligent and smart systems, advanced materials and low carbon energy.



The Great Birmingham and Solihull LEP Strategic Economic Plan also highlighted what were viewed as some of the market failures facing the region:

Whilst the number of firms identified as innovative has increased in recent years, a large proportion were not (47% across the UK and 44% in the West Midlands)

Innovation – the creation and application of new ideas – was seen as key to increased productivity and growth. For example, if Greater Birmingham were to close its productivity gap through innovation there is potential to grow the economy by over £4bn.

At the heart of the Back Country SEP, were a set of six priority propositions, including:

High Value Manufacturing City: a series of interventions to accelerate the growth of high value manufacturing businesses in the Black Country, including action to improve the quality of existing employment locations.

There was also a strong drive to invest in high value manufacturing (HVM) and innovation:

"Investment will support the growth of high value manufacturing (HVM) sectors and strengthening of their local supply chains. High value manufacturing is one of our five transformational growth sectors and central to our City Deal proposal. Growth will be achieved through funding for business support, supply chain development, workforce skills and physical site development."

It was envisaged that Black Country partners would drive innovation, building on existing research and sector based assets, financial investments and future technological opportunities, to make local firms more competitive, and keep them competitive.

It was observed that the Black Country currently performed poorly on innovation benchmarks. Assets such as the University of Wolverhampton could provide the expertise required by growth sector firms and be a gateway to knowledge-based institutions across the West Midlands. This could be delivered by building the innovation asset base through strategic projects; including extending the Manufacturing Technology Centre and a clear Smart Specialisation approach, ensuring strategic investment and interventions are built around a detailed understanding of assets and opportunities, aligning with national priorities.

Finally, the West Midlands Combined Authority Science and Innovation Audit (SIA) had suggested key market driven priorities include Next Generation Transport, Sustainable Construction, Energy Storage and Low Carbon and Technologies for Better Health, which were supported and underpinned by enabling competencies of Advanced Manufacturing and Engineering, Digital Technologies and Data and Systems Integration.

DI4M has continued to align its activities to tackle these opportunities, raising levels of R&D investment through its deployment of industry experts and leading-edge facilities to promote a digital approach to advanced manufacturing across the key sectors.

1.3.Market Failures and Rationale

The Full Application drew on several key strategic documents and national research in identifying the market failures to be addressed. The application stated that *"UK Manufacturing is behind in the global race towards Digital Manufacturing, such as the adoption of robots and automation technology, and without intervention to accelerate the implementation of digital manufacturing technologies, UK manufacturing will be left behind".*

It was argued the Coventry & Warwickshire, Greater Birmingham & Solihull and Black Country LEP areas needed the DI4M project in order to:

- Boost the region's R&D capacity and capabilities:
  - The West Midlands, on a national level, scores towards the bottom of innovation active businesses, with 44% of companies involved in innovation (findings from the UK innovation Survey, 2013 BIS).
  - Generate new ideas - every 'new idea' realised and brought into the market adds significant value to the regional economy. For example, the estimated Gross Value Add (GVA) per job created in the R&D sector in the West Midlands is approximately £67,806 (Annual Business Survey, ONS).
  - Increase the number of SMEs who collaborate with research centres and increasing the current baseline (ERDF specific objective 1.3)
- Boost the competitiveness of its SMEs in key sectors:
  - In a global economy, regional SMEs need support to identify and adopt the technologies that can increase their market share, but help them operate more efficiently through new/'repackaged' products and services.
  - Most SMEs have limited awareness and specialised knowledge and do not have the resources to achieve competitive advantage through innovation without active collaboration with an external knowledge provider, particularly with research entities such as universities.

"Working with WMG has given Pashley the opportunity to take advantage of skills, expertise and facilities which we would never otherwise have had access to."

Adrian Williams, Managing Director - Pashley Cycles

"WMG's help in implementing the new cobot has been amazing. We can't wait to expand our company because of this new step towards efficiency."

Martin Billingham, Chairman - Billingham Bags Ltd

1.4. Project Design

As set out in the Full Application the objectives of the project, were:

1. To raise awareness of the advances and opportunities in High Value Manufacturing through Technology Demonstration to SMEs.
2. To undertake Collaborative New Product Development with SMEs to develop new innovative products and services.
3. To assist SMEs to access Collaborative Research and Development through research collaboration and dissemination of results.
4. To operate an Innovation Ecosystem Network to promote and sustain innovation between SMEs, the University of Warwick, and the WMG centre High Value Manufacturing Catapult, large companies, and other stakeholders.

The project has clearly achieved these objectives and key elements of the design and delivery have helped make this happen – a strong management team, experienced industrial specialists, good connections to the local innovation Eco System, stakeholders and the wider University network, effective acquisition processes led by experienced individuals who can talk to businesses with credibility and quickly build trust, a high quality, and well attended event programme, and the provision of access to the right support at the right time.

Members of the senior team are well connected across the network – Paul Milne the Project Manager for SME Group co-chairs the Coventry and Warwickshire Focus Innovation Group, and Mark Swift Head of SME Group sits on innovation boards across the region. The team have creates some strong connections to larger businesses – most of which has happened via the Net Zero Innovation Network. The team acknowledge that element could have been stronger, but Covid severely disrupted networking opportunities, and the market shifted, limiting opportunities to connect to supply chains.

HVMC Catapult

It must be noted that with the funding provided by the High Value Manufacturing Catapult (HVMC), DI4M would not have existed. The support provided by the catapult is incomparable with other HVMC centres across the UK. Catapult investment has part funded all members of the team and is a key factor in the projects ability to recruit high quality advisors.

The capital investment has provided companies with access to world class equipment. The expertise which resides inside the catapult is unique, providing industrially relevant capabilities for business, and access to leading research. The wider catapult ecosystem has been crucial – and has provided resolutions to challenging problems faced by the project.

1.5. Project Targets

At the time of the evaluation the project was seen to be performing well against its output targets, which were adjusted in November 2022 via a PCR.

Output Measure	Current Progress	Final PCR Target
ER/C/O/01 Number of enterprises receiving support	335	364
ER/C/O/04 Number of enterprises receiving non-financial support	335	364
ER/C/O/26 Number of enterprises cooperating with research institutions	172	184
ER/C/O/28 Number of enterprises supported to introduce new to the market products	39	58
ER/C/O/29 Number of enterprises supported to introduce new to the firm products	198	144

Table 1: Project Performance Versus Final PCR Target

The project Logic Model detailed the following 3 outcomes measures:

- New product/ service leading to impacts on turnover and jobs.
- Process improvements leading to eventual impact on productivity.
- Innovation activity increase for future competitiveness, GVA increase and growth benefits.

The Model includes 3 Impact measures

- Increased levels of innovation at manufacturing SMEs within the Coventry and Warwickshire, Greater Birmingham and Solihull and the Black Country leading to productivity improvement, new products and services being brought to the market.
- Increased numbers of SME that are innovation active
- Net additional gross GVA and employment impacts

The project has put in an excellent performance. We have concluded that most output, outcome and impact measures were logical and achievable, however there has been some reflection inside the project team regarding the difficulties associated with the ambitious C26 and C28 outputs. Convincing companies to agree to long term collaborations outside of the scope of any project is very difficult. Finding business managers that will invest time and resource, and the challenges associated with closing the gap between academia and business present major obstacles. There are unknowns when the team and SME manager enter a project, and it can be hard to predict if it will progress to a longer-term relationship. Firms may be well served in terms of project support but not progress into a longer-term commercial relationship.

The success of new to market products are also hard to predict and their realisation is more outside project control. Beneficiaries cannot be recruited based on whether they will definitely launch a new product or not, and the likelihood is that the closer to market they are, the less likely they are to engage. In addition, the projet team set a high bar in terms of evidence, and there were a high proportion of beneficairies who implemented new processes - which was a key focus of the project.

1.6. Changes in Context

The DI4M project has operated during one of the most challenging periods in recent times. The landscape has changed significantly over the past 5 years with generational global and national events – the Covid 19 pandemic, War in Ukraine, Brexit and the Energy Crisis. In addition, there have been serious skills and semiconductor shortages. All these have had a profound effect on manufacturing industry. Companies have been focussed on survival, leaving less time for innovation.

Of course, all management teams will respond differently in a crisis, and numbers of companies have reached for innovation as a way to increase resilience and recover. In some ways, the events of the past 5 years have triggered some positive changes, for example businesses looking towards areas like automation and digitisation.

The changes in context have been well documented. Companies have needed more help than ever and the DI4M model has always been about removing the clutter around public support and offering as much time and support that a client company needs.

The most recent major event – the energy crisis – has resulted in the creation of the Business Aid Energy Toolkit (BEAT) which aims to help manufacturing SMEs reduce their energy consumption and increase profitability. Support includes a site visit by experts, who fit energy clamps, measure energy usage, and offer cost saving solutions. There are also workshops which can provide more information on opportunities to lower energy consumption.

Throughout the life of the project businesses have struggled with the skills gap. DI4M have looked to connect companies to internships as low risk recruitment options, or longer-term Knowledge Transfer Partnerships (KTPs).

From a project perspective, the COVID induced switch to remote working had a significant effect. Remote visits with companies do not have the same effect as in person visits – advisors can't walk the factory and get a feel for how the company operates via a video link.

The constraints imposed by the University during COVID made things even more difficult for DI4M. No-one was allowed on campus and external meetings had to be requested/authorised and required Health and Safety documentation. Travel was banned for 6-months.

There were recruitment challenges too. One of the key strengths of the project is advisor expertise, with the entire cohort recruited from industry. The right candidates can be difficult to recruit in normal circumstances, and as the project moved to a close, some experts decided to go back to the private sector.

1.7. Expectations of Performance

In our opinion, DI4M was extremely well designed and has been a well delivered project. The knowledge and skills that reside in the team elevate its performance above those typically seen inside Universities. The senior team retain strategic oversight, and their strong connections to both regionally and nationally are invaluable. The delivery team operate efficient and effective processes, and there has been an extremely strong team of advisors delivering market leading support. There has been an excellent mix of prior ERDF experience, and fresh perspectives from those who haven't worked in ERDF previously. Following discussions with the team, and a review of their expected outputs, we are extremely confident that the project will meet all outputs, with the notable exception of the difficult to deliver C28 target – new to the market products.

2. Project Progress

2.1. Project Spend & Outputs

In early 2020, the Managing Authority agreed to the expansion and extension of the project, doubling its value and duration. Total project costs were increased to £11.1m and its reach was broadened into Worcestershire, Leicester and Leicestershire and the South East Midlands, adding to its original target LEP geographies of Coventry and Warwickshire, Greater Birmingham and Solihull and the Black Country. Due to the impact of Covid 19, Brexit and turbulent market conditions – including global supply chain shortages and rising energy costs, delivery of the project was hampered. A final PCR saw a further extension to June 2023 and a reduction in total project costs to £10.43m.

Indicators / Expenditure	Original Funding Agreement	Amount in most recent Funding Agreement Variation	Total achieved at time of evaluation	% of target	Projected to be achieved at Project Closure	% of target
Expenditure						
ERDF Capital Expenditure (£m)	£0.00	£0.00	£0.0	#DIV/0!	£0.00	#DIV/0!
ERDF Revenue Expenditure (£m)	£5,084,967	£10,435,456	£8,965,965	86%	£10,435,456	100%
Indicators (please select from dropdown)						
(C1) Number of enterprises receiving support	168	364	335	92%	374	103%
(C4) Number of enterprises receiving non–financial support	168	364	335	92%	374	103%
(C26) Number of enterprises cooperating with research entities	84	184	172	93%	204	111%
(C28) Number of enterprises supported to introduce new to the market products	30	58	39	67%	51	88%
(C29) Number of enterprises supported to introduce new to the firm products	60	144	198	138%	224	156%

Table 2: Project Expenditure/Output Performance

The table shows the output distribution by LEP area.

LEP	C1	C26	C28	C29
Coventry and Warwickshire	106	56	14	65
Greater Birmingham and Solihull	95	49	15	58
Black Country	62	34	8	38
Leicester and Leicestershire	17	9	0	10
SEMLEP	40	18	2	20
Worcestershire	15	7	0	7

Table 3: LEP Output Distribution

2.2. Performance Factors

The project is on track to achieve its expenditure and will meet all output targets, with the notable exception of the difficult to deliver C28 target – new to the market products. . As explained earlier – this is one of the most difficult ERDF outputs to predict and evidence. Finding companies at the right time of their innovation journey is very challenging, particularly given the conditions the project has operated under over the past 3 years. The team have pushed hard to achieve all the outputs within the agreed timeframes and should do so by the end of March.

In our opinion success in all other areas is primarily down to an extremely well-designed project, strong strategic leadership, an experienced delivery team (both ERDF and in working with manufacturing companies) the ability of the business development team to identify and engage businesses, and the quality of the support on offer – which has been well received and proven to address a genuine market need. The project has maintained high professional standards throughout its delivery and has added significant value to its beneficiaries – as evidenced in the survey results, feedback and case studies.

3. Project Delivery & Management

3.1. Governance and Management Structures and Performance

Governance

The programme has a strong senior leadership team all of whom have significant industry expertise, led by Mark Swift (Head of WMG SME Group) and Paul Milne (Project Manager SME Group). Carl Walmsley (Project Manager DI4M) brings project management expertise, Kylash Makenji (Principal Engineer SME Group) leads on operations and Mita Panchel has decades of ERDF administration expertise.

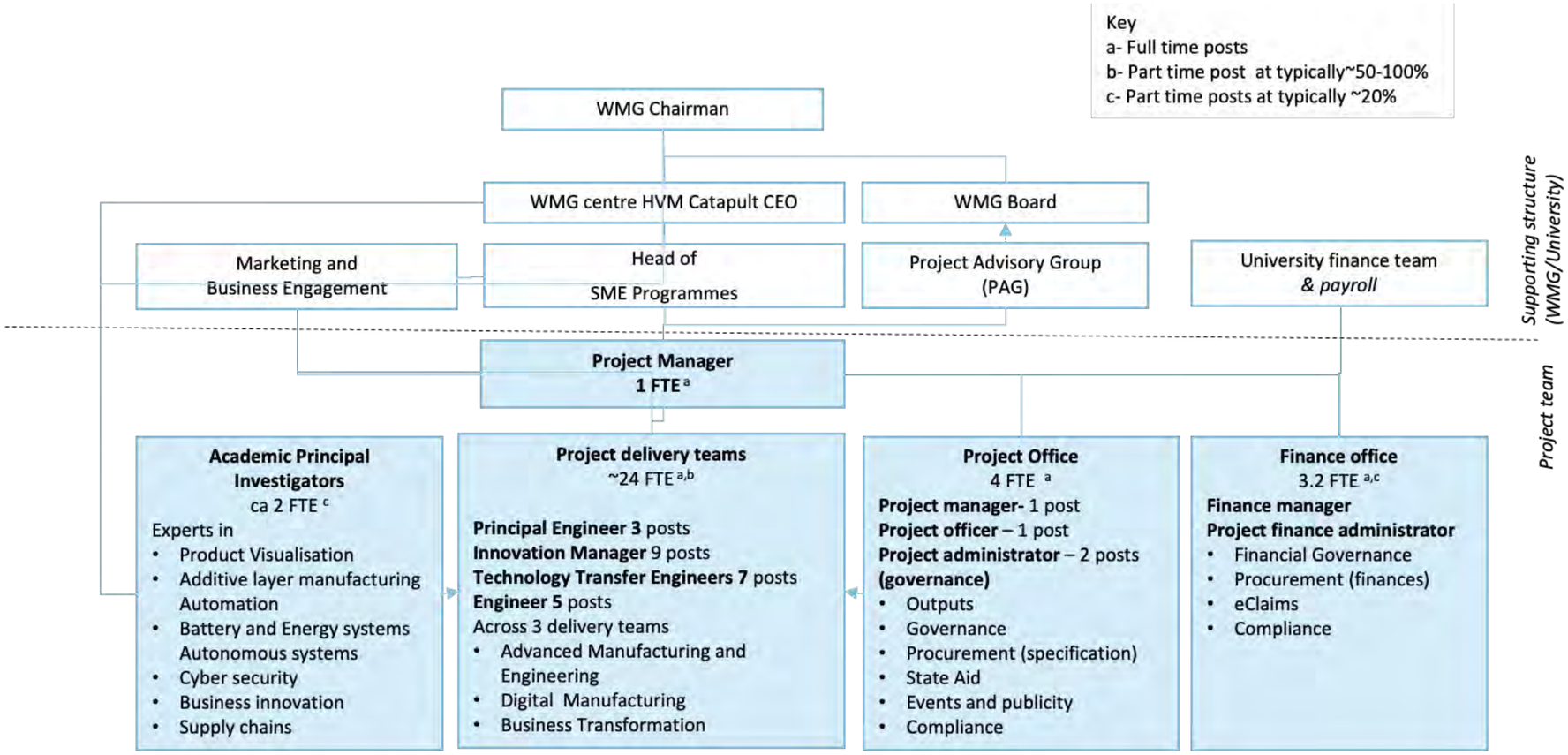
The programme has been governed by a Project Advisory Group which was established at the beginning of delivery and has included an extremely broad mix of industry specific partners and stakeholders. The group included:

- Dr Mark Swift (PM), Head of WMG SME Group (chair)
- Dr Paul Milne (PM), DI4M Project Manager
- Meri Kazazi (MK), Project Administrator (minutes)
- Shumi Mitra (SM), DI4M Finance Manager
- Professor Jon King (JK), HVM Catapult
- Charlotte Horobin (CH), Make UK
- David Hope (DH), Coventry City Council
- Corin Crane (CC), Chief Executive Black Country Chamber
- Pam Waddell (PW), WM Innovation alliance/ Black Country Consortium
- Rowan Crozier (RC), CEO C. Brandauer & Co Ltd
- Jim Griffin (JG), Fern Business Consultancy
- Richard Perry (RP), Three Way Pressings Group

When Covid hit at the start of 2020, the PAG was paused – with all partners heavily focussed on supporting an extremely hard-hit manufacturing sector. The group never managed to gain the same momentum, and whilst the individual relationships continued, it hasn't met formally since the pandemic.

"...It was good to work with WMG who were very professional and quick to respond to any comments we had.... Everything we asked for, they delivered."

Andy Robbins, Head of Engineering - AeroCoach Ltd



Management

The project has been extremely well managed with strong and established processes to control compliance and management information. As stated in our previous report – the management team have retained a healthy focus on relevance and how it delivers credibility and fuels impact. There has been a positive approach to recruitment, and whilst there have been challenges over time (with some expert advisors moving back to industry) that is true of many ERDF projects – which often suffer because team members are on the fixed term contracts. The project's approach to recruitment has always been admirable, with the team looking for experienced, technically curious people with a history of delivery. In the words of the management team, the addition of Carl Walmsley as Project Manager halfway through the project has been "a revelation". He has brought decades of experience and disciplines to the group all honed at JLR.

At the time of the evaluation the structure of the team was as follows. It was made up of 32 FTE, plus additional support from corporate services (such as pay roll and HR the costs of which have not been included in the project).

The team has been agile and dynamic and this has been reflected in delivery – the response to Covid, the adaptation of the offer, and then the subsequent refocus on sustainability with BEAT are evidence of how the team have been able to redeploy, reskill, and move quickly to respond to changing needs.

DI4M continues to deploy a light touch and simple approach to administering the project when working with SMEs. They hide the wiring very well, processes are consistent and iteratively improved, and every effort is made to minimise the burden on business.

The relationship with the Managing Authority has been difficult at times – the usual bureaucracy

associated with ERDF has continued to be problematic. There have also been challenges with the monitoring of the project, with constant changes of designated DLUHC officers, data not updated and delays in communication. However, the latest project officer who has been in place for almost a year and has been exceptional, offering practical, focussed support.

3.2. Standard of Project Delivery

The SME group at WMG continue to operate with the primary goal of delivering support which adds significant value to SMEs, and DI4M is no exception. DI4M aims to introduce businesses to new technologies and techniques that can lead to productivity and profitability improvements, new supply chain opportunities and new products and services being brought to market.

The primary route for doing that, is through advisor support. This activity is complemented by technology demonstrations – which act as a powerful way to trigger engagement – with access to world class equipment and facilities. However, it is the culture at DI4M which dictates the quality and nature of support given. That culture begins with the leadership team and one question: "How can we add value to this business?".

DI4M is primarily solving business problems, and the process is established. First engagement might be with a Business Development Manager (BDM), or with an Expert – depending on how the company was engaged. The approach is to understand the businesses top 3 or 4 challenges and match the skills inside the team, or wider University with the need.

The BDM retains a relationship with the company throughout, but the relevant expert(s) will work with the company to deliver the support. Successful initial interventions can then lead to additional support being provided under a C26 output. It is typical that the wider support network may be engaged at this stage – with University academic expertise and research brought in where necessary.

Strengths

The strength of the team is critical to having an open approach. Public Support Projects are often hampered by beneficiary manager's skills gaps – and there are many examples of where the supply side is unable to offer the support that a company needs because they don't employ or have access to specialist expertise. DI4M has had access to over 40 cross functional, experienced engineers, all of whom can offer an opinion or find a solution. They have all had industry experience which not only helps add credibility at the initial engagement but means they can draw on past experiences. The 'grey hair and battle scars" are invaluable and can dramatically speed up the development of a solution.

There are flagship specialities and core strengths, but fundamentally the Advisor cohort is made up of naturally curious people, and engineers who in particular want to fix problems. They also want to learn – and the project has seen major benefits in engaging early-stage businesses (who used to be referred to Accelerator programmes), whose Founders bring in young, fresh ideas.

Almost every project has benefitted from the level of expertise and understanding of industry. Whether that is changing layouts in factories to create efficiency gains that unlock growth or identifying that by upskilling staff on a particular machine the client could increase efficiency by 90%.

The quality of the intervention and speed at which the team can diagnose and suggest improvements are key factors in why the 2-5 day intervention works so well. It allows for rapid knowledge transfer and is an excellent way to prove credibility and impact which has led to some longer term collaborations.

The ability to engage businesses and overcome the barriers that still exists between business and academia is also a critical success factor. A real strength of DI4M is the ability of the experts and their industry background, enabling them to speak to businesses in their language.

This approach provides a soft entry point for businesses. It is unlikely that companies will think to contact a University for business support in the first instance. But once businesses have gone through an engagement with DI4M and value has been added, the business sees the University differently, as a trusted business support provider/advisor as opposed to an academic institution. This is backed up in the evidence, with 94% of survey respondents stating the support received had increased their likelihood of collaborating with the University of Warwick in the future.

Companies are able to access world class facilities, with top of the range equipment such as an electron microscope that would be out of reach for many. The ability to bring companies in to see the equipment and look at what else is available is a further benefit. There have been occasions where a company representative came in to use the microscope and 15 minutes later ended up using other equipment to develop a rapid prototype. That kind of service differentiates WMG from other University offers.

Access to the academic research team is a real benefit when the team are faced with something particularly innovative and challenging. The research teams are invaluable in those circumstances.

Weaknesses of Delivery

ERDF Outputs aren't really suited to supporting innovation in businesses. They encourage support for a tactical problem via a short-term intervention. We have observed that much can be achieved with a 2-5 day intervention, but the reality is, innovation support can be far more impactful when it is a long-term intervention, where teams can spend time in development, pull in wider skill sets, and treat support as a journey, as opposed to a quick fix.

The DI4M offer has been primarily designed to work with established businesses. There has been a perception amongst the team that start-ups are not considered enough, yet the data suggests that 22% of all businesses supported by DI4M (including those who progress to become a C26) are under 3 years old.

Whilst the open nature of the way the team engage with businesses is a real strength – it does have some drawbacks. Its less objective and doesn't rely on data to drive a decision. This can mean that decisions to engage are inconsistent and can result in one company being supported whilst another, seemingly similar company, is not.

Another major challenge is dealing with university processes. To engage in a long-term relationship with a business – there are a number of due diligence checks that need to happen. Contracting can take time, and financial sign offs are still quite low and resource intensive. Internal processes are slow, and whilst WMG do a good job of bridging the gap and operate much more closely to a business timescales and pressures, the old adage that comparing the private sector and a University is like the 'clock versus the calendar' is still true.

Challenges

Recruitment of project staff has been a challenge. The compounding factors of ERDF and University bureaucracy make it very difficult to employ efficiently. Most organisations are reluctant to begin recruiting until they have a contract from DLUHC. It can take the University at least 6 weeks from the point of contract to authorise recruitment, at which point the process has only just begun. ERDF regulations say jobs need to be advertised for at least a month. Taking into account interview schedules and the amount of notice required from the successful candidate, it can take anywhere up to 6 months to have someone in place.

The project has wanted to recruit the highest quality staff possible, and develop them in their career. As a University, Warwick train and teach succession planning, but ERDF contracts don't allow career progression as projects cannot promote without a vacancy being available. There needs to be a better way to progress people naturally within a project, so organisations don't lose their best people. ERDF projects constantly lose good people because of fixed term contracts and a lack of progression opportunities. This has a knock-on effect in recruitment, because the quality of applicants is often lower with short term fixed rate contracts.

However, major challenge the project has faced is the continually changing business landscape in the wake of major global events - Covid-19, Brexit, War in Ukraine, Global Supply Chain shortages and cost of living. Companies have prioritised survivial, and given less bandwidth to innovation. This has had a real impact on engaging potential beneficiaries.

3.3. Beneficiary Engagement

The Full Application provided detailed evidence of the demand for the project including:

- 6,600 High Value Manufacturers in 3 LEP areas*
- A pipeline of previous WMG clients and a database of over 1,000 Manufacturing SMEs
- Strong relationships with 23 local and national partners including Growth Hubs, Universities, Councils
- Chambers of Commerce and various manufacturing associations such as Made in the Midlands, Institute for Engineering and Technology and Innovate UK
- Joint events and promotional activity with Growth Hubs including focused research, referrals, and management briefings
- Engagement with selected news partners including Insider Manufacturing and The Manufacturer Magazine
- Active social media activity to almost 10,000 followers across various WMG channels
- A Marketing and Communications plan to raise awareness and generate interest within manufacturing sectors across the 3 LEP areas

*Prior to the expansion and extension.

WMG held 7 consultations with approximately 100 SMEs to showcase the project, providing information on the issues support would address and the innovation challenge faced by the 3 LEP areas. Of the 100, 17 expressed their intention to work with the project.

Our initial work identified the 18 different mechanisms the project had used to engage customers. These are still in use:

- Previous WMG clients
- Previous University of Warwick clients
- Project PR (press)
- University Marketing Department
- Social media
- Project Events – themed, sectors, regional
- WMG Events
- Partner Events
- Partner referrals
- Client recommendations
- Experts - previous clients
- Experts – personal networks
- Aggregators / Partners (Chambers, LEPs, Growth Hubs)
- Website
- On-line form
- Business Development Managers
- Cold calling
- Case studies

Typically, first engagement is with the Business Development Team who screen the initial enquiry for eligibility and suitability, before arranging an appointment. This is preferably at the company premises, and the BDM is accompanied by a relevant advisor(s).

This first meeting is crucial to understanding the business, building the relationship and breaking down any barriers to engagement.

In terms of understanding, the team will carry out what they call 'best practice walks'. The conventional wisdom on the supply side is that "you can tell a good company when you walk into reception". Advisors and BDMs approach this slightly differently. The two key questions they ask are "Would you buy their product (having walked round the building)?" and "Would you work there?". When visiting the Alan Nuttall Partnership, the advisor was struck by how everyone he saw had a smile on their face. It emerged that staff turnover was extremely low. Staff in the company were treated well, empowered, and looked after. These are the kinds of companies DI4M has sought to support.

Whilst SME eligibility criteria are fixed – suitability is more fluid. Our first interim report highlighted a lack of consistency in team members views around what an ideal client looked like. The project team since have looked at this, and rather than create a tight set of fixed criteria – have agreed to take a more holistic view of what type of company to support, and not rely on the numbers;

- How much resource capacity is there?
- Is it an interesting company?
- Does the challenge match?
- Are they doing something innovative?
- How strong is the management team?
- Does their challenge match our skillset and capabilities?
- Can we adapt to make this happen?
- If we don't help them, are they going to be inhibited?
- Are we unlocking a challenge that is stopping them from being successful?
- Are we critical to them achieving success?
- Could this lead to a long-term relationship?

The nature of the SME project is important. DI4M doesn't exist to be around the critical path for production. It's not about operations, it's about innovations.

Panel meetings decided whether to offer support or not. The key question: "Is this a company we should help? Or a company we shouldn't?".

From an individual perspective, the owner/manager has probably reached out to DI4M or been referred in some way, so they already recognise the opportunity. These questions are therefore more about how communicative managers are, and whether they see WMG as partners as opposed to service providers. Do they have an appetite for growth? It's also important whether they have the appetite and energy to work with WMG. If they're not interested enough to respond to emails, then they may not have the motivation (or time) for the project. The level of open-mindedness of the individual is also key, and their ability to work on the business, rather than in it.

Beneficiary Engagement Analysis

The following analysis looks at the size, shape and location of beneficiaries and attempts to understand the difference between a longer-term collaborator (using C26 beneficiaries as a proxy for this) and a standard beneficiary (Non - C26).

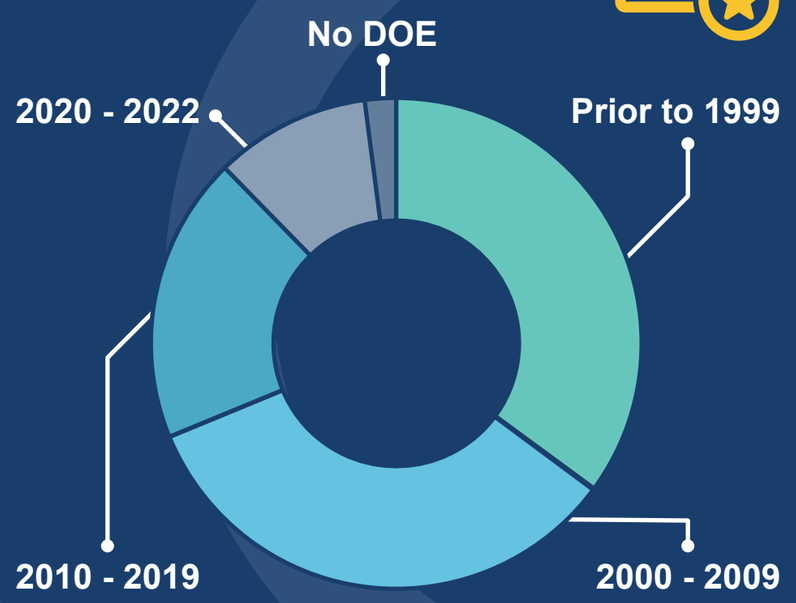
This analysis if based on a total of 335 C1 beneficiaries, 101 of which had also become a C26 output in the data collected by the DI4M project team and provided to this evaluation in February 2023.

C1: 234

C1/C26: 101

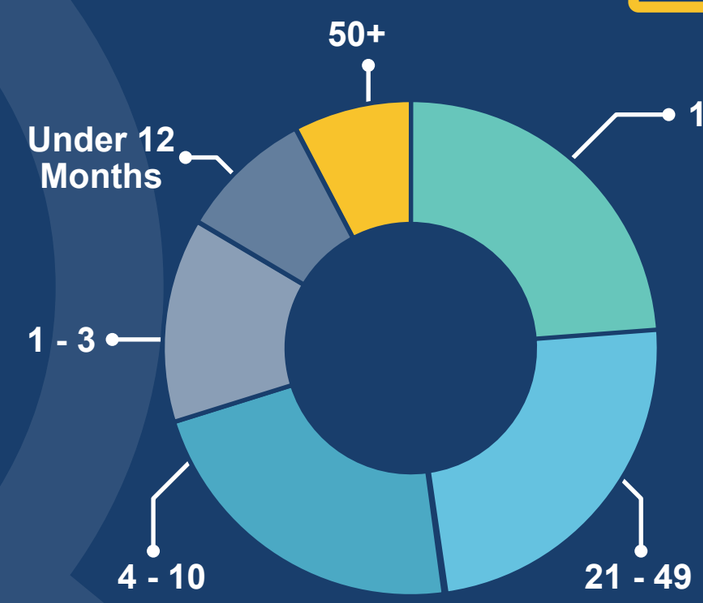
Total: 335

Date of Establishment



The majority of companies (36%) were established between 2010 and 2019.

Age at Time of Support



8% of companies supported are less than 1 year old (DLUHC definition of a start up), and a further 13% are under 3 years old (the Total Early-Stage Entrepreneurial Activity measure used by the European Commission is to be less than 42 months old). This means that 1 in 5 companies supported were in their very early stages.

- Youngest - 23 Days Old
- Oldest - 116 Years Old
- One Pre-start Supported

Employees

Changes in employment numbers are a probably the best measure we have to understand company growth. Our model is as follows:

- Zero (Founder(s) only) – 5%
- 1-2 (major leap, taking on your first employees) – 22%
- 3-9 (ramping up employment, starting to grow, big enough to fit round a table) – 21%
- 10-29 (creating teams, bigger or more tables required) – 23%
- 30-99 (creating departments, too big to sit round the same tables, in the same place) – 21%
- 100+ (creating divisions, multiple locations, difficult to remember peoples names let alone sit at a table with them). – 7%

Only 5% of DI4M beneficiaries had no employees. Almost three quarters of beneficiaries employed three or more people, and over half (52%) had 10 or employees.

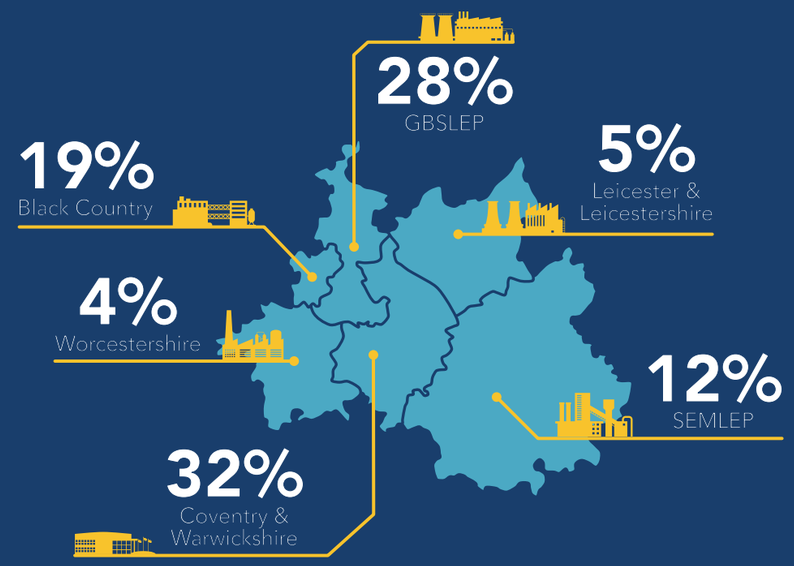
Turnover Band

Turnover is a less satisfactory way to measure company size and growth as it can differ dramatically from research intensive to non-research intensive businesses, and doesn't take account of the age of business or time elapsed. But it is interesting when providing a median to work with. Our turnover model is:

- 0 (pre rev) – 15%
- 1-99k (won a grant or prize, first signs of sales, enough to sustain a person or 2 or out-source to freelancers, early validation of the product/service) – 14%
- £100k-£499k (First period of growth) – 26%
- £500k - £3m (Further growth) – 23%
- £3m plus - (Sustained growth) – 22%

15% of businesses had no turnover in the previous year and a further 14% were yet to reach £100k – that's almost a 1/3 of businesses generating revenues of under £100k. 26% turned over between £100k a £1m, and 45% of businesses turned over more than £1m.

LEP Area



Note: Delivery in Worcestershire, Leicester & Leicestershire and SMELEP has only been in place for the final 3 years.

Whilst Start-ups are being supported, the vast majority of DI4M clients are established manufacturing businesses who were founded prior 2010, have a turnover of more than £100k and employ more than three people

Characteristics of C1/C26 Beneficiaries

Innovations in the Last Three Years

Double the amount of C26 beneficiaries (16%) had introduced five or more product/process innovations in the last three years compared to Non C26s (8%). Three quarters of Non - C26 companies hadn't introduced a product/process innovation in the last three years.

R&D Tax Credits

- C26: 7 companies claimed £317,735 for their participation in DI4M.
- Non C26: 8 companies claimed £580,587 for their participation in DI4M.

Total R&D tax credit claims £874,322 for their participation in DI4M.

Annual R&D Spend

Annual R&D spend by beneficiaries in the financial year prior to engagement was £28.5m, in 79 of the 393 beneficiaries where data was available.

- C26: 34 out of 173 C26 beneficiaries (20%) were investing a total of £20.3m. Once outliers are removed, this is an average of £171k per company.
- Non C26: 44 out of 220 Non C26 beneficiaries (18%) invested a total of £8.2m in R&D in the financial year prior to engagement at an average of £109k per company.

Hours Supported

89% of C26 beneficiaries received more than 25 hours, 41% more than Non C26s. All beneficiaries received the minimum 12 hours of support.

Age of Business

65% of C26 beneficiaries were over 10 years old, as opposed to just 51% of Non-C26 companies.

Innovations in the last 3 years, and Annual R&D spend are by far the clearest indicators of whether a business is likely to collaborate with the University on a longer-term basis. The Age of business is a weaker measure, but it is still marginally more likely that C26 companies would be older than 10 years. Employment size and turnover offer no real indication of likelihood to collaborate.

Additional LEP Areas

Securing the funding to deliver DI4M in the additional LEP areas of Leicester and Leicestershire, Worcestershire and South East Midlands was exciting – but the timing of the enhancement (the Project Change Request was approved in April 2020) couldn't have been worse.

The project will achieve its output targets in all areas. Extending into Leicestershire and Worcestershire have been fairly straightforward. WMG has good links into those areas. Leicester has a very similar economic profile to Coventry and there were a number of advisors who were already based there. Worcestershire is part of the West Midlands geography, and the team already had a good understanding of the area.

SEMLEP has been more challenging. It was a brand-new area to WMG, there was no existing presence, and Covid prevented the team from getting 'boots on the ground' to engage partners. There is a real frustration in the team that despite delivering the local outputs, they will not have made the inroads they would have liked into the region.

It wasn't just Covid that created barriers to success. There are some major engineering industries – Luton Airport, Vauxhall and GKN and no major University, so support from HE was somewhat alien. Even engaging the local Chambers of Commerce proved difficult. Partners and businesses struggled to see the connection between Warwick University and the area. There was no real knowledge of WMG, which didn't have the same reputation and recognition it has elsewhere.

Funding had also been relatively scarce in the South – with far less ERDF available over the past 20 years than in the other LEP regions. This also made trying to engage the audience challenging. Companies often wondered what the 'catch' was.

3.4. Beneficiary Perceptions and Impact

During our evaluation work, we have conducted two beneficiary surveys. The first was carried out in the summer of 2021 and received 34 responses. The second was carried out in January 2023 and received a further 45 responses. The insights presented in this section are based on responses to both the surveys combined. There were a total of 66 useable responses. Based on population size of 335 (total number of C1 beneficiaries) this gives us a 95% confidence level with a 11% margin of error. That means on a question where 50% of respondents answered Yes, we can be 95% confident that the true answer lies between 39% and 61%.

In analysing survey responses, we have treated blank entries as zero, and we have removed significant outliers from average calculations.

DI4M SA Data Analysis

Impact on Personal Capabilities

58% Collaborating with others (internal and external)

53% New knowledge

47% Process improvement

26% Market awareness

42% Confidence in technology and business approach

44% Strengthening your Network

15% Leadership and Management skills

24% Improved problem -solving skills

26% Ability to think creatively

Personal Impacts

97% thought that learning had transferred.

86% of respondents felt the support had made a positive and enduring impact on their behaviour.

Business Impacts

Behaviour

92% of respondents felt the support had changed the behaviour of the business.

Wages

20% of businesses reported an increase in wages of between 11%.

Profitability

41% of businesses reported an increase in profitability at an average of 26%.

Productivity

45% of businesses reported an average increase in productivity of 22%.

Survival

The support increased the chances of survival in 74% of businesses.

Collaboration

89% of businesses said the support had increased their likelihood of collaborating with the University of Warwick in the future.

Reducing Costs

The support helped 20% of companies to reduce operational costs by an average of 31% and 16% to reduce waste at an average of 23%.

Impact on Investment

38% of companies said they had increased their expenditure on new product, process or service introductions by an average of 17%.

29% of companies increased investment in equipment, hardware and software totalling £1.78m. Levels of investment ranged dramatically. Four businesses were responsible for £1.5m of investment, with one business investing £1m.

18% of businesses reported they had increased their investment in skills or training by a total of £195k, with eight of these businesses investing between £10k - £50k. The average increase in investment in skills or training was £15k.

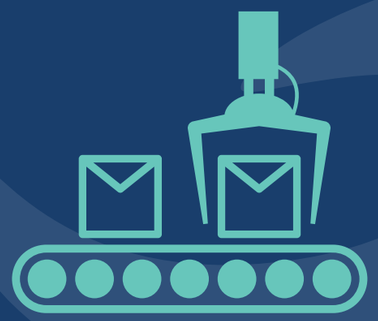
Saving Time

Businesses were asked to state if they had experienced any reductions in the time in manufacturing, getting to market or the Product Design/Development Process. The table demonstrates 77% of respondents experienced a reduction in time in at least one of the stated areas.

41% Experienced a **Reduction of Time in One Area**

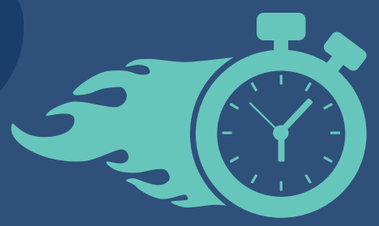
27 Businesses

Question: *Has the support you received resulted in a reduction in time in any of the following areas?*



Manufacturing Process

30 (45%)



Time to Market

19 (29%)

Product Design/ Development Process

35 (53%)

37% Experienced a **Reduction of Time in Two/ Three Areas**

24 Businesses

Increasing Sales & Creating Jobs

- The project has, to date, supported 335 businesses with a combined total of £1bn of Turnover, and employing 9,183 people. If we apply the average GVA per employee of £73,335[4], this equates to £673.4m of GVA in the economy has benefitted from DI4M support.
- 29% of businesses reported an increase in sales at an average of £57.7k – a total of £1,424,980.
- 12% of businesses said the support had helped them to safeguard a total of £10,660,000.
- 24% of businesses said the support had helped them to create a total of 37 NVQ Level 3 or above jobs – an average of 2.3 each.
- DI4M has gathered evidence of the creation of 693 jobs and safeguarding of a further 2,544.

[4] Based on data obtained from the latest available version of the Annual Business Survey (May 2021) for appropriate SIC codes.

Client Satisfaction

98% of survey respondents were either satisfied, happy (27%) or delighted (50%) with support they received from the DI4M team.

Propensity to recommend (Net Promoter Score)

We have calculated respondents' levels of satisfaction using the Net Promoter Score method. This score provides us with a high degree of confidence respondents are very happy with the support provided and they would recommend Warwick Manufacturing Group to others.

- DI4M Support = 60
- Similar PA1 Innovation Project = 55
- Average = 62

We have Net Promoter Score data for 19 projects we have evaluated since 2019 – the current average score is 62. The above data is a combination of 62 responses from the Year 2 and Summative Assessment surveys we undertook for this project.

Contribution Towards Catapult Indicators

Innovate UK made it a condition of the next 5-year funding cycle for all Catapults to have in place an impact evaluation framework by the end of 2021. The focus for each framework is to demonstrate evidence of an increase in productivity or value added as a result of technological innovation.

Following extensive research into the nature of catapult interventions, level of knowledge transfer, innovation, and commercial success, WMG have developed a pilot set of impact measures for the High Value Manufacturing Catapult. As part of our evaluation work, we incorporated these measures into the impact survey to understand how DI4M is contributing.

Note: % of Positive Survey Responses means the number of companies completing the survey who recorded a positive response. For example, In KPI1 – 29% of the 66 companies who responded, reported an increase in turnover at an average of £57,700.

It's important to note that the nature of support is different for each company, and only some interventions may have an explicit route to market built into the project. Others will have incremental improvements to existing products or processes, which may not create significant economic output. However, the initial results from the 66 companies that completed the survey are very encouraging.

Catapult Ref	Category	KPI	% of Positive Survey Responses	Avg. Increase
1	Commercial	% of firms supported who experienced increased sales as a result of innovative product or process	29%	£57,700
2	Commercial	% of firms supported who experienced increased profits from sale of innovative product or product made from innovative process	41%	26%
3	Commercial	% of firms supported who experienced increased worker compensation from sale of innovative product or product made from innovative process	20%	11%
4	Commercial	% of firms supported who experienced increased productivity as a result of introducing innovative product or process	45%	22%
5	Innovation	% of firms supported who increased expenditure on product or process development	38%	17%
6	Innovation	% of firms supported who adopted a new method or production of new product	60%	N/A
7	Innovation	% of firms supported who introduced 3 or more products or processes in a year	13%	N/A
8	Innovation	% of firms supported who increased investment on new equipment/hardware/software	29%	£45,000
9	Innovation contributors	% of firms supported who increased investment on R&D as % of sales	38%	20%
9a	Innovation contributors	% of firms with greater recruitment of workers with higher level of relevant qualification or experience	24%	2.3
10	Innovation contributors	% of firms supported who increased expenditure on skills or accumulation of knowledge	21%	£14,000

Table 4: Performance Versus Catapult Indicators

3.5. Horizontal Principles

Sustainable Development

The Full Application stated:

Sustainable development is an integral driver for the innovation ecosystem, with businesses looking to reduce waste, reduce energy consumption and use fewer raw materials in order to improve profitability and minimise any financial penalties that excessive waste might incur.

The project has worked closely with leading WMG sustainability research academics to promote and embed circular manufacturing principles. There have been three main ways in which the project has been able to influence behaviour and performance in this area:

- Supporting businesses in the Environmental industries
- Supporting existing manufacturers to apply sustainable principles to their processes and product development (i.e. use of materials).
- Implementing new delivery models specifically aimed at increasing sustainable development practices and supporting companies on their journey towards net zero.

From an initial analysis of the available data, we have identified at least 20 companies that have received support who developing more sustainable products or offering environmental consultancy.

Identifying the nature of SME projects has been more difficult, but there is some data available to suggest that a large proportion of businesses supported were interested in sustainable development, and it played an important part of their project. The energy crisis has only highlighted the need to drive down energy usage – and companies are now more engaged than ever. Brexit has also had an influence, with a large number of companies now looking to develop UK supply chains.

The survey also points to some significant results – 46% of survey respondents reduced waste at an average of 14% each.

Delivering outputs on profile has also allowed the team to look at new initiatives. DI4M has connected businesses to the Sustainability Product Innovation Network and was directly involved in the establishment of the Net Zero Innovation Network (NZIN) to raise awareness of more sustainable manufacturing practices, building an industrial community to share best practices as companies embark on their journey to reduce emission and waste. Recognition for the project's innovation and leadership in this space was gained via the Technology Supply Chain Innovation Award (winners for Manufacturing in the organisation champion section 2022). NZIN was open to DI4M beneficiaries past and present – as a mechanism to raise awareness via a series of 1 day workshops, and it gave companies the chance to collaborate and learn from each other. A number of DI4M beneficiaries went on to work more collaboratively with the University and that has led to a number of C26 outputs. The added benefit of making NZIN available to DI4M alumni is that it is a productive way to maintain engagement and offer value added activities.

The project team have also developed the Business Aid Energy Toolkit (BEAT) which aims to help manufacturing SMEs reduce their energy consumption and increase profitability. Support includes a site visit by experts, who fit energy clamps, measure energy usage, and offer cost saving solutions. There are also workshops which can provide more information on opportunities to lower energy consumption.

Equality and Diversity

As part of the University of Warwick the project operates to the high standard set by the University for the support, promotion and advancement of equality, diversity, and inclusion (EDI). At a project level all staff have received mandatory EDI and unconscious bias training.

At least 15 companies have taken on an intern as part of their support, and it is believed that number is likely to be much higher because of outward referrals to the intern scheme.

According Women and Ethnic minorities are underrepresented in the Manufacturing industry. to data from the University of Cambridge, women make up 26% of the manufacturing workforce[5], and 18% are from ethnic minorities[6], who also occupy just 5% of board level roles. Women occupy around 17% of board roles, but just 15% of middle management roles, compared to 27% globally.

The University of Warwick, and WMG, are acutely aware of this. As a University, the Social Inclusion Group launched their strategy in August 2019, setting out the framework for how the University would deliver its commitment to equality, diversity and inclusion. The University and WMG both hold a silver Athena Swan award.

WMG have proactively championed equality, diversity and inclusion across all its programmes – including DI4M. There has been a strong emphasis on working with women and ethnic minorities in manufacturing. A number of events have purposely included all female speakers to increase the amplitude of the female voice in manufacturing. It provides an opportunity to showcase women in manufacturing in leadership roles.

The successful internship programme, which looks to increase the number of young engineers, is very pro-active at achieving gender and ethnicity balance. The team actively promote this when talking to SMEs.

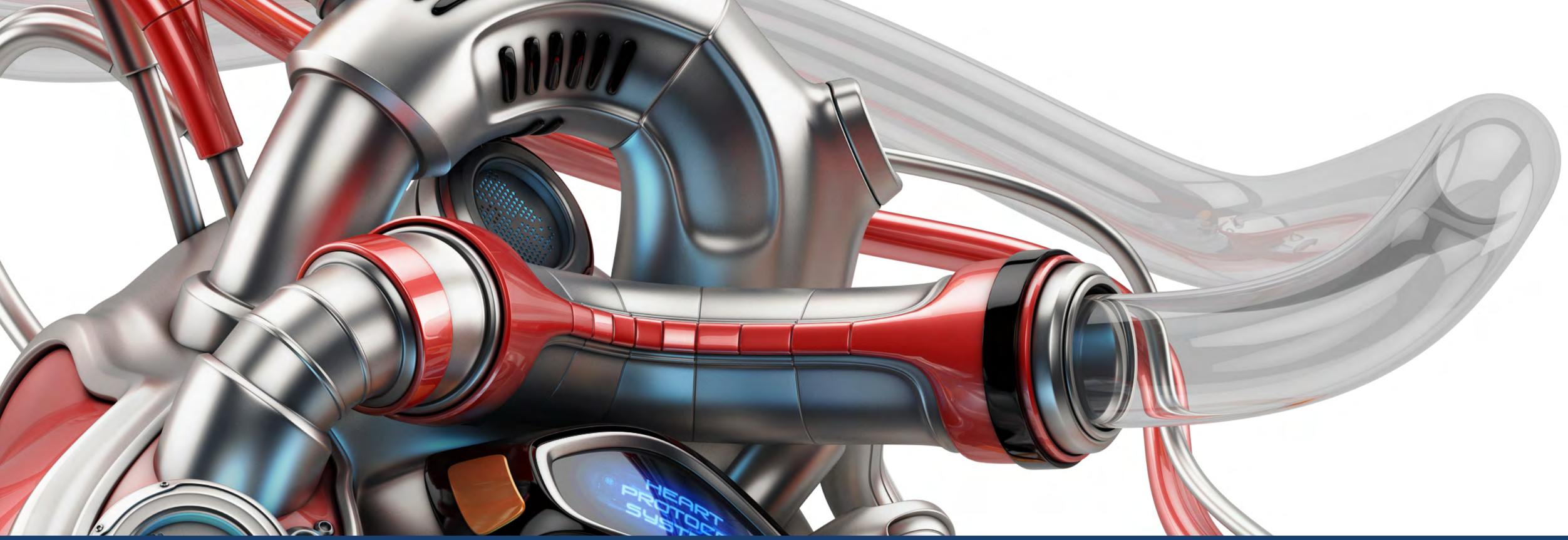
Success stories also ensure inclusivity, and there is a larger proportion of female and ethnic minority case studies in order to tackle the underrepresentation, increasing visibility of a diverse workforce.

[5] https://www.ciip.group.cam.ac.uk/news/women-manufacturing-initiative-/

[6] https://www.makeuk.org/-/media/eef/files/reports/industry-reports/manufacturing-our-recovery-through-inclusion-160621.pdf

"Circular manufacturing is an essential step in the journey to Net Zero and the work carried out by WMG was the first step in what has become the primary focus of Sarginsons' strategy: to be the first foundry in the world to have a totally circular supply chain."

Mark Nunan, Director - Sarginsons Industries Ltd



4. Project Outcomes & Impact

4.1. Progress towards Outcomes and Impact

The project has achieved each of its outcome and impact measures, as detailed below.

Outcome 1: New product/service leading to impacts on turnover and jobs.

The project has to date, helped 39 companies introduce new to market products, and 198 companies to introduce new to firm products. These numbers are expected to rise to 51 and 224 by the end of the project.

Survey data evidence suggests that 25% of companies reported increases in sales, at an average of £75,000 each (An average of £21k across all 77 respondents). The 335 C1 Enterprises Supported have a combined turnover of just over £1bn. If the increase were extrapolated across the 335 Enterprises Supported, it would result in an increase of £7.035m – with a 10% margin for error.

There is also evidence of a gross increase in employment of 693, across all 335 enterprises supported.

Outcome 2: Process improvements leading to eventual impact on productivity.

All businesses experienced a level of process improvement – given the nature of support. The surveys provide evidence that 45% of businesses increased productivity at an average of 21%. This is a higher proportion than it first appears, given that many projects (i.e. new product developments) will not lead to productivity increases.

Outcome 3: Innovation activity increase for future competitiveness, GVA increase and growth benefits.

The project has created £40.8m of Net Additional GVA and Safeguarded a further £174.4m. That is £215.2m of additional GVA, year on year, in the local economy that would not have existed without the support of DI4M.

Survey results show a reduction in manufacturing times of 43% for 39% of businesses, a 28% reduction in time to market for 25% of businesses, and a 51% reduction in the product design/development process for 45% of businesses.

Impact 1: Increased levels of innovation at manufacturing SMEs within the Coventry and Warwickshire, Greater Birmingham and Solihull and the Black Country leading to productivity improvement, new products and services being brought to the market.

The project has to date, helped 39 companies introduce new to market products, and 198 companies to introduce new to firm products. These numbers are expected to rise to 51 and 224 by the end of the project.

All businesses experienced a level of process improvement – given the nature of support. The survey evidence demonstrates that 45% of businesses increased productivity at an average of 21%.

Impact 2: Increased numbers of SME that are innovation active

At the time of evaluation, the project has delivered 335 Enterprises Supported and estimates it will support 374 by the time the project closes. These businesses have all been supported to adopt or apply digital innovation processes.

Impact 3: Net additional gross GVA and employment impacts

The project has generated Gross Additional Employment of 693, and Gross Safeguarded Employment of 2544. Once deductions and multipliers are applied, this results in Net Additional Employment of 660 and Net Safeguarded. Employment of 2659. This is 3,319 jobs in the economy that wouldn't have existed without the support.

Using employment to calculate GVA, the project has generated Gross Additional GVA of £38.7m, and Gross Safeguarded GVA of £159.3m. Once deductions and multipliers are applied, this results in Net Additional GVA of £40.8m and Net Safeguarded GVA of £174.4m. This is £215.2m of GVA in the economy that wouldn't have existed without the support.

4.2. To What Extent are the Changes in Relevant Impact and Outcome Indicators Attributable to Project Activities?

In calculating economic impact, we have used the employment data collected over the course of the project.

Net Impact has been calculated at the Multi-LEP geographical level. Employment data has been used to calculate GVA and utilises data obtained from the latest available version of the Annual Business Survey (May 2021) for appropriate SIC codes.

We have applied a series of standard economic multipliers. For GVA and employment, Deadweight has been applied at Zero, as respondents were asked to attribute any increase in employment directly to the support received.

Displacement of 29.3% and Leakage of 11.5% have been applied based on HCA guidance (for regional-level business development and competitiveness support, in line with BEIS guidance).

Type I economic multipliers have been applied at the SIC divisional level. Type II multipliers not only include the direct (impact on the business supported) and indirect effects (impact on the supply chain), but also account for induced impacts – the increase in household income throughout the economy.

Substitution is not applicable to this type of intervention, whereby existing employees at an SME will not have been replaced by other SME funded/incentivised via public monies.

4.3. What Are the Gross and Net Additional Economic, Social and Environmental Benefits of the Project (Where Relevant and Applicable to Project Activities)?

Table X shows that the project has generated Gross Additional Employment of 693, and Gross Safeguarded Employment of 2544. Once deductions and multipliers are applied, this results in Net Additional Employment of 660 and Net Safeguarded. Employment of 2659. This is 3,319 jobs in the economy that wouldn't have existed without the support.

	Net Additional Employment	Net Safeguarded Employment	Net Additional GVA	Net Safeguarded GVA
Gross Impact	**693**	**2544**	**£38,758,269**	**£159,360,324**
Deductions				
Deadweight	693.0	2544.0	£38,758,269	£159,360,324
Displacement	490.0	1798.6	£27,402,096	£112,667,749
Leakage	433.6	1591.8	£24,250,855	£99,710,958
Multiplier	660.1	2659.2	£40,822,811	£174,473,137
Net Additional Impact	**660.1**	**2659.2**	**£40,822,811**	**£174,473,137**
Net Impact Extrapolated across 75% C1 Beneficairies (n=114)	**495**	**1994**	**£30,617,107.92**	**£130,854,852.89**

Table 5: Net Additional Jobs and GVA

Using employment to calculate GVA, the project has generated Gross Additional GVA of £38.7m, and Gross Safeguarded GVA of £159m. Once deductions and multipliers are applied, this results in Net Additional GVA of £40.8m and Net Safeguarded GVA of £174.4m. This is £215.2m of GVA in the economy that wouldn't have existed without the support.[7]

[7] One company, Ramfoam, were responsible for the creation of 550 jobs and safeguarded a further 750. This accounts for 79% of all additional employment and GVA, and 29% of all safeguarded employment and GVA.

As we have used a series of ready reckoners (based on HCA guidance) to calculate additionality, we have also applied a 75% sensitivity test which offers a more cautious estimation and could be considered the minimum impact level.

It is likely that the employment and GVA impacts will continue for several years, providing ongoing benefits to the local economy. To estimate this ongoing impact, a 10-year persistence effect can be applied utilising a discount rate of 3.5 per cent (based on HM Treasury Green Book). To calculate this we have only used the employment increase as measured by the project and have not included the additional data collected from the Beauhurst research. The 10-year impact estimates are as follows:

Persistence Measure	GVA
DI4M 10-Year net additional economic impact based on employment increase.	£351,389,959
DI4M 10 Year net safeguarded economic impact based on jobs safeguarded.	1501810067.0
Combined 10-Year net additional and safeguarded economic impact based on employment.	1853200027.0

Table 6: Persistence Measures

4.4. Can these Benefits Be Quantified and Attributed to the Project in a Statistically Robust Way?

All impacts are attributable to the project as respondents were asked to attribute any increase in employment directly to the support received.

Creating a Counterfactual Argument by Attributing Benefits

Engaging with companies who have been supported by the project is challenging and is evidenced by the take up rate of our surveys. Overall, we had 77 responses from the Surveys out of approximately 300 survey invites sent out. That's a positive return rate of 26%. Companies are suffering from survey fatigue (a combination of lots of evaluations, small business surveys, and various Covid related surveys). They are also, quite understandably, still focussing on recovery from the pandemic.

We have serious doubts about the validity of using publicly available data as a counterfactual, particularly at this point in time. Most of the data available is from either 2019 or at best 2020. It is likely that financial and employment data is representative of pre-Covid performance, and in our view, that would be incomparable to current performance.

In addition, taking a pre-support and post-support position is not always a true reflection of the reality. For example, when looking at turnover or employment, a company may turnover £10m and employ 100 people before support, and turnover £9.5m and 90 people after support. Using that data in isolation, it would look like the support has had no impact. Yet, in reality, it may have been that the company actually lost 15 people, but the support helped them to generate 5 new jobs. Adopting a pre and post approach would not have captured this.

The same principle is applied in the opposite direction – a company may increase their turnover or employment, but it may have nothing to do with the support given.

This would also be true of productivity, if using turnover per employee as a proxy. The support may improve the productivity of a process within a business, but this wouldn't necessarily always appear in the financials, particularly if you take into account the example above.

Because of these reservations, we maintain that directly asking the company to 'attribute' impact to the support given is one of the best ways to create a counterfactual argument. By directly asking the company to state the increase in turnover (£ value) as a direct result of the support provided, means we don't overclaim or underclaim any impact, and a credible and robust counterfactual argument is created.

"Essentially [the touchscreen technology] makes the lives of our workforce easier and allows managers to track a job on the system and immediately see where it is in the manufacturing process."

Gavin Dodds, General Manager - Genius Facades Ltd

4.5 To What Extent Has/Will the Project Contribute to the Achievement of ERDF Programme Result Indicators?

The project has contributed towards all ERDF programme result indicators.

1.2 Proportion of small and medium sized enterprises that are innovation active

At the time of evaluation, the project has delivered 335 Enterprises Supported and will support 374 by the time the project closes. These businesses have all been supported to adopt or apply digital innovation processes.

1.3 Research and development tax credit by number of claims under the SME scheme

There is evidence of 15 R&D tax credit claims. In addition, there are other positive indicators. The project has to date, helped 39 companies introduce new to market products, and 198 companies to introduce new to firm products. These numbers are expected to rise to 51 and 224 by the end of the project.

In addition, annual R&D spend by beneficiaries in the financial year prior to engagement was £28.5m, in 79 of the 393 beneficiaries where data was available.

1.4 Research and development tax credit by value of claims under the SME scheme

DI4M was responsible for 15 tax credit claims at a total value of £874,322.

1.5 Value of services provided to small and medium enterprises by higher education institutions

There is data available for 393 companies who received a total Gross Grant Equivalent support value of £4,204,304 at an average of £10,697 per company.

1.6 Number of contracts or interactions with small and medium enterprises

The project will achieve 373 C1 Enterprises Supported outputs by the close of the project, but has reached far more than this. It will achieve 204 C26 number of enterprises collaborating with research institutions. A proportion of these will go on to continue to work with the University. At least 15 companies have accessed the Universities Intern programme, and 10 companies have participated in the University's Knowledge Transfer Partnership Scheme (KTP).

5. Project Value for Money

Value for Money

With a total project expenditure (at the time of evaluation) expected to be £10.45m, and an ERDF contribution of £5,381m, our analysis of the value for money provided is summarised below. For the purposes of these calculations, we have used Project Closure Projections for Expenditure and Outputs.

- The total public cost per Enterprise Supported (374) is £14,387.
- When compared to research conducted by Regeneris[8] it represents exceptional value for money, significantly lower than the Mean (£34,000).
- If we take the project data, which evidences a gross increase in employment of 693, each individual additional employee will have come at a public cost of £7,764, and a total cost of £15,079.
- This delivers excellent value for money when compared to other projects we have evaluated – one comparator project delivered gross employment increase costs of £57.5k – over treble the cost to this project.
- When compared to the Regeneris benchmarks, the project will have achieved exceptional value for money, significantly lower than the Mean cost (£71k) and the Median (25.7k).
- The project is estimated to deliver £7.58 of net additional GVA per £1 of public money invested and approximately £32.42 of safeguarded GVA. That is £40 of GVA for every £1 invested, in the economy, that wouldn't have existed without the support.

[8] England ERDF Project 2014-20: Output Unit Costs and Definitions

"We have revised the way we look at product improvement and the design of new products now across the business because of the processes WMG introduced us to. This has the potential to drive real growth and innovation for the future"

Aidan Lewis, Technical Manager - Lanemark Combustion Engineering Ltd

6: Project Legacy

"The Net Zero Innovation Network cohort was really insightful; it enabled us to gain support with a practical project, whilst collaborating with other organisations. It's given us direction in our journey to Net Zero."

Stephen West, Head of Operations - Armac Martin

DI4M will leave a significant legacy for WMG, its regional partners, the wider innovation ecosystem and most importantly, the businesses it has supported.

It has raised awareness of the key role digitisation will play as an enabler for productivity and competitiveness. It has created a wider ecosystem around the policy area, increasing the understanding for regional stakeholders and partners.

One major benefit has been the duration. With 5 years, DI4M has had the space to grow as a project and as a team. The attitude to learning, professional development, continued improvement has taken delivery to a different level than has been possible before. We would encourage Government fund projects of this nature for longer than the typical 3 years – commission projects for 5 or 6 years from the start and give them the space to make a difference.

Internally, DI4M has raised the capability of WMG and the HVMC catapult. The team has grown significantly, and most of those highly qualified and competent people will stay. Advisors have come from industry – they understand the challenges businesses face and can talk to owners and managers in their language. The power of that must not be underestimated – and it plays a major role in being able to engage companies, prove credibility quickly, and create impact inside the business. Some of those advisors have left – moving back to SMEs and major multinationals. The knowledge they have gained from their time in DI4M is now being embedded back in industry.

The economic impact speaks for itself - £40m of Net Additional GVA, £174m of Net Safeguarded GVA, and a combined, potential, 10-Year net additional and safeguarded economic impact based on employment, of £1.85bn. That is a remarkable impact on the local economy.

But there are also a host of softer legacy impacts that have materialised. DI4M has altered the long-term behaviour of 86% of individuals supported by the project. 89% felt support had increased their likelihood of collaborating with the University of Warwick in the future. DI4M has broken down some major barriers that have existed between Academia and Business. Finally, during one of the most difficult periods to be a business owner in modern history, 74% increased their chances of survival, and 41% increased profitability. These are major achievements.

Finally, there are the follow-on projects that have been developed as a direct result of the learning that has occurred through delivery of DI4M. Made Smarter tapped into the learnings from DI4M in order to secure funding and will utilise the digital expertise of the advisor cohort.

The link between digital, decarbonisation and productivity has become clearer through DI4M – and is supported by the Enterprise Research Centre, based at Aston and Warwick Business Schools[9]. The Net Zero Innovation Network brings together like-minded companies to discuss how sustainability can be brought into manufacturing. The Business Aid Energy Toolkit (BEAT) is helping manufacturers to reduce their energy consumption and increase profitability through the provision of a site visit, energy usage identification process, and recommendations for cost saving opportunities.

[9] https://www.enterpriseresearch.ac.uk/enabling-the-triple-transition-in-uk-smes/

7. Conclusions, Recommendations & Lessons Learnt

Lessons for DI4M Team

Project Design

There has been a view amongst the team that long term and multiple interventions are ineligible. This is incorrect. In fact, there is a strong argument that long term interventions are necessary in the innovation arena. Repeat interventions have always been eligible, even though projects are only allowed to count the output once. There is little output benefit to delivering repeat support to a business, although there may be 'outcome' benefit - more jobs, more productivity. It is therefore back to Government measuring the right thing, and project owners provoking the decisions by designing projects that achieve this.

DI4M currently refers companies to the University Intern programme – but increasing investment in that provision and making it part of the core offer could make it easier for businesses to invest in interns, address a genuine need around skills shortages, and aid the implementation of change programmes. It would have the added bonus of the intern having access to WMG equipment and capabilities – creating a genuine partnership or collaboration.

Beneficiary Recruitment

Based on project data, the number of innovations in the past 3 years and annual R&D spend are still the best indicators of whether a company is likely to collaborate long term. Availability of resources and growth stage are important, but the culture of the business and capacity, capability and vision of the management team are crucial.

Engaging businesses to understand the barriers to engagement with WMG/HEIs could be an interesting exercise. Looking at new ways to break down barriers.

Project Management and Governance

The disbanding of the Project Advisory Group has been unfortunate – particularly given the strength of that group and the role it has played in connecting the project to local and regional partners. Many Steering Groups fail to steer – but the PAG played an important role in the development of the project in the first few years, even if at times that was only from an information sharing perspective. The personal relationships with individuals have continued, and that is good – and members of the project senior team now sit in on a number of regional innovation networks.

We recommended the categorisation of interventions based on the nature of the SME projects. It has been carried out to a certain extent, but inconsistently. The project has had a significant impact in several areas – understanding what the intention of SME projects were would help refine these indicators. For example, according to the survey, 46% of businesses reduced waste by an average of 14%. What we don't know is, how many projects had the intention to reduce waste. The capture and coding of that information on the CRM could increase understanding of project impacts even further.

Like its counterparts University processes are bureaucratic. The SME group and DI4M in particular, have done an excellent job of operating like a business, being able to respond in commercial timeframes. More autonomy around areas such as recruitment, contracting and financial processes could further increase efficiency and effectiveness and thereby enhance the University's reputation.

Marketing

The team should look at how the project and SME group is marketed. We have recently seen ERDF projects delivered by private sector organisations who have dedicated resource and expertise at marketing. They have focussed on building brand recognition. When an offer isn't in the line of sight of people, project's have to throw a great deal of marketing effort at it – that was the case during Covid and was the same challenge in expanding the project into SEMLEP. Also, marketing shouldn't try to do too many things – carrying one clear message. The project we examined also gave entrepreneurs and businesses the chance to showcase their business at investor days and events. Whilst that may not be appealing or suitable for all DI4M businesses (especially in the hard-nosed world of manufacturing) – we believe the principles are the same. The view across the team is that to be successful with companies, DI4M and the wider SME group need to prove their industry credentials and operate more like a business. We would recommend that consideration is given to a marketing approach that aligns with this.

Treating marketing as seriously as a business could also help. We have seen some excellent things happen when private sector delivery partners have thrown serious resources at marketing, events and brand recognition. Behaving like the private sector in that area could have dramatic benefits and create an even bigger distinction between WMG and other public sector support.

Lessons for Project Designers

We always recommend that projects start with the 10 out of 10 solution, the thing that would really drive growth – and work backwards, as opposed to starting from the conventional wisdom, or the way it is always been done. This could drive real innovation in the way the supply side operates.

A well evidenced and argued case for could be made around longer or more intensive support in future delivery. For example, a 5-year project, working with far fewer companies, which puts companies on a pathway where they connect multiple times across a number of years. Or 6-month, intensive intervention (location based for early-stage entrepreneurs) with access to experts and facilities, could speed up commercialisation and their access to funding.

There is a significant opportunity to deliver wraparound support. Project desigsn could work harder to connect programmes.

In a world where resources are short consider collaboration with others – don't compete. One organisation could deliver the analytical support, another could do processing. analytical, they could do processing. Co-promotion and hosting of events could help raise the profile and develop the ecosystem. It could be a collaboration, with 1 project and multiple partners, or something more collaborative where 5 projects all operating under an umbrella brand, with one entry point.

"We had such a positive experience working with Kieran that we have subsequently recommended WMG's digital factory optimisation tools and will continue to do so."

Stephen Blythe, Business Manager - Jaltek Systems Ltd

Lessons for Policy Makers

Monitoring and Audit

We believe the current DHLUC monitoring officer delivers a Best Practice benchmark in terms of support – his approach needs to be bottled and replicated. Communication is good, there are clear instructions and good knowledge. A large part the success is the attitude and culture of the individual – one of being supportive and trying to help. Assistance has been pragmatic, responsive, but strict on standards / clear on what is expected, ensuring the project is delivered in the way it was intended.

There has been too much threat and fear in the delivery of ERDF. There is a big difference between deliberately circumventing the rules and making an honest mistake. Both are have been treated the same by the MA, but shouldn't be.

There are too many checks and audits in ERDF which are non-value adding and divert project teams away from what they should be doing. This has been a massive waste of limited resources.

Outputs vs Outcomes

There are too many tactical and not enough strategic outputs in the world of ERDF. The policy should provide projects with the option to undertake more strategic support – longer interventions, fewer volume outputs, longer term impact. Innovation is different and it needs to be treated differently. We are asking for businesses to think more strategically and look more longer term at sustainable growth – but we are delivering short term, quick fix interventions. If we want businesses to think 5 years ahead, we should be designing support that allows them to do so.

The closer to market a company is, the less likely they are to engage. The ERDF requirement to count the number of companies as opposed to the number of products taken to market seems ham fisted. The measure of the innovation health in an organisation is the volume! (There is a requirement for projects to capture the number of product or process innovations in the last three financial years (the average across 129 companies for DI4M was 5 per company). We also believe that the introduction of a new process can be as valuable as a new product – and in the right circumstances, can be a better indicator of innovation. The MA and Commission guidance on these issues has been equally thin and often unhelpful. We would encourage HMG policy makers to reconsider how innovation is measured in the future.

Inefficient Processes

Application forms and paperwork continue to frustrate client businesses and be a barrier to entry. Government have looked at system to ease the burden on the supply side (Spotlight) but have not done the same for business. One radical (but sensible) suggestion might be to have one centralised HMG application system. Companies could complete a single application for the year which allows them to access support across the country. Partners could access the system and download the company information to test eligibility/suitability. It would also allow partners the chance to upload the amount of aid granted. Companies could renew applications each year.

Future Opportunities

UKSPF is a chance to improve things and an opportunity to learn from past mistakes, but it is already looking like it will be almost as complex to manage as its predecessors. At every turn, it seems like contracting gets more difficult – for example there will be 24 (or more) contracting bodies across the Midlands, multiple partners and Local Authorities (many with limited prior experience) making decisions with little sign of cross collaboration or economies of scale.

It remains true that company managers feel that when something is free, it must have limited or no value. Asking companies to contribute is a good test of their commitment, and it can support the development of further services. A contribution of towards total project costs (25%?) may be a good place to start. SPF could embrace income generating projects.

Many of the implementation issues that have been experienced have the potential to be resolved. But they require the Managing Authority to improve their understanding of the realities of delivery, and project design. Longer projects would allow more space for innovation and creativity in terms of learning and adapting and giving teams more stability with their roles – which may allow delivery organisations to improve the quality of the people they can attract. Fully funding implementation and close out periods is one option which deserves serious consideration – if the intention is to use learning to drive the improvement of public services. Taking 3-year projects, and turning them into 4 years, by adding 6 months at the front end to recruit, setup processes, etc. and 6 months at the close to sweep up and capture impact could materially improve delivery.

8. Case Studies

James Lister and Sons Ltd

BEATING the energy crisis – Getting to grips with business data to make big energy savings

Challenge

James Lister and Sons Ltd is an engineering services supplies company that turns over £15 million. It operates from six locations in the Midlands and south Wales, employing 100 people. The Listertube division which manipulates metal tubes used in hydraulics, heating appliances and exercise equipment, approached WMG to collaborate as the energy crisis began to take hold. Like many other manufacturers across the UK, the rising energy prices were impacting production costs and reducing their bottom-line returns.

Solution

Listertube joined WMG's Net Zero Innovation Cohort which brings together groups of businesses to discuss issues relating to energy costs, emissions, and the UK's NetZero ambitions. After participating in a series of collaborative workshops and a benchmarking exercise to review their current Net Zero position across the business, WMG carried out an Energy Value Stream Map (e-VSM) for Listertube to find out where where they were consuming the most energy and how they could reduce it.

Impact

- WMG identified that by turning off machines when not in use, Listertube could save around 15% in energy costs and that prioritising one machine over the other to create products could result in an 82% energy saving on some individual machines
- Listertube invested in a new all electric machine to replace the highest energy using machine which should draw between a sixth and a tenth of the previous energy usage. They also installed a rapid action door preventing warm air escaping when forklift trucks go in and out of the factory
- Overall following the project completion, Listertube expect to save up to £6,000 based on future predicted costs, approximately 19% of current energy expenditure

DI4M Case Studies

Sarginsons

Waste streams to wins - Midlands foundry uncovers potential to reduce core shop waste by 50%

Challenge

Coventry based Sarginsons are a leading European aluminium foundry that design and produce complex aluminium castings for light weighting in the automotive sector as well as for rail, oil and gas, and wind energy applications. They needed help to work out why only 53% of the 280 tonnes of silica sand they purchased each year was contributing to the production of usable cores and why the rest was not being utilised. Any sand not used went to landfill. This was a huge material loss stream for them.

Solution

WMG's Laura Downey first set about measuring and mapping the process from silo to finished core. It was discovered that 133 tonnes of silica sand per year were not being utilised, costing the business over £18,000. Laura also identified the wasted energy costs involved in this process which was around 15000kWh/ £2000.

Laura then went on to make recommendations for how Sarginsons could reduce this. Ideas included using digital solutions to monitor equipment, predict and preventative maintenance, and engaging employees to minimise waste more effectively. She suggested that unavoidable waste sand and post processes sand could be used to create construction materials and presented a business opportunity to reuse and reclaim sand onsite or work with other casting firms to do this collaboratively offsite.

Impact

- Sarginsons now have the potential to boost their environmental credentials which is hugely important as part of their role on the Coventry City Climate Change Board and with their customers and supply chain.
- A 50% reduction in waste in the core shop process will result in significant cost and energy savings and 2.6 tonnes in Co2 equivalent.

DI4M Case Studies

The Alternative Pallet Company Ltd

Sustainability project leads to 60% of waste offcuts reused

Challenge

The Alternative Pallet Company, based in Northamptonshire, provide a range of lightweight, strong paper-based Honeycomb pallets under the trade name PALLITE. They offer an affordable alternative to wooden pallets with the same product performance – but with the added bonus of being 100% recyclable. The company were committed to streamline their production processes. Although the PALLITE products are more sustainable than timber alternatives, there were still efficiencies to made, with 10 tonnes (15% of total produced) of Paper Honeycomb offcuts per month sent to an external facility to recycle. The company wanted to know if there were any new product opportunities or revenue streams to explore by re-using the offcuts instead.

Solution

WMG's Laura Downey set out to find an alternative use for the Paper Honeycomb offcuts and conducted an extensive feasibility study using the '5 Rs' sustainability hierarchy. She proposed that nesting optimisation software would be the most effective way to minimise waste, increase efficiency, reduce labour and raw material costs per part.

She then made recommendations for how offcuts could be repurposed, including animal bedding, moulded pulp packaging, and packaging insulation and inners. It was concluded that using the offcut materials to create packaging inners and packaging fitments was the most sustainable alternative use. The honeycomb traps air within the hexagonal cells and works very well as a thermal insulator. These packaging inners and fitments would be a brand-new product for the company to market.

Impact

- As a direct result of the feasibility study, The Alternative Pallet Company purchased a slitting machine, to slice the off cuts into packaging inners and packaging fitments which gave a return on investment in less than a year
- The impact of implementing alternatives to recycling include reducing waste offcuts by 6 tonnes per month, which is a 60% reduction

DI4M Case Studies

Gordon Ellis & Co

Woodwork company nails success with more than 70k savings

Challenge

Gordon Ellis & Co is a UK manufacturer of precision woodworking and rotational moulding. Specialising in CNC precision woodworking, products include hospital bed frames, trolleys, high end audio equipment casings, and premium engineering grade automotive components. Although the company has progressed massively from manual manufacturing practices to industrial machinery, they wanted to step into the digital age. They wanted to identify how 'digital manufacturing' could create improvements on their shop floor to meet increased customer demand.

Solution

WMG's Onur Eren undertook a detailed investigation of the key facilities 'current state', reviewing existing equipment, productivity, efficiency, and data outputs. He was able to propose a 'future-state', recognising equipment suitable for upgrade, targeting challenge areas, and identifying the business's core capabilities. He proposed how costs could be reduced by eliminating material waste and promoting operational excellence methodologies and suggested methods to gather data from the factory.

Impact

- The preliminary project 'quick wins' suggested by Onur saved the company £70k a year.
- These savings will allow them to invest in the newly defined strategy, targeting industry 4.0 technologies. More substantial gains will be realised after installation of state-of-the-art CNC equipment, yielding an estimated fourfold gain in production capacity
- The company subsequently won Innovate UK KTP funding for a project aiming to increase the turnover of Gordon Ellis & Co by £540k over the next five years

Gordon Ellis & Co

Woodwork company nails success with more than 70k savings

Challenge

Gordon Ellis & Co is a UK manufacturer of precision woodworking and rotational moulding. Specialising in CNC precision woodworking, products include hospital bed frames, trolleys, high end audio equipment casings, and premium engineering grade automotive components. Although the company has progressed massively from manual manufacturing practices to industrial machinery, they wanted to step into the digital age. They wanted to identify how 'digital manufacturing' could create improvements on their shop floor to meet increased customer demand.

Solution

WMG's Onur Eren undertook a detailed investigation of the key facilities 'current state', reviewing existing equipment, productivity, efficiency, and data outputs. He was able to propose a 'future-state', recognising equipment suitable for upgrade, targeting challenge areas, and identifying the business's core capabilities. He proposed how costs could be reduced by eliminating material waste and promoting operational excellence methodologies and suggested methods to gather data from the factory.

Impact

- The preliminary project 'quick wins' suggested by Onur saved the company £70k a year.
- These savings will allow them to invest in the newly defined strategy, targeting industry 4.0 technologies. More substantial gains will be realised after installation of state-of-the-art CNC equipment, yielding an estimated fourfold gain in production capacity
- The company subsequently won Innovate UK KTP funding for a project aiming to increase the turnover of Gordon Ellis & Co by £540k over the next five years

Pashley Cycles

Long term partnership leads to awards and new product success

Challenge

Pashley were approached to bid as a partner for a £79.7m contract to develop a new bike for the Transport for London (TfL) London Cycle Hire (LCH) scheme. The timeframes were extremely tight, they would have just 18 months to design, develop and launch a brand-new bicycle. They would need to source new materials that were lightweight and robust, a different approach to the traditional materials Pashley used in their classic bikes. To move forward, they had to prove to Serco, the contract provider, that they had the capability to deliver high-quality bikes in modern materials and that's where WMG came in.

Solution

Using 3D printing, WMG experts 'mocked up' Pashley's prototype designs to look like metal and plastic moulded parts, so they could demonstrate to Serco their unique design capabilities and robustness. WMG also helped with the selection of an alloy to make the frame and other components, which was vital in helping Pashley secure the partnership with Serco. Via our extensive networks of UK manufacturers, WMG were also able to introduce Pashley to a supplier for the plastic components, anchoring the supply chain for these British-made, iconic London bikes firmly in the UK.

Impact

- Pashley was successful in being selected as the sole supplier for the next generation of London Cycle Hire bicycles, a five-year contract that secured the jobs of 50 people at the company
- This success led to a further contract to supply 1,000 hire bikes (including 100 e-bikes) to the Edinburgh Bike scheme and a contract to supply the West Midlands Cycle Hire scheme with 1500 hire bikes (including 150 e-bikes)
- Following this project, Pashley went on to collaborate with WMG and a wider consortium including Simpact Engineering, Reynolds Technologies, and Foresight Innovations to develop an award-winning novel, e-assisted cargo trike

Jaltek Systems

WMG support programmes pave way for major change and new product growth at manufacturing firm Jaltek Systems

Challenge

Jaltek Systems is a contract electronics manufacturer based in Luton with over 30 years' experience. With growing demand for their electronic box build capability (where they assemble a full electrical system on behalf of clients), they approached WMG to help with their plans to set up a new facility to help them realise their ambitious growth targets.

Solution

Initially WMG collaborated with Jaltek to review how their existing factory layout could be scaled up in the new facility to meet demand for the company's growing box build capability. After undertaking analysis on the "current state" of the production process, WMG conducted a laser scan of the existing and new production facility areas using state of the art equipment from their Centre for Imaging, Metrology and Additive Technologies. This enabled WMG to design an optimal digital 3D version of the "future state" for the new facility that could be customised going forward. Alongside this, a series of recommendations were made including implementing digital visual management in new areas to track build progress, separating out a test area from assembly, and implementing more ergonomically friendly workstation design.

Impact

- The new factory layout offers a potential 75% increase in capacity going forward which will allow Jaltek to meet any potential surges in demand
- Following this work, Jaltek took on intern Nayan Wani for 12 weeks on WMG's Internship Programme to oversee the project management of the new facility to get it up and running to enable the delivery of multi-million programmes with two key clients.
- The partners are now embarking on a two-year Knowledge Transfer Partnership (KTP). The KTP will embed cutting edge management techniques into the organisation to allow them to make transformational changes, including launching into new markets and improving operations.

DI4M Case Studies

HausBots Ltd

Wall climbing robot developed for market has potential to save hundreds of lives

Challenge

An innovative small manufacturing company HausBots had developed a unique remote-controlled robot that can climb vertically and tackle rough surfaces and obstacles such as wires without the need for scaffolding. Using a robot for painting difficult to reach places offers the potential to significantly reduce the number of work-related falls and accidents in the construction industry. They initially needed help with early prototyping and later some specific testing work to ensure that any radiated emissions from the robot did not affect other machinery on a building site and likewise that radio emissions from other equipment did not affect its performance.

Solution

WMG worked with HausBots on the circuit motor controls and designed the system to help them get from prototype to production ready. They then linked with WMG robotics experts and gained access to WMG specialised electronics testing facilities to undertake the important testing work. The tests identified that there were some radiated emissions from the robot umbilical cable (the cable that carries power, paint, and data). WMG supported Hausbots to design out the issue with an invaluable product development service and provided further guidance regarding the certification process. WMG also implemented extensive electro-magnetic compatibility (EMC) testing to make sure the fans, which attach it to the surface were functioning correctly.

Impact

- The project accelerated the development of the product by many months, bringing it to market faster than would have been possible without WMG's support
- The product is now selling internationally, with plans to increase their global reach

DI4M Case Studies

Woodhall Products Ltd

Manufacturer expands horizons with new scanning tech

Challenge

Woodhall Products Limited based in Dudley has a heritage as an established toolmaker, press shop, machining, and welding business. With big plans to double the size of the firm over the next three years, they had already pushed the boundaries by investing in 3D printing capabilities. However, they knew that there was the potential to add even more value to existing processes and were investigating if it was viable to procure scanning facilities to bolster their offering in concept design, prototyping and low volume manufacturing. They needed some additional expertise in scanning technology and contacted WMG for guidance.

Solution

WMG's Deeksha Sampath met with Ian Heaford at Woodhall to find out more about their requirements. Investing in a scanner would allow Woodhall to generate polygon mesh files and get more precise data to create CAD or amend designs for clients. This would close the loop, giving them an enhanced product development offering and generate additional turnover. Deeksha conducted a technology and research review of the best scanner offerings available to Woodhall for their budget and specification, thinking about the potential clients and existing processes in the business. She visited potential suppliers on behalf of Woodhall to get more detailed information and to make a full assessment.

Impact

- Deeksha presented a report of her findings with recommendations for the most suitable manufacturer and model scanner for Woodhall which de-risked the decision to invest
- Using the report, Woodhall were able to secure funding to support 50% of the cost of the new scanner.
- The new capability will allow Woodhall to secure more work (£195,000 over 3 years), increase productivity, export further overseas, and create new jobs
- Parts and products through scanning can now be Reverse Engineered
- The project has helped to futureproof the business, with more flexible solutions to offer clients

DI4M Case Studies