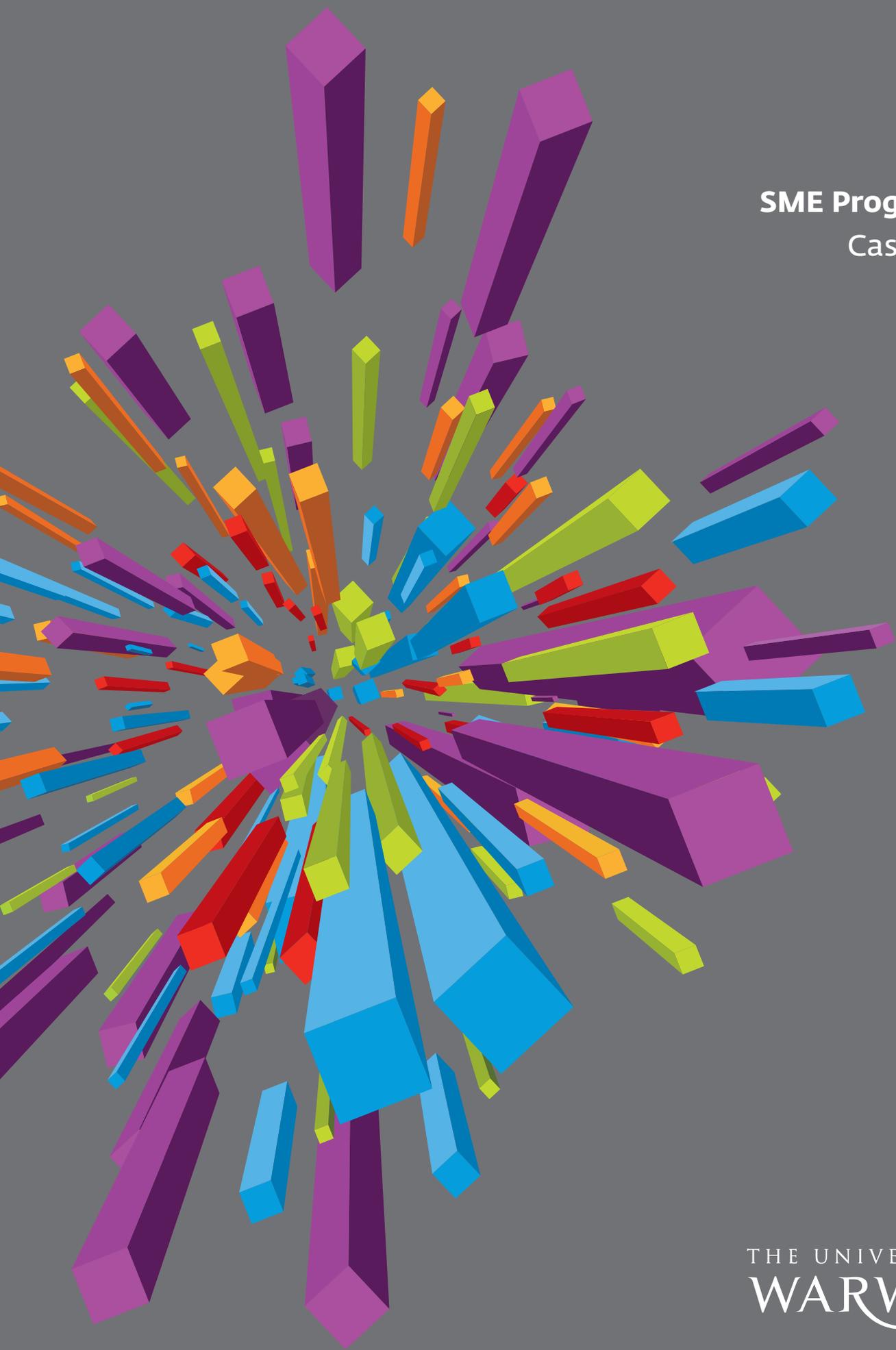


SME Programmes
Case Studies



Foreword – Dr Mark Swift, Head of SME Programmes



It has often been said that small and medium-sized enterprises (SMEs) are the engine of the UK economy, not only that, but their ability to be agile and to think differently often provides the innovation fuel for future market leading products. WMG is proud to have a long track record of working with SMEs in order to help them access new research-led technologies and become more competitive. We have consistently advocated the importance of creating an environment with the right conditions where SMEs benefit from cutting edge research and new thinking in order to develop innovative new products, services, and processes.

I have been Head of SME Programmes, leading the WMG SME Team for over ten years, and have witnessed the benefits of establishing strong and lasting relationships with businesses, working in partnership with them through the various challenges and opportunities they face. During this time, I have overseen the delivery of three major SME support programmes, from online marketplaces to the International Digital Laboratory, and have been continuously impressed by the growth of dynamic and talented businesses in our region of the West Midlands.

Here we showcase examples of partnership work with SMEs from a range of sectors undertaken through the innovation programme at the International Institute for Product and Service Innovation (IIPSI).

The most compelling stories highlight a journey that a business has taken from discovery of a new idea at a workshop through to commercialisation of that idea into a new product or an in-depth research project. It has been a delight to accompany businesses on that journey and witness them move up their respective value chains, creating smarter and more customer focused products and services. We have encouraged our SME partners to work together to create competitive advantage and have been encouraged to see successful collaborations emerging as a result of the networks we set up at IIPSI throughout the duration of the programme.

As the programme at IIPSI comes to a close, the future of partnership work between universities and SMEs looks promising. We believe that we continue to lead the way in developing major new initiatives to support SMEs with the ever-changing business landscape. We are supporting the work of the High Value Manufacturing Catapult Centre, the Advanced Propulsion Centre, and our Local Enterprise Partnership, and are involved in the development of a range of new innovation and skills projects to ensure that the legacy of the IIPSI programme continues.

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About WMG SME Programmes



The International Institute for Product and Service Innovation (IIPSI) and its Innovation Programme was launched as a facility at WMG, to support West Midlands SMEs access world-leading technology to develop highly competitive, innovative products and services.

IIPSI was part funded by the European Regional Development Fund and the University of Warwick, to the value of £12.4 million. Over the last four years, we have worked with 200 SMEs giving technical demonstrations, delivering workshops, offering specialist internships, undertaking intensive innovation projects, and collaborating on research. The interns were selected from across University departments, mentored by an IIPSI technical expert and were part funded by the SMEs. The programme has created over 65 new jobs in the region, safeguarded 140 and created four new innovation driven businesses.

IIPSI focused on three theme areas; Internet of Industrial Things and Digital Systems, High Value Manufacturing, and Customer

Insights, with the intention to support a future of smart, digitally connected, user centred products.

High Value Manufacturing

We have a long heritage in the manufacturing sector. The particular areas of expertise that we have offered to SMEs include Additive Layer Manufacturing, Advanced Materials Testing, and the Reuse and Recycling of Polymers. One of the key outcomes of embedding these technologies and capabilities into businesses has been the shift from them being part of large supply chains to becoming Original Equipment Manufacturers (OEMs), manufacturing their own products in new market sectors.

Internet of Industrial Things and Digital Systems

The Internet of Things (IoT) is transforming consumer products and services, giving consumers the ability to monitor activities and control their electronic devices from a distance. The data generated in this network of devices is being collected, analysed, used to improve business efficiency, and better serve customers. We work in the area of Internet of Industrial Things (IoIT), helping SMEs improve their equipment's reliability and develop systems that make industrial and business processes more efficient.

Customer Insights

We advocate the need for user considerations in the innovation process, with Experience Led Innovation (ELI) specialists working to determine the best way to capture user perceptions to feed into engineering and design processes. ELI is innovation that is informed by how people use or experience a product and service. We have developed practical tools, such as customer 'persona' workshops, to help SMEs better meet customer needs when developing new products and services. A number of SMEs have benefited greatly by putting their customers at the centre of innovation in their businesses.

The directory on the following page lists 26 SME case studies, and indicates the expertise areas that have been applied, those that have resulted in the creation of a new product, service or new business, and those that have benefitted from an internship or access to R&D funding.

Case Study Directory



Company Name	IoIT & Digital Systems	High Value Manufacturing	Customer Insights	New Product/Service	Internship	R&D Funding	New Business	Page No.
Automotive Insulations Ltd		●		●	●			15
Barkley Plastics Ltd	●	●		●				29
Barton Coldform Ltd		●		●				16
Beerbods Ltd	●			●			●	25
Boomerang Plastics Ltd		●		●				24
Caption Data Ltd	●		●	●	●			28
Cornpoppers Ltd			●	●				26
Digital Native Academy Ltd	●	●	●	●				6
Goodfish Ltd ('Stique)		●		●		●	●	7
Hills Numberplates Ltd			●	●				17
Hobsons Brewery & Company Ltd	●	●		●				27
Hospitality Umbrellas Ltd	●	●	●	●			●	8
Induction Technology Group Ltd		●	●	●				18
JSC Rotational Ltd		●						30
Lightwave RF Plc	●		●	●		●		12
MAN Group		●				●	●	19
Mudhugger Ltd	●			●			●	9
Pashley Cycles Ltd		●	●	●				10
Printed Electronics Ltd	●	●		●	●	●		13
Region Services Ltd		●		●				14
Simpact Engineering Ltd		●		●	●	●		20
Strand Hardware Ltd	●			●				21
Thermotec Plastics Ltd		●		●				31
Trans-Rak International Ltd	●			●				22
Warwick Music Ltd		●		●				11
Wickens Engineering Ltd	●				●			23

Creative



Digital Native Academy Ltd

3D Printing Revives Cultural Relic

The Company

Digital Native Academy is a digital media and innovation practice with offices in The Public in West Bromwich and Spectacle Works in the Jewellery Quarter in Birmingham. Founded six years ago, it provides a range of services to the public, private, academic and third sectors.

The Challenge

Digital Native Academy was working with Walsall Museum on a Heritage Lottery funded project to engage younger audiences with an old relic of Walsall's past; The Bayard's Colts. These are a series of ceremonial clubs held at Walsall Museum; with a range of distinct heads that date back at least to the eighteenth century. They are likely to be older, but their exact age, their origins, and even their name are shrouded in mystery. Digital Native Academy was helping Walsall Museum to explore how new technologies could be used to create a more exciting visitor experience for younger people when they came across our International Institute for Product

and Service Innovation (IIPSI).

The Solution

Geoff Henderson, Director at Digital Native Academy first met with us to help the company and the various project stakeholders think creatively about the visitor experience they wanted to create in the museum. We set up a workshop for local people, museum and council staff to develop ideas together for what young visitors to the museum would want to experience from the exhibit. We also brought together other WMG staff who had expertise in digital and manufacturing technologies to generate ideas for how technology could enhance the Bayard's Colts. Following the workshop, we agreed to develop an interactive model of one of the Colts using Additive Layer Manufacturing and 'Internet of Things' technology. A series of 3D printed heads were made, one using different types of materials that would be engaging for young people with sight impairments. Using the digital 3D model, Geoff went on to replicate the heads in chocolate as gifts in the museum. The final

head was a clone of a demon like club that was fitted with glowing eyes and an Arduino that was programmed to change the colour of the demon's eyes when someone sent a message to it via Twitter. The heads were showcased in the museum and the feedback of the piece was very good. We went on to use the head in the IIPSI building to demonstrate how physical things can be connected to the Internet.

The Results

Through the project, both Digital Native Academy and Walsall Museum accessed valuable skills and know-how to develop future visitor experience pieces in the sector. The project resulted in the creation of a new job at Digital Native Academy and was one of the first projects at IIPSI that demonstrated how all three theme areas could be combined to support an organisation with new product and service ideas. DNA also invested in their own 3D printer and were then well equipped to offer their own 3D printing service going forward.

“The relationship we have with WMG is very much about collaboration, not only are we gaining from the advanced 3D modelling, manufacturing and design skills they have, but they are learning from our experience in the culture and heritage sector too.”

Geoff Henderson,
Director, Digital Native
Academy Ltd



Consumer Products



Goodfish Ltd ('Stique) Injection Moulder secures

Kickstarter funding for its Own Range of Products

The Company

Serving Tier 1 Suppliers and OEMs, Goodfish Ltd is an established, high growth tool-making and injection moulding company based in Cannock Staffordshire.

The Opportunity

Goodfish were looking to invest in developing their own product line. They approached us having heard about the range of support available for West Midlands SMEs in product and service development. Managing Director of Goodfish, Greg McDonald, had developed a new product concept for a bicycle tyre lever and was looking for some support in bringing it to market.

The Solution

Greg attended several workshops,

including a session about customer centred innovation, and a session highlighting the different Additive Layer Manufacturing (ALM) technologies that are available for prototyping and low volume manufacture. He then worked with our polymer specialists to develop his product ideas further. We produced printed prototype parts so that Greg could test the mechanical and aesthetic properties of a particular material, and offered some further insight into the feasibility of Goodfish investing in their own ALM capabilities for product development purposes.

The Results

Following the various trials at WMG, and additional work Greg and the team at Goodfish

undertook to develop the product, the 'Stique Multilever launched on Kickstarter in the summer of 2014. The product successfully secured £15,000 in investment to set up tooling and bring the product to mass manufacture and is now selling well. The team at the newly formed company 'Stique Ltd are now developing a range of other cycling products including new iterations of the multilever as well as pedals, lights and bottles. The 'Stique product is a clear example of how supply chain SMEs can create their own products and brands, and sell direct to their customer, realising strong margins.



Hospitality Umbrellas Ltd

Innovation Rains Supreme as Entrepreneur Reinvents the Umbrella

The Company

Hospitality Umbrellas Ltd was set up in 2012 to launch the Rainshader Umbrella product, an innovative new concept that has transformed the perception of what shape an umbrella should be. Kenilworth-based entrepreneur, Steve Collier developed the idea at a wet and windy Grand National. The Rainshader protects people from the elements while watching major sporting events; crucially, it doesn't blow inside out, poke passers-by in the eye, or drip on neighbours' shoulders in crowds. Its cut-away front, based on the design of a motorcycle helmet, lets people watch live sporting action, while it sits low over the head so it doesn't block the view of those behind. It is specifically designed for major sporting events and other big televised gatherings, and is fully customisable in order to offer firms a significant branding opportunity.

The Challenge

Although Steve had conceived a great concept, he was unsure where to start with the development of the product and how to realise his idea. After doing some research, he

found out that we had a funded SME innovation support programme and approached the team. Chris Brown and Dr Xiao Ma met with Steve and highlighted each step that would need to be taken to protect, design, manufacture and retail the umbrella.

The Solution

We helped link Steve with specialists in the patenting process and with potential manufacturers, and spent time helping Steve understand the user experience features of the product and how to ensure that it met all of the customer requirements. We were able to make use of Additive Layer Manufacturing technology at WMG to develop prototype parts, and also supported Steve with the development of a digital marketing and retail strategy that enabled Steve to garner interest and support in the product before it was mass manufactured and retailed. Using social media channels such as Facebook and YouTube, the team developed a community around the product that succeeded in gaining lots of positive online coverage. A video developed showing the

umbrella being tested in a wind tunnel at Gale Force 7 got almost 60,000 views and sparked interest internationally with reviews in publications such as "Gizmag" and "The Daily Mail". Chris and Xiao also helped Steve look at a mass customisation model of the umbrella, where large brands can customise the umbrellas to their particular requirements.

The Results

Through the collaboration with us, Steve took an idea into concept and manufacture. He has now sold over 50,000 umbrellas across the world. The umbrellas are targeted at outdoor sporting events and Steve regularly attends these to showcase the products. The range has developed considerably and many brands are starting to show interest in using the products for their own promotional requirements.

In summer 2014, the Rainshader Umbrella won the BPMA (British Promotional Merchandise Award). The BPMA is the UK's leading trade body dedicated to promoting best practice around the sourcing, manufacturing and distribution of promotional products.



“With the help of WMG, we designed a new product which we believe will soon become a fixture at all major sporting events. By producing such a distinctive design we have opened up exciting possibilities for branding and we believe this product offers more viewable advertising space than any other umbrellas on the market, which has become very attractive to corporate advertisers.”

Steve Collier,
Founder, Hospitality Umbrellas Ltd

Mudhugger Ltd

Mudguard Product a Success with Support of Social Media Strategy

The Company

Having experienced first-hand the limitations of existing mudguards on the market, mountain biking enthusiasts Bruce and Jamie Gardiner developed an idea for a novel new rear mudguard product called Mudhugger in 2012.

The Opportunity

Whilst Bruce and Jamie had devised a clever design for the Mudhugger product, they needed advice on both how to manufacture it, and get it to market. Directors of an existing manufacturing organisation, the brothers had identified that the opportunity to break into a new market and develop a product of their own would add increased and direct value to their current operations.

The Solution

Bruce and Jamie met with us to talk through the requirements they had in order to develop the

product idea further. We advised on the route they should take to manufacture the product; however it was felt that the biggest area of potential development was to capitalise on the marketing opportunity available by engaging in the already very active mountain biking social media scene. We developed a social media strategy for Mudhugger and delivered a series of training sessions so that they were able to coordinate and manage the content and platforms themselves. As the product launched and received a series of excellent reviews and awards, Bruce and Jamie were able to use social media to share this information and create a following for the product. As the product became more popular and subsequent iterations were developed and launched, we then went on to help them develop an online store where they could sell the products directly from their own website.

The Results

Since the first product launched in 2013, Mudhugger is now a standalone business and sells a number of other products, including both front and rear mudguards. Mudhugger has over 3,000 followers on Facebook and continues to engage with its customers and biking enthusiast community online via social media. Bruce and Jamie are still working with WMG on the development of further products and through the success of the project have safeguarded jobs within their existing company. This case study is an excellent example of the importance of a company transferring from being purely a supplier, to becoming an Original Equipment Manufacturer (OEM) which offers competitive advantage, broadens their portfolio, and creates additional security for a company.



Pashley Cycles Ltd

Tradition and Innovation Combine for Growth

The Company

Pashley Cycles is England's longest established bicycle manufacturer. Founded in 1926 and based in Stratford-upon-Avon, its dedicated team design and hand-build a unique range of traditional bicycles and tricycles.

The Challenge

Although a traditional brand, Pashley realise that to continue to grow and develop they must innovate. They had two separate challenges when they initially met with us. The first was the ability to apply decorative finishes and bespoke imagery to metal and plastic parts on their cycles for some upcoming limited edition products. The second was around developing the customer experience associated with their high profile brand across their distributor network, sales process, website, and social media presence.

The Solution

We have expertise in both materials

technology and user insights, and so two different projects were set up to support Pashley Cycles with their exciting plans.

Time was spent defining the 'Personas' of key customer groups that Pashley supply to and would like to engage with. We conducted a workshop where the customer journey was mapped out with the Pashley team, and key 'touchpoints' were identified where Pashley could potentially engage with their customers more effectively.

We also worked together to identify what key activities could be implemented to ensure that the Pashley brand and customer experience is mirrored across different distributor organisations.

In order to apply decorative finishes to the cycles we proposed to trial the process of dye sublimation, a process developed and optimised at WMG. We are currently undertaking trials on a Pashley mudguard to test

if the geometry will work using this process, and also on a white part to test if the colour reproduction will be effective using dye sublimation. We will then spend time with Pashley explaining what different finishes and coatings can be used and make recommendations for how they could use the process going forward.

The Results

So far, a number of new ideas have arisen that Pashley can start to work on to build on the experiences that their potential customers have when buying a cycle. New opportunities have been identified which could significantly grow Pashley's customer and distributor base.

Through the work, five jobs have been safeguarded in the business.



“It is an enthusiastic and professional support that a company like ours needs, and we have received this from the WMG SME Team.”

Adrian Williams,
Managing Director,
Pashley Cycles Ltd

Warwick Music Ltd

pTrumpet – Plastic Brass Instrument Playing the Tune of Success

The Company

Warwick Music was formed in 1994 with a single piece of music. Since then it has grown into one of the world's leading music publishing companies specialising in wind and brass music. There are over 1,500 titles in the catalogue covering all genres, styles and abilities, and the company represents composers from across the globe.

The Challenge

As well as publishing music, the company are now the world's largest producer of trombones, having developed the pBone, a 'brass instrument' made entirely of plastic. The Warwick Music team were developing a trumpet using the same material and were looking for support with a specific

manufacturing challenge. A trumpet has the added complexity of needing a valve system and Warwick Music required assistance in developing a method of checking tolerances and fit of the complex assembly within the manufacturing environment.

The Solution

We began working with Warwick Music to develop a specification and suitable tolerances for the valve assembly of the pTrumpet. We also designed and manufactured a set of jigs to allow rapid, repeatable, manual evaluation of finished components to test them for quality purposes.

The Results

The work carried out on the valve of the trumpet enabled the product to be improved and it is now launched to market and selling well.

The project led to the creation of a new job in the business and Warwick Music is continuing to grow and gain more and more publicity. The company was recently announced as one of The Telegraph's most disruptive entrepreneurs of 2014. We are continuing to work with them on further iterations of the pTrumpet and Matt Pope, Director of Warwick Music has spoken at recent networking events at WMG to inspire other entrepreneurs.



Electronics



Lightwave RF Plc

Research Collaboration Leads to £495,000 Funding Win

The Company

Lightwave RF specialises in the design, development, and manufacture of home automation systems to enable consumers to remotely operate everyday household appliances, such as lighting, heating, air conditioning, door entry, audio, video and security. The company is very active in retro-fitting Smart Home technologies into residential properties.

The Opportunity

Lightwave RF first began working with us in 2013 to access specialist skills to develop a mobile app for a heat monitoring product. Throughout this time the company continued to grow and decided that one particular untapped market was commercial buildings, where there is potential to save vast amounts of energy through the use of automation products. Director of Lightwave RF, John Shermer, talked to Knowledge Transfer Specialist Scott Crowther about how we could help Lightwave RF develop this market opportunity.

The Solution

Scott highlighted a funding call from the SBRI programme (Small Business Research Initiative) designed to improve the energy efficiency of existing non-domestic buildings. The competition was funded by the Department for Energy and Climate Change (DECC) with support and resourcing from Innovate UK. SBRI calls provide opportunities for innovative companies to engage with the public sector to solve specific problems. Scott and John then decided to talk to the University of Warwick Estates team to see if they would be interested in piloting some of Lightwave RF's technology in the University's buildings. Head of Energy and Sustainability in the Estates team, Joel Cardinal agreed that there was scope to trial the products in the Social Sciences building, and Dr Rebecca Cain from WMG's Experiential Engineering research group joined the collaboration in order to contribute and gain useful insight into how users of the building would be considered in the technology

installation. An application was put together which proposed that a highly personalised heating and energy economy system would be installed and tested at the University. In October 2013, the collaborative group was awarded £495,000 to complete the project.

The Results

The project is now nearing completion, with Lightwave RF products installed in the Social Sciences building. Dr Cain and her research team are working on the user interfaces for tablets and phones which will be used to drive the user interaction of the system and to ensure that the system is able to function in a personalised manner. Once the project has been trialled and proved effective, it is hoped that other departments in the University will adopt the system. Lightwave RF have gone on to commercialise the technology and are currently implementing their products in a number of schools and other commercial buildings.



“We are delighted that Lightwave RF has been able to secure investment to further develop their products and test them in an environment that has the potential to transform the way it manages energy in the future. Our work at WMG is all about helping small businesses realise their potential and develop leading products and services. This is a great case of the benefits of collaborating with a University.”

Scott Crowther,
Knowledge Transfer
Specialist, WMG

Printed Electronics Limited (PEL Ltd)

Collaboration Leads to New Product Ideas

The Company

Printed Electronics Limited (PEL) is focused on integration, development and commercialisation of processes and systems for the fabrication of electronic circuits, structures and devices using digital, additive and inkjet methods. They have a manufacturing facility in Tamworth and offices in Cambridge.

The Opportunity

PEL are active in research and development, with a focus on materials that have electronic attributes including conductors, luminescence and insulators. They were introduced to us through research we were doing around the in-mould processing of printed electronics. As an SME, PEL were eligible to benefit from the support programme at our International Institute for Product and Service Innovation. Initially the company approached us for

support with some unusually shaped prototypes they had been commissioned to produce. However as the relationship developed, further opportunities for collaboration arose.

The Solution

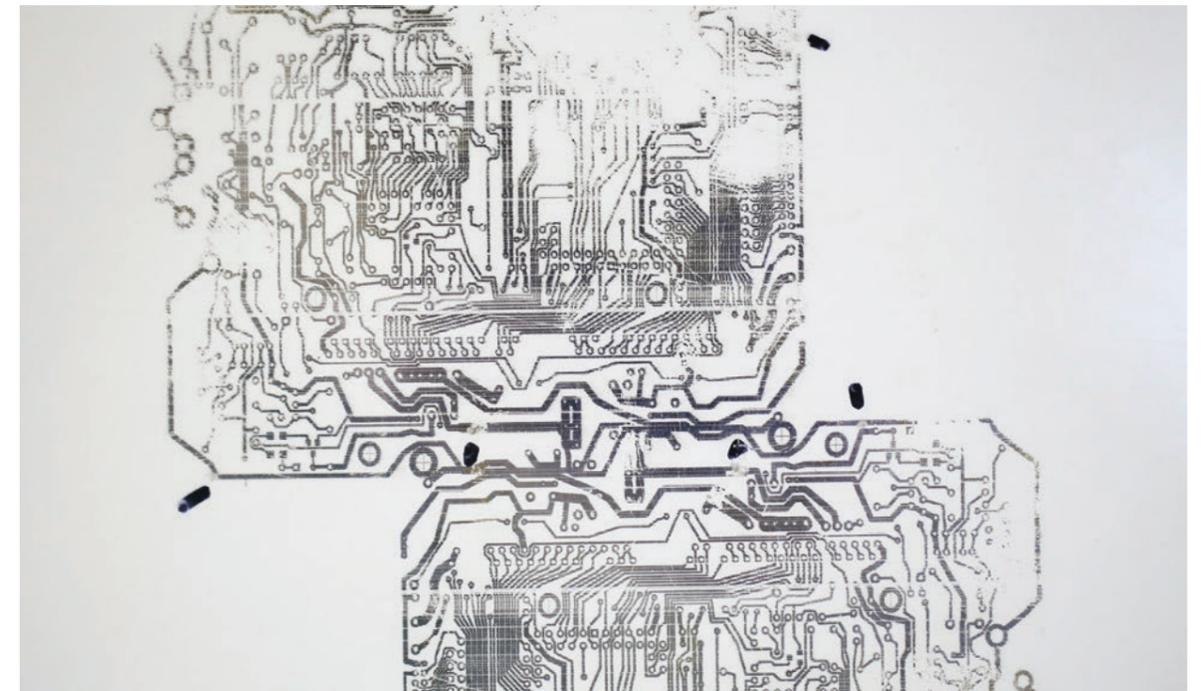
We assisted PEL with the creation of several complex shaped prototypes built on our Fuse Deposition Modelling (FDM) 3D printer, which were subsequently used for PEL customer trials. PEL also joined newly formed Polymer Innovation and Internet of Things networks that are held regularly at WMG, to link them with other manufacturers and developers. Most recently we worked together to set up a specialist internship to build an 'Internet of Things' demonstrator for PEL to use at trade shows. The demonstrator consisted of establishing working 'parts' of two separate internet connected chess boards. It will

allow two opponents in two different locations to play against each other on physical boards.

The Results

The demonstrator chess board was created in conjunction with Tom Preece, an intern from the Warwick Mathematics Institute, who developed two interactive boards and chess pieces that are capable of sharing data with each other using LED lights. This will be used to promote PEL's capabilities in the 'Internet of Things' space.

To date the project work that WMG has undertaken with PEL has safeguarded at least one job in the business and the overall collaborative partnership between WMG and PEL has led to some further research funding from Innovate UK. This will allow PEL to further develop its capabilities and know how in printed electronic devices.



Region Services Ltd (RSL)

Novel Application of Additive Manufacturing Leads to New Business

The Company

Based in Coventry, RSL are market leaders in developing and supplying public information systems, such as interactive terminals, broadcast screens and smart ticketing machines. They offer a complete service from designing the hardware, software, and installation process, as well as offering back office support and on-site maintenance. They have developed systems for a number of rail and bus stations across the UK and Europe.

The Challenge

RSL are regularly asked to produce 'proof of concept' systems for their clients so that they can be tested for form and fit. They had found out about our services through the Coventry & Warwickshire LEP

and were interested in discovering if Additive Layer Manufacturing (ALM) could be used in their pre-production process. After supporting the company in the production of some initial parts, a further more challenging project arose, whereby RSL required assistance with producing a large prototype shelter display unit that was 900mm in length.

The Solution

We were able to assist with this project by re-working the original CAD drawings, and by creating a number of separate parts with novel fastenings to create the 900mm wide shelter. It was the largest series of parts we had produced for a company. The completed shelter unit was then sent to one of

RSL's clients for evaluation.

The Results

The client placed an order for several hundred units. This provided significant additional turnover for RSL and resulted in the creation of new assembly operative jobs in the company and safeguarding of the 100th job in the region by our team.

Since this project was completed, RSL's Head of Product Development and Procurement has gone on to be one of the first senior managers to join our new Postgraduate Innovation Business Leadership Programme. This is a Master's level course for managers working in high growth SMEs who rely on innovation to gain competitive advantage.



“We have had a very positive experience working with the SME Team at WMG. We were able to produce a large complex prototype to evaluate which is now in production, leading to jobs secured and created in our business. Connecting small businesses in the region with University expertise is an effective mode of boosting the local economy and is an essential ingredient for manufactures to innovate and grow.”

Peter Cieslak,
Head of Product Development and Procurement, Region Services Ltd

Engineering



Automotive Insulations Ltd

Interns with Impact

The Company

Automotive Insulations Ltd (AI Ltd) is a specialist in the design and manufacture of innovative noise reduction systems. The fast growing company has built an excellent reputation for introducing sound solutions to noise problems across a number of key sectors, including automotive, commercial vehicles, marine, and industrial.

The Challenge

The team at AI has to adapt quickly to new market opportunities and challenging requests from their customers. They had a requirement to test and set up a new product line that they were developing for the Swedish automotive market. They required specialist polymer chemistry skills to do this and approached us to discover if we had any students or graduates that could assist.

The Solution

We delivered a summer internship programme so that West Midlands SMEs could access specialist skills

for specific project challenges. Through this scheme, a University of Warwick Chemistry student, Shaun Morris, was taken on by the company for eight weeks. Mentored and technically guided by Dr Paul Milne, he was briefed to define the material requirements and specifications for the new product, manage procurement and preparation of material formulation, train AI staff to use the machinery required to fabricate prototype parts, and undertake testing and analysis of samples and prototypes.

The Results

Shaun had an immediate impact at AI, helping to implement a brand new production line into one of their manufacturing facilities, along with creating training and operating guidance documents for the new cell. He led an R&D project focusing on how thermal protection could be added to the product and investigated cycle times. He also assisted the company with how they could cost

parts in the future and created a marketing video. AI were delighted with the success of the project and through Shaun's hard work have already employed a supervisor. Another 20 jobs are expected to be created as a result of the project and AI hope that Shaun joins the company after he graduates.

Following the success of Shaun's project, AI have taken on another two interns, Dan Beddow, an Engineering student from the University of Warwick, and Sarah McDougall, a Chemistry student from the University of Central Lancashire. Sarah spent time testing the viability of a number of new materials ready to go into production, and Dan worked on an exhibition demonstrator project for the IZB exhibition in Germany, resulting in a cut away of a MINI Cooper that showcased all of AI's products in one vehicle, and an innovative touch screen system for visitors at the exhibition to use.



“Working with universities is a must for small businesses, you have a resource you can tap into to access new capability and resources and they are great places to look for staff.”

Jim Griffin,
CEO, Automotive Insulations Ltd

Barton Coldform Ltd

Product Development Innovation Leads to New Contract Win

The Company

Droitwich-based company Barton Coldform is one of Europe's leading manufacturers of bespoke critical fastenings and special cold forgings. For more than 80 years, engineers across Europe have turned to Barton to solve the most complex problems.

The Opportunity

Barton were keen to find out what opportunities there might be through working with the team at the International Institute for Product and Service Innovation. They were keen to find out about how Additive Layer Manufacturing (ALM) could work for their business. They often have requests from clients to demonstrate parts quickly; however the normal process to develop tooling for a part can take up to 14 weeks. They wanted to know if using ALM to produce demonstrator parts could be feasible for their

product development, verification and validation process.

The Solution

Polymer expert, Dr Paul Milne, spent time with Barton's Managing Director, Andrew Nuttall, to assess the different technical processes involved in ALM and their commercial strengths as well as limitations. Under a Non-Disclosure Agreement (NDA) Andrew shared designs from a large automotive customer with Paul who went on to print prototypes of the designs to assess quality, fit and form in comparison with the equivalent parts normally manufactured in metal. Andrew was surprised at the quality of the printed parts and used them to demonstrate to the customer what an actual finished product would look like. The customer was happy and was able to use the printed parts to assess feasibility of the parts working in their assembly. The client's

engineers were able to 'touch' their design and communicate changes to Barton. The delivery of the printed prototype to the client saved weeks of development time and Barton were delighted that the customer placed an order to manufacture tens of thousands of the parts following the demonstration.

The Results

The customer order was worth almost £300,000 to Barton. This has led to the safeguarding of one job in the business and the creation of another. The use of ALM will now be considered regularly as an option to create demonstrator parts for customers of Barton going forward. It will lead to increased efficiencies and will act as an incentive when approaching new customers.



“This technology is a revelation in our manufacturing processes. Whilst we are not yet able to make actual parts using this technology, being able to showcase the fit and form of our parts to customers using additive manufacturing means that lead times are much shorter and customers are able to move their designs and production forward at a faster pace.”

Andrew Nuttall,
Managing Director,
Barton Coldform Ltd

Hills Numberplates Ltd

User Insights Transform Product Development Process

The Company

Birmingham based Hills Numberplates was incorporated in 1927 and trades as a manufacturer of number plate components, ready-made registration plates and the latest number plate manufacturing systems.

The Challenge

An innovative company that has invested heavily in its production facilities, Hills Numberplates was looking for further opportunity to develop its processes and attended two demonstration workshops with us in 2013. They had identified the potential of bringing new digital systems into the business to help it build capacity and were also keen to work with our user insights specialists to support the development of a new anti-theft product. The key challenge was to understand the customer experience associated with the purchase and installation process

of this particular product.

The Solution

Initially we undertook a two day digital health check at the company to review current systems and make recommendations as to which new platforms could benefit the business. It became apparent that the area in which the company would benefit most would be implementing new processes to help with new product development. We went on to work with Hills on a project specifically related to the new anti-theft numberplate.

WMC's Kate Ainscough helped the company identify three customer groups that were likely to buy the plate, including hobbyists, theft victims, and security conscious individuals, and then set up user tester sessions with a sample of these customer groups. They tested the installation process of

the plate using sticking, gluing, and drilling, and were also given a questionnaire to complete

The Results

The customer experience testing provided Hills Numberplates with a clear insight about the product and its application. There were some practical issues with the installation process that were able to be addressed, and the company were able to fully understand the needs and requirements of the customer groups to take the product forward. They are now much more informed about which markets to launch the product in and have identified further areas of work to be undertaken before they take the product fully to market. The process they followed can now be implemented for future products and has transformed the existing process for the better. The project led to 10 jobs being safeguarded in the company.



Induction Technology Group (ITG) Ltd

Additive Layer Manufacturing Creates Unique Prototype

The Company

For over 20 years, ITG have been setting the pace in air filter technology. They manufacture foam based air filters, air boxes, and other induction equipment for motorsport, road vehicles, and power boats. They develop the latest air filter technologies for the FIA Formula 1 championship teams, British Touring Cars, British and World Super Bikes, Le Mans Series and the World Rally Championship.

The Challenge

ITG approached us to support with the development of a prototype induction system for an aftermarket Volkswagen tuning specialist. The system would be used in the mk7 Golf GTi vehicle for a championship race to be held later that year and ultimately launched in the performance accessories after market. Rather than investing lots of money in tooling for this prototype, ITG were searching for a low cost prototype option that would allow them to evaluate packaging constraints and to establish performance gains. The prototype would need to function on a running engine.

The Solution

We suggested that ITG look at the use of Additive Layer Manufacturing (ALM) to develop the prototype, however there were a number of different elements involved in developing the system. Working with Dr Alex Attridge in WMG's Metrology Research Group, Dr Ben Wood coordinated the 3D laser scanning of the packaging space of the engine bay, to define the size of the prototype. The laser scanner documents thousands of measurement points every second. The process took minutes rather than hours of complex, manual, measuring. Dr Wood then went on to review the specific materials and type of ALM that would be required to develop the prototype. The material had to be a specialist polymer able to withstand temperatures of up to 175 °C. Due to the size of the complete prototype required, the CAD design had to be re-worked so it could be built in a number of parts on the Fortus 400MC, the largest FDM (Fused Deposition Modelling) machine that WMG has, based at the International Institute for Product and Service

Innovation. The prototype parts were then printed and put together ready for testing in the vehicle.

The Results

The use of ALM to produce a prototype of this size was unique in the industry and ITG were delighted that, after a robust product verification and validation process, they were able to determine the requirements for the system. Volkswagen Racing went on to approve the design, and ITG were then able to develop tooling to produce 3,000 of the final system. This was a completely new process for ITG which saved them much time and cost, and could be replicated for other clients in the future. It allowed them to spend time thinking about the complete design process including the look and feel adding significant value to the product. The original prototype is still in use within a test vehicle and has proved to be extremely robust.

The project led to two jobs being safeguarded in the business and has opened up a number of new opportunities.



“Without assistance from WMG's, Dr Ben Wood and Dr Alex Attridge, the process would have heightened lead time and increased marginal cost. WMG offer exceptional opportunities and innovative solutions for small businesses and low volume manufacturers to rapid prototype pre-production items with outstanding accuracy using state of the art technology.”

Jonathan Douglas,
Chairman, ITG Ltd

The MAN Group

Collaboration is Key to Growth

The Company

The MAN Group is a network of ten West Midlands manufacturing companies that work together to deliver complete manufacturing and engineering solutions for customers in every aspect of mechanical, electrical and electronic engineering. The collective, which employs over 650 people and records combined sales in excess of £65 million, provides access to precision pressings, castings, design, etching, injection moulding, wiring looms, toolmaking, PCB assembly, and electrical control systems. Member firms include Advanced Chemical Etching, Alucast, Barkley Plastics, Brandauer, Muller Engineering, Grove Design, Mec Com, PP Electrical Systems, and SMT Developments.

The Opportunity

The MAN Group invited WMG to collaborate in April, 2014 and we began exploring ways that the collective could be more efficient and effective through this new relationship.

The Solution

We undertook Competence Profiling with each business to identify capabilities that could be extended to new market sectors. A number of key priorities were also identified including skills development, access to finance and access to new technology. PP Electrical Systems and Mec Com benefitted from some specialist internships to work on specific projects in digital marketing and operations management. SMT Developments, a MAN group member with specialisms in PCB prototyping and manufacture worked with WMG's Dr Ben Wood on a "Growing Places" grant application to facilitate the expansion of their business through funding from the Coventry and Warwickshire Local Enterprise Partnership.

A number of managers from other MAN Group companies registered on WMG's Innovation Business Leadership programme, a one year postgraduate course

directed primarily at fast moving SMEs who rely on innovation to gain competitive advantage.

The Results

The various projects that the MAN Group members worked on with us led to a longer term collaborative innovation plan which will lead to further sales and jobs within the group. To date the group has seen an increase in turnover of £1 million as a result of the collaboration and they plan to create ten new jobs.

Through the support that Dr Wood provided for the completion of the 'Growing Places' application form, SMT Developments were successful in securing a grant of £230,000, which allowed them to purchase their £1 million premises on the Heathcote Industrial Estate in Warwick and invest in new machinery.



“We have very big ambitions for the future, with my company alone expecting to double turnover by 2015. Collaborating with an academic department like WMG gives us the ability to access the very latest technology and capability early on, so we can be first to market with new products and services.”

Tony Hague,
Chairman, MAN Group

Simpact Engineering Ltd

Collaboration Leads to Success

The Company

Simpact Engineering Ltd is a high quality Computer Aided Engineering (CAE) consultancy. Its core business activity is the design, development and engineering of bespoke safety solutions which offer protection from impact loading.

The Opportunity

Simpact create a range of impact related products and materials founded on their own IP, but understand the benefits of collaborating with a University department in order to validate them for market. Since 2012, Simpack has had a range of requirements to bring new skills into the business to manage new projects and deliver growth, and we began working with them through an existing relationship they had with the WMG High Value Manufacturing Catapult Centre.

The Solution

The first project that we collaborated on involved securing funding for a short Knowledge Transfer Partnership (KTP), which enabled an Associate to

work on the testing of a natural composite made out of reed bundles. This was an innovative re-engineering of a material that hadn't been used for 4000 years, using state-of-the-art simulation and test equipment to turn the ancient composite into something suitable for the modern day.

Following this, Simpack took on two specialist interns. The first tested polymer materials at high and low temperatures for a product for the industrial gas supply industry. This involved testing samples of a range of materials to destruction using specialist equipment in an environmental chamber. The plastics were tested at temperatures between -40C and 80C. The second internship investigated the fatigue properties of specialist composite materials. Composites can be engineered to have fantastic mechanical properties, and how they perform when new is well understood. However there is a lack of knowledge of how they perform after a life of hard use. During this internship, a specialist testing kit was used at WMG to

generate data which has helped Simpack to understand how this ageing process happens. The work on this internship has allowed WMG and Simpack to successfully bid for research funding from Innovate UK for a further KTP project. The project will provide an understanding of the lifetime performance of composites, in particular those which are designed to perform in harsh environments.

As well as developing components and products for OEMs (Original Equipment Manufacturers), Simpack are now developing their own unique products. We have assisted Simpack with the design and prototyping of the first of these – a unique lighting system for high speed photography, which is used in all sorts of impact testing, from automotive crash testing to ballistic trials for armour.

The Results

Simpact have been able to develop a number of new products and materials to commercialise and sell to a range of industries. The very first internship project resulted in them winning business with a major company in the oil and gas sector to redesign a component. The second internship and KTP project will allow Simpack to develop an 'artificial' ageing process to improve impact properties and will deliver a technology demonstrator for the purpose of marketing to potential clients.

The work we have carried out for Simpack's new lighting products has greatly reduced the tooling cost for the finished part. Since starting work with WMG, the company has doubled in size, employing three new people.



Strand Hardware Ltd

Digital Project Leads to Better Understanding of Customer Data

The Company

Strand Hardware Ltd established in 1991 is a family owned business with a wealth of experience in the Architectural Ironmongery industry. They supply high quality Window and Door Hardware for commercial buildings, as well as a range of locally manufactured products.

The Challenge

Managing Director Catherine Franks, contacted us with a requirement to update the company's CRM (Customer Relationship Management) system. The existing system was not offering their sales team the functionality they required and the database was not user friendly. It took a long time for the sales team to find the most up to date information about customers and prospects before visits, and more importantly, the sales team were unable to access the system securely and update whilst out on the road. Strand Hardware were unaware which systems were most relevant for them and were keen that any new software would be able to integrate with existing systems within the company.

The Solution

Our digital experts spent time

with the Strand Hardware team to understand their needs, including employees in sales, finance, administration and engineering roles. Through these consultations we were able to identify the various requirements that the company as a whole had. Key requirements included the ability for the sales team to access data when out on the road using mobile devices, and for the system to be used collaboratively across the company to update information. They required the data to be displayed in a much more visual way, rather than having to trawl through a large database of information.

The SME Team spent time reviewing technology options and worked with Strand Hardware to design an appropriate data collection and visualisation process. It was decided that a system integrating Google Apps with Strand Hardware's current data was the best option, bringing flexibility and the ability to include further apps in the future. After a period of testing, a new system was presented that included a tailored mapping system allowing staff to visualise customer data nationally and internationally on an interactive map. It was a much more intelligent solution that

gave staff the critical information they needed. Crucially it had been developed with Strand Hardware's needs in mind and was not an expensive solution to implement.

The Results

As a result of the new system the sales team are much more efficient and are able to optimise journeys, clearly seeing which customers and prospects are in particular areas of the UK. The system pulls in live data about customers from the web combined with Strand Hardware's own data. The system works across a number of mobile devices and allows teams to work more proactively and collaboratively to convert prospects and meet customer needs. This system has been demonstrated in the International Institute for Product and Service Innovation to show other SMEs in the region what is available through using Google Apps. Since this initial project, Onur Eren from the WMG SME Team has gone on to add an additional layer of security and automation to the system which has been valuable to the long term plans of the company. Through this work, a new job has been created at Strand Hardware Ltd and several jobs have been safeguarded.



“This new system has transformed the way we work at Strand Hardware and has made a number of the teams much more efficient. We now realise the value of the data we have and are able to make better, informed decisions as a result of having better access to it.”

Catherine Franks,
Managing Director,
Strand Hardware Ltd

Trans-Rak International Ltd

Digital Technology Makes Shipping Cars Stress-Free

The Company

Trans-Rak International (TRI) are the world leaders in the design and manufacture of vehicle racking systems for shipping containers. Working with over 50 of the world's largest organisations, they enable safer and more efficient shipment of vehicles around the globe. TRI has over 30 years of industry experience and leads the way in vehicle containerisation.

The Challenge

Shipping a container is very expensive but the cost is mostly dictated by the container size, not necessarily by its weight. TRI had identified that by managing to fit more cars in a standard container (four cars in place of the typical two), their racking system could offer a substantial reduction in shipping costs and in turn they would supply more racks. However to make this happen, TRI were operating a manual process to find the optimal placement of a given set of cars that was time consuming and resource intensive. Additional complexity arose when considering

the hundreds of potential makes and models of vehicles with their individual sizes and shapes. Most of TRI's clients either use sub-optimal placement by shipping three cars using one racking system, or contact TRI to ask for help which creates a considerable overhead for the business.

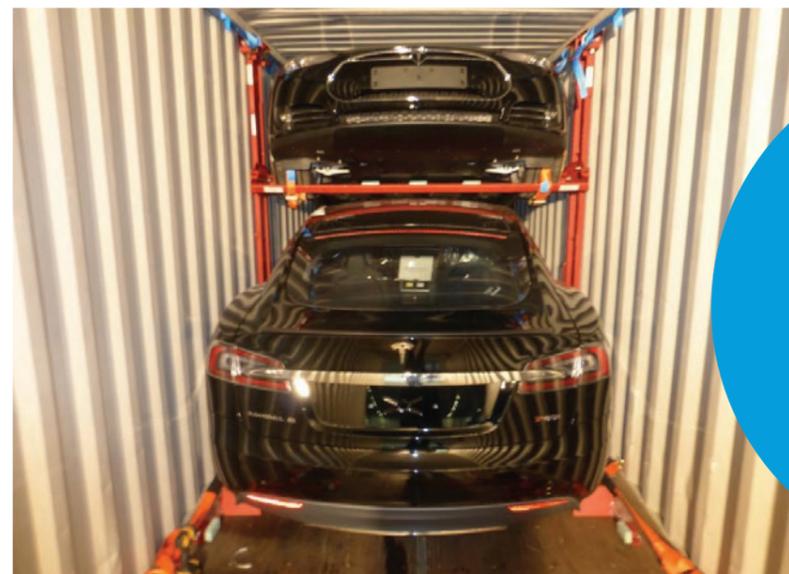
The Solution

Working with TRI, Piero Filippin, a Technology Transfer Specialist in the WMG SME Team developed an innovative proof of concept system which automates the task of finding the optimal placement of cars - a good example of how digital technologies can provide added value to manufacturing. The software he developed allows the customer to easily select a number of cars to be shipped from a list of makes/models and, after a numerical simulation processing hundreds of thousands of different scenarios that are compatible with TRI's loading procedures, generates a report containing the most efficient combination of cars in each container and their

exact position/tilt. Ultimately this minimises the number of containers needed per shipment.

The Results

This collaboration has led to a win-win situation - customers will save a considerable amount of money in shipping costs but by using this system purchase more racks from TRI. It will increase TRI's profitability and will lead to a new business opportunity of shipping different car models in the same container. This offer was not previously available to their customers because the placement of cars was too time consuming to manually optimise. TRI are now developing ideas for how they take the novel solution forward. One of the possible avenues is to distribute the system as a cloud service to customers, providing the opportunity to "crowdsource" information to increase the number of car models inputted into the system which will make it even more useful. The solution can also be sold as a subscription service to new and existing customers.



“The solution we developed with TRI is just one example of how we can help manufacturing firms with processes and systems. It is vitally important that firms embrace digital technology to not only become more efficient but open up new market opportunities.”

Piero Filippin,
Technology Transfer
Specialist, WMG

Wickens Engineering Ltd

Internet of Industrial Things Demonstrated to Improve Efficiencies

The Company

Wickens Engineering Ltd is a long established engineering firm that specialises in the manufacture of industrial racking and other bespoke storage systems for large blue chip clients. The business is family run and based in Worcester.

The Opportunity

Wickens had a desire to better understand what digital technologies might be available to them to remain competitive and to build efficiencies in their business. They were interested in finding out what systems might be worth investing in to enhance their current operations. Roy Pulley from the Manufacturing Advisory Service introduced Managing Director Steve Wickens to the WMG SME Team to see if there was any support that could be offered to the company to help them move forward.

The Solution

Our digital experts, Piero Filippin

and Onur Eren, visited Wickens to undertake a digital health check on the business which involved analysing all of the current processes and systems, making recommendations for new technologies that could be introduced to optimise existing processes. Wickens reviewed these and decided what was most relevant to them. This initial project led to a further piece of work employing specialist intern Licínio Ferreira, a physics graduate, who worked alongside Piero Filippin to develop and retro-fit 'Internet of Things' technology to monitor the piece rate of a punching machine that Wickens use on their shop floor. He set up a system using ultrasound and other sensing technology, as well as Arduino and Raspberry Pi systems to monitor and visualise the piece rate of the machine and to record any periods of inactivity. As is often common in small manufacturers, much of Wickens machinery is

not automated to track activity like this and so it was a low cost and effective way to support Wickens become more efficient and intelligent with their operations.

The Results

The system that Licinio developed is now being trialled on the shop floor and should revolutionise the way that Wickens operates that piece of machinery in the future. The company are now looking at further projects with WMG including measurement of flow through the sprayshop.

To date the project has led to the safeguarding of two jobs in the business. In December, 2014 Licinio won the "Highly Commended" Award in the Internship category of WMG's SME Awards for showing commitment and innovation in his work.



Environmental



Boomerang Plastics Ltd

Characterisation Study of Recycled Plastics

The Company

Boomerang Plastics Ltd specialises in processing contaminated plastic in niche markets. The company offers a sustainable alternative to landfill whilst showcasing the world's best processing equipment. It actively sources materials from the UK and supplies it back to UK manufacturers, therefore reducing the environmental impact of unnecessary freight.

The Challenge

During the latter part of 2014, Boomerang came to us with a specific challenge to collect characterisation data for waste paint pots, paint, and certain plastic films that they were recovering and recycling. In order to be able to reuse waste material such as the items mentioned above, it was important for them to understand what the characteristics of that

material were so that it could be assessed for reuse in a supply chain to make something new.

The Solution

Circular manufacturing is an area of great interest to WMG and we have cutting edge extrusion and compounding equipment as well as extensive materials testing facilities. We proposed to granulate the separate recycled wastes that Boomerang had produced, compound it and injection mould it, so that test sample plaques could be created which could then be used for the characterisation process. The plaques would be tested to establish a number of key characteristics including the material's tensile strength. This would then be compiled into a specification sheet that Boomerang could use for commercial purposes.

The Results

With clear material performance and specification data, Boomerang have been able to look at opportunities to resell the material and investigate other end uses for recycled paint. This offers a significant new commercial opportunity and has led to the creation of two new jobs and the safeguarding of two more.



“The linear ‘take, make, dispose’ manufacturing model relies on large quantities of resource and energy, which is not efficient and is damaging to our scarce resources. It is important to work towards the circular economy and we are proud to help Boomerang Plastics develop technologies and approaches that benefit the environment and future generations.”

Dr Paul Milne
Knowledge Transfer
Specialist, WMG

Food and Drink



BeerBods Ltd

Start Up Success for Innovative Subscription Service

The Company

BeerBods, an online beer club and subscription service, was launched in 2012 with the aim of getting the nation to drink better beer. Earlier this year they broke crowd-funding records by raising £150,000 from 101 investors in just 36 hours. BeerBods has been voted “one of the 100 most innovative, disruptive and resourceful small businesses” in the UK and has been featured in The Guardian and The Financial Times.

The Challenge

The BeerBods business model is based on building a community of beer lovers to share information, discuss, and rate beers, and the business had been successfully using social media such as Facebook and Twitter to do this as well as drive users back to the BeerBods site. However they were finding it difficult to manage information about customers and community members as well as orders. They approached us to find out what cloud systems might be

appropriate to support, streamline, and automate the business's administrative functions so that they had more time to focus on customer care and acquisition.

The Solution

BeerBods founder, Matt Lane outlined requirements to our digital experts. The system had to be low cost and manage customer enquiries, sales, and logistics. It was essential that the system could be managed by Matt and his team internally. Scott Crowther, Knowledge Transfer Specialist worked with Matt to decipher back office process flows, and look at which technology would best fit Matt's needs. He also spent time mapping out the online customer journey to better optimise the BeerBods website for customer use. They then decided on the system together, involving the integration of three different platforms; Google Apps for work, Xero, and Stripe. This was an extremely innovative approach to managing

back office systems, offering BeerBods complete flexibility in their operations and meant they were not tied to one major provider. Through this approach they were also able to integrate their email marketing platform Mailchimp.

The Results

Following the implementation of the system BeerBods were able to manage their processes much more efficiently and effectively. It has freed up Matt's time to focus on the development and scaling up of the business, which continues to grow. Through highlighting a whole range of platform and system options, we empowered Matt to better understand how digital technology could support the business going forward. Work in this area is continuing to develop, with Matt and Scott now exploring the development of a CRM system and how that could integrate with the other platforms the business is using.



“Working with the WMG SME Team really opened our eyes to what was possible for the business using digital technology. We see the benefits of collaborating with WMG on an on-going basis and it has been great to share the BeerBods journey with them.”

Matt Lane,
Founder BeerBods Ltd

Cornpoppers Ltd

Customer Experience Project Helps Launch New Popcorn Product

The Company

Cornpoppers Ltd was formed in 1979 and is a privately owned family business based in Wednesbury, West Midlands. Over the past 35 years the company has evolved from a fun-food machinery manufacturer, to one of the UK's largest popcorn producers and supplies to a number of major retailers. As well as being a supplier, Cornpoppers also has a variety of flavours and styles of popcorn developed at its own manufacturing site with a Research and Development team.

The Challenge

Cornpoppers were directed to us via the Manufacturing Advisory Service. They had developed a new range and brand of gourmet style popcorn with 'scratch and sniff' packaging, but were unsure how to go about retailing the product and how to ensure the product was something that would appeal to customers. Kate Ainscough, Knowledge Transfer Specialist met with the Cornpoppers management team to talk through the range of research based tools WMG has developed in the area of Experience Led Innovation (ELI). ELI is innovation that is informed by how people use or experience a product and service, and this

was critical to the development of the new popcorn product.

The Solution

Kate and the Cornpoppers team worked together to implement a number of the tools to understand the customer experience of 'scratch and sniff' packaging, and to find out if it was a differentiator in the market. They used a Personas tool to define customer profiles, and a Touchpoint Matrix to think about how the customer might engage with Cornpoppers in every interaction. Kate undertook a competitor analysis study, reviewing the brand and product against other popcorn manufacturers. The gourmet popcorn market has expanded rapidly over recent years and there are lots of brands already active in this area. Kate also set up user testing sessions including sensory impact tests where potential customer groups

reviewed the product in terms of taste and packaging, and also importantly to review the kind of feelings and senses they had when buying or eating the product.

The Results

The range of tools and user test results gave Cornpoppers a very clear idea of their position in the market and provided them with valuable feedback about their product concept. Cornpoppers were able to make some important decisions about the product's development and were empowered to re-think and re-position the product in preparation for retailing. It embedded new processes and thinking for the company to take forward for the 'scratch and sniff' product and other products in the future.

“Kate's insight and expertise helped us look at our popcorn product in a completely different light and gave us incredibly useful data to take forward. We now feel fully equipped to undertake a successful retail launch of this product and develop new product ideas for the future.”

Balvinder Nijjar,
Director, Cornpoppers Ltd

Hobsons Brewery and Company Ltd

Smart Barrel Tracking System is an Industry First

The Company

Hobsons Brewery and Company Ltd is a small, innovative brewery with an established network of sales outlets across the world, and a prize winning reputation for its beers. The success of the brewery and its many awards has been down to a strong culture of supporting its region, its people, and its resources. The company owns 3,000 beer casks and two pubs in the area local to their brewery.

The Challenge

Hobsons had a specific problem with tracking its beer casks and being able to successfully identify their location and contents. They had a logistics and traceability issue that resulted in barrels sometimes getting lost or misplaced, which also meant that collection and delivery of barrels was not always optimised. They approached us to see if there was a technological solution to the problem. We agreed to collaborate closely and investigate how a tracking and visualisation system could be developed to improve the logistics and traceability within the business.

The Solution

The project initially involved the WMG SME team scoping out what sort of technology would be available to track the barrels and manage the stock and distribution process and create a new smart beer barrel system. A range of RFID (Radio-Frequency Identification) products were assessed, leading to the decision to implement a NFC (Near Field Communication) solution using a smartphone app and cloud database system to do the asset tracking. This solution allowed for communication between different devices and the ability for Hobsons staff to monitor assets while on the road. The next stage was to develop a robust smartphone-ready NFC tag capable of working on metal casks and withstanding the harsh cold, wet and physical environments. Through the manufacturing and polymer expertise at our International Institute for Product and Service Innovation, a waterproof tag casement was developed that was resistant to the inevitable wear and tear of a brewery's operations.

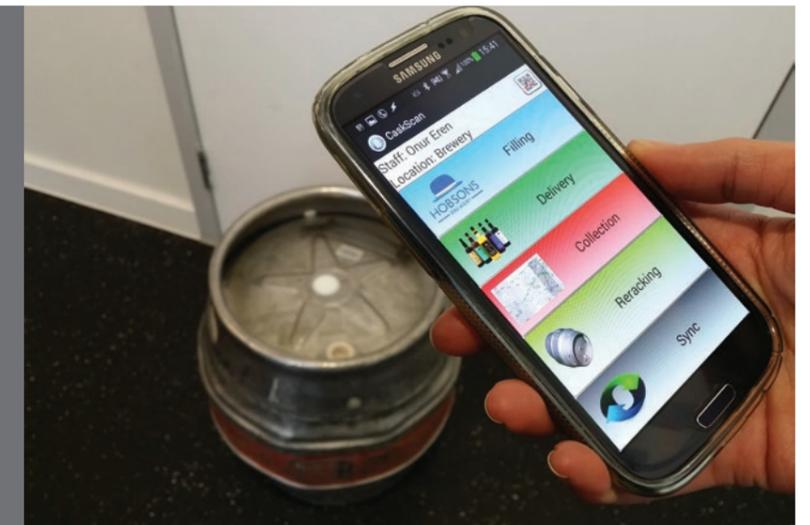
With the tag technology in place, a proof of concept software application was built using Google's platforms to visualise the location data gathered from the tags for the Hobsons team users.

The Results

The working prototype is now in use and is being tested with 3,000 barrels in Hobsons to ensure that the product can be scaled up for wider use. So far the project has led to the creation of one new job in the company and there are plans for setting up a new division of the business that will facilitate the commercialisation of the new system. The smart beer barrel enables Hobson to better understand their supply chain and dynamically re-configure depending on supply and demand conditions.

“This project has been a real learning curve for Hobsons and has opened up a number of new business opportunities for us. We are planning to roll this technology out to other breweries which could revolutionise the way that operations are carried out.”

Nick Davis,
Managing Director, Hobsons
Brewery and Company Ltd



Information Technology



Caption Data Ltd Product Improvement and Demonstration of Internet of Things Technology

The Company

Caption Data Ltd produces remote data logging systems which allow sensor data to be delivered in real time through 3G and onto the web. The company works with a range of businesses globally to enable monitoring and connecting of sensors, devices and "things" remotely - via mobile phone networks and the Internet. Their systems monitor everything from the drying regime of water damaged buildings, to the internal climate of historic buildings and food manufacturing processes, to storage of military electronics.

The Challenge

As part of their product development process, Caption Data had a range of test requirements to validate their temperature and humidity monitoring systems. Their systems need to cope in a number of stressful environmental conditions and it can be difficult to simulate without expensive equipment and capabilities. They were keen to work with us to develop a testing programme that would help develop their systems further.

The Solution

We worked with Caption Data to set up and configure a number of experiments to test their systems. Caption Data took on Dr Sook-Voon Yap, PhD graduate from Nottingham Trent University, through our internship programme who spent four weeks implementing the testing programme at WMG. Caption Data also worked with customer insights specialist Kate Ainscough, to improve the user interface of the web portal used by a wide range of customers to access data from the remote data readers. They walked through the customer journey, captured user requirements at a workshop with customers and subsequently made changes to the interface to improve the customer experience of the portal.

The Results

Through the project, the systems were fully tested in a range of different environments, allowing Caption Data to prove the benefits of their products and add further technical credibility to their offer. Improving the user interface

of their portal, which presents complex data, has led to increased customer satisfaction and reduced technical support requests.

Caption Data's products demonstrate the value of "Internet of Things", an area that WMG is also active in; supporting other West Midlands SMEs to connect their products and services to the web. The initial project work has since led to the development of a demonstrator sensor and display system in the IIPSI building which is being used to showcase to other SMEs and visitors just what is possible in terms of monitoring a working environment and how the data can be used. The collaboration between Caption Data and WMG has led to the safeguarding of three jobs in the business and the creation of a new marketing role. Caption Data's new marketing coordinator now attends a regular marketing meeting at WMG to learn about how new digital marketing techniques can benefit the company going forward.



Plastics and Polymers



Barkley Plastics Ltd New Product and Process Development Leads to £1 Million Additional Turnover

The Company

Barkley Plastics Ltd was established in 1965 and is a plastic injection moulding, assembly and tool making company based in Birmingham. The business operates out of an 80,000 sq.ft facility and produces in excess of 80 million mouldings each year for sectors including automotive and retail.

The Opportunity

Barkley Plastics are regularly approached by Original Equipment Manufacturers (OEMs), large retailers and smaller entrepreneurs who have product ideas that they require to be manufactured. Collaborating with us on new products offered them the opportunity to develop proof of concept pieces, test materials and processes and reduce development costs. Barkley Plastics also identified opportunities to validate their own patented processes and technology through working with us.

The Solution

Over the last three years, the company has used specialist optical microscopy equipment at WMG to assess the validity of their patented

in-mould welding process, and used our Additive Layer Manufacturing (ALM) facilities to create prototypes for a number of products. These include an automotive instrument structure, and more recently a range of phone charger and ear phone storage solutions for a Tier One supplier of Marks and Spencer now on sale in stores across the UK. We worked with Barkley Plastics and the Tier One Supplier PBFA (Peter Black Footwear & Accessories Ltd), to design and undertake materials testing for the product. This helped Barkley Plastics win an order from PBFA to manufacture the product and subsequently sell in M&S stores. A further ground breaking project is currently underway for the development of 3D printed injection mould tools that could revolutionise the way that low volume manufacture is done in the future. ALM technology has been used to pioneer novel printed polymer inserts that are capable of producing more than 200 injection moulded parts. With a build time of only four hours and a cost per set in the low hundreds of pounds, it is a highly attractive manufacturing route for companies looking to

bring new products to market.

The Results

Through the on-going relationship that Barkley Plastics has had with us, over £1 million additional turnover has been recorded through the new sales that have been achieved. The collaboration has led to new products, has safeguarded seven jobs, and created two more. Research into using ALM for tooling will continue, and it has already been tested as part of the development of the new ski lock product Loqski that is now on the market. The two organisations are also collaborating on a digital project, looking at how Barkley Plastics can manage their CRM system more effectively.

“Access to support and equipment at the International Institute for Product and Service Innovation has been invaluable to us on our journey to create new and exciting products for our clients.”

Maurice Cassidy,
Technical Director,
Barkley Plastics Ltd



JSC Rotational Ltd

New Materials and New Processes add Value to Business

The Company

JSC Rotational Ltd provides quality rotational moulding and assembly services. With over 20 years' experience in the plastics industry the company has the technical ability to undertake a wide variety of projects and works in a number of sectors from leisure to automotive.

The Challenge

JSC initially approached us regarding a gaming seat product they were developing for a well-known arcade gaming manufacturer. The manufacturer wanted to make the product more aesthetically pleasing and more interesting for their customers, and therefore JSC wanted to find out what technology might be available to optimise the rotationally moulded products they provided to the manufacturer.

The Solution

Directors Karen and Mark Drinkwater met with Dr Ben Wood to find out what additional functionality could be incorporated into their seat product. Dr Wood suggested they trial an electroluminescent panel at the

front of the seat, which would light up and was a process that would be scalable to their production needs. Trials were undertaken, and whilst this particular material was not used in the final production, the experience of working with WMG created a number of further ideas for development.

Following this project, we investigated the possibility of using JSC's manufacturing process to produce the casing for a product which requires very high impact resistance. We undertook mechanical testing of samples to the relevant ISO standards, and were able to interpret the results to guide JSC's manufacturing process and material choice for the new product. Since then the company has collaborated with us and plastics recycling company Boomerang Plastics, to integrate recycled plastic products into their rotational moulding process, as well as how they can reuse non-recyclable materials in their processes. Trials have indicated a number of ways that JSC can be more environmentally friendly and cost efficient. The most recent

project has resulted in the creation of an innovative solution to the problem of venting hot air from tooling during rotational moulding. The concept has been proven, so we will now work with JSC to find a suitable medium to high volume manufacturing solution.

The Results

Through working with us, JSC Rotational has developed new processes and products that have added value to the business and to its customers. To date they believe that at least seven jobs have been safeguarded within the business.



“I think it's really important for a progressive company to be right at the forefront of any developments in their industry, and working with WMG has really given us that.”

Karen Drinkwater,
Director, JSC Rotational Ltd

Thermotec Plastics Ltd

Strategic Partnership Leads to New Client Offering

The Company

Birmingham based Thermotec Plastics Ltd is an innovative and bespoke supplier of engineered solutions in vacuum forming and polyurethane mouldings. It operates in a number of niche sectors including luxury prestige automotive, military seating systems, aircraft and rail interiors.

The Challenge

One of Thermotec's key customers, a luxury automotive manufacturer had a specific requirement for performance related data for a new composite material that Thermotec were using to make their components. Thermotec were unable to produce the data themselves as the testing equipment required was investment prohibitive. Fortunately, Managing Director, David Rose identified that the relevant testing capabilities existed at WMG.

The Solution

David met with Dr Ben Wood and through our funded support programme for SMEs at the International Institute for Product and Service Innovation, Thermotec were able to access the materials characterisation facilities they needed free of charge. Access was coupled with expert mentoring and guidance for how they might be able to conduct the testing themselves in the future. Testing was undertaken over a period of two months and Thermotec now have a full report of all the results gathered.

The Results

Thermotec are now able to demonstrate the capability of their products with meaningful, technical data that will be used by the luxury automotive customer on a £500K potential project. It will also allow Thermotec to target

other clients with a potential spend expectation of £1m.



“Thermotec Plastics is an innovative forward thinking company and it has been great to help them with this specific materials challenge. We are offering materials health checks for SMEs across the West Midlands as well as support with new product development and other manufacturing challenges that businesses may have.”

Dr Ben Wood,
Technology Transfer
Specialist, WMG



 **WMG**
Innovative Solutions

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WARWICK

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- Nearest airport - Birmingham International - 20 minutes
- Nearest train station - Coventry

Getting in touch

-  www.wmg.warwick.ac.uk
-  wmgsm@warwick.ac.uk
-  +44 (0)24 765 74299

WMG
International Institute for Product and Service Innovation
University of Warwick
Coventry
CV4 7AL
United Kingdom

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