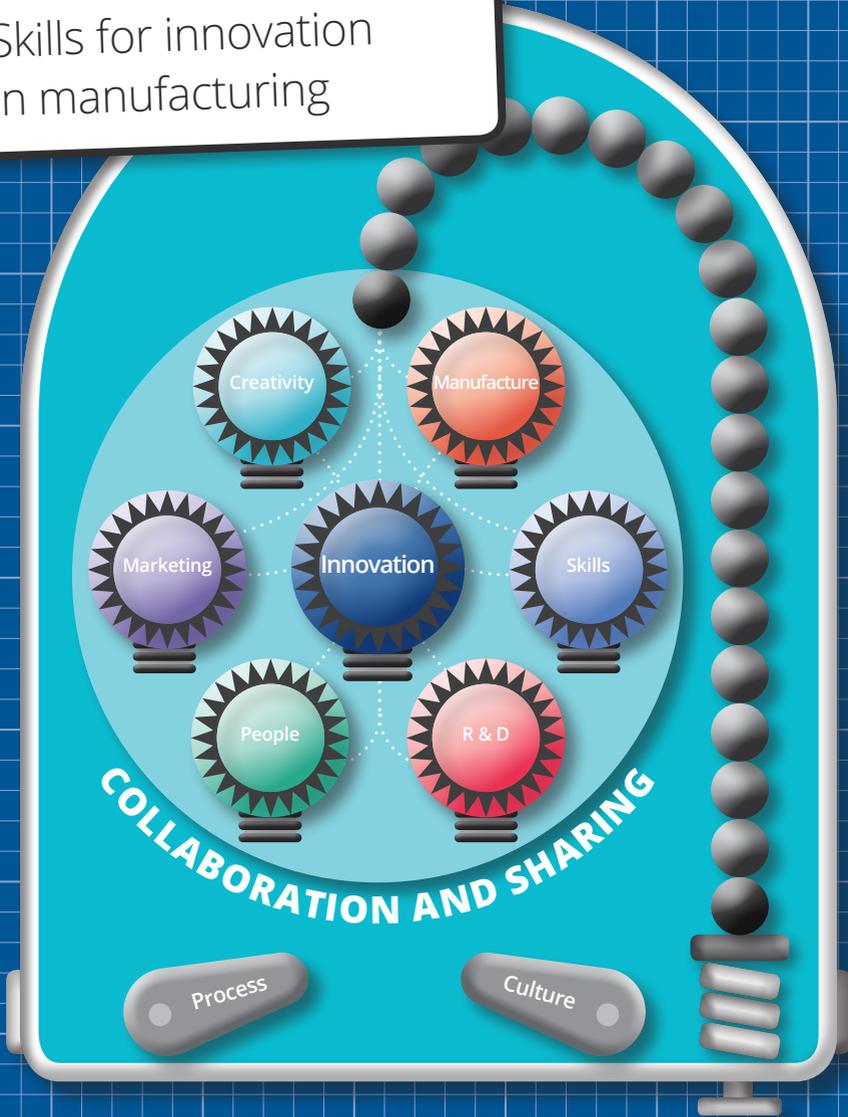


# TILTING THE ODDS

Skills for innovation  
in manufacturing



# Tilting the Odds

## Skills for innovation in manufacturing

Innovation is vital for UK prosperity. As the basis for economic growth it is critical for job creation and improving productivity. What we mean by innovation is the introduction of new or significantly improved products, processes and services or as entirely new ways of doing business within the organisation itself or within the markets it competes in.

Whilst it is encouraging that UK innovation performance is strong against international competitors – it has risen up the Global Innovation Index in recent years, to second place in the 2014 and 2015 rankings – there is still room to improve, particularly around the skills and talents which people need to drive and support the innovation process. As the economic benefits of innovation are realised through businesses, the skills, workplace practices, and management within them are critical to maximising the value of innovation. To successfully innovate requires a diversity of skills.

UKCES' research and consultation with stakeholders suggested that while businesses commonly recognise some shortages in STEM skills, there was less of a focus on the skills required to support the management and commercial exploitation of innovation. For this

reason, we have focused on supporting the 'human factor' in these areas of innovation.

In January 2015, I launched this Productivity Challenge and five projects took up the challenge. Based throughout the UK, each represent different manufacturing sub-sectors and sizes, exploring different approaches to boost skills and workplace practices needed to effectively manage the innovation process and then successfully commercialise it.

The experiences and successes of these projects, outlined in this brochure, provide examples of effective ways for businesses to maximise the value of their own innovation. I would encourage you to consider what you can learn from these examples and what more you might do to foster innovation and productivity in your own business.

## PROJECT OUTLINES

### **BAE Systems Maritime Naval Ships**

Piloted a new way of incentivising innovation and enhancing discretionary effort through the introduction of schedule-based working into a complex, maritime manufacturing facility.

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### **BAE Systems (Operations) Ltd**

Developed a programme to increase strategic thinking, innovation capacity and leadership and management skills of SMEs through masterclasses, workshops, innovation challenges, and action learning groups. It also supported the engagement of hard-to-reach SMEs with regional and national innovation infrastructure.

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### **Cardiff Metropolitan University**

Created a new innovation-focused supply chain. The four-tier, healthcare supply chain worked together as an innovation-focussed, self-learning partnership to trial a new 'Unified Innovation Model' approach to new product development.

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### **Northern Ireland Polymers Association**

Brought together firms in the polymer and construction sectors to learn from their strengths and weaknesses to develop innovation skills. This novel approach saw two distinct, yet complimentary, sectors collaborate to deliver more effective innovation and commercial exploitation for their complementary member firms.

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### **Swansea University**

Developed a programme which focuses on increasing the innovation management skills and knowledge of leaders and senior managers, helping them develop the innovation culture of their organisations.

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### **Paul McKelvie OBE**

Training and Development Professional  
and UKCES Commissioner



# BAE Systems Maritime Naval Ships

## Schedule Based Working

### Our Solution

BAE Systems Maritime Naval Ships is encouraging staff to improve production processes, saving time and business cost, through the introduction of 'Schedule Based Working' (SBW) at its Glasgow Shipyard.

This approach has been developed fully in conjunction with its Trade Unions. SBW

empowers people to work more efficiently and innovatively by rewarding teams for their output levels, rather than for their attendance. The project builds on previous small-scale pilots and has sought to understand the impact of introducing these innovative working arrangements as well as how to encourage greater engagement and productivity from employees.

### Highlights and Successes

Employee engagement has undergone a step change with the advent of SBW. For example, drop-in surgeries have been introduced to engage the production workforce and share information. These represent a fluid, unstructured way of communication, as opposed to the previous fixed, and direct one-way channel. Surgeries have been very popular with the volume of employees attending indicating increased engagement.

“ Schedule Based Working has changed my role, in that I have been able to release control to the operators. It has fundamentally changed how the team and I interact on a daily basis and I have confidence that what needs to be done will happen. There is a lot more team spirit and a give and take.”

**CHRIS STEWART**

OPERATIONS IWT MANAGER,  
BAE SYSTEMS MARITIME – NAVAL SHIPS

“ When I was first made aware of Schedule Based Working I was very cynical about it. We have been on it now for nearly two months and I have to say that it has been going well so far and I am now an advocate for it. It has been, for me, the biggest and best change to my working life since the 37 hour week but SBW is a journey not a destination.”

**JOHN BROWN**

WELDER SHOP STEWARD, GOVAN,  
BAE SYSTEMS MARITIME – NAVAL SHIPS

### What did we achieve?

The impact of SBW has been very encouraging in this traditional manufacturing environment. It has been the driver of an unprecedented increase in productivity across this pilot area, as well as previous other pilots.

Productivity improvement has been supported by evidence of significant behavioural change, demonstrating an increase in discretionary effort and employee motivation. The generation of continuous improvement ideas/ innovations has increased, allowing for improved process efficiency. Mechanisms

like 'you say, we did' enable workers to provide suggestions to improve processes and practices.

Team members willingly approach each other to agree how they can support the delivery of each other's activities. Experienced workers actively support the development of junior colleagues. For example, workers will support apprentices by staying on at work, giving up their own time, in spite of weekly targets having been accomplished. Improved self-regulation within the team is evident, in respect to poor performance or poor attendance.

“ The positive challenge to the business that SBW brings is not to be underestimated. We have witnessed cultural change on a major scale at the shop floor level, but equally we have shone a light upstream into how we structure and enable our tasks. Schedule Based Working will focus the attention on delivery and drive success across the business.”

**STEVEN CLARK** HEAD OF TRANSFORMATION, BAE SYSTEMS MARITIME – NAVAL SHIPS

### This Project in Numbers

- **120** staff working to SBW principles, with significantly more being engaged and aware.
- We have seen, on average, a **16%** cost efficiency in the areas working under SBW.

### What can you do?

To find out more you can visit [www.baesystems.com](http://www.baesystems.com) or contact [ashley.thomson@baesystems.com](mailto:ashley.thomson@baesystems.com)

# BAE Systems (Operations) Ltd

## Innovation in Manufacturing and Engineering (IME)

### Our Solution

BAE Systems (Operations) Ltd, in conjunction with Lancaster University, have sought to increase the innovation capacity of owners and managers, of small and medium sized enterprises (SMEs), in the North West of England.

Focusing on the Advanced Engineering and Manufacturing sector, the university's renowned former leadership development programme, LEAD, has been adapted to

help develop non-technical skills required by firms to support and drive innovation.

Innovation in Manufacturing and Engineering (IME) also signposted and supported SME access to regional and national innovation infrastructures, including BAE Systems at Samlesbury, Siemens at Congleton and the Advanced Manufacturing Research Centre (AMRC) at Sheffield.

### Highlights and Successes

SMEs were proactive in leading on their innovation journey and critically reflecting on their understanding of innovation, using this to evaluate their existing management and workplace practices, as well as changing the way they manage and shape their employees.

Whilst this project was open to the entirety of Advanced Engineering and Manufacturing employers, one opportunity within IME was to showcase BAE Systems' Military, Air and Information Division to regional SMEs to further develop supply chain opportunities. IME has helped change perceptions of working with BAE Systems and those SMEs engaged with IME now understand that there is an opportunity to develop a more collaborative, rather than just a transactional relationship, with BAE Systems to help it meet the productivity and cost challenges it will face in the future.

IME promoted understanding of the importance of non-technical skills to foster innovation within organisations and focused on three key themes: culture, transformation and collaboration. These were promoted by various site visits, each focusing on a different key theme.

### What did we achieve?

A cohort of 19 participants from 18 SMEs completed the IME programme. Through active, experiential learning comprising masterclasses, workshops, peer shadowing, visits, exchanges and action learning groups, participants developed their strategic thinking, growth planning skills, innovation capacity and leadership and management skills.

A further 76 SMEs participated in innovation masterclasses, linking into wider networks and being introduced to the cutting edge equipment and facilities available at Lancaster University.

IME recognised the important role that regional anchor institutions, such as large corporates and universities, can play in attracting and encouraging regional SMEs to develop their skills, improve their workplace practices and learn from each other in a trusted peer network. It also played an important role in raising awareness of innovation infrastructure, such as Catapult Centres, including the AMRC at Sheffield, and how they can be accessed by SMEs.

“As a business we recognise we do not have a monopoly on good ideas and if there are collaborative ways we can work with our supply chain to develop new ways of working, we want to take them. We hope this programme will enable us to support our supply chain further to ensure we are all playing a part in being as efficient and effective as possible.”

**DAVE HOLMES**

MANUFACTURING OPERATIONS DIRECTOR, MILITARY AIR & INFORMATION, BAE SYSTEMS

### This Project in Numbers

- **19** participants from 18 SMEs completed the IME programme.
- A further **76** SME employers participated in the programme by attending masterclasses and/or were signposted to relevant innovation support.
- **6** participants have further engaged with Lancaster University via student-consultancy projects, business support programmes or working directly with university technical staff.

### What can you do?

To find out more you can visit

[www.baesystems.com](http://www.baesystems.com) or [www.lancaster.ac.uk/lums/business](http://www.lancaster.ac.uk/lums/business)

or contact [steve.dilworth@baesystems.com](mailto:steve.dilworth@baesystems.com) or [h.fogg@lancaster.ac.uk](mailto:h.fogg@lancaster.ac.uk)

# Cardiff Metropolitan University

## Enhanced Flexible Innovative Supply Chain

### Our Solution

Cardiff Metropolitan University's International Centre for Design and Research (PDR) supported the creation of a new innovation-focused supply chain comprising four organisations in medical manufacturing.

The supply chain worked together to pilot a 'Unified Innovation Model' (UIM) approach to new product development. The model

will act as a blueprint for collaborative innovation, bringing together the unique insights of designers, manufacturers and end users to develop new product service systems. It also measured organisational learning and demonstrated how to manage this collaborative innovation process, ensuring different perspectives were able to contribute to delivering a marketable product.

### Highlights and Successes

High quality innovation skills have been aligned to the innovation management processes within the supply chain partners, as evidenced by the feedback received from the project participants.

During the course of the project, it was possible to observe the evolution of separate organisations into one collaborative, enhanced flexible supply chain. This combined engagement has de-risked entry into new markets for supply chain partners.

It was possible to correlate the improvement in organisational learning with the level of innovation that was developed by the project participants.

All four organisations have increased their technology readiness levels as a result of engaging in the project. And, the supply chain will be able to progress toward the highest levels by using the core skills and competencies gained through the programme.

“ We were generally working quite separately in our own methods, in our own mind-sets. So what I try to do now is pull everybody together including people that aren't technical within the field they are working in – to get them in there – and I think the best thing I learnt from it was this concept.”

**DR PAUL DELOOZE** REAL-TIME LOGISTICS SOLUTIONS LTD

### What did we achieve?

This project has been successful in developing a new, collaborative innovation focussed supply chain. A series of workshops and activities were built where only contemporary innovation skills and techniques were taught, in order to provide 'fresh' thinking to participants and their organisations. This fitted really well with the open approach, which UKCES allowed, for the team to adapt and tweak the workshops according to employer needs.

During the course of six workshops, participants developed a new configurable sling and a product service system for medical hoists. Throughout their time together and the activities carried out, the participating companies were able to understand each other's core competencies when coming up with their final 'sling-plus-configurator' concept. They are now able to use this understanding in taking this forward to a demonstrator version. The next steps will then be reliant on the business case they can make to take it to commercialisation.

### This Project in Numbers

- Over **9** months the project ran six workshops with the four companies forming the supply chain.
- Participants committed at least **111** hours to engaging in workshops and generated **75** ideas for new products.
- Product ideas were whittled down to a product service system (a sling and configurator system) and its estimated time to market is currently **2017**, following the development of a final business case by the supply chain.

“ Skills for Innovation in Manufacturing has been a catalyst for PDR and Cardiff School of Management to work closely together to enhance the collaborative innovation offering that Cardiff Metropolitan University can now offer. It has strengthened links with industry, developed an enhanced innovative supply chain, and drawn upon skills from across the university to deliver a successful programme. The management team found the flexible, and open, management approach from UKCES to be an enabler and provide a pragmatic way to test and learn innovative new approaches for improving innovation and creativity in new supply chain of organisations.”

**DR PETER DORRINGTON** PDR, CARDIFF METROPOLITAN UNIVERSITY

### What can you do?

To find out more you can visit [www.pdronline.co.uk](http://www.pdronline.co.uk) or contact [pdorrington@pdronline.co.uk](mailto:pdorrington@pdronline.co.uk)

# Northern Ireland Polymers Association

## Innovation Management and Market Exploitation

### Our Solution

Northern Ireland Polymers Association (NIPA) and CITB Northern Ireland worked together to develop innovation skills between the polymers and construction industries in Northern Ireland.

Building on the respective strengths of the polymers industry, in designing

innovation, and the construction industry, in extracting the commercial value of innovation, the project sought to fuse these skillsets. 22 employers tested out new 'innovation interventions' to improve their own innovation capabilities and have shared good practice via a toolset for other businesses in the sectors.

### Highlights and Successes

Very strong employer engagement and commitment has been demonstrated throughout the initiative.

Employers worked through their innovation needs, which have some key common ingredients: regular review of actual progress against plan; a structured development process with stage reviews; spending as little money as you are required to at each stage; and not being afraid to kill off under-performing projects to make room for new potentially more productive ones.

This initiative reinforced that people are the key ingredient in innovation and commercialisation and there is a need for increased focus on the importance and implementation of training and development to build skills and capabilities.

"I would compare the project to a pinball machine. We have inspired companies to appreciate what innovation is and what it can do for their organisation. We have pulled back and released the plunger of the pinball machine and fired the ball into the game. Each company now has that kinetic energy and is on their own individual journey to control, capture and innovate in their own way."

**BARRY NEILSON** CHIEF EXECUTIVE, CITB NI

### What did we achieve?

This is the first time that businesses from the polymers and construction sectors, in Northern Ireland, have come together to collaborate to develop and improve their innovation capabilities in what has been very much an employer-led initiative. The cross-sectoral fertilisation of ideas and insight has taken advantage of the relative strengths of each sector.

All the participating companies now have a clearer understanding of innovation, and the activities they need to take to improve how they approached this, with a view to improving their commercial returns and remaining an attractive company to do business with their current and future customers.

### This Project in Numbers

- Participation of **22** companies - **11** from the Polymers Sector and **11** from the Construction Sector
- **34** shared learning meetings were held with participants attending from across Northern Ireland.
- Three companies have increased their workforce by **20** employees during the period of engagement
- Companies' own financial spend on the programme was double that envisaged at the start of the Challenge. This was due to some investing extra money of their own over and above that allocated to them. Furthermore, training in other innovation activities parallel to the challenge and in the same time-frame are not included in this figure.

"It is essential to have innovation and commercialisation on the agenda and part of the discussions."

**MARK MCCLURKIN**

GENERAL MANAGER,  
WRIGHT COMPOSITES LTD

"Innovation is not just for people in white coats - it is about new ways of doing things. Invention was the perception but it is also about change."

**KEVIN MOONEY**

MD, BAILEY WASTE

### What can you do?

To find out more you can visit

<http://polymersni.com/about-us/innovation-some-research-and-thoughts-on-doing-innovation>

or contact [michael@polymersni.com](mailto:michael@polymersni.com)

### Our Solution

Building on its successful leadership programme, LEAD Wales, Swansea University has piloted a new programme, SIM (Skills for Innovation in Manufacturing) Wales, to increase the innovation management skills and knowledge of leaders/senior managers, of small and medium-sized (SME) manufacturing firms in Wales.

Supported by Industry Wales and the Engineering Employers Federation (EEF), SIM Wales has helped SMEs to improve their organisational innovation culture as well as understand the challenges of managing and exploiting innovation for commerce. The programme has used experiential learning (i.e. learning by doing) and peer learning to develop the commercial skills, knowledge and practices required for successful innovation.

### Highlights and Successes

All of the delegates have introduced positive changes into their organisations. For one business implementing changes, including introducing a new system, it culminated in a 20% increase in capacity, and an increase in the workforce.

SIM Wales delegates have reported increased confidence in their approach to leadership and management.

“ The SIM Wales programme achieved its primary aim of testing the methods that boost the innovation skills and practices of UK firms. It also achieved its secondary aim of developing the innovation knowledge and skills of a group of manufacturers, in order to enhance their productivity. Firms reported productivity savings of over £200,000 whilst on the programme and the productivity gains will continue to accrue. The gains would not have been possible without the foresight and support of UKCES.”

**GARY WALPOLE** COURSE LEADER – SIM WALES, SWANSEA UNIVERSITY

### What did we achieve?

SIM Wales has given employers a clear understanding of the challenges of commercially exploiting innovation and a means for its implementation. The issues of each employer were addressed via individual innovation projects and the chance to discuss their own unique challenges.

In feedback sessions delegates have advised that discussing and sharing implementation challenges, through formal mechanisms, like action learning, and through informal peer mechanisms, within workgroups and break times, has enhanced their knowledge levels.

### This Project in Numbers

- **10** SME manufacturers, based in Wales, took part in SIM Wales' 10-month programme.
- Initiated **12** learning events, **8** action learning meetings, **5** business change projects and **4** best practice company visits.

“ In the first 13 weeks of this year we've seen a 6% increase in efficiency, with downtime reduced from 24 to 19 minutes per tonne, which equates to a saving of 31 days or £27,500 per year.”

**CHRIS SHARLAND**

PROCESS PRODUCTION MANAGER,  
ENVIRONWALES LTD

“ Five years ago, the full force of the global recession had hit home, and the manufacturing world was in a very bad place. Taking part in SIM Wales was a genuine lifeline; we met with other businesses facing similar challenges and worked through problems together, sharing experiences and learning a huge amount from the programme's delivery team.”

**MIKE EVANS**

MD, EBS AUTOMATION

### What can you do?

To find out more you can visit

[www.swansea.ac.uk/business-and-industry](http://www.swansea.ac.uk/business-and-industry)  
or contact [g.l.walpole@swansea.ac.uk](mailto:g.l.walpole@swansea.ac.uk)

# Conclusions

## Tilting the odds to innovation success

Our five projects have shown that to develop the innovation-relevant management and commercialisation skills so often lacking in UK business is a complex task, especially for businesses with few existing generic management processes or systems. But, crucially, they have also demonstrated that improvements can be made. This Challenge has shown that whether businesses focused on improving innovation-relevant training and/or workplace practices, both elements are important factors to increase innovation capability. For example, there was no point providing innovation management training if there wasn't also a change in how the innovation processes in the business were conducted. And correspondingly, there was no point changing processes without training people to be able to use them effectively.

The projects provide some useful pointers for businesses to find, foster and fulfil innovation in their firm:

## Finding innovation

- Businesses might be more innovative than they think. As well as product and service innovation, if they are developing new business structures, practices, marketing concepts or strategies, or if they are improving existing ones, they are innovating. But if this is unrecognised, it may be that businesses are not making the most value of that innovation.
- So understanding the meaning of innovation, and its breadth, is crucial to give it the prominence it deserves within business as usual activities, and to ensure it gets the time, people and resources it needs to flourish.
- Position innovation up front and centre in an organisation's strategic thinking. This can be done by having an innovation strategy or even just as a standing item agenda to maintain focus.

## Fostering innovation

- Senior managers need to provide vision and leadership with the aim of embedding and growing a culture of innovation throughout the organisation. This can be achieved via good communication and encouraging contribution amongst all staff.
- Engaging staff is critical. Innovation should not be the preserve of a discrete few. With all parts of the business engaged, there is greater opportunity to reap the rewards as innovation is spotted, nurtured, managed and commercialised.
- Simple measures include introducing 'suggestion boxes' to promote innovative thinking throughout the workforce. It is important here to make sure any ideas are acknowledged and feedback given and their success celebrated (as well as learning lessons from failures).
- Establishing an 'Innovation Champion' (or two or three) can help drive through the changes needed in processes and promote the right organisational culture for effective innovation.

## Fulfilling innovation

- Innovation is difficult! No silver bullet exists to ensure its success, with no right or wrong way to do it. But there are tools and approaches which can structure and manage the approach so it is important that innovation is relevant and customisable to each organisation.
- Variety is the spice of innovative life – a diverse workforce, with varying approaches to risk, can yield the most beneficial results.
- People are the key ingredient in innovation and its commercialisation. Ensure that training and development are prioritised to build skills and capabilities.



Cardiff  
Metropolitan  
University

Prifysgol  
Metropolitan  
Caerdydd



**SIM Wales**  
Skills for Innovation in Manufacturing



The UK Commission for Employment and Skills (UKCES) is a publicly funded, industry-led organisation providing leadership on skills and employment issues across the UK. Together, our Commissioners comprise a social partnership of senior leaders of large and small employers from across industry, trade unions, the third sector, further and higher education and across all four UK nations.



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