



Evaluation of UK Futures Programme

Final Report on Productivity
Challenge 4: Skills for Innovation
in Manufacturing

Briefing Paper
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Final Report for Productivity Challenge 4: Skills for Innovation in Manufacturing

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1 The UK Futures Programme

Productivity growth in the UK is currently sluggish. Matching productivity in the US would make each family in the UK £21,000 better off. To boost productivity, the UK needs to pay due attention to improving the skills of our workforce and to putting them to better use. Productivity relies on a dynamic economy where good ideas spread rapidly, workers are well matched to jobs, firms can scale up, and where people move into jobs that use their skills¹.

The UK Futures Programme (UKFP) adopted an innovative approach to tackling workforce development challenges. The programme was funded by the UK Commission for Employment and Skills (UKCES) and ran between April 2014 and June 2016.

The UKFP offered small scale investments, targeting specific workforce development challenges and where appropriate a location, occupation or sector where there was greatest scope for learning. The programme took a Research and Development (R&D) approach to devising and testing skills solutions, it sought innovation and was tolerant to risk taking to promote greater levels of learning about what works, what does not, and how to apply that learning. The aim was to influence the application and implications of this learning in both strategic / policy decisions, and the action taken by employers and intermediaries.

The UKFP saw UKCES and industry co-creating projects to research, develop, pilot and/or scale innovative solutions to identified current and emerging workforce development issues that restrain business performance.

Through the Programme, UKCES aimed to:

- Support collaborative approaches to workforce development issues amongst employers and, where applicable, wider social partners
- Encourage innovative approaches to addressing workforce development issues
- Identify ways to address emerging or persistent market or system failures which act as a brake on UK workforce competitiveness
- Identify 'what works' when addressing market failures in relation to workforce development, for adoption in policy development and wider business practice.

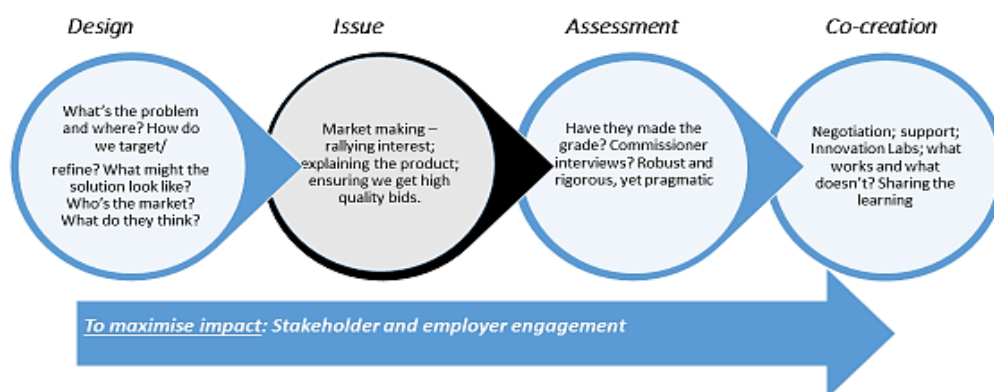
The UKFP identified a series of 'Productivity Challenges' which, if solved, had the potential to increase the skills of the workforce and ensure that they are put to good use. Five Challenges were launched and completed by mid-2016. Each Productivity Challenge co-

¹ HM Treasury (2015) *Fixing the foundations: Creating a more prosperous nation*, HMSO

invested in a number of projects identified through a competitive process, which explored different aspects of the Challenge theme / workforce development challenge(s).

Each round of investment followed a staged process through which UKCES first identified the workforce development challenge from a combination of research, the knowledge of its Commissioners and staff, and then conducted market testing and consultation with employers and intermediaries to refine that challenge. UKCES then carried out a market making activity to encourage project development and applications that demonstrated shared risk and active cash and / or in-kind investment by employers to the benefit of the design, delivery, reach and / or communication of the proposed solution. These applications were then assessed. The successful projects received co-creation support to nurture learning, collaboration and innovation within and across the projects. This process is shown in Figure 1-1.

Figure 1-1: UK Future Programme stages



Source: UKCES

Productivity Challenge 4: Skills for Innovation in Manufacturing

Innovation is vital for UK prosperity because, as the basis for economic growth, it is critical for job creation and improving productivity. Broadly speaking, for this Productivity Challenge, UKCES defined innovation as 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 they compete in. This is a relatively broad definition and is different to the common perception among manufacturing firms that innovation equates to “technical skills”. Part of the work of the Productivity Challenge has been in disseminating this wider idea of innovation, and demonstrating the benefits it can bring to businesses.

UK innovation performance has risen up the Global Innovation Index in recent years, moving to second place in the 2014 and 2015 rankings. For example, 53 per cent of UK

businesses reported themselves as innovative in 2015, compared to 45 per cent of businesses in the 2013 survey². Whilst it is encouraging that UK innovation performance is strong against international competitors there is still room to improve.

An international benchmarking assessment of the UK's science and innovation systems, by the Department for Business, Innovation and Skills, identified deficiencies around management skills, which limit business' ability to capture economic value from innovation.³ To successfully innovate requires a diversity of skills. Despite clear strengths, science and innovation in the UK has been shown to have significant deficiencies in planning, recruiting, training, retention, progression and project management of staff.⁴

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, this Productivity Challenge has focused on supporting the 'human factor' in these areas of innovation. The Productivity Challenge also focused on the manufacturing sector.

Furthermore, there is clear under use of existing skills across the economy, indicating that the country's firm foundation in innovation is not being fully exploited. Effective skills, workplace practices and management are crucial factors in ensuring that innovation value is maximised.

Productivity Challenge 4 (PC4) was formulated following discussions between UKCES and Innovate UK. In order to ensure the Challenge did not duplicate any of the investments that were already being made by Innovate UK, the focus of PC4 was on the 'long-tail' of companies which were not touched by regular innovation support. UKCES perceived this group of companies as being the least likely to promote innovation within their businesses, and to adopt innovative work practices.

PC4 was intended to focus on work practices as well as skill sets. Investment has been made in projects that focus on the skills required for innovation management, rather than technological skills and on the development of workplace practices that enable staff to manage and commercialise innovative projects in manufacturing. The PC4 brief set out six themes that applicants might consider when developing their projects:

- Innovation relevant management development
- Innovation relevant commercialisation development

² Global Innovation Index 2015, <https://www.globalinnovationindex.org/gii-2015-report>

³ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/277090/bis-14-544-insights-from-international-benchmarking-of-the-UK-science-and-innovation-system-bis-analysis-paper-03.pdf

⁴ UKCES, UK Futures, Productivity Challenge 4 Brief https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/402587/15.01.29_UKFP_Brief_for_Comp_4_V3.2.pdf

- Recruitment, retention and career pathways
- Job design
- Incentivising innovation
- Broader organisational strategy.

A number of delivery mechanisms and techniques were also suggested, to provide applicants with a range of possible options for projects. These included staff training programmes, development of organisational structures, use of work placements, peer learning, coaching or mentoring and using existing employer networks to address innovation challenges.

Evaluation of the UK Futures Programme

UKCES commissioned SQW to carry out a real-time evaluation of the programme. The aims of the evaluation were to:

- Develop a rich understanding about ‘what works’ in addressing workforce development issues
- Understand the conditions that can stimulate workplace innovation and learning
- Actively enable continuous improvement of the investment approach
- Communicate the learning in a way that can readily inform and influence policy and wider practice.

These aims, which guided the evaluation, fell into two broad areas. Firstly, they were concerned with learning what works, what doesn’t work, under what circumstances and why, in relation to the solutions that were being tested in addressing workforce development issues; secondly, they were focused on exploring the operation of the UKFP and its implications on UKCES delivery and wider policy.

The evaluation of PC4 was structured around its own research questions that contributed to the programme level aims. At the point of assessment, UKCES identified a set of learning themes and research questions that they expected the evaluation to be able to explore during the lifetime of the projects. The research questions were reviewed and evolved over time; they were used to shape the activities undertaken by the evaluation team to learn what works. These are shown in Figure 1-2.

Figure 1-2: Research questions for the UK Futures Programme Productivity Challenge 4

Skills for Innovation	Enhanced innovation management and commercialisation <ul data-bbox="204 293 1410 443" style="list-style-type: none">• How far have projects enhanced innovation management and commercialisation in firms?• What is the effectiveness of different approaches to boosting skills for innovation management? How best to implement them?• What has been learnt about innovative work practices, including job design, end-to-end approach and incentivising innovation?• What is the effectiveness of different methods of collaboration on encouraging innovation within organisations?• What are the barriers and enablers for sustainability and scalability?
Engagement	Effective approaches in engaging firms to foster innovation <ul data-bbox="204 580 1410 790" style="list-style-type: none">• What works in enabling firms to engage with innovation in their manufacturing processes?• How can employers and end-users be engaged effectively in fostering innovation?• What approaches were effective in benchmarking innovation levels of individuals/ organisations?• What are the barriers that small firms face in engaging with innovation in their manufacturing processes? How does the project mitigate those barriers?• How can large companies encourage an innovation environments in SMEs?• What has been learnt about collaboration through supply chains, cross sector collaboration, working with trade unions and collaboration with universities?

Source: SQW

Evaluation methodology

The evaluation methodology for this Challenge consisted of four key elements:

- **Desk based review of programme documents.** The document review covered the following: programme background documentation (e.g. programme introduction documents⁵, various programme guidance documents⁶); Productivity Challenge guidance documents and summaries of the market testing phase; application forms, logic chains and End Stage Reports of the projects in the Productivity Challenge.
- **Consultations with key stakeholders.** Consultations were conducted with UKCES Productivity Challenge Leads and Relationship Managers. These were conducted at different milestone points during the lifetime of the Productivity Challenge.
- **Deep dive activities.** SQW also conducted qualitative research work with the projects, visiting specific project events or activities, observing them and interviewing project staff and participants. In addition, all project leaders were interviewed either in person or by telephone. These activities were conducted towards the end of the Productivity Challenge.

⁵ https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/418213/15.03.11_UKFP_Introduction_updated_-_V2.pdf

⁶ UK Futures Programme website, <https://www.gov.uk/government/collections/ukces-futures-programme-overview>

- **Participation at Co-creation Labs.** SQW attended and observed two Co-creation Labs. In the second of the two Labs the evaluation team took a leading role in designing and facilitating key sessions. In addition, the evaluation team circulated a post-Lab questionnaire to all Lab attendees asking about their reflections and learning from the day, and any affects these might have on their role / project going forward. After the Labs, the evaluation team carried out a debrief with the UKFP staff who attended to reflect on the success of the day and any learning that could be taken away. After each debrief, a note summarising the feedback on the Lab and highlighting the key learning points was circulated amongst projects and the UKFP staff.

The next section of this report describes the projects that were funded. The following section contains the evaluation findings about what works and what does not against the research questions for PC4. The implications and applications of the learning are discussed in the final section.

Throughout the two final chapters a series of summary tables highlight the key learning on what has worked or not, and the key messages that PC4 has highlighted.

2 Productivity Challenge 4: Skills for innovation in manufacturing

PC4 ran between August 2015 and June 2016. UKCES selected five projects to work with, and invest in, with a total UKCES investment of £424,941, and a total co-investment from projects of £351,172 (including cash and in kind contribution).

The projects were led by:

- BAE Systems Maritime Naval Ships
- BAE Systems (Operations Ltd)
- Cardiff Metropolitan University
- Northern Ireland Polymers Association (NIPA)
- Swansea University.

Whilst these organisations were selected as leads for their respective projects, some delivered their activities in partnership with co-lead organisations. One of the private sector leads worked closely with a university to deliver its project, whilst another project lead collaborated with an employer representative body.

One of the five projects was a pilot programme, which used experiential learning to provide an “innovation management” training programme for up to 10 participant manufacturing companies. These companies were small or medium sized businesses, which were not receiving other public support for innovation and did not generally consider themselves to be engaged in innovative activities. The programme of training was based on a model that the project leads had developed through other training delivery, which also focused on innovation management. The training focused on strategic skills and knowledge that senior managers and operational managers require to guide innovation at their companies. Moreover, the project team aimed to develop the commercialisation skills of participants, in order to allow them to assess and determine which innovation practices to incentivise within their teams and organisations.

In order to achieve these objectives, the project team used a variety of different activities to develop participant skills, as well as encouraging knowledge transfer between participants. Activities included an overnight experiential learning event, the use of benchmarking tools and methodologies, workshops that incorporated action learning sets and peer-to-peer learning. The project also helped to develop participants using reflective learning logs, organisational development plans, presentations and constructive feedback.

The second project focussed on improving innovation within a single company, in order to improve productivity and efficiency. The project used the concept of Schedule Based Working to empower employees to reduce waste and inefficiencies within their working environment, and improve processes where possible. The movement to Schedule Based Working was also intended to foster a new culture of co-operation and team work, which rewarded teams based on their outputs, rather than their attendance.

This new model of working had previously been developed and tested at pilot sites prior to PC4. As a result of the pilot, Schedule Based Working was identified as the primary mechanism to drive the required behavioural and cultural change. Moving to this new system was intended to deliver the productivity improvements needed to ensure the long term competitiveness and sustainability of the business. The UKFP provided the opportunity to roll out the model to a much larger and more complex manufacturing facility, allowing for more robust testing. This work, and the resulting learning (which has been captured in a case study with the intention of being made available to other firms in the future), will ultimately inform the implementation of the model across the whole company, with the possibility of extending to other partner organisations.

A third project aimed to use sectoral collaboration to develop skills in innovation management. The project brought together sector bodies for a manufacturing sub-sector and construction to help overcome current under-performance in the delivery of innovation of products, operations and services within both industries, through co-operative and self-defined training. The collaborative element of this approach had the added benefit of facilitating the transfer of knowledge between two different sectors.

The project brought together employers and manufacturing companies. It was delivered through three working groups. Each group undertook a mapping exercise of the innovation process from concept to commercialisation (an end-to-end approach). Employers were split into three groups, one with only SME participants, one with large company participants, and the third with a mixed group. The findings from this exercise were then used to test approaches to developing innovation, by implementing approaches that were identified through discussion within the companies involved, based on potential impact and ease of delivery. This contributed to improving innovation processes within participant businesses and enhanced their ability to capitalise on new products and processes. Funding was provided to participants to source any training that was required to meet identified skills gaps. Learning and expertise were then distilled into best practice guidance to maximise innovation effectiveness and productivity in both sectors.

The fourth project developed an innovative, connected four-company supply chain to work towards a common vision and develop a new product. The project piloted a Unified Innovation Model approach to new product development, where the insights of designers, manufacturers and end users were brought together and shared throughout the entire process of developing the novel products targeted at the high-value UK medical device marketplace. The companies were drawn from a range of manufacturing sectors, which were brought together through the programme. This approach was based on previous practice that had been developed by the project lead, focussing on the use of testing and learning, and applying theories on innovation to develop practical solutions.

The project team provided a step change in technology and manufacturing readiness levels at participant companies, as well as helping them to develop and enhance their organisational learning cultures. Another important project outcome was to develop a mentoring system that encouraged exploring ideas and accepts risks. These activities worked towards a wider impact, through feeding back to participants and disseminating the learning to other manufacturing companies, helping to create new innovative supply chains.

The final project was another innovation skills training programme, led by a manufacturing prime and a university, with the intention of leveraging the knowledge and expertise of both organisations to provide a richer experience to participants. The training programme targeted owner-managers of SMEs in the advanced engineering and manufacturing (AEM) sector, and aimed to develop and enrich their ability to manage and encourage innovation within their organisations. The participants were predominantly small or medium sized businesses, who were not part of a major supply chain. Like two of the other projects on this Productivity Challenge, this programme of training was based on previously developed techniques, which the university had used on other training projects.

The training was designed to ensure that participants would gain the strategic skills to recognise market opportunities and develop cost-effective responses that ultimately could be exploited commercially. The project team focussed on developing non-technical innovation skills, by concentrating on the owner-managers themselves, giving them the necessary tools to provide a framework for profitability, innovation and business growth. Participants took part in a variety of activities, including an overnight experiential session (to build cohesion in the group), masterclasses, action learning activities and workshops.

As the above descriptions show, there were significant differences in the approaches taken by the projects to meeting the Productivity Challenge. Whilst they all focused on innovation skills, they varied in scope and approach, with different levels of emphasis on the various themes set out in the Challenge brief (and presented on page 8 of this report). Whilst one was overtly concerned with 'job design' (Schedule Based Working project), others had more of a learning focus, teaching people about innovative work practices, innovation incentivisation and organisational strategy.

Additionally, whilst three sought to recruit manufacturing businesses to a development programme, there was a difference in the businesses they were specifically targeting and in the approaches they used (e.g. working via a large firm to support the potential supply chain), although, all used networks and contacts to do so. All three focussed on different geographic target areas in the UK, which ensured that businesses were located relatively close to each-other. Moreover, whilst they all recruited businesses in the advanced engineering and manufacturing sectors, one project addressed a specific sub-sector, and aimed to recruit three groups of businesses, one of large companies, one with SMEs, and a mixed group. Another project focused on engaging businesses from a particular supply chain, but did not have any targets for the size of potential participants.

All of the projects involved working in collaboration with partners except one, which was a single employer project. But it too brought in external expertise to help it test the effectiveness of its solution.

3 Evaluation findings

This section details the evaluation findings against the research questions in Figure 1-2 in the first chapter. It comprises two parts: how far skills have been enhanced and what contributed to this; and how employers and end users can be effectively engaged to foster innovation.

Throughout the chapter we summarise in a table what has and has not worked at the beginning of each section and then expand on this in the following text.

3.1 Distance travelled in enhancing skills for innovation in Manufacturing

The Productivity Challenge aimed to boost skills and work practices required to enhance innovation and maximise its value within businesses and more widely in the UK. This section describes the key learning about what worked well and what worked less well in this regard, and why.

As noted above, PC4 sought to engage 'long-tail' SMEs, who were perceived by UKCES as harder to engage with, and to promote innovative work practices in their businesses. Indeed, the majority of the companies that participated in the projects (some larger but mostly small and medium size companies) were not previously engaged with similar initiatives to enhance innovative practices in their business. As will be discussed further below they did not perceive themselves as being particularly innovative as well.

When asked to reflect at the end of the process on distance travelled, all of the projects felt that they had enhanced the levels of innovation management and commercialisation amongst the participants, through raising awareness of the need for managing innovation in the company and teaching different approaches to tackle innovation management effectively in the business. The success of the projects was reflected through the participants indicating that they were either in the process of introducing changes to their manufacturing processes (fostering innovation) or that they were already implementing a number of changes in their work practices. For example, a few participants commented that they changed how they went about generating new ideas, were encouraging employees to move away from their desk or regular work station (if appropriate) and were implementing flexible working environments to increase productivity and creativity.

In most cases the projects felt they had made greater progress with regards to innovation management than with commercialisation. This was because for most of the projects, commercialisation was not at the centre of what they did as part of their project, but rather an element of innovation that was likely to develop further down the line as the new work practices were embedded in the company. A number of projects commented that perhaps with time, companies could see further progress in commercialisation as well.

Looking forward, the majority of projects made relatively conservative predictions about the impact they would have on the levels of innovation management and commercialisation in the next 12 months. The nature of the skills and workplace practices that were developed and established with employers meant that the most noticeable progress was made at the start and towards the middle of the projects. As the learning became embedded and the organisation settled in around the new processes the participating companies adopted, the level of change and progress tended to slow down.

A majority commented that most of the benefits for the participating companies had been achieved in the first year of the project. These included: a better understanding of the innovation process, acquiring the skills to implement innovation in the workplace, enabling a discussion about innovation within companies and starting the implementation of innovation practices. Projects commented that the evidence of companies *increasingly* using innovative methods to show an impact on their own productivity and profitability, and indeed wider in the sector, **would be a long term outcome**, one that would require several years of implementation and development to materialise. For this reason, projects were not expecting noticeable change in the first year after the training. One project lead commented that

Learning and the benefits of the projects were captured too early, it takes time to gain the benefits from training. When I was working on a previous, similar programme.... we would interview participants three years later. (Project Lead)

One of the striking features of PC4 was that each of the projects sought to develop different solutions for enhancing skills for innovation management. The projects were quite different and yet they all seemed to face quite similar issues and challenges, and all seemed to have gone through similar processes of learning. Across the five projects in PC4 there was learning about which approaches appeared to have been effective in enhancing skills for innovation management and commercialisation. The lessons are summarised in Tables 3.1 to 3.4 and explained in greater detail below.

3.1.1 Effective learning methods in enhancing skills for innovation

The experience of the projects in the Challenge highlighted a number of approaches and learning methodologies, which were effective in enhancing skills for innovation. These are set out in table 3.1 and the commentary below.

Table 3.1 Effective learning methods to enhancing skills for innovation

What worked	Why/how did this work
Shared understanding of terms	Developing a shared understanding of what innovation means for the business and what it looks like, was a crucial step for setting expectations amongst participants and ensuring the effective implementation of the projects
Learning in small increments	Adopting a change to the culture of the business is too big a task if trying to grasp and realise it as a whole. Breaking up the process and working in small increments, learning and embedding one step at a time proved to be effective in addressing this
Combining theory and practice	Combining theory related to adopting innovative process with practice (to make the experience tangible) proved to be effective
Experiential learning	The benefit of this approach was that it allowed learning from the experience of others, who had been in a similar position and dealt with similar issues, relating to introducing new processes and changing culture within their companies
Paired peer-to-peer learning	Paired peer-to-peer learning can be an effective tool, in a similar way to experiential learning. Different to experiential learning, which is normally a group activity, paired peer-to-peer learning tends to take place between two companies learning from each other through discussing their practices and visiting each other sites. For this reason, it requires trust between companies and a good match between the peers

Innovation, as defined in the Challenge, has a broad definition and perhaps one that is unfamiliar particularly within the context of manufacturing processes, which are often tangible, and where there is likely to be a focus on 'technical' skills. Indeed, during the very first activities of many of the projects, it became apparent that the different stakeholders (i.e. participants and project leads) had different understandings and definitions of innovation in business, what it meant and what it looked like. All of the training based projects spent a considerable amount of time at the beginning **aligning their understanding of innovation, the process involved in introducing innovation in the workplace and setting out expectations** around the aims and foci of the training programmes. In some cases, the process of promoting a shared understanding took longer than anticipated and had to be reinforced throughout the project. It was agreed by project leads that having a shared understanding of innovation and setting expectations was a crucial step in ensuring effective project implementation. For many of the projects it was a significant stumbling block, in particular in getting 'long-tail' SMEs to engage with the training.

Furthermore, introducing innovation in a business through the development of new work practices is a very complex process, which the majority of the projects referred to as a process of changing the culture of the company. This is a big task that can be quite daunting, and may be too large a task to grasp and realise as a whole. Project leads commented that at the start of the project, it was quite apparent that there was a risk that many participants might be overwhelmed by the complexity of the process if too much information was delivered too quickly. Projects addressed this issue by **working in small steps, introducing and embedding one element at a time**, acknowledging that learning in small increments would be much more effective for this type of work. For example, one project had broken down the manufacturing process into steps (e.g. generating ideas, shortlisting and selecting the one to manufacture, building a prototype, testing and learning), each of which was delivered in one or two sessions, where the step was studied, discussed and experienced by participants before moving on to the next. One of the project's reports back to UKCES commented on this, stating that:

Feedback from the first continuous improvement workshop, from a few delegates, suggested too many models had been introduced in one session. The project team have hitherto reduced the quantity in theory all models being introduced in each workshop (Project Second Stage Report)

Innovation in the workplace was perceived by the project teams as part of an organisation or business culture. Therefore, the projects sought to influence and **change the mind-set** of participants, to be more open and accepting to change. The majority of projects with training programmes that looked at skills for innovation management included skills such as idea generating and creative thinking, and involved a great deal of theory (which can be perceived as 'soft' or abstract content type). At the same time, the target audience of the training, business managers with backgrounds and qualifications in design and technology, were used to working with more tangible content. In a number of projects, overly academic content posed a risk of disengaging some of the participants. The project teams acknowledged that in order to change mind-sets amongst the group of employers that they engaged, it would be beneficial if the outputs of the projects were tangible for the participants (e.g. a product or specific process plan that companies can take away and test out).

As a result, a number of projects developed a training programme that **combined the theory of innovation management with practice**. In most cases, this entailed the design and development of a product to demonstrate the process of implementing innovation. For example, in one of the projects, the participating companies were tasked with the development of a new product, to demonstrate the implementation of the skills they acquired through the training, and with the intention of manufacturing it at the end of the project. The participants were guided through the process by the projects leads, to ensure that they used the new skills that had been covered in the workshops. In developing their product, the participating companies practiced different idea generating techniques, learnt the benefits of recording and documenting the development process, and experienced different methods of testing and learning. Due to the relatively short lifetime of the project, the companies did not reach the stage of manufacturing their product by the end of the project, but the participating companies indicated that they did plan to continue working, beyond PC4, towards manufacturing and selling the product.

In another example, one of the innovation management training projects ran all-day sessions, with theory workshops in the morning and practical activities in the afternoon. The afternoon sessions would often involve activities that took place in the outdoors, or that were more hands-on and gave participants the chance to work with the concepts from the morning session. Taking these sessions outside of a classroom setting helped to make them more practical. At the end of the day, participants were encouraged to use the concepts in their business, and report back on how it had gone. This approach, helped to embed the concepts in participants' minds and show the connections between theory and practice. The project lead commented that:

It's about providing the tools to businesses to create a learning organisation. The exercises allow us to discuss the efficacy of different innovation models. One challenge is getting them to use the tools and techniques afterwards. They always find that they have skills gaps during the implementation phase, so to address that, we work through action learning to anticipate issues and prepare for them. (Project lead)

Another project introduced participants to a variety of approaches and theories on innovation management and commercialisation through a series of workshops and activities. At the same time, participants were asked to develop their own innovative project at their companies, making use of any relevant techniques or ideas they learned from the training. At the end of the project, all the participants reported back on what they had done, highlighting how the theory worked in practice, and any learning they had gained on challenges and enablers for this type of project. Feedback from the project teams and some of the participants indicated that this approach was effective in encouraging participants to adopt, develop and implement innovative processes in their business. It demonstrated to the participating companies what the process of introducing changes to the culture and work practices looks like from **end-to-end**, as well as what managers need to do when implementing the process. The advantage of this approach is that it goes beyond just providing the theory, and takes participants through the process, showing, rather than telling them, how it works. This creates a deeper understanding and has a more enduring impact than simply lecturing participants on the process.

While this approach was effective overall, there were some challenges associated with it. For example, participants were encouraged to try out new approaches at their workplaces, but some found that these were not effective because they had not had enough time during the training to understand fully how to use them in practice. In order to address this, one project arranged for visits to employers who used these techniques, in order to demonstrate them in action. This helped to embed the new techniques in participants' minds, and allowed them to implement them with confidence at their own company.

Experiential learning, which involved providing examples of how innovation was being implemented in different companies, was widely viewed as being effective. This happened through visits to the premises of large companies to demonstrate to the SMEs who engaged in the project how these companies had succeeded in transforming their business; through a positive and open approach to innovation, presentations from guest speakers at training sessions, and most importantly, through participating companies sharing with each other their experience of implementing new processes. The benefit of this approach was that it allowed companies to learn from the experience of others who have been in a similar position and dealt with similar issues, such as introducing new processes and changing culture within their companies.

The experiential learning approach helped to demonstrate to the participating companies that collaboration can be a powerful tool, that there is much to learn from the practices of other companies, and that there is much to learn from the feedback of other companies. UKCES hoped that the links that were starting to forge through the projects will continue beyond PC4 and assist in promoting the skills for innovation agenda in the sector. However, due to the short lifetime of the Challenge, evidence to this regard is limited at this stage.

Related to experiential learning, another method that appeared to be effective was **peer-to-peer learning**. This involved pairs or groups of companies (through the representatives who participated in the project) coming together to learn in depth from each other's experience of implementing existing and new manufacturing processes. The purpose of the peer-to-peer approach was to demonstrate to companies that are at the same stage of looking to change and transform their business, how other companies might deal with similar issues through different approaches, with both companies in the pair learning from each other. The difference between experiential learning and peer-to-peer learning was that peer learning tended to happen in pairs rather than groups and was structured around a dialogue *between* the two engaged companies, while experiential learning took place through activities targeted at the larger group of participants, for example through site visits to large organisation or research centres.

Projects commented that in order for peer learning to be effective, **trust must be built between participants**, and that this can take time. Companies that take part in the peer-to-peer learning need to trust that the communications between the two sides will be constructive, rather than highlighting the advantages of one company over the other.

Furthermore, for peer-to-peer learning to work, consideration must be given to the matching of companies. Companies who engage in peer learning should have similar characteristics in terms of business maturity, size and place in the innovation development process. The feedback from the projects suggested that when the pairing of the companies was not right (e.g. a large company was paired up with an SME) the large company often felt they were playing a coaching role for the SME. In some cases, the SME felt overwhelmed by what they saw at the large company. The great differences between the companies meant that quite a lot of what the SMEs learnt from the larger companies was not relevant to their settings.

3.1.2 Effective work practices to enhance skills for innovation

The experience of the projects in PC4 highlighted a number of *approaches and work practices* that were effective in enhancing skills for innovation in companies. These are set out in Table 3.2 and the commentary below.

Table 3.2 Effective work practices to enhance skills for innovation

What worked	Why/how did this work
Dare to take risks	There are benefits in being open to trying new ideas when it is not clear whether they will work, and accepting that while some things may produce large gains, this cannot always be known in advance
Learning from mistakes	Things that go wrong in the process of developing or implementing ideas should not be considered as a bad thing. There is much that can be learnt from things going wrong
Job design	Improvements to job design can be highly effective in improving productivity, through giving employees more freedom to innovate, and incentives to improve their work practices
Good internal communication	Managers need to engage employees as everyone can and should contribute to the successful implementation of change

One of the key principles of adopting innovative practices and processes in the workplace, was being prepared to **take reasonable risks** and try new ideas even if there are no certainties around whether they would work, accepting that some of these new ideas will fail. By taking these risks, companies expand the scope of ideas and activities that they undertake. While in many cases, during the development and implementation of new processes and ideas, some things will inevitably go wrong, taking those risks may also have considerable benefits for the company. By trying new things, companies might try something that could work very well and bring profit and growth to the company that they would not have tried otherwise.

Making mistakes or experiencing failure of some or all elements of the process should not be considered as a bad thing. **Learning from mistakes (or failures)** can be a powerful tool in developing new processes. There is much that can be learnt from things going wrong. In order to allow this process of learning from mistakes, the projects commented that it is paramount that this message is conveyed to everyone involved (managers and employees alike), so that individuals are able to take risks within acceptable controls / tolerances.

A manager of one of the projects that offered innovation management training commented that participants benefited from having a project fail and reflecting on their experience, as it improves their ability to assess when to cut their losses. For example, whilst working on the project, he noted that participants had previously wasted their resources by pursuing projects that were clearly unworkable, due to fear of admitting failure and writing off investments in time and resources. This in itself was an example of an idea that was covered in the training, the “sunk cost fallacy”. He was able to communicate this idea effectively by sharing previous examples from his own experience, as well as highlighting how participants had fallen into the same trap.

Improving job design also proved to be an effective way to boost productivity and incentivise innovation, as demonstrated by the experience of one particular project. The project was delivered by a large manufacturing company that wished to improve productivity through increasing employee engagement and giving them the flexibility to innovate. In order to achieve this, the business introduced Schedule Based Working, where set hours for employees were replaced by targets for outputs. Employees were rewarded for finishing tasks early with extra time off. This incentivised them to innovate, as teams were encouraged to look for new solutions and process improvements, in order to complete their schedule faster.

The manufacturing company that implemented this new way of working has seen significant improvements as a result of the project. Productivity has increased markedly in the areas where Schedule Based Working has been piloted, with workers putting in fewer hours and producing results much faster than they had done previously. Moreover, the company has captured evidence of significant behavioural change, which has shown an increase in discretionary effort and employee motivation. This demonstrates how **improving job design can unleash hidden potential** in existing employees, allowing them to work innovatively, and helping to bring real benefits to businesses.

Through the work of the projects, it has become apparent that **introducing or enhancing innovation management in businesses must include the engagement of everyone**. Innovation cannot happen in isolation (i.e. in just one unit of the organisation or amongst select individuals) if it is to become the culture of the organisation. **Good and open internal communication** throughout the firm, with all levels of the workforce (i.e. managers as well as employees), was perceived as a key enabler for disseminating the messages of innovation and any new processes, which could ensure buy-in at all levels. For example, in the Schedule Based Working project, building trust and empathy between departments, teams and individuals was key to understanding the role of each unit and their contribution to the innovation process.

In another example of open communication and staff engagement, the Schedule Based Working project used a series of intensive workshops with staff to develop its project concept and engage with staff members. Sessions for factory level staff helped to develop trust and understanding of the detailed issues with implementation, whilst groups that included senior management staff and trade union officials created a higher level forum to discuss any concerns that workers had with the changes.

3.1.3 Learning in relation to collaboration between companies

PC4 saw a large number of companies of different types and sizes come together and collaborate in the different projects. The majority of the companies that were engaged in the projects had no prior knowledge of their peers in the participating cohort, nor did they have previous working relationships with them. Yet, the projects have been successful in bringing these companies together to engage in collaborative learning. The experience of the projects highlighted a number of learning points in relation to what works in bringing companies together to collaborate, as set out in Table 3.3 and the following commentary below.

Table 3.3 Effective approaches in promoting collaboration between companies

What worked	Why/how did this work
Build in time in the project plan to build trust between participating companies	For companies to work collaboratively with each other, trust must be built in order for the companies to confidently share and provide feedback to each other. This can take time
Address SMEs specific concerns	SMEs expressed specific concerns about protecting their Intellectual Property and other business sensitive information. It is beneficial to provide additional support and information to SMEs to reassure them that they do not risk any business sensitive content in the process of collaborating with other companies
Developing shared outputs	Developing a joint output outside of the routine production of the companies was an effective way to bring companies to collaborate on a mutually businesses beneficial output, and thus mitigating any risks related to business competition

As noted above, many of the companies who engaged in PC4 had no prior relationships with each other. Indeed, many were business competitors. For collaboration to work effectively in this context, **trust must be built between the participating companies**, to increase their confidence to share their knowledge and experience and to contribute to the learning process. The projects commented that they had spent the first few sessions engaging the companies in ‘ice-breaking’ and other team building activities, to enable the participants to get to know each other and form relationships. Investing this time at the beginning proved to be highly effective, with participants developing a strong bond.

As the project teams were looking to develop good and productive relationships between the participating companies around the various activities of the project, it became apparent that SMEs had great concerns around protecting their Intellectual Property. Initially this was a potential barrier for SMEs to engage in peer learning and other collaborative forms of work. A number of the project lead teams commented that they had not anticipated how concerned SMEs would be about protecting business sensitive information and how little SMEs knew about protecting their Intellectual Property. This highlights that participants must be reassured that they are not compromising their business by sharing experiences. This can be achieved through building trust amongst the group and through providing information on how to protect business sensitive information. For example, in one of the projects the team included a session on how to protect Intellectual Property.

Another approach that was taken by two of the projects was focusing on **developing a joint output** (a product to manufacture in one project and a tool kit for skills for innovation in another project). Having a common task of developing something new, the benefits of which would be shared by the companies that were engaged in developing it, was an effective way of bringing companies to collaborate as they were all working towards a common goal. In addition, developing something new with each of the participating companies contributing from their specific breadth of experience and expertise was an effective way of mitigating any concerns or barriers related to business competition between companies.

Many of the participating companies have formed links with each other during the projects. A few have indicated that they have plans to collaborate in the near future on joint-projects. The companies commented that they were going to build on what they had experienced in PC4 in the projects that they planned and build on newly formed relationships with other companies in the cohort. That said, the primary motivation of the businesses to collaborate was the new business opportunity that presented itself, and the prospect of profit and growth for their business, rather than enhancing skills for innovation management in their companies. A business opportunity would be pursued for reasons of business growth rather than for enhancing skills for innovation management. This means that enhancing innovation management was perceived as a means (one of many) rather than an end in itself. In at least one example, plans from a project seemed to have been postponed by a large company, because a 'better' business opportunity presented itself.

3.1.4 Learning in relation to what worked less well in enhancing skills for innovation

The projects faced a number of challenges during delivery, as set out in Table 3.4 and the following commentary below.

Table 3.4 Things that worked less well in enhancing skills for innovation management

What did not work well	Why not
Pre-assumptions about companies' knowledge	It should not be assumed that information that is relevant to the project training is available to the participating companies. Projects need to 'go back to basics' to identify and fill in any such gaps in information, so no time is wasted during the activity
Short lifetime of projects	The type of change that the projects sought to achieve requires time to embed and settle in. Project teams felt that they may have been able to achieve more if they had delivered a longer training programme

One of the common challenges was realising that to a large extent, the project teams' expectations in relation to the participating companies' knowledge about innovation and about *development of resources and opportunities for their companies* was incorrect. For example, one project arranged a tour at a Catapult Centre⁷, yet it became clear on the site that participants were not aware of the Catapult Centre programme. Time was then needed to be spent on site to explain the programme, leaving less time to explore the site itself. This also made it clear to the project team that the participating companies were not aware of the resources that were available to them to support the development of innovative work practices in their business. On another occasion, the project arranged a visit to the premises of a large company. However, it emerged that time was needed to be spent on providing information about the transformation that the company had made, as this information was crucial to understand the key messages that were intended to be conveyed through this visit. This took a considerable part of the visit, leaving less time to view the company's processes. This meant that these activities were not as effective as they could have been.

Projects realised that they **should not have assumed any prior knowledge** and should have checked the knowledge and understanding of the participating companies, not just with regards to gaining a shared understanding of terminology, but also with regards to providing background information relevant to the activities they had planned.

⁷The Catapult centres are a network of world-leading centres designed to transform the UK's capability for innovation in specific areas and help drive future economic growth. They are a series of physical centres providing access to expert technical capabilities, equipment, and other resources required to take innovative ideas from concept to reality. <https://www.catapult.org.uk/about-us/about-catapult/>.

Furthermore, the projects commented generally that **the short lifetime of the Challenge was a barrier to achieving more progress**. The type of change that projects sought to achieve requires time to embed and then deliver results. Project teams felt that they may have been able to achieve more if they could have delivered a longer training programme. Feedback from participants reinforced this. Participants commented that they had expected to be required to spend more time on the projects, and some mentioned that they would have liked the sessions to be longer, to allow them to generate even more ideas and finalise the products they were working on as part of the exercises.

The short lifetime of the Challenge was also a barrier in relation to the sustainability and scalability of the projects. There was a great interest amongst projects in continuing their activities and seeing their scope widen. However, they all acknowledged that at this stage of the process their sustainability plans were still focused on relatively small scale delivery. For the majority of the projects their plans seemed to be a repeat of what they have done before, although the projects mentioned introducing changes and improvements to their activities, based on the learning from their experience of PC4. The university partners in particular, indicated that their intention was to recruit a new cohort of companies for another run of their training programme, while another project had plans in place to continue with their existing group of companies in order to develop their work into a sharable toolkit. One of the projects had plans in place to expand their activities and the development of innovative work practices into other teams in their business units. However, by and large projects did not have plans nor did they engage in activities to reach outward or expand the projects activities wider in the sector.

There was one exception to this. One of the projects aspired to develop a new research centre for SMEs in their local area, to enhance innovative work practices. Feedback from the project manager suggested that it was always their aspiration to develop this research centre, as that particular geographical area did not have such resources. The work on the project in PC4 demonstrated to the team that there was an appetite amongst SMEs in the area. The project team commented that they were making use of their existing network to reach out to external stakeholders to progress with plans

Taking the learning from PC4 and disseminating them wider in the sector, would have been the role of UKCES. UKCES had planned to work with the project to promote the messages in the wider circles. However, with the closure of the Commission, it is not clear who will be taking this role going forward. This will require a trusted intermediary body, much like UKCES was, to take the Challenge Communications Plan forward and work with the projects to share their learning with stakeholders in the wider sector and in to government and development agencies.

3.2 Engagement of companies and employees to foster innovation

Through PC4, UKCES sought to identify how employers and end-users can be engaged effectively in the development of solutions to enhance skills for innovation and commercialisation in the manufacturing sector. In addition, the evaluation looked at what has been learnt about motivation and barriers to engaging with innovation.

3.2.1 Effective approaches in engaging companies and employees

The experience of the projects highlighted a number of key learnings in relation to what works in engaging companies and employees in activities to enhance skills for innovation. These are set out in Table 3.5 and the following commentary.

Table 3.5 Engaging companies and employees

What worked	Why/how did this work
Benchmarking innovation	Benchmarking innovation amongst the participating companies proved to be an effective tool in encouraging the positive engagement of participants, as it helped to demonstrate that companies were already fairly innovative (which made any further change seem more manageable)
Working through change agents	Change agents are individuals in a company who become innovation champions to drive innovation forward in the business. To fulfil this role effectively, change agents should seek to acquire suitable skills to facilitate innovation in their business
Senior management buy-in	Culture change in a firm will happen from the top down. Buy-in from senior management was found to be a key enabler in promoting the implementation of change in the business
Linking innovation to profitability and business growth	Linking innovation to profitability and business growth highlighted the engagement in the projects as a new business opportunity, tapping into the companies' primary motivation of growing their business
Making use of existing networks amongst large companies and stakeholders	Projects built on existing relationships to promote the discussion about enhancing innovation management in companies. This direct contact approach, based on existing links and acquaintances, could be effective in engaging companies and stakeholders in the wider sector

Before beginning their activities, project teams sought to get to know more about the work practices and perceptions relating to innovation amongst their participating companies, to help guide the training plan. Four of the projects engaged different companies in their activities, many of which they did not work with before and so did not know well. To get to know the companies better, the projects designed a series of questionnaires, which asked about practices of design and manufacturing process, with the aim of establishing a baseline of where business were in terms of their level of innovation practices. At this point, the majority (if not all) of the companies who were engaged were grappling with the concept of innovation and when considering their own practices, did not think that their process or companies as a whole were innovative. Projects used a number of different methods to benchmark businesses, which were generally adapted from existing models, such as technology readiness levels (TRLs), or the EU Community Innovation Survey.

The results of the baseline questionnaires revealed that many of the companies were much more innovative than they had thought (mostly because they had an uncertain grasp of innovation and had not considered any of their processes or work practices as being innovative). Providing a **benchmark of innovation** for the companies in the project group had a positive effect of strengthening the engagement of the participants. Realising that their business was already deploying innovative work practices, encouraged participants to see that they had much to gain from the training that was provided through the projects as they could further develop their practices. Towards the end of the project, the benchmark questionnaires were run again, to measure the progress that companies had made. Feedback from the project teams suggested that companies were encouraged to see that they had made progress in adopting innovative practices. This increased their confidence in pursuing further new approaches and implementing changes into the processes and work practices in their business.

As noted above, innovation management was considered to be part of the culture of the company. Enhancing innovation management and introducing new processes and work practices into a company requires a change in the mind-sets of people throughout the company. This type of change requires a great level of engagement from employers and employees as all levels within the companies, need to adopt the new processes and work practices and implement them. Projects found that an effective method of engaging companies was **working through 'change agents'**.

Change agents are individuals in the company (the number will depend on the size of the company) who become innovation champions to drive innovation forward in the business. These individuals should be able to acquire buy-in from all stakeholders in the company, link different divisions, departments and units from within the company, and bring together people from different grades in the organisation to develop processes together, as well as promote the company as an innovative one with external stakeholders. The Schedule Based Working project provides a good example, where a team member from a production area that had implemented the new way of working visited colleagues in the new Schedule Based Working pilot. Following discussions with staff at the site, management decided to transfer this team member to the new site to provide constant guidance, and a permanent link between the two teams. This example illustrated the role of the change agent in the company, as explained above.

To fulfil this role effectively, change agents should seek to acquire suitable skills and knowledge to facilitate innovation amongst managers and employees in the company. These include, for example, idea generating techniques, familiarity with different work practices and techniques that make flexible use of space, techniques of product testing, and knowledge around wider resources and opportunities to support innovative work practices in the workplace – skills and knowledge that were delivered through the training programmes in a number of the projects.

In addition, the change agents should be of a suitable grade to be able to link with the different stakeholders with enough authority to bring them together. There was much debate amongst the projects with regards to who in the business would be most suitable for the role of the change agent. One of the 'innovation management' training projects targeted owner-managers of SMEs as change agents, giving them the theory and skills to develop an innovation plan for their businesses. Due to the size of these businesses, the owners were the most appropriate change agents. However, another business addressed a mixture of SMEs and large businesses, and found that change agents in larger businesses were more difficult to select, as they required a specific mixture of strategic and operational focus to be effective.

Middle management was mentioned as the tier which would be most suitable to champion innovation, in particular in large companies. The rationale for this was that middle management are in the right grade to communicate change to the senior manager and get their buy-in, and are well placed to convey the message of change to the workforce. It was suggested by several projects that this would make middle managers the ideal change agents.

At the same time, projects agreed that any change in the business will happen from the top down. Hence, a key enabler for enhancing innovation management and commercialisation in a company was **acquiring buy-in from the senior management** in the business. It was commented that changing people's mind-sets and training them in skills for innovation management was not enough and would have no effect if the senior management were not convinced.

'This shows the reality of decisions being made, it's not a case of we've done excellent work, it's really collaborative, one of the MDs might be really interested in that. But it sounds like the environment is quite tough, changing things [priorities] very quickly'. (Project lead)

Project teams commented that it was quite clear, that when the company delegate that was engaged in the project was of a senior grade, the effect on the company was quick, as they went away and implemented changes in their process. More junior members of the company needed to gain approval of their seniors to implement changes. Engaging senior managers at the outset could help simplify and shorten the route for change.

A key method for successfully engaging companies in the projects was **linking innovative work practices in the company with increased profitability and business growth**. This highlighted the projects as a new business opportunity for the companies, thus tapping in to the primary motivation of the companies to grow their business. It was particularly important for engaging the 'long-tail' and harder to reach SMEs in order to highlight the benefits of adopting innovative practices to their business. With the support of UKCES (e.g. through presentations and guest speakers at Co-creation Labs) and through project teams' existing networks, the projects linked with a number of high profile large businesses to demonstrate how innovative processes have promoted business growth in their case.

A number of projects shared anecdotal examples that participating companies had adopted the new approaches that they had learned, and had seen an increase in productivity as a result. One participant that took part in innovation management training used generic process analysis tools he worked with at a session to identify production issues at his food processing factory. This allowed him to streamline production and significantly increase the productivity of the company. In another example, a participant in training provided by a different project was persuaded to take on more junior staff to deal with operational tasks at his company. Freeing up senior management time (through recruitment) helped the participant to concentrate on developing an innovation strategy for his business.

Projects also mentioned making use of their existing networks as an effective method for engaging with a wider group of companies with the work of the project. Through the development and delivery of the projects, **many established partnerships or engaged in collaborative work to some extent with large companies and high profile stakeholders in the manufacturing sector**. In particular, the university partners on the project teams have wider links within government organisations and sector bodies. The projects mentioned building on these relationships and other existing links in their respective networks to promote the discussion about enhancing innovation management in companies. It was noted that this **direct contact approach, based on existing links and acquaintances**, could be effective in engaging further companies as well as establishing sustainability for the work of the projects, and potentially scaling up the work to the wider sector, especially if the project is successful in gaining an interest from high profile stakeholders.

3.2.2 Learning in relation to things that worked less well in engaging companies and employees

The projects faced a number of challenges in relation to engaging companies, as set out in Table 3.6 and the following commentary.

Table 3.6 Things that worked less well in engaging companies and employees

What did not work well	Why not
Challenges around participants' availability	Finding free time in diaries to attend training sessions was not a simple task. In future, projects would consider booking all session dates at the start of the programme, so people can block days off well in advance
Rushed recruitment phase	The short lifetime of the Challenge meant that project teams rushed through the phase of recruiting companies to engage with the training programme. This limited their ability to research the companies who applied for the training. As a result, the companies in the project cohorts were not always the best fit for the project
Social media	Attempts to use social media platforms indicated that these were not an effective format for companies to engage with each other and with other stakeholders, either because of lack of time or unfamiliarity with the concept of social media

Through the work of the projects it became apparent that the projects needed to think carefully about their target group and recruitment strategy. One consideration, as mentioned above, was the seniority of the participants engaged. Another consideration that the projects mentioned was the **maturity of the business**. This was defined by the complexity of the production and manufacturing processes of the company as well as its marketing strategy. The maturity of the business was related to the level of openness and attitude towards innovation, and the availability and readiness of the business to foster change. It appeared that the more open and ready for change the companies were, the easier they found it to implement change.

Furthermore, targeting senior and middle managers, while beneficial for encouraging the implementation of the new process in the business, posed challenges in relation to **participants' availability** to attend sessions. Finding free time in diaries to attend training sessions (most of which were one or two days long, a relatively big commitment) was not a simple task. Some projects commented that more time than expected had been spent on 'synchronising diaries' and in some cases a few participants had to miss parts or whole training sessions. It was suggested that in future the dates of the sessions should be set in advance, so that participants can block off their diaries well ahead of time, when there is a greater chance that they are free.

The key challenge that was mentioned by projects was the short lifetime of PC4. The Challenge was designed to run for 12 months, having been extended following a recommendation from experts during market testing. However, the announcement of the launch of the Challenge was not timed well, leading the contracting stage to take place during the summer. This caused the contracting phase to be prolonged, because many of the key stakeholders, from UKCES and the project teams, were not available during the period when UKCES was seeking to finalise and agree the projects' contracts. The outcome of this was that the actual time which projects had to deliver their programmes was cut, with projects operating for between seven to nine months.

Timing issues meant that the three projects, which needed to recruit companies to engage in their programmes, felt that they had to rush the recruitment process. As a result, projects did not invest as much time as they would have liked in researching the companies who applied for their project, in order to understand their needs and suitability to engage. **As a result of the rushed process, the projects felt that some of the companies they engaged were not the best fit** in terms of the attitude and mind-set of the participants, and in hindsight they would have recommended to them not to have joined.

Instead, the projects commented that they spent a great deal of time at the beginning of their delivery programmes setting out expectations with participants, explaining what they would focus on and what they would not cover, primarily to mitigate any gaps in expectations from companies relating to tangible outputs. Projects commented that despite the feeling at the start from a large number of companies that the particular initiative was not for them, only a few decided to drop out during the lifetime of the Challenge. For some of these companies, the project team felt that staying on the programme was the right choice; but for other companies it seemed to the project leads that with hindsight it would have been best if they had not proceeded.

UKCES and a number of the projects trialled the use of social media platforms such as LinkedIn and other sectoral or interest group specific forums to promote a discussion around innovation in the workplace. The platforms that were set up were internal and designed for the use of projects participants only, with the view to consider opening the discussion to include wider audiences should this prove to be effective. However, the feedback from UKCES and the projects that tried this approach suggested that **the use of social media was not an effective tool to engage people in conversation**. Feedback from participants suggested that their reluctance to use the social media platforms was either because they had little time to engage with it or that they were not accustomed to social media and engaging with it was something they did not consider. Instead, **conventional approaches to communications, such as email and face-to-face meetings were much more effective with this audience**.

The feedback from the project leads indicated that all of the projects were intending to continue their activities beyond the Challenge. The success of their projects demonstrated to them that it was possible to engage companies in activities to enhancing skills for innovation and that these activities could have positive effects on the participating companies. The projects recognised that in order to sustain their activities the two primary challenges that they will face will be recruiting further companies to engage with their projects and securing funding.

4 Conclusions and key messages

The findings from Productivity Challenge 4 have provided useful learning in relation to engaging employers with enhancing skills and workplace practices to improve innovation management and commercialisation. The findings lead to a series of key messages for SMEs, large companies, delivery organisations and policy makers. These messages are set out later in this chapter, after a summary of our key conclusions around each of the key research questions.

4.1 Enhancing skills and workplace practices to improve innovation management and commercialisation

The projects in PC4 were successful in raising awareness of the need for *innovation management* in the business. The projects effectively delivered various techniques and methodologies to introduce new and innovative work practices and enhance innovation management amongst the participating companies. In addition, the projects appeared to be successful in changing the mind-sets and attitudes of the participating companies, as well as their awareness of the benefits this can bring to the business, promoting their openness to foster change.

The projects highlighted a number of delivery approaches that were most effective in enhancing innovation:

- Establishing a shared understanding of innovation and what it looks like for the company. This was a crucial step for managing expectations and ensuring the effective implementation of the projects
- Changing the culture of the business can be too big a task if trying to comprehend it as a whole. Breaking up the task and working in small increments, learning and embedding one step at a time proved to be more effective
- Combining theory related to adopting innovative processes, with practice (to make the experience tangible) proved to be effective in changing participants' mind-sets
- Experiential learning allowed learning from the experience of others who have been in a similar position and dealt with similar issues
- Peer-to-peer learning can be an effective tool similar to experiential learning. It requires trust between companies and a good match between pairs
- There are benefits in being open to trying new ideas, even when it is not clear whether they will work. Companies should dare to take considered risks and accept that while some things may produce large gains, this cannot always be known in advance
- Learning from mistakes was a powerful tool. A more risk-taking approach should be encouraged and not feared amongst companies

- Improvements to job design can be highly effective in improving productivity, through giving employees more freedom to innovate, and incentives to improve their work practices
- Good internal communication is key to the successful implementation of innovative work practices. Innovation is not a discrete process that happens in isolation. Managers need to engage employees as everyone can and should contribute to the successful implementation of change
- For companies to work collaboratively with each other, trust must be built in order for the companies to confidently share and provide feedback to each other. It can take time to build trust
- SMEs have specific concerns that may pose a barrier to collaborating and engaging in activities designed to enhance skills for innovation management. It is beneficial to provide additional support and information to SMEs to reassure about the process of collaborating with other companies and how they can or should protect their intellectual property
- Developing a *joint* output outside of the routine production of the companies was an effective way to bring companies to collaborate with each other, because it helped mitigating any risks related to business competition between partners.

The projects agreed that the activities had been successful and achieved quite a lot of progress. However, they all felt that they may have been able to achieve more if the projects could have run for longer.

Furthermore, although there was interest amongst projects to continue their activity and see their scope widen, they all acknowledged that at this stage their sustainability plans remained on a relatively small scale. The projects (bar one) did not have plans nor did they engage in activities to reach outward or expand the projects activities wider in the sector. This would have been the role of UKCES, but with the Commission closure it is not clear who will be taking on this role going forward.

4.2 Effective approaches in engaging companies and employees to foster innovation

The projects used a variety of approaches to engage employers and employees in enhancing innovation. Their learning about what worked well was relatively consistent and included:

- Benchmarking innovation amongst the participating companies proved to be an effective tool in encouraging the positive engagement of participants

- Working through internal change agents, who act as innovation champions within the company and drive innovation forward for the business was mentioned as an effective approach to gain buy-in within the company. To fulfil this role effectively, innovation champions should have the skills to facilitate innovation amongst managers and employees in their company
- Change in firms will happen from the top down. Buy-in from senior management was found to be a key enabler in promoting the implementation of change in the business
- Linking innovation to profitability and business growth was effective in engaging companies, because it highlighted the engagement in the projects as a new business opportunity, thus tapping into the companies' primary motivation of growing their business
- Making use of existing networks amongst large companies and high profile stakeholders, and implementing a direct contact approach with acquaintances in these networks was mentioned as an effective method to engage companies in the work of the project.

The main achievements of PC4 were: raising awareness amongst participating companies about the need to manage innovation, demonstrating different approaches to tackling innovation management and supporting companies through making changes in their work practices. The Challenge did not identify a specific skill set that was required to foster and implement innovation management. Instead the Challenge found that a particular mind-set was important and it needed to be one that is open to change, prepared to take risks and that will learn from failure. The experience of the projects in PC4 highlighted that businesses need support to be made aware of these factors, and of the specific needs of their organisation in relation to skills for innovation management.

4.3 Key messages

Arising from the key learning from PC4, there are a set of key messages for a range of audiences. These are set out in Table 4-1 below.

Table 4-1: Key messages by audience

Audience	Key messages
SMEs and large companies	Innovation in manufacturing processes can lead to business growth and profitability ⁸ Innovation does not happen in isolation in a company. Managers should seek to engage everyone in the company

⁸ Research by NESTA (2009) show that innovative companies, defined as those that have introduced a new product or process, grow nearly twice as quickly in terms of both employment and turnover as non-innovators. The same research also shows that just six per cent of high growth companies generate half of the new jobs created by existing businesses in the UK between 2002 and 2008. See: NESTA (2009) The Vital 6%. Accessed online (July 2016) <http://www.nesta.org.uk/publications/vital-6>

Audience	Key messages
	<p>Collaboration with other companies, whether primes and large companies or peer SMEs could be an effective tool for learning new techniques and innovative processes</p> <p>An innovation culture can grow through step by step incremental changes in practices</p> <p>Identifying and working with change agents in the company could help to promote the development and implementation processes in the business. The change agents should be trained in innovation skills and techniques in order to disseminate the knowledge to the company</p> <p>Innovation is not a matter of simply technical skills, it requires internal work processes and the engagement of everyone in the company in the innovation policies</p> <p>Innovation management requires a specific mind-set which fosters change and embraces risk taking</p> <p>Techniques to foster and implement innovation in the workplace can be learnt. Companies should seek to acquire these techniques if they wish to develop and implement innovative processes</p>
<p>Delivery organisations / projects leads</p>	<p>Time should be set aside to research the companies that wish to engage with the programme to ensure their fit to the course and each other (in terms of size and type of business, aspirations, and attitudes towards change), and that they will be able to make the most of it. Good fit will depend on the nature and content of the programme that is delivered</p> <p>Change in the company will happen from the top down. Delivery organisations should seek to engage senior people, or a nominated Innovation Champion (who acts as a change agent) in their training programmes to ensure change</p> <p>Messages to engage companies need to be tailored to the audience: acknowledging <i>SMEs</i> specific concerns and interests and acknowledging that <i>large companies</i> can attract high profile engagement, which could act as a hook</p> <p>Delivery teams should not assume companies have prior knowledge or understanding of the topic area. Time should be set aside to reach a shared understanding of what innovation management is, what the training programme entails and what information the companies require to make the most of the training</p> <p>Businesses learn well from similar businesses: engage well-matched companies in peer-to-peer and experiential learning</p> <p>Businesses value tangible examples of what innovative processes look like. Training programmes should seek to combine theory with practice</p>

Audience	Key messages
	<p>An end-to-end approach (i.e. walking through the entire innovation process from start to finish, from idea generation to roll out, detailing what needs to be done to implement it) is beneficial with this audience because it goes beyond just providing the theory, and takes participants through the process, showing, rather than telling them how it works</p>
<p>Policy makers</p>	<p>Innovation in the workplace is often linked with increased profitability and company growth. This was evidenced through some of the participating companies</p> <p>The role of UKCES in encouraging and supporting organisations to innovate was important – encouraging a risk-taking approach (through the principles of the UKFP) and providing a platform for projects to engage and network through the Co-creation Labs were beneficial to the projects. In this respect, UKCES filled in a gap in the market</p> <p>It is possible to reach out to the ‘long-tail’ of businesses who are not engaged in innovation, or who do not think they are engaged in innovation, to promote better innovation management. Trusted intermediaries or respected businesses are good routes to do so. However, with the closure of UKCES it is not clear who will be encouraging companies to do so</p> <p>Funding was required to enable delivery organisations and companies to trial new approaches. The UKFP required co-investments from participating companies (cash or in-kind). This demonstrated commitment from employers</p> <p>Innovation management can be achieved through different techniques and different mind-sets. Activities to foster innovation in the workplace need to be supported and encouraged. The role of UKCES was crucial in establishing a platform for these activities to take place (through the UKFP and support activities throughout)</p> <p>Innovation is not about technical skills alone, it requires management skills and supporting high performance working practices. Consideration could be given by the new Department for Business, Energy and Industrial Strategy on how to boost the take up of High Performance Working by businesses</p>

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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