



Evaluation of UK Futures Programme

Final Report on Productivity
Challenge 1: Offsite Construction

Briefing Paper
October 2015

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**Final Report on Productivity Challenge 1:
Offsite Construction**

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1 Introduction

Productivity growth in the UK is currently sluggish. Matching productivity in the US would make each household in the UK £21,000 better off per annum¹. To boost productivity we need 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 skills.²

The UK Futures Programme (UKFP/the Programme) is seeking to adopt an innovative approach to tackling workforce development challenges. The programme is funded by the UK Commission for Employment and Skills (UKCES) and is intended to run for around two and a half years in the first instance (from April 2014).

The UKFP is not intended as an extension of previous programmes which provided seed corn funding for skills infrastructure. UKFP has adopted a different approach by offering smaller scale investments, targeting specific workforce development challenges and where appropriate a location, occupation or sector where there is greatest scope for learning. The Programme encourages a Research and Development (R&D) approach to skills, seeks greater innovation and risk taking to promote greater levels of learning about what works, what does not, and how to apply that learning. The aim is to influence the application and implications of this learning in both strategic / policy decisions, and the action taken by employers and intermediaries.

The UKFP sees 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 is aiming 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 new or persistent market or system failures which act as a brake on UK workforce competitiveness

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

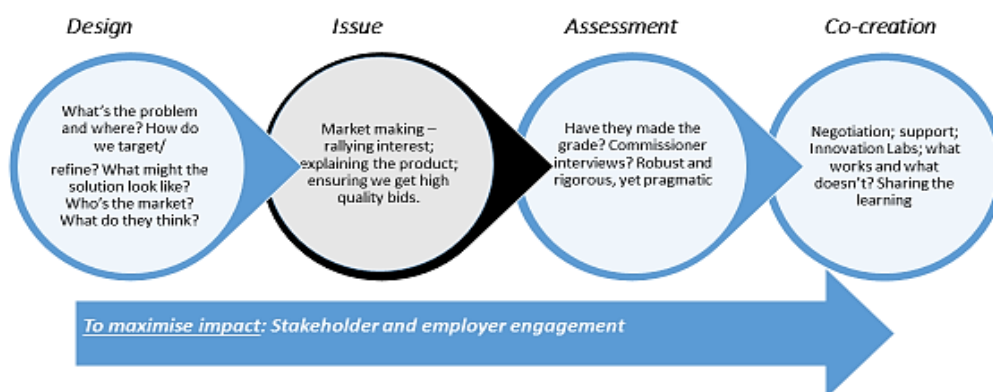
² Ibid.

- Identify ‘what works’ when addressing market failures in relation to workforce development, for adoption in policy development and wider business practice.

The UKFP has identified a series of ‘Productivity Challenges’ which, if solved, have the potential to increase the skills of the workforce and ensure that they are put to good use. Six Challenges have been launched to date and all are expected to be completed by the end of 2016. Each Productivity Challenge co-invests in a number of projects identified through a competitive process, which will explore different aspects of the theme / workforce development challenge(s).

Each round of investment follows a staged process through which UKCES first identifies a workforce development challenge from a combination of research, the knowledge of its Commissioners and staff, and then market testing and consultation with employers and intermediaries to refine that challenge. UKCES then carries out a market making activity to encourage project development and applications that demonstrate 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 are then assessed. Successful projects receive 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

1.1 Productivity Challenge 1: Offsite Construction

Productivity Challenge 1 focussed on designing solutions to the workforce challenges in the offsite construction (OSC) industry. The UK has one of the largest construction sectors in Europe and has the opportunity to benefit from the forecast growth in the global construction market to 2025.

Offsite construction, as one of a number of modern methods of construction, has the potential to change the way the construction industry builds and operates. It could also address some of the UK industry's most pressing challenges (e.g. the need for new homes and the low-carbon agenda). If the UK construction industry is to exploit the potential of offsite construction, multi-skilling, interdisciplinary collaboration and greater flexibility within a number of job roles is crucial. If the demand for offsite increases, there is a very real chance skills shortages will damage profitability and competitiveness. The current training and qualification offer for offsite construction is considered to be largely inadequate by employers. The sector itself is also fragmented in terms of employers joining together to identify common skills challenges and working with education and training providers to create courses that meet their needs. Hence provision is fragmented and companies generally create their own, bespoke, in-house training³. As such, offsite construction provided ideal learning territory to explore what works when talking about the skills challenges of a 'sunrise sector'⁴ and the potential to influence the application of this learning beyond OSC.

UKCES research with employers in the industry, identified the blend of skills which would be required to meet the needs of this growing sector⁵. Projects did not have to specifically address these skills needs in their projects but they were encouraged to consider how their products might address these skills gaps:

- **Greater collaboration between professions in offsite construction** – professionals in OSC need skills that enable them to operate and collaborate across disciplines, for instance, design, construction, manufacturing and engineering.
- **Project management** – the skills to effectively manage the interface between the offsite and onsite environment are critical and require skills in timing, sequencing and scheduling.
- **Design and IT skills** – the digital process covering the design, construction and operation of buildings will drive productivity and create demand for combinations of design and IT skills, more generally.

³ UKCES (2014), The UK Futures Programme Competition Brief. Addressing skills deficiencies in the Offsite Construction Sector.
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/307153/UK_Futures_Programme_Competition_brief.pdf

⁴ A sunrise sector is one that is new or relatively new, is growing fast and is expected to become important in the future.

⁵ UKCES (2013), Technology and skills in the Construction Industry, Evidence Report 74,
https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/305024/Technology_and_skills_in_the_construction_industry_evidence_report_74.pdf

⁶ UKCES (2013) Ibid.

- **Marketing and business development** – in offsite construction this requires a sound technical understanding of the product or service being sold. This emphasises a combination of high level technical skills such as engineering or design with strong customer service skills. The ability to promote and communicate to financiers and insurers about the industry.

1.2 Evaluation of the UKFP

UKCES commissioned SQW to carry out a real-time evaluation of the programme. The aim of the evaluation is 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.

UKCES identified a set of expected learning themes / research questions that it expected the evaluation would explore during the lifetime of the Productivity Challenge 1 projects. The research questions were reviewed and were changed over time. They were used to shape the activities undertaken by the evaluation to learn what works.

The research questions are grouped into three broad areas. Firstly, the distance travelled against the four skills areas which UKCES research identified as priorities to address (i.e. collaboration, project management, design & IT, marketing and business development); secondly, the process of development and implementation of the projects; and thirdly, they focused on exploring the operation of the UKFP and its implications on UKCES delivery and wider policy.

The evaluation of Productivity Challenge 1 was structured around the research questions shown in Figure 1.2.

Figure 1.2: Research questions for the UKFP Productivity Challenge 1

Distance travelled	Wider learning	Programme learning
<ul style="list-style-type: none">•...in greater collaboration between professions?•...in improving project management - and what is the key learning?•...in improving design and IT skills - and what is the key learning?•...in increasing marketing and business development skills?	<ul style="list-style-type: none">•What has been learned about how to engage end users - in both shaping solutions and taking part?•What has been learned about how to use supply chains to good effect?•What has been learned about approaches to education and learning?•What has been learned about the role of standards and how they have been used?	<ul style="list-style-type: none">•Has this Productivity Challenge stimulated innovation?•How effective has this Productivity Challenge been in fostering collaboration?

Source: UKCES

The next section of this report describes the funded projects and their achievements. The following section details our findings about what works and what does not against the learning questions for this group of projects. The implications and applications of the learning are discussed in the final section.

2 Productivity Challenge 1: Offsite Construction

UKCES selected five projects to co-invest in and work with in Productivity Challenge 1. The projects were led by BuildOffSite, Skanska, Edinburgh Napier University, Laing O'Rourke and the Steel Construction Institute. Productivity Challenge 1 ran between September 2014 and March 2015, with a total UKCES investment of £616,029 and total co-investment of £439,243 (including cash and in kind).

One project aimed to develop best practice guidance and management training targeted at site and project managers in a specific division of the sector. The guidance note and training resources were intended to be made available through a Virtual Learning Environment (VLE), hosted on the VLE facilities of an academic partner to the project.

The development of the guidance and training tools was still on-going in March (when Productivity Challenge 1 ended). Based on end-user feedback of pilot materials the format of the outputs had been changed to include a series of short guidance notes by topic, rather than one long document. Similarly the training sessions had been broken down into 20 minute segments. Further development of resources and dissemination work had been planned by the steering group going forward.

Another project sought to develop an "Offsite HUB" to provide practical and interactive training materials for specific skills in offsite construction. The project worked towards three key outputs: (1) training materials addressing specific skill gaps of industry partners (relating to management, design and site level workers); (2) a generic set of learning materials for the wider industry; and (3) scaling up and internationalisation of the Hub. The training materials were developed following research conducted into the training needs of the two offsite construction companies in the partnership and through testing by the end users.

During the life of Productivity Challenge 1 the project developed training materials to address the specific needs of the employers in the partnership and launched the first generic module. The project had also engaged with various industry, sectoral and government stakeholders in order to form a steering group to promote the scaling up and internationalisation of the Hub. The next steps for the projects will be to continue and develop further generic materials for the wider industry, as well as looking into ways to scale up the work of the Hub.

The third project aimed to develop a prototype comparator tool (including an educational version of the tool for students), which modelled the whole-life costs of construction projects and compared offsite and traditional methods. The project also intended to link the tool to the Building Information Modelling (BIM) database in order to allow it to draw on a growing library of modelling data for the UK.

The tool was developed through research looking at existing data on whole-life costs and sustainability of offsite solutions. In addition, the project engaged with employers and offsite construction practitioners to secure data on the costs of offsite construction methods. As the various elements and functionalities of the tool were being developed they were tested through case-study work with employers and students. The development of the tool was not complete at the end of Productivity Challenge 1, with further development work and ironing out of software issues required. As next steps the project intend to market the tool in the wider industry through engaging membership bodies (such as the Royal Institute of Chartered Surveyors (RICS), the Royal Institute of British Architects (RIBA) and the Chartered Institute of Building (CIOB)).

The forth project sought to develop an “Offsite Management School”, providing an online portal and resource library of materials. As a first step the project developed an online diagnostic tool for offsite construction companies to understand their skills gaps, and to help build a plan in order to address these using the online resource library. As the next step the project developed a series of e-learning modules for offsite construction businesses. The modules provide BRE accreditation to those who complete them. Businesses were involved at various points of the development process, participating in scoping discussion groups, testing versions of the products and providing feedback.

The ‘Offsite Management School’ was launched in March 2015, and 112 members from 77 individual organisations had signed up. Thirteen e-learning modules have been developed to date. As next steps the project aims to continue and develop further learning modules, enrich the resource library and increase the number of businesses signing up to the school. The project is hoping to identify and recruit ‘champions’ amongst the members of the schools and establish a business-to-business peer mentoring and support activity through the school.

The fifth project was based around live research of an ongoing offsite construction project to understand the skills issues that the business faced, in terms of the workforce and the supply chain. The live research was conducted during the delivery of a major construction project involving contemporary offsite techniques, which the company leading the project had been awarded prior to the launch of Productivity Challenge 1. The researcher observed the work on the project and conducted interviews with workers in order to identify skills gaps and needs, and came up with recommendations on how to address them. The research was intended to inform the development of training modules.

The project developed five training modules, which corresponded to the gaps that were identified through the live project research. Through their partnership with the Construction Industry Training Board (CITB), the project ensured that those completing the modules gain accredited qualifications. The training modules had not yet been piloted, and this was planned to take place outside of the timescale of this Challenge. The company which led on this project had linked up with the 'Offsite Management School' and plans had been set in place to integrate the finalised modules into the school.

3 Evaluation Findings

This section details our findings against the research questions in Figure 1.2 above. It comprises three parts: firstly the distance travelled against the four skills areas which UKCES research identified as priorities to address (i.e. collaboration, project management, design & IT, marketing and business development); learning about the process of development and implementation of the projects; and learning at the programme level.

3.1 Distance travelled

If the UK construction industry were to exploit the potential of offsite construction, multi-skilling, interdisciplinary collaboration and greater flexibility within a number of job roles would be crucial. This section sets out the contributions that the projects made towards addressing each of the four skills needs that were identified by UKCES research on the offsite construction industry (see Figure 1.2)⁶. Projects may not have designed their outputs to tackle these four areas explicitly but by measuring distance travelled in this way we can more easily assess the contribution that these projects have made towards solving the wider workforce development challenges.

A key learning point from the Productivity Challenge is that projects needed to 'go back to basics' in understanding the issues relating to skill gaps and deficiencies in the offsite construction sector. During the process of developing their respective solutions, the projects realised that in order to understand the problem, they first needed to re-define the skills and competencies that were required in the sector, as they were not necessarily the same as the skills needed for traditional construction projects. Only once needs were defined could they assess gaps. The projects achieved this through consulting with their partners and developing a common language, thus validating the research conducted by UKCES into the skills gaps in the sector. Through this validation process, the projects found a wider set of issues than they expected; agreeing with but also adding to the initial list of needs (e.g. understanding what is involved in site management in OSC projects, or realising gaps in logistics skills).

⁶ UKCES (2013) Ibid.

Moreover, because each project was going through this process, it was only later in the Productivity Challenge timeframe that they realised that they would all benefit from a common language around skills, which was shared across the sector. This highlights that language and interpretation may not be the same across sub-sectors or even firms in the same sub-sector. These differences can be quite substantial when discussing the skill-sets that are required for specific roles in the industry. It may be that more could have been done on this at an early stage, although in practice projects found working with their own stakeholders on this issue a key part of their own development. Therefore, a balance would need to be struck, perhaps emphasising the sharing of materials across projects, rather than joint working and development.

3.1.1 Greater collaboration between professions in offsite construction

UKCES research identified that professionals in occupations in offsite construction increasingly need to be able to operate and collaborate across a range of disciplines, including the principles of design, construction, manufacturing and engineering.

Table 1: Distance travelled – greater collaboration

What worked	Why / how did this work
Bringing people together in a Steering Group to help develop the product	Led by a single body, either a sector intermediary or prime contractor Focussed on existing relationship Created a forum for employers to meet to talk about a specific, neutral, issue
Getting partners to deliver elements of the project	The partners were already engaged through the Steering Group Partners had expertise and self-interest in making it work Partners had an interest in setting out the solution to work in a way what would suit their needs
Gaining wider access through the networks of others (especially UKCES and stakeholders)	UKCES linked projects with contacts in their networks; government representatives invited to Labs
What did not work	Why not
Attracting new collaborators at the start of the project	No personal relationships No product to get people interested Perceived by the newcomers as too high risk to invest time
Increasing collaboration on day-to-day activities	No explicit mechanism for this to emerge through the individual projects, although may come in time given the enhanced relationships developed around the product

Reaching out to the wider sector

Limited time in the Productivity Challenge
Limited engagement as yet with some key partners –sector bodies plus designers / architects etc. – who only came to be seen as important later
Even when key bodies were spoken to it was hard to identify the right person, or in cases a need was identified to create relationships with multiple people

All of the projects brought together representatives from a range of disciplines and organisations on their steering groups, including government bodies, professional associations, employer membership organisations, and employers and companies of different sizes, some of which were business competitors. It is important to note that members of project steering groups had usually worked together previously, and were not new partners coming together. In some cases new partners were brought in to widen the projects' appeal outside their existing network of contacts. These new links, in most cases, were made through direct contact between companies' senior managers. In all cases this happened further down the line, after the projects had a demo or a prototype of their product to demonstrate its benefits.

The steering groups worked with the projects in different ways:

- Overseeing the development process
- Testing and reviewing outputs
- Delivering outputs
- Developing ideas for future developments of the products

Feedback from the project leads suggested that the collaboration with other employers and stakeholders in the development of the project had been beneficial. The discussions held with partners during the various development stages of the products were perceived to be invaluable, adding insight and focus to their work, resulting in improved products which were likely to be better suited to partners' needs. One project, for example, carried out scoping research with employees to identify the specific needs of their industry partners. Another project worked with business partners who tested their product on live business cases to help identify gaps and improve functionality.

One of the objectives of the UKFP was to promote greater collaboration between projects. To this end the UKFP ran three 'Co-creation Labs' during the life of Productivity Challenge 1, which were whole day workshops designed to promote collaborative working and innovative thinking in the development of the solutions. On occasion UKCES invited stakeholders from government and sectoral bodies to these Co-creation Labs to engage with the projects. In one specific example, this was designed to lay the groundwork for projects to link with government bodies and expand the network around their projects. However, the timing of this engagement was not right from a networking perspective, as it took place when projects were focused on finalising the design of their products and getting ready to launch them. They were not yet in a place where they could think about wider dissemination and scaling up.

As mentioned above, projects' engagement with stakeholders outside of their existing networks and in the wider sector was limited. This was in part due to time constraints, and in part because projects initially did not see collaboration outside their networks as a priority while they were still developing their products. That said, as the work of the Productivity Challenge progressed the projects saw the added value in networking and two of the projects even linked together with plans to integrate the products of one with the product of the other (see above).

When preparing to engage with stakeholders outside of their immediate networks, the projects commented that having a prototype of the product helped them engage with new partners. The prototype helped partners understand the idea more fully and perhaps gave the project more credibility, and so reduced the perceived risks to others in adopting a product that had not been piloted or tested in full. Now that products exist it could be possible to attract wider interest.

However, the projects recognised the challenge in reaching out to new unknown partners (such as employers or even representative bodies). It is challenging to identify the right person or people in each organisation, and so to be sure that the message will be spread through the organisation and to the wider sector. This required research into the organisations to identify the right people to link with, which took time and resources. There was not sufficient time during the life of the Productivity Challenge for projects to take on this activity fully.

When considering collaboration on a wider scale (i.e. in terms of driving the change in the sector), feedback suggested that the projects valued linking with large membership based organisations in the sector (e.g. BuildOffSite, RIBA, RICS), because they perceived them to have a large influence on the industry, being respected and highly valued. Indeed, for one project it has proved to help promote the engagement of the sector in the product.

In six months the projects in this Productivity Challenge have offered learning about how to foster greater collaboration between businesses which in itself is valuable. More work still remains to spread a culture of co-operation across the wider sector. The projects have created a network that includes many significant industry players who are willing to work together, but there remain others still to be reached. The fairly short timescale of the Productivity Challenge may have mitigated against this. However, given that all projects acknowledged it is important to drive the change, it is likely that they will invest in reaching out to the wider sector in the future.

3.1.2 Improving project management skills

Offsite construction is increasingly important but there remains an interaction with ‘traditional’ onsite construction which means that having the skills to effectively manage the interface between the offsite and onsite environment is critical for OSC professionals. Therefore there is a need for the workforce to develop project management skills in timing, sequencing and scheduling.

Table 2: Distance travelled – improving project management skills

What worked	Why / how did this work
Developing tools for project management	Creating software tools to provide detailed intelligence during offsite construction project design
Greater recognition of the challenge	All projects sought to develop materials in this area
Using action research to inform future project management	Using an impartial observer to catalogue issues and lessons learned around skills and project delivery. Project management skills gaps were identified during delivery, before they were forgotten (as often they are not discussed in end of projects reviews)
Testing new materials/approaches	Testing at different stages of development helped adjust and improve the content and functionality of the products
What did not work	Why not
Improving management skills	Limited time to implement the tools and so impact on skills. This may improve in the future

The projects developed materials to address project management skills in the sector. These included a best practice guide, e-modules and virtual learning environment (VLE) training session (some of which awarded accredited qualifications), a skills gaps diagnostic tool and a tool to inform managers on the life cost of a construction project to inform their decisions. It was apparent from the great emphasis that all of the projects have put on developing tools and materials for addressing management skills, that this has been identified as a gap and a priority for the projects. However, due to the short lifetime of the Productivity Challenge, none of the projects had had sufficient time to fully pilot and launch their products to the wider sector. Therefore, evidence about the impact of the tools on project management skills was not available at the time of writing this report.

That said, through the development of their products, the projects have provided some insight into which methods were more effective in understanding the issues around management skills in the sector. Feedback from projects suggested that using a live-project research and case-study methods (i.e. in depth investigation of the use of the product in a real work scenario, as an example to demonstrate the usability, deficiencies, benefits and

impact of the product) were the most helpful. Using data drawn from experience on the ground seemed to have provided insight into the issues that would have not been obtained through other methods. The case study approach, in which partners used the product on real business cases helped highlight gaps in content and functionality of the product. The live-project research method provided important learning on gaps in project and site management skills (particularly the logistics of supplies coming to the site and responsibilities between offsite and onsite elements) which were not appreciated fully at the start of the programme as these issues had not come through previously in 'end of project' reviews.

'Lessons learned reviews at the end of projects miss many of the larger issues. Project teams can forget difficulties they experienced on a job once it is finished'
[Project Lead]

This learning could potentially improve the efficiency and project management in the sector, and enable early risk detection in OSC projects.

3.1.3 Improving design and IT skills

UKCES research identified that the digital process covering the design, construction and operation of buildings would drive productivity and create demand for combinations of design and IT skills more generally. The projects in this Challenge looked to use IT and online resources in developing and delivering their products. These skills are different from the wider design and IT needs in the sector (as identified through research) and it is not clear that the skills developed (for example to develop online learning and assessment tools) will address the wider IT needs of the sector.

When considering design in relation to offsite construction, projects that have engaged designers and architects in the development of their products agreed that this was invaluable. It highlighted the importance of building a common understanding between designers and offsite construction suppliers around what the sector can offer and how best to design a project that intends to use offsite construction solutions. In this respect the Productivity Challenge helped highlight the needs and issues relating to design skills. However during the life of the Productivity Challenge none of the projects had fully developed outputs to address these gaps. It may be a development that will happen in the future, as the projects had raised awareness of the issues.

3.1.4 Marketing and business development skills

Effective marketing increasingly requires a sound technical understanding of the product or service being sold. This suggests a need to combine high level technical skills, such as engineering or design, with strong customer service skills. A further dimension to this is the ability to promote and communicate an understanding of the industry to financiers and insurers, as such marketing and business development skills are important for OSC professionals to develop.

Table 3: Distance travelled – increasing marketing and business development skills

What worked	Why / how did this work
Developing partnerships to promote offsite construction	Labs provided a forum for projects to get to know each other UKCES and BuildOffSite able to encourage group thinking Projects have agreed to continue co-operating to build on work from the Productivity Challenge
Developing tools that have the potential to promote the sector to wider audiences	By demonstrating the benefits of OSC or by raising awareness of skills gaps and providing guidance to address these
What did not work	Why not
Marketing and development skills were not developed in the wider the sector.	Teams focused on marketing their own projects rather than developing skills on this issue in the wider sector
Improved marketing and business development skills (and similarly IT and design skills)	Not taken forward as part of projects

Projects focussed on meeting this objective in relation to marketing their own projects, rather than focusing on skills development to promote the sector and businesses in it. However, through some of the solutions that have been developed, there is potential for promoting the sector to wider audiences. For example, the product of one project was designed to highlight the financial benefits of OSC solutions in certain construction projects, which could encourage stakeholders to consider using OSC solutions who would not otherwise do so. Other projects have the potential to promote the sector through working with universities and other higher education institutions who could use the learning modules and thus raise awareness of the sector through their users.

The projects and their partners did intend to work together to promote the sector and their skills offer further. This may end with them forming an industrial partnership: this is where employers across an industry sector, in this case OSC, come together to lead the development of skills, with a focus on growth and competitiveness. The group has agreed to sponsor events and help to build on the achievements of the Productivity Challenge, with the focus being on the Offsite Construction Show in October 2015.

The new industrial partnership has been driven by BuildOffSite and the Productivity Challenge Lead. The projects aimed to engage with senior executives at major construction companies to gain buy-in for the improvement of skills in the sector. The formation of the industrial partnership was still in its early stages of development, but projects continued to engage and drive the partnership forward. There was a clear appetite on the ground to carry on with this work, however it was too early at the time of writing this report to say whether this would have the desired effect on the sector.

3.2 Overview of distance travelled

UKCES identified four key areas of challenge relating to skills in the offsite construction sector, as mentioned above. Productivity Challenge 1 sought to find out what works in addressing these issues through the work of the projects. The projects had made some progress in addressing these challenges, more on some challenges than others, although every project did not set out to explicitly cover every aim in their work plans. Progress had been made in particular in promoting collaborative work and in understanding the needs relating to design and management skills. In that respect Productivity Challenge 1 had travelled some distance compared to where it started, but the journey only just started.

It is worth noting that all the projects took time to investigate the nature of the challenge they wished to address in more depth, in most cases conducting scoping through consultations and discussion with partners in order to improve the design of their solutions. The project leads commented that throughout the life of the project they found that learning was ongoing. The scoping and learning meant that in the time available the distance travelled was less than expected, but at the same time this promoted a greater understanding of the problem, and of what steps needed to be taken going forward to address it.

The least distance travelled was in terms of IT skills, and marketing and businesses development skills. In many cases the development of the products seemed to focus initially on the immediate needs that were emerging through the skill audits projects conducted. IT skills and marketing did not seem to have come up as priority at that stage, however it was recognised by the projects to some extent that these areas needed addressing. In this respect, Productivity Challenge 1 failed to produce evidence in relation to these areas.

Due to the short life of the Productivity Challenge the projects did not always have time to pilot their products as they would have liked, to engage sufficiently with the wider sector or to report on wider take up of a finished product. Therefore the evidence relating to the impact of the Productivity Challenge on the wider sector is limited at this point. The projects recognised this: reporting that they were at the beginning of a long journey and had really only just started on it. However, there was also recognition of the need to improve skills and workforce development in the sector, and the resources and relationships developed were expected to contribute to this.

3.3 Learning about development and implementation

3.3.1 Engaging end users

Building on their experience of previous employer led initiatives, UKCES is aware of the importance of identifying and engaging end users in the process of developing products to ensure they are relevant and appropriate to user needs. The stakeholders in the different projects identified different audiences as their end-users. This included clients, companies in the supply chain, employees, graduates and young people looking for qualifications.

Table 4: Development and implementation – engaging end users

What worked	Why / how did this work
Having something tangible (demo or prototype of the product)	Easier to explain about the product Demonstration helps in convincing
Using existing links with companies in the supply chain and potential partners	Quicker as relationships were established

What worked	Why / how did this work
Obtaining feedback from likely end users during the development stage (not just at the end)	Helped adjust and focus the product Ensures that the product addresses needs Needed prompting from UKCES
Engaging with the right people at the right time. This requires research and exploration into the companies engaged as these were often not a known contact. The timing of engagement depended on the issue and the person being engaged. Some required early engagement and others later engagement to be most effective	Having the most relevant source of information and influence at the suitable stage of the product to have optimal effect
A personal approach in the consultations (i.e. telephone calls, discussion groups, meetings in person)	Enabled a building of rapport and promoted high levels of engagement from the end users
An open approach during the consultations	Two-way dialogue ensured end-users were listened to Encouraged high levels of engagement
Engaging beyond known contacts	Doing this once there was a tangible product for them to comment on. This gave context and focus to the request for feedback
What did not work	Why not
Using email or e-surveys	Remote approach, made it easier for end-user to ignore
Engaging user outside existing networks	Not sufficient time to research and identify relevant people Requires building relationships and trust, which again takes time and can be difficult until there is something tangible to show

At the early stages of Productivity Challenge 1, feedback from the project leads suggested that they all agreed that engagement of the end-users was vital in order to get end-user buy-in. The projects intended to leave the engagement with end-users to a later stage (i.e. when the solution was developed and ready for marketing). However, as the work on their solutions progressed, all of the projects realised that the engagement of end-users was key in the development process as well. The promptings of UKCES were important in bringing about this change of perspective.

‘Engaging with a wide audience from concept to delivery helped to develop output functionality, flexibility, relevance and appeal ’
[Project lead]

The projects found that they were engaging with end-users earlier in the process than they initially envisaged. End-users provided helpful feedback on:

- Where the gaps in skills were
- What their needs were in terms of addressing these gaps
- The solutions developed through testing them at various stages of the development

Project leads commented that engaging end-users in testing their products was invaluable in helping them improve the design and functionality of their products. In one of the projects for example, feedback from end-users changed the format of the materials they produced (moving from one long document to short segments). In another project users commented on the functionality of the tools that were developed to help smooth out the process.

The projects noted that in engaging end-users they all tended to approach stakeholders in their existing networks and rely on existing links. Using existing links was a successful approach in getting the projects off the ground, and was sufficient for the early stages of the projects' development. However, all projects agreed that a key challenge was to engage outside existing networks and seek new links and widen the network as the solutions and products developed. Linking with stakeholders outside their existing relationships required research into the organisations to identify the right people to link with and for finding the common interest.

Getting the timing right in linking with new stakeholders was another challenge. The correct timing was dependent on the nature of the input that the projects were looking for from the stakeholder. For example, if they required feedback on the product, then engagement has to follow when a prototype is available; if they required buy-in to the idea and co-investment in further development, then a later engagement worked better for those not engaged from the start (when projects could produce case studies or feedback from user to demonstrate the potential benefit of the product). All of this engagement took time and resources. The projects commented that there was not sufficient time during the life of Productivity Challenge 1 to conduct this research into widening the network. Widening the network was perceived as being especially important when taking the solutions into market and so had been expected to happen towards the end and after completion of the Challenge.

The projects sought to work through known contacts and organisations to reach end users. They particularly recognised the role that sector bodies could play. In this context they reported the challenge of identifying the right individual within the organisation that they needed the buy-in from, and could then use as a champion of offsite construction and of the solutions proposed to end users. Through identifying the right individual the message about the need for a change could trickle down the organisation much more effectively. However, they cautioned that it was not always clear who this person was; and in several cases that they needed more than one contact as internal communications were often not ideal.

3.3.2 Use of supply chains

Table 5: Development and implementation – use of supply chains

What worked	Why / how did this work
Using supply chain engagement to market products	Showing clients that suppliers engage with skills solutions ensures quality work throughout the supply chain.
Consultations with clients with regards to their needs and requirements so that their needs can be communicated to the supply chain	Demonstrating the need on the ground Ensured the product aligned to needs
What did not work	Why not
Not all of the supply chain engaged	It was optional in some cases and only those who had recognised the need then engaged In the main it was those with the strongest relationships who engaged

Not all of the projects targeted their products at their supply chains. However through discussions between the projects during the Co-creation Labs they all acknowledged the important role that supply chains hold in ensuring change in the sector (they are a large part of the employment base and the operations of the primes and growth of the sector would have been constrained if the supply chain did not change with the needs of the larger firms). In two projects in particular, success of their products was reliant to a large extent on engagement and buy-in from their supply chain. Their products were aimed at addressing skills gaps and upskilling their supply chains to ensure the quality of their services to their clients. Through demonstrating that their supply chains were engaging with the solution (i.e. addressing the skills gaps amongst their staff), the businesses could more confidently guarantee the quality of their services to their clients.

Projects agreed that clients' feedback played a key role in engaging with their supply chain. Through demonstrating the clients' needs and interests they could emphasise to their supply chain the need for a change to address skill gaps in the sector, and therefore the importance of identifying the existing gaps within their own organisation. Feedback from the clients was also vital in the development of the solutions, to ensure that the focus of the product was right.

3.3.3 Engaging the education sector

Table 6: Development and implementation – Engaging the education sector

What worked	Why / how did this work
Developing educational materials to address gaps	Most projects researched and produced training materials in different contexts, at individual business and sector levels.
Engaging with bodies to validate and award accredited qualifications for learning modules	This added value to the modules and was designed to encourage buy-in from employers and learners
Scoping research with industry users	Informed the design of the training modules in terms of delivery model and content to align with industry needs
Engaging educational institutions in research	The research findings informed the development of the product
Developing different versions of the product for education and industry use	Ensures the suitability of the product to different needs
Providing a demo version of the product for use by universities	Helped lay the ground for future partnerships Served as a method of testing the product for educational purposes
Developing educational materials to address gaps	Most projects researched and produced training materials in different contexts, at individual business and sector levels.
Engaging with bodies to validate and awards accredited qualifications for learning modules	This added value to the modules and was designed to encourage buy-in from employers and learners
What did not work	Why not
Uncertainty around awareness and provision through educational institutions in the long term	Still early days. While higher education institutions were engaged in partnership in some of the projects, long term arrangements have not yet been put in place

All of the projects in Productivity Challenge 1 included an element which engaged with the issue of education in some form or other. This included hosting training modules on a university website, working in partnership with universities, and developing training modules which awarded accredited qualifications on completion.

Two of the projects that have worked in partnership with universities developed different versions of their product for education and industry. They took this approach because during the development of their products they recognised that the industry and universities have different needs and foci, and therefore the different versions of the product should be able to address that. For example, in one project the modules were designed to target gaps in the specific context of the employer, while for the university the module provided content on a more generic level. In the other project the university received a limited demo version of the product, as some of the functions that were required for business purposes were not necessary for the education purposes.

One of these projects conducted a scoping research with various staff members in the industry to inform the design of the learning modules. This proved effective in defusing some of the assumptions that the education team had made in terms of engaging learners, and so helped reshape the delivery approach of the modules. In this case, the project planned to use 'Virtual Reality' methods as a training tool to demonstrate the skills, but had moved to conventional learning and use of case-study examples instead, as the feedback suggested these would be much more appropriate for the need of the employers and the learning styles of those targeted.

It is too early to say at this stage, whether these solutions had been successful in driving a change in terms of the awareness amongst educational institutions about skills needs in the sector. Furthermore, in two cases the partnership with some of the educational institutions did not seem to be sustainable in the long term. In these cases the educational institutions seemed to have engaged with the projects because they saw this as an opportunity to test a technology or simply because it was a funding opportunity. The educational institutions did not have a vested interest in driving a change in the OSC sector.

Productivity Challenge 1 has highlighted a gap relating to training and learning in offsite construction. Educational institutions were reported as not keeping up with the changes in the industry, and so people who graduated from construction courses were not equipped with the relevant set of skills to be able to work in offsite construction projects.

The projects have identified this gap as a key one to tackle, in order to successfully address the skills gaps in the sector. While there was an example of this being successfully implemented in Scottish institutions, one suggestion was to initiate a work-stream following the end of Productivity Challenge 1 that would look to create a new curriculum for offsite construction UK wide.

3.3.4 The role of standards

Table 7: Development and implementation – the role of standards

What worked	Why / how did this work
Raising awareness of National Occupational Standards (NOS)	Initial awareness was very low. Input by UKCES brought NOS to their attention Projects asked for NOS to be covered at the Lab, which was done
Initial presentations on standards at Co-creation Lab stimulated discussion	Projects asked for presentation on standards at the lab, and the inclusion of the presentation helped to inform attendees
Projects sought accreditation for their products	They approached sector / education bodies. They usually worked with those they already knew
What did not work	Why not
Projects unable to fully engage with standards or develop products which aligned to NOS	Low initial awareness meant projects begun without this objective in mind Lack of time in the Productivity Challenge meant projects could not adapt their effort in time, although they may return to it later

At an early stage of the Productivity Challenge the projects expressed interest in gaining a better understanding of the existing National Occupational Standards (NOS), in order to look into adopting and adapting these within their solutions. The rationale was that working with industrial standards would add validity to the solutions and therefore promote buy-in from the various stakeholders. This was stimulated by UKCES, who recognised that projects had very low awareness of NOS.

As the development of the solutions progressed, and projects shifted their focus towards engaging with clients and end users for feedback, it seemed that the interest in working with occupational standards became a lower priority. In effect it would have required some changes to project plans and outputs, which projects did not think they had time to accommodate, especially as it was not seen as a key priority. Projects may come back to this at a later date.

3.4 Programme Learning

The experience from Productivity Challenge 1 contributed to learning on the UKFP, relating to the programme objectives and expected impact. The learning also highlights a few implications for the programme going forward, which we refer to in the last section of this report.

3.4.1 Stimulating innovation

Table 8: Project learning – stimulating innovation

What worked	Why / how did this work
Generated adaptive innovation	Two projects developed products based on solutions already operating in another context This type of innovation was seen as more deliverable as it could draw on previous experience and feedback
Creating leadership for the sector in identifying solutions	Having project leaders with credibility / influence to get others to follow Drawing in sector and development organisations to promote activity more widely Pushing forward carefully, ensuring the supply chain can follow
Stimulating new ways of working, especially around product testing	Through the Co-creation Labs and UKCES input
What did not work	Why not
Little discontinuous innovation	This is by definition difficult to deliver Projects were strongly focussed on delivering something they thought would work, and maybe more risk adverse than initially hoped – not least because they had identified a need in the sector The short timescale of the Productivity Challenge meant there was little opportunity to significantly change an initial idea

Innovation is one of the key objectives of the UKFP. UKCES see innovation as a spectrum running from continuous (i.e. incremental development of existing initiatives to discontinuous (i.e. out of the box thinking, radically different solutions) processes of thinking⁷. Productivity Challenge 1 had stimulated innovative ideas at the continuous end of the spectrum, where projects adapted solutions from different contexts into the offside construction sector. For example, two of the projects had adapted their solution from a product they had already used in a different context. Feedback from the consultations suggested that stakeholders saw an advantage in learning from the experience of other sectors and adapting solutions which had been effective elsewhere to the context of Productivity Challenge 1.

⁷ UK Futures Programme – Guidance Document: Innovation. available online: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/363955/14.10.15_UKFP_Innovation_V2.pdf

In discussion the project leads pointed out that it was good to be ahead and lead the industry into a new way of working, because this ensures that as a business you are ahead of the curve when changes are taking place. To achieve this requires brave leadership. It also means that others may follow, especially where the leaders are widely recognised in the sector. However, it is important not to get so far ahead that the industry is not yet ready to follow, for example because the supply chain cannot always be pushed ahead at the same pace.

Similarly, there is a need for buy-in from the industry in order to foster change more widely. For these projects this had involved piggybacking on other industry events to engage with a wider audience and tapping into the wider networks of existing contacts to reach new businesses. Ensuring the backing of industry skills organisations like CITB and the Innovation Centre in Scotland was also crucial to cementing new ways of working.

That said, although the projects may not be on the discontinuous end of the innovation spectrum, the method in which the UKFP encouraged projects to implement the development of the products (in particular promoting collaboration and focusing on R&D) was innovative. Feedback from the projects suggested that by engaging with the UKFP and working together with each other and with UKCES to drive a change in the sector, they perceived themselves as pioneers. They adopted a new way of thinking and worked towards addressing skills deficiencies in the sector.

A greater element of discontinuous innovation was probably hoped for. However, this type of innovation is most often hard to achieve. It appeared that projects were less concerned with this than with simply developing solutions to meet identified needs. In essence, they needed something that would work. Their bids had set out their best guess as to what this would be, and so they were unwilling to change radically through the Co-creation Lab and in the short time available.

3.4.2 Fostering collaboration

Table 9: Project learning – fostering collaboration

What worked	Why / how did this work
Collaboration within projects was apparent	Steering group members were brought together and worked on the development of the products
In some cases competitor businesses collaborated on shared skills problems	The issue of skills was seen to be a safe place for joint working The market opportunity was large enough, because the sector was growing, that firms could see advantages in working together rather than gaining an edge by competing

What worked	Why / how did this work
	<p>The intermediaries played a role in allowing this to happen</p> <p>The funding available gave a focus to activity, and encouraged collaboration through the application process</p>
Projects collaborated with each other	<p>The inception meeting at the beginning of the Productivity Challenge, bringing all projects together for the first time, and doing so at an early stage so they could share plans when they could still be influenced</p> <p>The Labs provided a forum for them to share ideas and thinking</p> <p>UKCES was able to spot opportunities and link projects together</p>
The projects expected to continue to collaborate	<p>This followed from them being brought together</p> <p>The projects saw a wider need to promote the sector, and they were more likely to be successful working together</p>
What did not work	Why not
Projects pro-actively linking together	<p>Collaboration relied heavily on stimuli from UKCES. There were missed opportunities for projects to link due to time pressures and the need for external stimulus</p>

Collaboration was a key objective of the UKFP. It was hoped that by bringing together employers with a common problem or interest, they would work together to come up with new solutions. Achieving collaboration between the different businesses and organisations within the Productivity Challenge could have posed a significant challenge, as the companies and organisations engaged were in some cases competitors.

Within projects there was a good level of collaboration. In many cases this reflected that those involved had worked together before. However, this was not always the case and it required either a more neutral organisation (university or sector body) to bring employers together, or use of existing relationships. For example, in one project a lead partner acted as an intermediary bringing employers to work together. In this case the lead partner had previous links with each of the employers separately, but the employers had not worked with each other before. The offer of investment from UKCES also helped foster the initial relationships.

Projects from across the OSC Productivity Challenge worked collaboratively, sharing information and ideas (e.g. attending each other’s steering groups, or testing and providing feedback on each other’s products, and forming a mentoring relationship to learn from each other’s experience in relation to specific issues). Feedback from the various stakeholders suggested that this was driven and promoted by the Productivity Challenge Lead from UKCES.

The experience did demonstrate that collaboration is possible. The success in achieving collaboration between companies, many being competitors, could be explained by the focus on skills as the main issue to resolve. Skills is a common problem shared by all businesses and one that is relatively ‘safe’ for businesses to collaborate on because it does not require sharing of business sensitive information and resources (although in some cases firms did share these with each other). In addition, the context of the Productivity Challenge, a growing sector, may have also contributed to the success in collaboration, as businesses were highly motivated to drive a change and recognised this required joining forces for an effective impact.

The Productivity Challenge has been successful to some extent in promoting collaborative work between projects, and therefore between competing businesses. In one case, two employers worked together through the Productivity Challenge in order to integrate one product with the other. However, there have also been a missed opportunities for projects to link, suggesting that projects still lacked the initiative required to pro-actively cooperate with each other. For example one of the projects did not share a terminology glossary that would be beneficial for all to use, especially given the challenge around common language. Another example was a project that could have been using the platform developed by another but instead turned to a provider which could only provide a temporary solution).

The successful collaboration between projects was heavily reliant on stimuli from UKCES, through the work of the Challenge lead and the Co-creation Labs. Changing culture to foster collaboration takes time although much was achieved in a short period. It will be interesting to observe how far collaborative activity moves forward following the end of the Productivity Challenge.

3.4.3 Expected impact

Table 10: Project learning – expected impact

What worked	Why / how did this work
Solutions have been developed and are ready to be implemented	Committed projects with clear ideas of what needs to be done Input of UKCES: financial input encouraged activity; and then project

What worked	Why / how did this work
	management helped to maintain and enhance development
What did not work	Why not
Improving the skills situation in the sector	Too little time to develop and implement a solution. This may come in time depending on take up of the products.

When asked to reflect on their progress and achievements to date, all the projects agreed that they made good progress in developing their solutions, as well as in identifying the key issues and challenges relating to skills gaps in the sector. The projects also acknowledged that progress in tackling these issues had been modest, and that the journey ahead is still long. However, understanding more about the problem and having a solution was already a step forward. All of the projects indicated that they are confident they now understand what needs doing and are in a good position to plan their actions going forward, for tackling the problem and driving a change in the sector in the next few years.

Stepping back, they also acknowledged the importance of this Productivity Challenge in drawing them together and giving them a focus to develop their solution. This alongside the inputs of UKCES (e.g. support of the challenge lead, Co-creation Labs, references to research conducted by UKCES, and links to stakeholders in the UKCES network) appeared to have generated real additionality.

3.4.4 What is expected to be scalable/sustainable

Table 11: Project learning – what is expected to be scalable/sustainable

What worked	Why / how did this work
There is agreement that collaboration is possible and can drive change	This should continue going forward, through the possible industrial partnership, and if so should help stimulate further development in the sector The bringing together of businesses and intermediaries through the Productivity Challenge was an important stimulus in giving them a shared interest for their initial engagement. They are now more comfortable working together on wider issues
The projects have recognised that they can engage end-users and their supply chains and so improve skills more widely	Through needing to test products and think about markets they have identified how best to do this

The projects all have plans in place to continue supporting their products beyond the end of the Productivity Challenge

They were encouraged to think about this at an early stage

They recognised the importance of the issue and so wanted to be sure that they could continue to address it

What did not work**Why not**

Limited success (or effort) to reach a wide audience

Limited time available and fairly early stage product to take to market – this may follow in time

The main achievement of Productivity Challenge 1 to date is the change in the mind-set of the various stakeholders that collaboration between businesses and organisation within the sector can happen and can be an effective approach to drive a change. The project leads and main partners seemed to be driven to keep going and drive the change forward. Similarly, feedback from their experience in developing and implementing their solutions seemed to suggest that they have been successful in engaging their respective supply chains, end-users and clients. It is hoped that they, in turn, will engage stakeholders within their networks, and thus promote change in the industry even further.

However, in discussion with the project leads, they agreed that the main issue around ensuring sustainability was securing the funding for continued activity. In discussion, all projects agreed that having the external funding (i.e. the UKFP) for this initiative was vital to kick start the project. However, they believed that now that solutions have been developed and partnerships formed around each project, employers were more likely to agree to jointly invest in developing the products going forward, and indeed in their use. This is because they could see the benefits for their business in promoting the change. It is also helped by having a product for wider employers to agree to pay for, when they might have been reluctant to invest in an idea.

'Funding gives it focus but it is not just about the money. The benefits are enough of an incentive on their own accord. But businesses would be reluctant to invest all the funds themselves'. [Project lead]

4 Conclusions and key messages

The findings from the evaluation, as described above, highlight that much can be achieved in a short space of time. The findings also highlighted several messages for the programme managers, policy makers and other stakeholders, and sectors in terms of how growing industries can be supported to ensure they have the skills they need to succeed.

4.1 Distance travelled

As a model for initiating projects to address the skill deficiencies in the offsite construction sector, Productivity Challenge 1 seems to have been effective. However, the overall amount of progress is modest and there remains a considerable distance to go. Good progress has been made in the time of this Challenge in relation to clarifying what the challenges are for the OSC sector. For some employers, the project has identified problems they did not know they had and they have, therefore, needed to adjust their baseline assessment. These issues often related to, but also went beyond, previous UKCES research, which helped to shape the solutions they developed. However these deficiencies have not been overcome through this Challenge, nor could they have been. Given the scale of the issues faced, the projects reported that they felt the sector was at the start of a longer, '10 year change programme', to make a real long term difference.

The outputs produced by the projects have the potential to address some of the challenges faced by the sector, having been developed and tested with key partners and experts. However it is too soon to conclude the effectiveness of the tools developed. It became clear early on that six months may not be long enough for Productivity Challenges to address the level of fundamental challenges faced by the projects, although the timeframe perhaps added a sense of urgency to the sector and was welcomed by some employers. Longer term tracking will be useful to allow the full effect of a solution to be realised.

4.2 Conditions for employer collaboration

In the case of offsite construction the driving impetus for employer collaboration, in what has been a fairly fragmented sector, is growing demand for its products with the potential of further growth. This provides a positive backdrop whereby employers can see merit in working together to capture benefits to the sector and to themselves at the same time. In such circumstances there are clear skill gaps and shortages that need to be addressed and it is in the interests of all employers to try to tackle these to avoid blockages in production or rising wages. For OSC partners, conditions for collaboration have been seen to include:

- A strong and clear reason to act; common drivers and problems to address, and an acute awareness of the reasons for action and risk of inaction.
- A clear sense of knowing the challenge is bigger than any one of them (or their part of OSC) and they will be able to achieve more together than apart.
- A foundation of strong individual or group relationships between some or all of the partners on each project. This reduced the risk and meant there was a foundation of common understanding and language
- A focus on a 'safe' and common problem (in this case 'skills')
- Even the relatively small funding made available was a significant catalyst to collaborate.

Collaboration between the projects within this Productivity Challenge has also been an area of success. There are a number of factors about the UKFP approach that appear to have led to this:

- A neutral body (UKCES) initiating and leading the initiative
- Continuous stimuli from UKCES in the form of co-creation support
- Projects making time to build commitment to work together

This suggests that policy makers and UKCES should repeat and build on these factors in any future similar initiative. It also suggests that the model may be successfully repeated in similar circumstances. Employers and other stakeholders in growing sectors should also consider and be encouraged to work together to develop solutions to address skills gap.

Each separate project has a longer-term sustainability plan to continue, and the projects are exploring ways to strengthen their collaboration. This is possible because there is now evidence and developed products for people to pay for. At the beginning investing in development was perceived as too high risk, even amongst known partners. This suggests bringing employers together with a short term purpose can be a good way of stimulating longer term, wider collaborative working. Intermediaries can play a key role in this initial engagement.

4.3 Engaging End Users

All projects agreed that engaging employers and testing stakeholder reactions throughout their projects was essential to successful product development and progression. As projects were beginning to develop their solutions they discovered issues around language and understanding of their needs. A common language is important to be able to communicate effectively with end users and influence their behaviour.

UKCES and policymakers should reinforce the benefits of engaging with end-users at the start of the development process. Case studies of projects in Productivity Challenge 1 could be used as examples to demonstrate these benefits. For employers, intermediaries and other stakeholders who may wish to engage with similar initiatives in the future the key message is to engage with end-users fairly early in the development process.

There has been some useful practical learning on how to engage prospective end users:

- Thinking hard about the needs and developing a shared definition and language amongst project partners at the outset of the project
- Having something tangible to demonstrate the solution/product
- A personal approach (discussion groups and conversations in person)
- Two way open dialogue, showing willingness to take on board comments
- Expect and accept attrition of some partners over time

All of the projects agreed that the key challenge was to engage stakeholders outside their existing networks, and that this usually came later once they had a more developed concept / tool. For future Productivity Challenges UKCES might wish to explore ways in which they can support projects by linking them to UKCES networks and stakeholders, who can in turn help widen the networks of the businesses engaged. Doing so would fit within the collaborative, developmental ethos of the programme. It also suggests to policy makers and UKCES the difficulty of achieving engagement with new networks, and the assessment of future bids should be realistic in their expectations, recognising the scale of this challenge.

4.4 Education-industry relationships

The issue of education providers being unable to keep up with the pace of technological change is not unique to the OSC sector or particularly new. Some progress was made through the Productivity Challenge in terms of combining industry and academic knowledge to create their training material and products being made available to university students. It was suggested that another way to influence change in the academic syllabus was through the professional bodies, for example the Royal Institute of Chartered Surveyors, or Royal Institute of British Architects, as these bodies are aware of the technological change and associated skills needs and set professional standards. However these bodies were often not straightforward to engage beyond an individual level and so the effectiveness of this route requires to be explored further.

4.5 Reducing sector fragmentation long-term

The strength of the network, which the projects in this Productivity Challenge have created, provides confidence of the longer term commitment of the projects to work together. This has been stimulated through their engagement with UKCES, the involvement of BuildOffsite as an industry wide body and the recognition of a shared agenda across the suite of projects. Going forward it will be important that the momentum created towards forming an industrial partnership is maintained to give the sector a greater common focus and leadership in the future.

4.6 Key Messages

Arising from these conclusions are a set of key messages for a range of audiences which have been summarised in the table below.

Audience	Key Messages
Offsite Construction Sector	The projects should continue to promote the project outputs for the wider benefit of the sector, including at sector events with the support of UKCES.
	The sector faces long-term challenges and has an opportunity to build on the foundation and relationships established through the competition to address the challenge of the '10 year journey'.
	Encourage closer collaboration with stakeholders, including Buildoffsite, CITB, professional bodies (who in turn influence education curricula), clients, designers and architects. The outputs of the projects provide an opportunity to showcase the potential of the sector and its commitment to ensure it has the skills needed to deliver.
	The sector should also engage policy makers across the UK to make them aware of the outputs and of their on-going needs and plans. This has begun to happen in Scotland through the Innovation Centre, and employers engaged in the Construction Industry Leaders Group could use the products and collaboration of the competition to promote the potential of the sector and secure government support for the pathways set out.
	Employers could adopt 'action research' methods to evaluate projects while they are live – this being a more effective means of extracting organisational learning and identifying critical areas to address.
Employers in growing sectors	It is important to have a clear and rounded view of the problem you are seeking to address and to understand it from a number of perspectives. Developing this shared understanding and language can, in itself, be a way of starting to garner support amongst the people/institutions who need to be engaged in a change process.
	'Skills' can be a safe topic from which to develop wider collaboration.
	Employers must take a strong leadership role. The influential players, those who set the culture, will encourage others to follow,

	<p>especially if they work together to do so for the benefit of the sector as a whole. Supply chains in particular may be a way to achieve wider reach, especially where primes work together to provide leadership.</p>
	<p>Where there is competition between these businesses, a trusted intermediary can serve to bring the businesses together.</p>
	<p>It is essential to identify the stakeholders you need to take with you – which may be many and various in multi-stakeholder complex sectors such as these, including clients, designers, professional bodies, educational institutes. Identify experts/champions within, engage them in the ‘problem articulation’ process, pose a challenge concerning the vision for the industry and their role in achieving it.</p>
	<p>Identify the routes to influence the training market: who validates the university courses; which Colleges are actively engaging the sector; what potential for employers to collaborate to change the nature of provision through a coherent voice.</p>
	<p>Existing products, such as NOS and existing frameworks can provide a solid basis for discussion and engagement early on, as having something to discuss makes for a better interaction than a blank page. At the same time, it is important that agreement is reached on a common language that works for the sector.</p>
	<p>How can you work with government as a client/enabler of some of these actions? What routes do you have?</p>
<p>Governments (in addition to above)</p>	<p>A clear industry strategy provides employers with a framework for investment. Government has an important role to play in setting the conditions clearly to enable employers to lead the development of such strategy; this would include providing a stable policy environment to facilitate long term sectoral planning; and clarity of roles and responsibilities and potential for investment. With the development of the National Infrastructure Plan for Skills in England, Government has taken steps to clarify who is responsible for what, and it is now over to public and private sponsors within the regions to develop their talent pipelines.</p>
	<p>It is important that Government develops evidence-based strategy, utilising the available data, including the UK Commission’s Employer Skills Survey and Sector Insights projects, as well as draw on the emerging learning from the UK Futures Programme, to ensure that areas of challenge are not missed. This report, for example, has identified examples of emerging skills gaps uncovered during the course of the Productivity Challenge, such as the importance of construction logistics.</p>
	<p>Government is well placed to foster collaboration between employers in fragmented sectors to ensure that the needs of smaller businesses, who might otherwise find it hard, are successfully conveyed to education providers. Skills are a safe place for collaboration and a relatively small amount of funding can support this collaboration to address skills issues.</p>
<p>UKCES</p>	<p>This Productivity Challenge has demonstrated the potential of the UKFP approach in galvanising employer action and developing collaboration with its emphasis on co-creation. The emphasis on testing solutions has encouraged projects to test their products</p>

	beyond what they would have done before, though the longer term impact of this is yet to be tested.
	For other Productivity Challenges consider the need to have something tangible to test before engaging beyond the 'usual suspects'. Recognise that this needs to be reflected in assessment and management.
	Consider how to address the challenge of a lack of awareness of existing products and services (such as National Occupational Standards) to avoid potential duplication or wastage and to encourage engagement with the skills arena.

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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