What happens in a Knowledge Exchange and Enterprise Network (KEEN) project?

A report of an online survey into knowledge exchange processes in KEEN projects funded by the European Regional Development Fund and managed by the University of Wolverhampton

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Acknowledgements

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1.1 INTRODUCTION

This report identifies the knowledge exchange process within the Knowledge Exchange and Enterprise Network (KEEN) projects managed by the University of Wolverhampton. An online survey was conducted during January and February 2015 which asked all project participants about their involvement in the knowledge transfer process.

KEEN projects were university/business collaborations targeting strategic growth within small and medium sized enterprises (SMEs) within the West Midlands region. The programme was partially funded by the European Regional Development Fund (ERDF). Six universities in the West Midlands were responsible for operating the projects: Aston University, Birmingham City University, Coventry University, Staffordshire University, the University of Wolverhampton, and the University of Worcester. A KEEN project undertook a defined intervention within a business and lasted for a period of between six months and two years. There were four key participants involved: an affiliate (graduate) supported by an academic, a member of the business who supervised the affiliate, and a representative of the university business team who set up and administered the project.

In order to structure the survey, Szulanski’s model (1996, 2000) of knowledge transfer was used. This model suggests that there are four stages to the knowledge transfer process: initiation, implementation, ramp-up, and integration. At each stage of the knowledge transfer, the activity can be affected by what Szulanski termed ‘stickiness,’ which is a barrier to the process. The survey sought to identify key processes at each stage and any barriers that might be present.
1.2 Background Profiles

1.2.1 Respondents

The survey was aimed at four groups of participants: the business development managers (BDMs) for the universities, the lead academics, the affiliates, and the company supervisors from the businesses. Four versions of the survey were developed tailored to each group’s role from a generic concept template. The survey was issued to 299 KEEN participants in total from the six university partners and 213 returns were received (71% returned). The respondents in each group were as follows:

- Business Development Managers: 15
- Lead Academics: 53
- Affiliates: 80
- Company Respondents: 65

Table 1 below shows an analysis of the survey respondents for each university.

<table>
<thead>
<tr>
<th>University</th>
<th>Respondents</th>
<th>Uni. BDM Count, (%)</th>
<th>Academic Count, (%)</th>
<th>Affiliate Count, (%)</th>
<th>Company Count, (%)</th>
<th>Total Count, (%)</th>
<th>Projects Count, (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aston</td>
<td>1, (100%)</td>
<td>1, (33.3%)</td>
<td>4, (100%)</td>
<td>3, (75.0%)</td>
<td>9, (75.0%)</td>
<td>4, (3.2%)</td>
<td></td>
</tr>
<tr>
<td>BCU</td>
<td>2, (100%)</td>
<td>5, (83.3%)</td>
<td>1, (20.0%)</td>
<td>3, (60.0%)</td>
<td>11, (61.1%)</td>
<td>8, (6.3%)</td>
<td></td>
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<tr>
<td>Coventry</td>
<td>2, (66.7%)</td>
<td>23, (60.5%)</td>
<td>39, (69.6%)</td>
<td>35, (71.6%)</td>
<td>99, (69.2%)</td>
<td>68, (54.0%)</td>
<td></td>
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<tr>
<td>Stafford</td>
<td>1, (100%)</td>
<td>1, (100%)</td>
<td>1, (100%)</td>
<td>1, (100%)</td>
<td>4, (100%)</td>
<td>1, (0.8%)</td>
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<td>Wolverhampton</td>
<td>8, (100%)</td>
<td>22, (91.7%)</td>
<td>34, (75.6%)</td>
<td>23, (57.5%)</td>
<td>87, (74.4%)</td>
<td>44, (34.9%)</td>
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<td>Worcester</td>
<td>1, (50%)</td>
<td>1, (100%)</td>
<td>1, (100%)</td>
<td>0, (0.0%)</td>
<td>3, (60.0%)</td>
<td>1, (0.8%)</td>
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<tr>
<td>Total</td>
<td>15, (88.2%)</td>
<td>53, (72.6%)</td>
<td>80, (71.4%)</td>
<td>65, (67%)</td>
<td>213, (71.2%)</td>
<td>126, (100%)</td>
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Table 1 – Analysis of Survey Responses for Each University

1.2.2 Relative Levels of Expertise of Participants

BDMs, affiliates, and academics were asked about the level of qualification they had and their previous experience before joining the KEEN programme to gain an overview of some of the expertise being brought into the project. Figure 1 shows that the university BDMs were normally degree qualified to a range of levels. The higher qualifications were in cases where the business development function was part of an academic role. The majority of the lead academics had obtained higher degrees whilst the majority of the affiliates were first degree graduates. Six respondents out of the affiliate group were undertaking additional studies.
**1.2.3 Subject Area Groups of Qualification**

The academic and affiliate surveys provided information on the subject area groups in which the respondent were qualified. Figures 2 and 3 display the results grouped into seven subject areas as pie charts. These show a degree of similarity between the academic and affiliate groups. The major observable difference is that the background of the academics contains more respondents with subject areas in business and management (17, 33%) compared to only (16, 20%) in the larger affiliate dataset (54% bigger). In compensation the IT, computing and electronics area for the affiliate respondents is larger at 12 (15%) versus the academic segment of four (7%). This may reflect that academics from business and management are more likely to engage in knowledge transfer projects than from other subject areas.
The status of the projects used by the respondents to complete the survey is summarised in Figure 4. The first bar has the status of the 126 projects as of 5th December 2014. This is the ‘control status’ shown in Figure 4 and represents the overall picture at this date. Projects in progress and completed projects are well represented in all respondent groups. The “finished early” segment is under-represented in the BDM and affiliate groups. In the former case, the most likely cause is that the size of the respondent group is small. In the latter case, it proved difficult to obtain responses from affiliates who had left the project company. Figure 4 also serves to show that caution must be exercised in attempting to triangulate between the responses to similar questions set to each of the groups. The composition of each group is made up from a different mixture of projects dependent on those participants who chose to answer. Most of the projects at the time of the survey were “in progress.”
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1.2.5 Mapping the Knowledge Transfer Process

As previously stated, the survey was designed using the Szulanski (1996, 2000) model as a framework. A schematic diagram of the model is shown in Figure 5. Passing through each of the stages can be affected by what Szulanski terms ‘stickiness,’ which involves barriers in the knowledge transfer process.

Figure 4 – Status of Project Shown as a Percentage for Each Group of Respondents

The line chart in Figure 6 describes the stage of the transfer process which there project has reached through the responses of each of the participants. As the number of respondents in each group is different, the lines have different starting points in the vertical axis. The general trend is a decline in numbers as the stages of the process progress. However, the individual projects in the survey had different start points, end points, and durations, providing a contribution to this observation. Some of the projects had been running for less than three months at the time of the survey and were unlikely to be near the integration stage. Whilst the rate of reduction appears greater for the groups containing more respondents, this has been distorted by the dissimilar group sizes. If the line end points are compared relative to the line start points as a percentage, three out of the four observations fall into the range 42% ±5%. The BDM observation falls well outside this range (60%) but the sample size of this group is...
significantly smaller and as a result may be less representative. Nevertheless, this spread of projects allowed an evaluation to be made of the knowledge transfer process at each stage of the Szulanski model.

![Completed Model Stages for Projects](image)

**Figure 6 – Line Chart Showing the Completed Model Stages of the Projects**

### 1.2.6 Initiating the Project

A number of aspects relating to the initiation stage of the Szulanski model were highlighted in the survey. There are several issues that need to be addressed for project initiation to be successful. One of these elements was assessing the existing knowledge held by the organisation before the establishment of the project. A knowledge gap needs to be identified so that the objectives of knowledge transfer can be established. 41% of company respondents stated that they had conducted a knowledge audit prior to the start of the project, identifying the extent of project-related knowledge in the company and what knowledge was required for innovation and growth. Some of the respondents stated the type of knowledge audit completed in the qualitative responses. Nine company respondents indicated that an informal knowledge audit was undertaken. Responses varied, as illustrated in the following quotations from the survey.

“A realisation that a company needed in-depth IT support as it had no such existing provision.”

“An informal review of the company’s existing skill set.”

“Discussion with company directors.”

A further five respondents reported that they had site visits and meetings with university staff, specifically the academic and business development manager, which they considered was a form of knowledge audit. This suggests the companies’ knowledge gaps may have been highlighted by meeting university staff, and hence the decision to pursue KEEN may have been influenced by the university representative in these cases.

Another nine (9/24) respondents, stated that they had meetings and discussion, but in the majority of cases did not state with whom, about what, or the outcome of meetings and discussions, to justify this as a knowledge audit. However, given the fact that the majority of these companies are small enterprises,
with very few numbers of employees in some cases, it is reasonably understandable why things are done informally. Further analysis and corroboration of existing data on all companies involved with KEEN projects showed that 77% of companies had fewer than 50 employees, and 18% had fewer than 20 employees, while 3% had between 200 and 250 employees.

1.2.7 The University Relationship

Of the company respondents approximately 40% (25/63) reported that they had previously engaged in university business collaborations, including Knowledge Transfer Partnerships (KTP), Step programmes, technology transfer projects, and the Speed plus programme. Some had also taken students on placement and internships; others had previously employed graduates of the respective universities.

One company noted that they had previously tried an unsuccessful collaboration with a university, although they did not specify why this was the case. However, they were willing to give the KEEN programme a try and commented further:

“Our graduate is great and working well and the financial support is very helpful; however, the process of the KEEN is very over complicated.”

Another company explained the previous relationship with a university and mentioned that the company had used such collaborations as a means to create additional employee resources to tackle projects beyond the time availability within the existing workforce:

“Worked with a university for many years and have found that this and similar schemes have been a very effective method of bringing good quality graduates into the business to focus on a specific project/ opportunity that existing staff are unable to tackle due to work load. This and previous projects have had a positive effect on existing staff and helped to raise standards. Embedding these new skills has been a key focus and criteria for our business.”

Other university collaborations cited by respondents and used to enhance their businesses included the Shell Scheme for IT improvement in manufacturing, the Goldmann Sachs 10,000 Small business programme, and receiving technical assistance with production processes.

1.2.8 Selecting the University Partner and Academic, and Preparing to Start

With some companies which had established a need for knowledge input through audit, the next part of the initiation phase concerned the selection of the university partner. The most influential factor in selecting a university was location, with 20% of the respondents selecting this as the most important reason. Other highly rated factors included:

- Recommendation (17%)
- Specialist Expertise (16%)

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1 Step is a work experience programme for students and graduates. The Speed Plus programme supports the creation of new businesses in the West Midlands region.
• Based on previous experience (14%)
• Based on an approach by the university (13%)

The survey revealed that factors such as location and recommendation were more influential than the specialised knowledge or expertise offered by a university. Indeed, as some of the knowledge audits were quite informal, it suggested that it is typically a generic level subject knowledge that is being sought rather than in-depth academic knowledge in the majority of the KEEN projects. Additionally, the free text survey responses noted that the choice of university was also based on: ‘Referral through UKTI (UK trade and investment)’; ‘Being an alumnus of the university’; ‘The university having a suitable scheme’; or the recruitment process as the main influence of university selection. This final choice referred to assisting the firm with the recruitment of a graduate through providing an HR function, which in many SMEs may be absent.

Another feature of the initiation phase of the project is the personal role of the academics and BDMs. The academics highlighted a significant personal role in the early development of the project. 72% of the academics helped to prepare the project work plan for the affiliate, whilst 67% assisted the company in completing the KEEN application form. When assessing the choice of graduate, 62% of academics had been part of the interview process. Involvement in the affiliate interview means that the academic buys into the graduate’s pathway to succeed within the project from the start. Despite the involvement of the academic, 55% of BDMs noted that there were issues with the recruitment of appropriate graduates. In some cases, the affiliate post required repeat recruitment campaigns to generate a suitable shortlist of candidates for selection.

However, there is a significant role for business managers in the early stages of a KEEN project. 92% of BDM respondents stated that they had helped to prepare the work plan for the affiliate and 75% stated that they had convinced the firm to take part in the programme, and also assisted with the recruitment of the affiliate. This suggests a key role in the initiation phase for BDMs. However, academics in some cases also fulfilled an important role in the initiation phase as 41% stated they personally introduced a company to KEEN. Indeed, 37% of academic responses had completed some form of collaboration with the project company in the past.

The final aspect to be discussed in relation to the initiation phase concerns the nature and level of training for the key participants undertaking this type of project. Over 90% of the BDM survey responses indicated that there was no formal training programme for academics involved in KEEN. If any training was conducted this was mostly through previous experience in knowledge transfer projects or being a second academic on another project. The responses on the academic survey support these observations, but in several cases even past experiences were in short supply. For example, only 23% of respondents stated that they had been a second academic in another project. However, only 17% of academics stated that they had taken part in a formal internal training programme and just 10% highlighted that they had undertaken an external training programme. By implication, it can be supposed that the professionalisation of the knowledge transfer process through formal training is not currently supported.
2.1 Motivation and Expectations

2.1.1 Motivation for Taking Part

The survey investigated why the respondents became involved in the KEEN programme and what they hoped to gain from taking part. The survey responses from the companies indicated that their primary motivation was the desire to employ a skilled graduate. This was the top answer given by 70% of the company respondents. In contrast, both the academics and the affiliates specified an interest in the content of the project as their primary motivator in 72% and 88% of the replies, respectively. When asked about the academics’ motivation, the BDM group concurred with the view of the academics as 87% selected interest in the project as the main motive. It would appear that there is a high degree of intrinsic motivation present in regard to participation for academics and affiliates.

The BDM group, from their external view of the company, believe that in their opinion the greatest motivation for the company is to fill a knowledge gap. This was selected by 80% of the respondents from the group. This lines up with the implicit desire of the companies to employ a “skilled graduate,” who would fulfil the need to “fill a gap in knowledge.”

Having addressed some of the key motivations, the expectations of the respondents will now be summarised. The academic group rated ‘collaborating with businesses’ as the most popular response. ‘Applying research in a practical setting’ was not widely selected, implying that the academic group did not view the KEEN projects as a primary means of commercialising the outcomes of their specialist research, as occurs in many Knowledge Transfer Partnerships (KTPs).

The affiliate’s greatest expectation was ‘to gain new skills’ which can be considered to be in line with the observation that the KEEN programme has appealed to new graduates looking to start out in first employment. However, the affiliates as a respondent group least expected to gain skills in new technologies or to work on a new technology based project. This implies that not all KEEN projects are oriented towards new technology as is often the case with KTPs. Indeed, KEEN may be more about the development of individual skills and the gaining of work experience from the affiliate’s perspective. The three free text responses in the company survey around expectations about participation were focused on business growth:

“Increase the manufacturing capacity of the company.”

“Increase Sales.”

“A new sales and marketing employee.”

3.1 Bringing Skills into the Company

The next aspect drawn from the survey relates to skills. The affiliates were asked to state what skills and previous experience they were able to bring to the project. A qualitative analysis of the text-based replies was carried out in this regard and generated three categories. The most frequently mentioned category was technical/ academic skills, which generated 106 references as shown in Figure 7. The top three skills mentioned in the technical category were product design (20 references), computing & IT (18), and marketing (16). The next category of personal skills had 83 references and is shown schematically in Figure 8. The final category was transferable skills with 30 references. Affiliates noted a variety of specific skills that they had brought to their companies:
“The ability to design and develop ideas, create eye catching visuals and concepts from the initial sketch through to model making and the use of 3D CAD packages to bring products to life.”

Computing and IT skills are highlighted in the following comment:

“Prior knowledge of 3D graphics APIs and graphical effects to improve fidelity in games, these were applicable to the requirements of the job position.”

Finally marketing skills were assessed in the following remarks:

“Within the company I am working there has never been any form of marketing so it was a whole new ball game to them. I brought the benefit of my experience in marketing, a creative approach including: in house design, online marketing skills including website management and updating, social media marketing skills.”

Figure 7 – Technical Skills Brought by Affiliates

The category illustrated in Figure 8 displays transferable skills. Here, the top four categories are made up of research and analysis, and document writing, in equal top position with seven references, followed by project management and change management in equal second position with five references.

Figure 8 – Transferable Skills Brought by Affiliates
For research and analysis, a typical comment is shown below:

“My background in research and methods of environmental analysis made a thorough Programme Outcome Evaluation possible.”

A comment surrounding document writing concerned user guides:

“Knowledge from both university and my design role during university has delivered better documentation such as clearer user guides, datasheets, and marketing.”

The final category covering skills was a summary of personal skills, as illustrated by the model in Figure 9. The most popular references were enthusiasm and being a good communicator, in top equal position with 15 references each. Respondents also claimed to offer a fresh approach and to be adept at problem solving, with 11 references each. Team working followed closely with ten references.

![Figure 9 – Personal Skills Brought by Affiliates](image)

Typical examples of the comments made in each of these categories are listed below:

For enthusiasm:

“I brought an enthusiastic approach and the social capabilities to work successfully within a design team.”

For communication:

“I had some sales and little IT knowledge, but brought excellent communication skills, confidence and interpersonal skills as well as being a quick learner and adaptive worker.”

“[I had] fresh ideas to reinvigorate the company's marketing communications both online and offline.”

For problem solving:

“Enthusiasm to learn and develop new products and solve problems that were a real world issue and not just a theory.”

For team working:

“Many years of experience of working within a team.”
It could be argued that the skills that affiliates thought they were bringing were the attributes of the ‘initiative-taking’ graduate that the companies wanted to benefit from so as to address the needs that might somehow be lacking within their company.

Having established the key skills and experience brought by the affiliates to the projects, further questions on rating the match of skills to the project at hand were brought into the survey. This enabled the academic and affiliate to rate their skills against the project, whilst the company and BDMs were asked to rate the skills of the academic and affiliate to the project. These aspects were measured over time, with a rating scale used to identify any change in match.

The assessment of skills match for the affiliates at the start of the projects is shown in Figure 10. This indicates that the majority of the affiliates were scored as a moderate or better match to the project. Indeed, the shape of the diagram indicates a normal distribution with the majority of the responses falling in the middle of the rating scale.

![Skills Match of Affiliate at Start](image)

**Figure 10 – Match of the Skills of the Affiliate at the Start of the Project**

With the skills match at the start of the project now established, Figure 11 identifies the current (or final if project completed) match of skills of the affiliate. This chart has a different distribution to the one shown in Figure 10, and it now has a negative skew, with the majority of the data at the upper end of the rating scale. This highlights that the skill match of the affiliate had now shifted towards the better and best match ratings. This indicated that as time on the project increased, the more capable the affiliate became. This may be representative of the knowledge transfer process taking hold as the affiliate drew on the company skills and managed to establish the project within the company.
When investigating the skills match of the academic, a similar picture emerged to that of the affiliate. Figure 12 indicates that, at the start of the project, the majority of academics were placed in the moderate or better match ratings. As a result, the diagram closely resembles a normal distribution.

As with the affiliates, the current (or final if project completed) match of the academic skills to the projects suggests a stronger match than at the start. The diagram also has a negative skew with the majority of academics rated in the better match or best match categories (i.e. in the upper range of the data set).
1.8 The responses from the BDM surveys reported differences to the other surveys. Within the group of 15 BDM respondents, some individuals did not have a day-to-day relationship with the company, academic, or affiliate. As a result, their perception of the exact nature of any skills changes in the other participants may have only been of limited insight. Thus, the BDM responses appear to show academic skills did not change, but with the affiliates it did show an improvement towards a better skills match with the company’s needs. This may reflect a view of the project that is focused on affiliates and companies and not on knowledge exchange being reciprocal and tripartite. Moreover, this reflects that the KEEN programme appears to have a bias towards knowledge transfer into the business (from university/academic to business), rather than an equitable knowledge exchange involving a similar extent of knowledge transfer out. In the company survey, the change in skills of the affiliate also reports an increase in match as the project proceeds, and further it highlighted that the academic increased their skills match.

4.1 Type of Knowledge Brought into the Company

The surveys also asked respondents to identify the type of knowledge which the project brought into the company. This was defined in three ways:

- Knowledge entirely new to the company
- New knowledge adding to the existing knowledge of the company
- Methods for using existing knowledge more effectively

The type of knowledge brought into those companies undertaking KEEN projects is summarised in Figure 14.
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The responses from all four surveys indicated that the perception was that new knowledge adding to the existing knowledge of the organisation was the most common type of knowledge brought in through KEEN projects. In each of the surveys, this type of knowledge scored over 50% of the responses. Methods for using existing knowledge more effectively was ranked second, although the companies scored this aspect more highly than the other surveys. 40% of the companies stated that this was the main type of knowledge brought into the organisation as a result of KEEN, which compared to 28% for the affiliate group and 25% for the academic group. Care must be taken when interpreting the BDM result due to the small sample size when compared to other respondents.

5.1 Level of Confidence in Other Participants

Confidence (and the trust which it invokes) is an aspect of the knowledge transfer process which can act as an enabler to the project but can vary as progress is made (Das, 1998; Levin, 2004). In order to identify the level of confidence which the key participants had experienced in the project, a theme concerning confidence was incorporated into the survey. The respondents were asked to state what their level of confidence was in other participants, whether confidence had changed, what issues had contributed to confidence changes, and then to state any steps taken to improve confidence. Confidence in the key participants was requested for the start of the project. The level of confidence of the academic, affiliate, and company rated by the other participants is shown in Figure 15.
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Figure 15 – Appraisal of Confidence Level as a Weighted Mean Index (5-Point Scale)

The chart shown in Figure 15 indicates that the level of confidence in the academic, affiliate, and company was generally high across the responses received (~4). This was judged by using an average weight from a five-point scale. In an average weight, each element is weighted based on the relative importance (i.e. the frequency of selection in the questionnaire).

The BDMs had the highest level of confidence in all participants with the average weight reported between 4.33 and 4.53 for each of the other groups. The academics had a marginally higher level of confidence in the company than the affiliate, with an average rating of 4.17 for the company and 4.33 for the affiliate. At the same time, the company had marginally higher confidence in the academic (rated 3.97) than the affiliate (rated at 3.94). Furthermore, at the start of the project the results indicated that the company generally had lower trust in the other project participants than the academic group or the affiliate group reported for the same question.

The next aspect of confidence investigated in the surveys was to ask whether the confidence level had changed since the start of the project. The results are summarised in Figure 16.
The responses from the four survey groups indicate that most projects did not encounter any situations which contributed to a change in confidence as shown by the green bars in the chart (Figure 16). The BDM survey gave the highest result, where 80% of responses indicated that there had been no situations which had contributed to changes in confidence. In contrast, the responses on the company survey reported 60% of projects had no situations which contributed to changes in confidence. Incidental observations from the other research material suggested that in most cases confidence starts out high and is maintained for the duration of the project. Almost two out of every three projects undertaken did not encounter confidence level changes.

In projects where confidence had changed, respondents were asked to give a short explanation of the reason for the change. These text responses were analysed for positive and negative effects in Figures 17-19. The negative responses predominated in all three respondent groups. For the companies (Figure 17), the key issues boosting confidence were achieving goals (seven reasons) and along similar lines resolving issues (two), whilst confidence was eroded by changes in members of the project (six reasons) and in cases of misaligned objectives (six). The former is typified by:

“The performance of the affiliate in particular has exceeded our expectations. He has developed his skills far faster and more effectively than we had hoped.”

Misaligned objectives came out in responses such as:

“Sometimes the project felt more like an academic research exercise than being driven by business need.”

“Our timetable did not match the academic timetable.”

Changes in project members were evidenced:

“The affiliate got a new job one year into the two year project, but a new affiliate has been recruited with minimal loss of service. Both have done an excellent job.”
“Change of lead academic.”

The responses influencing changes in confidence are summarised in Figure 17.

Figure 17 – Model Illustrating Confidence Level Changes Reported by Company Contact

In Figure 18, a similar illustration is shown for the responses from the affiliate group. In contrast, the most significant positive influence was the growth of personal confidence (seven reasons), as evidenced in several cases from recognition (one) or the building of relationships (four). One affiliate reported that:

“Confidence improved due to the following: 1) Resolving technical issues with the 3D Printer and CAD Software. 2) Working under timed pressure. 3) Helping move the initial project towards success in terms of prototyping. 4) Dealing directly with the company director.”

Amongst this group, achieving goals was also a confidence raiser (three). On the negative side, a wide spread of causes was reported, as shown by Figure 20. However, misaligned objectives were the most reported reason (four), which was a reason also cited by the company contacts. In the affiliate group, this prompted comments such as:

“Academics often go off on a tangent, or fixate on one small detail.”
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The lead academic group is illustrated by the model in Figure 19. Here, there is an even bigger bias towards the negative influences (14 reasons versus four), although the negative instances are lower than for the other groups (14 reasons versus 21).
The observations of the academic group seem to fall into line with the company contacts in so far as changes in the project team (four reasons), and misaligned objectives (three), feature as the top two negative contributors, evidenced by:

“Change in affiliate.”

“The brief has evolved and become more complex.”

Two of the respondents introduced another factor which had eroded confidence which was that of family relationships which are often present in the smaller businesses. One case illustrated a negative influence on confidence arising from a change in leadership:

“A very experienced family member ….., handed over control [of the company].”

On the counter side the academics reported, as found with the other groups, that goal achievement was one of the routes to growing confidence, for example:

“Company [is] becoming more confident and supportive as they have seen the success of the scheme.”

Where steps to alter confidence were taken, 27.42% of company respondents (17/ 62) reported that they took steps to alter the confidence level during the partnership. Some of the steps taken included: the provision of external training for affiliate and staff; holding quarterly meetings with the academic and partners; holding meetings with the lead academic to understand issues and possibly seek further assistance from outside the partnership; and, ensuring the affiliate understood the company’s ethos. Other confidence enhancing factors included affiliates receiving mentoring from the academic and the company supervisor and the holding of review meetings with the academic team. One company gave the affiliate a pay-rise to boost confidence, whilst another company involved the university academic in other research initiatives, and one reported providing support, encouragement and training for the affiliate to become more confident. Furthermore, a company also reported they had ‘frank’ discussions about different positions held by the individuals involved in the partnership and how work could be aligned more effectively.

Some negative responses were drawn from this question and this included finance. There was a comment that KEEN had too much paperwork, was overly complicated, and takes too many people to manage. Late payments may challenge the confidence between the collaborators, as maintaining cash flow is typically critical to SMEs.

6.1 Sharing of Knowledge

This theme addressed knowledge sharing within the project company. The first part deals with how knowledge was shared in the organisation, in particular which methods were used. This theme was only relevant to the company contact, affiliate, and academic surveys and is illustrated by Figures 20, 21 and 22, respectively.
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Figure 20 – How Knowledge is Shared: Company View

Figure 21 – How Knowledge is Shared: Affiliate View
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Figure 22 – How Knowledge is Shared: Academics View

Figures 20 to 22 indicate that there is some form of agreement on how knowledge was shared in the project companies. All three surveys placed the sharing of knowledge through face-to-face communication as the most common way knowledge was shared across the respondents’ companies. Team meetings were also identified as a common way of sharing knowledge within the company, but the sharing of knowledge through documentary sources was not shown to be a common method of sharing knowledge. Other methods such as holding training sessions and seminars were not scored as highly. This implies that knowledge is often shared using verbal and practical methods and not through more formal written approaches, as illustrated by Figure 22. For some companies, they may not have the ability to record the knowledge which has entered the organisation (due to their small size) and this may raise the question of longer term sustainability.

6.2 The Reach of Knowledge within the Company

The second aspect of sharing knowledge refers to other individuals in the organisation who received the knowledge brought into the company by the collaboration. The respondents (company, affiliate, and academic) evaluated the spread of knowledge through a range of individuals and teams within the company and conversely how far knowledge from the company had been used within the academic setting:

- The members of the company project team
- The members of the immediate company department
- Other employees within the company
- Contacts external to the company
- Project leading to an increase in the opportunity for research
• Company providing input for teaching (academic and company only)
• Company providing knowledge input into my department (academic only)
• Company providing knowledge input to my faculty/school (academic only).

The academic and company responses both rated the spread of knowledge to the project team as the highest, but the affiliate responses scored members of the immediate department as the group which has received the greatest spread of knowledge. This suggests that some of the affiliates may feel more attached to a department rather than a specific project team. This might be the nature of a “new” face within a company making contacts beyond the immediate role. Predictably, the spread of knowledge to contacts external to the company scored low in comparison to the spread of knowledge to internal departments or individuals.

When looking at the spread of knowledge back into the universities, academic respondents gave ‘input into teaching’ a weighted average of 2.87. This compared to a weighted average of 2.71 for the same statement when asked to company respondents. The academics rated the ‘knowledge input into their department’ at 2.86 and ‘input into faculty/school’ at 2.61. In both cases, whilst some knowledge may have entered the university, the extent of this spread is limited. Also, the academics and company respondents scored ‘opportunity for research’ at 2.71 and 2.00, respectively, in comparison to the affiliates who rated this at 3.26. The difference in these responses suggests that the affiliates can see a greater value in the projects leading to research opportunities, and this may reflect the potential for more practical (rather than theoretical) research.

6.3 Managing the Knowledge Transfer Process through the KEEN Programme

The respondents to the BDM surveys were asked a specific question about how KEEN projects are managed and monitored. All of the BDMs stated that regular contact was maintained through the review meetings. According to the BDM respondents, 93% of the responses indicated the lead academic made regular visits to the company to assess the progress of the project. Where administrative issues did occur, 80% of the BDMs stated that contact was made with the team in the university to resolve these issues.

However, some negative issues were also highlighted by the BDM respondents. 64% noted that they had experienced issues with delayed payments to the companies, whilst 55% noted issues with the recruitment of a suitable candidate.

7.1 Issues with the Knowledge Transfer Process

The next theme in the survey considered the issues or barriers which the respondents may have faced during the project. These issues concerned factors such as:
• Resistance to change
• Difficulty with communication
• Breakdown in confidence
• Problems with motivating others
• Difficulty with training
• Shortages of equipment
• Shortage of experience
• Insufficient time available
The first set of questions relating to barriers was focused more on the ramp-up stage of the Szulanski model (where transferred knowledge has begun to be used). Key barriers for the affiliates are summarised in Figure 23.

**Figure 23 – Barriers Highlighted by Affiliates**

The most significant references reported were resistance to change (ten references) followed by absorptive capacity (six) and lack of staff availability (six) as joint runners-up. Absorptive capacity relates to a firm’s ability to make use of any new knowledge which is brought into the organisation.

Resistance to change was evidenced by comments such as:

“*People who have worked at the company for a long time and have got used to doing things a certain way can be reluctant to change.*”

“*Slight resistance to change coming from senior members of the management team at the company.*”

In respect of absorptive capacity, examples of the comments are:

“As I was the only one in the company with an IT background, we faced some difficulties in training others. Furthermore, due to the lack of experience in IT, we had to put more time to explaining, and describing every concept.”

“*Many members of staff have struggled with the introduction of the 3D Computer Aided Design programs. The initial drawings are taking a large amount of time to complete.*”

Finally, in relation to lack of staff availability the following references apply:

“*Some of the academics were busy so we couldn’t have regular meetings.*”

“*Difficulty securing meetings with key personnel due to schedule constraints.*”

The responses from the company contact and BDM surveys indicated that insufficient time was the most frequent barrier faced. 27% of BDM and 42% of company respondents highlighted time as an issue.
Although the academics rated resistance to change as the highest barrier at 30%, 25% of academics also found time to be a barrier.

An impact of time is highlighted below:

“Time available: The project scope is a bit ambitious in terms of completing all the tasks and sometimes it’s challenging to meet the deadlines on time.”

“Insufficient time to produce and share quality analysis findings. An extension of three months would be enough to make sure that knowledge is shared properly and will dynamically improve common practice in the company.”

“Our plans of action allow for more activities than current working time allows.”

For the academic, time was not just related to the project duration but also influenced by the hours given to an academic for involvement in the project:

“Insufficient time allocated to myself 25 hours a year is too little.”

When considering resistance to change, although the academics noted this as being the most frequently encountered barrier (30%), the company contacts scored this at 13%. Of the affiliates, 25% highlighted resistance to change as a barrier. Therefore, company responses are at odds with the information provided by the other two groups of respondents. In this case, it may be that the company respondents are not recognising resistance to change as an issue. The BDMs shared a similar view to the company respondents as just 13% stated that resistance to change was a barrier, but this response is from a much smaller sample size than the other groups of participants and is typically formed from attending quarterly review meetings.

From the academics responses, some of the textual comments made reference to issues which influence resistance to change:

“The board are set in their ways and are difficult to motivate.”

“It’s their business they know best, they don’t need us.”

There were also some comments which suggested the project was run in ‘isolation:’

“Lack of understanding in the wider business about the role of the KEEN affiliate.”

“The project exists in isolation within the firm, and is understood and paid any attention only by the two senior executives.”

This raises questions about the ability of some projects to fully integrate into the operation of the company. However, a company response related to resistance of change noted the importance of communication and making a connection:
“People always resist change. It is how the information is passed on that will change their perception and acceptance. Motivation for something people consider does not include them is difficult to get going.”

7.2 Unexpected Outcomes

The academic, affiliate, and company surveys asked the respondents whether any unexpected (not part of the original objectives) outcomes were generated by the project. These unexpected outcomes were placed into positive or negative aspects. In each survey, around 38% of respondents noted that positive unexpected outcomes have been generated by the project. In terms of the negative outcomes, these were less commonly noted, although 16% of the company respondents stated that their project had encountered unexpected negative outcomes. These are summarised in Figures 24-26.
In terms of assessing what the unexpected outcomes were, the qualitative comments provided further details. These unexpected outcomes were analysed into positive, negative, and mixed outcomes. Some of the positive outcomes are highlighted below:

“Winning major contract.”

“Our affiliate has demonstrated real directorial talent.”

“We have been able to expand the project to look at new strategic areas.”

“Affiliate has exceeded expectation and is more capable than we had hoped thus being able to work much more independently than planned.”

“The school in which the affiliate was based had a recent unannounced external inspection to monitor how behaviour is supported. The work of the affiliate was mentioned specifically by inspectors as contributing to learning in the classroom. This was a very positive result for the school and company as the work is innovative and the inspection was led by specialists in the field.”

There were also negative unexpected outcomes:

“The affiliate left the company and we decided not to continue with project.”

“The affiliate was poached by another company before project completion.”

“Company did not want to accept change. Candidate was suitable.”

There were also some cases where both positive and negative unexpected outcomes were present:

“Broadening company’s horizons in terms of what may be possible. Concern about our long term ability to support the computer code being generated on our behalf.”
“Positive potential for my company. Negative: Insufficient time available.”

“Positive, the graduate had additional design and styling skills. Negative, unclear industry directives ref compliances and standards.”

8.1 Successful Integration of Knowledge into Practice

The next set of questions related to the integration phase of the Szulanski model. This stage is where knowledge becomes part of the organisation’s regular routines and satisfactory performance has been achieved with the new knowledge. The level of knowledge integration according to each group of respondents is shown in Figure 27.

![Incorporation of Knowledge](image)

**Figure 27 – Level of Incorporation of Knowledge**

The affiliates, academics, and company respondents were in broad agreement about the level of incorporation of knowledge into the company. These average weights were in the region of 3.6 to 3.7, which implies that there had been a significant level of incorporation of knowledge into the firm, but as yet the overall picture did not indicate there has been full integration. However, 27% of companies, 33% of academics, and 22% of affiliates stated that there had been full incorporation of knowledge into the company. However, this was to be expected as the vast majority of KEEN projects were at that time ongoing and due to conclude three to four months later. In contrast, the BDM responses had an average weighting of 4.31 for the knowledge incorporation in to the company, which is slightly higher than the other three groups of respondents but may arise from the fact that this group had a smaller sample size.

When evaluating the incorporation of knowledge into the university, the affiliate, academics, and business managers rated this lower than the incorporation of knowledge into the companies. Just 9% of academics stated that the knowledge had become fully incorporated into the university, whilst only 8% of affiliates agreed. The number of BDMs who stated there had been full integration into the university was even lower at 7%. This reinforced that the perceived direction of knowledge flow was biased from
university/affiliate to the company and not vice versa. The survey did not question the company respondents on this topic.

### 8.2 Integration Evidenced by Changes to Operations

With the new knowledge brought into the project companies, operations may need to change to adapt to the incoming knowledge. This information is summarised in Figure 28.

![Changes to Operations](image)

**Figure 18 – Company Changes to Operations**

There were differences in response for questions concerning changes to operations. Academics stated that 60% of companies had to make changes as a result of the new knowledge, which is a much higher figure than recorded in the surveys for the company contact, affiliate, and BDM. In contrast, the affiliate responses highlighted that 39% of companies had made changes to operations, whilst the companies scored this at 48%. Of the BDM responses, 53% stated that changes were made, but the other 47% of the responses were scored as ‘Don’t Know.’ This appeared to reflect that the BDMs were less involved with the project companies at the day-to-day level and so had less awareness of any changes that may have taken place.

The free text responses from the surveys highlighted a range of operational changes. These included:

“A whole variety of changes have been made by the affiliate including new processes for sales teams when handling projects through to ensuring Project Initiation Documents are created before any concepts are started. Furthermore, product installation guides have been introduced and full assembly instructions for the product teams.”

“Better control of systems and resources.”

“The way we present our marketing message changed from being feature and technology led to being personal and benefit led, more a conversation, friendlier but still professional.”
“Entering a new market, reduced products offered and implemented cluster groups to manage Customer Relationship Management (CRM), sell and gather qualitative data.”

“Full rebrand across the business, new website which required hosting using a different provider. Quarterly perception surveys, exhibiting at shows for the first time which required allocation of resources.”

“Restructure of marketing department.”

“Implementation of a CRM system to replace the existing enquiry management system.”

“[Changes] established and operated a marketing plan – previously none in existence. Won a national tender that has influenced change in our client journey process. Reviewed and transformed both front and back stage operations. Client segmentation and fee restructure.”

“Reorganisation of management structure to cut down on overlaps and streamline operations.”

8.3 Barriers to Integration

The final aspect of the integration theme concerns some of the barriers which may have been faced during this phase of the project. The type of barriers highlighted included:

- Opposition to change
- Discomfort with new technology
- Continued reliance on old methods
- Availability of training
- Availability of equipment
- Alternative means of achieving outcomes
- Unmet expectations
- Inconsistency in performance
- Unclear rationale behind the project
- Arrival of new staff

Academic respondents highlighted three main issues or barriers faced by KEEN projects: ‘reliance on old methods’; ‘(lack of) availability of equipment’; and ‘lack of availability of appropriate training’. Affiliates also scored these three aspects as the most significant barriers faced during the project, but they rated ‘availability of training’ for themselves as the most significant issue and not ‘reliance on old methods.’ However, subsidised affiliate training was not easy to obtain through the KEEN programme owing to the constraints associated with the ERDF support. Affiliate training was typically achieved using university resources. Meanwhile, the company respondents rated ‘unmet expectations’ in the project as being the situation which most impacted upon the project. Unsolicited comment at the end of the survey indicated in a number of instances the academic and the company had misaligned objectives for the project. This indicates that some company respondents were dissatisfied with the project as it did not meet their expectations. Availability of training and reliance on old methods scored as the second and third highest issue faced.
9.1 Absorptive Capacity: How Far Could Companies Use the Additional Knowledge Brought into the Company?

The theme of absorptive capacity relates to a firm’s ability to identify, assimilate, and utilise additional knowledge which is brought into the company. If an organisation is able to make use of new knowledge then this means that it has the absorptive capacity or receptiveness within its systems and people to do so. Not all companies may have the necessary absorptive capacity to do this.

Figure 29 illustrates how far companies had developed their capacity to use the project knowledge.

![Extent of Capacity Development](image)

**Figure 29 – Extent of Capacity Development**

The results from Figure 29 indicate that the affiliates rated capacity development at the project companies more highly than the other groups of respondents. The average weighting for the affiliates was 3.49 compared to 3.43 for the academics, and 3.28 for the company responses, using a scale of one to five where five was the high (well developed) end of the scale. Affiliates rated the knowledge brought into the project as having a greater impact on company operations than the other two groups of respondents. This is perhaps understandable as affiliates perhaps have greater ownership and are closer to the project results. However, the healthy triangulation the results highlights the overall positive effect of the projects on knowledge transfer and use.

9.2 Generating New Ideas

A further aspect of the absorptive capacity construct is the ability which firms have to make use of the new knowledge brought in and transform it into new ideas (as discussed in this section and illustrated by Figure 33). The academics, affiliates, and company respondents were asked to consider whether the project had generated new ideas, put these ideas into practice, and had a plan to use these new ideas in the future. These responses are shown in Figure 30-32.
WHAT HAPPENS IN A KNOWLEDGE EXCHANGE AND ENTERPRISE NETWORK (KEEN) PROJECT?

Figure 30 – Generating New Ideas: Company View

Figure 19 – Generating New Ideas: Academic View
The responses to all three surveys indicated that new ideas had been generated from a significant number of projects. This ranged between 79% and 85% of the responses. Likewise, in all three groups of participants, over 80% of the responses indicated that there was a future plan in place to use the knowledge. Furthermore, each of the three surveys stated new ideas were put into practice in around 65% of the projects. This is a very positive response from respondents detailing the degree to which new knowledge and ideas were created from KEEN projects.

There were four main categories relating to new ideas which were identified. These were:
- New market
- New process
- New product
- New staff

These groups were further sub-divided to the next level of granularity as shown in the model in Figure 33.
At the detail level in respect of new staff, the references referred to expansion of the workforce as a result of the KEEN project:

“General development of the company as a whole with the addition of new staff bringing new ideas and therefore outcomes through the project.”

In the new product category, the top references by a noticeable margin were ‘Innovate New Lines’ (15 References) and ‘Modify Existing Products’ (12) confirming that KEEN projects have provided the impetus for product developments which can lead to business growth. These are evidenced by the following comments:

“The research led to generating innovative methods of producing [the] company’s products which may be patented in the near future.”

“The company has used findings from the project to develop a soft landings methodology for new and built projects, to propose measures to improve indoor conditions. Indoor conditions and energy consumption monitoring is now part of the company’s soft landings and post occupancy evaluation of buildings standard procedure.”

“The incorporation of visual basic to make the models more automated. Some code is being used in models at the moment.”

“Developing new ideas in terms of functionality of the products and how people interact with them to best suit their needs. Generating new ideas for ease of manufacturability especially for a new business making the products easy to create, assemble, and disassemble. The added integration with accessories and prolonging the longevity of the product for future design and trends.”

In the third category, new process, there is a single detail level which has noticeably more references than the rest. This is ‘re-focussed business process’ (12 references) and is reflective of the significance of business practice interventions that were a feature of many projects.

“New methods have been used to analyse information, for example, the system against a system selection criteria. Mapping the processes has been conducted in a new way which will be used in the future.”

“The research and innovation team in the company aspires to collate existing research happening organically within the company, to increase communication and sharing of findings internally and externally. The benefits of knowledge sharing are now very clear to the company and new methods are employed in order to enhance expertise sharing and learning from each other within the company itself.”

“The project concentrates on how to ease up our operation within the warehouse, delivering/collecting and trunking routines. There have been several trials/changes to the current operation and some of them have failed, but some proven to be very useful.”

The fourth and final category is new market and here two detail levels predominate. Firstly, new sales initiatives came top with eight references such as:
“Several ideas have been generated from the project progress likely to open a good market approach.”

Further references to marketing plans were made by six respondents:

“Marketing plan for 2015 – Company is funding new marketing activities as a direct result of the affiliate.”

“I have written a marketing plan and we have decided to move into e-commerce trading as a division of the company.”

“Ideas for additional marketing opportunities and additional market sectors could potentially be opened-up due to the outcomes of the project.”

10.1 Sustainability of the Project Knowledge within the Company

The theme of sustainability is important in assessing the long-term impact of the project on the company. Respondents were asked to assess how long-lasting the outcomes of the project would be to the future operations of the company. In order to establish sustainability, respondents were asked to rate a series of statements from one to five with five being highest. These were:

- The company has made a strategic plan for the future
- The project outcomes have become owned by the company
- Whilst I/the affiliate is employed by the company, the project outcomes will be maintained
- If I/the affiliate leave the company the project outcomes will be in jeopardy
- The project will revert to old methods in time.

The responses from the surveys indicated that there was generally a high level of sustainability present in the projects used to complete the survey. For example, the responses from the company survey, the outcomes becoming owned by the company was scored at weighted average 3.97 with the affiliates and academics rating this at 3.70 and 3.80. From a much smaller sample, the BDMs scored this statement even higher at 4.64. From these responses, it is apparent that the majority of project companies intend to take ownership of the project outcomes and only in isolated cases are there examples of firms who have not, or do not intend to, take ownership of the project outcomes. Moreover, the survey responses also suggest that there is only a small chance of the project outcomes being in jeopardy if the affiliate leaves the company. In this case, low response values indicated a positive outcome with the company responses scoring this statement at weighted average 2.33, with the business managers rating it at 2.08, the affiliates at 2.69, and academics at 2.60.

In terms of future planning, the surveys indicated that the companies had generally made a strategic plan for the future. The companies scored this aspect at weighted average 3.90; with the affiliates score 3.75, academics at 3.71, and BDMs highest at 4.71. This further suggests that the majority of projects had the potential for lasting results through a strategy to make use of the new knowledge brought into the company in practical terms in the future.
10.1.1 Plans for Project Continuation after Completion

An aspect related to sustainability concerned the future plans of the respondents once the project was completed. The majority of affiliates (63%) who responded to the survey indicated they either were or planned to continue working for the project company. Moreover, a further 12% of affiliates indicated that they planned to continue to work in the same industry but for a different company. Only 7% of affiliates planned to engage in further training or education after the project had been completed.

Of the academic respondents, nearly 60% indicated that they were prepared to engage in further collaboration with the company. Although the nature of the collaboration was not explained, there could be a possibility for further knowledge transfer. Moreover, around 50% of respondents stated that they were prepared to engage in collaboration with either different firms in the same industry or with firms in different industries. In terms of the backward linkage of knowledge transfer to universities, 58% of academics stated that experiences from this project would be utilised in teaching. However, it was not highlighted as to how these experiences would be adapted to teaching and whether the project company could be engaged as part of this process.

For the company responses, 62% indicated that they planned to employ the affiliate on a permanent basis when the project was completed. This figure compares well with the 63% of affiliates who wish to remain with the project company. 52% of the company respondents also indicated that they would be looking to establish further collaboration with the university. Again, whilst the nature of this further collaboration was not highlighted, this could lead to an opportunity for further knowledge transfer.

11.1 How Far Had Respondents Benefitted from KEEN Projects?

The academics and affiliates were asked to rate (one to five) the level of benefits which they feel have accrued to the key participants involved in the project. These are shown in Figure 34.
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When assessing the benefits from KEEN, the affiliates rated personal benefits higher than benefits to the university and to the company. In contrast, the academics noted that benefits to the company were greater than to benefits to the university and to themselves. The two key beneficiaries of projects in this regard appear to be the affiliates and companies. Once again the result implied the direction of knowledge transfer is biased towards the company as the affiliates appear to align themselves more directly with the company than the university.

11.1.1 Benefits to Company: Were Projects Meeting their Objectives?

In the survey, 85% of the company respondents stated that their KEEN project was meeting or exceeding its objectives as set out at the start of the project. Furthermore, 26% of these respondents believed the project exceeded their expectation and almost 5% felt that expectations had been strongly exceeded.

11.1.2 What Skills Were Gained by Affiliates and Academics?

Affiliates and academics were asked what skills had been gained as a result of the project. 94% of the affiliate responses stated that they had gained new knowledge and/or skills by participating in KEEN. The nature of the skills or knowledge gained as a result of KEEN was highlighted in the free text responses. These skills were mostly either specific to the job (e.g. relating to a particular piece of software) or more general skills. Some of the types of skills gained are highlighted below:

“New technical knowledge specific to the project. Client relationship skills.”

“Improved skills in new and existing 2D & 3D CAD software.”

“Project management skills, new technical skills.”

“Analytical skills, critical thinking, new technologies, use of energy software.”
There were also several comments around project management and planning skills:

“Things I didn’t learn whilst at university.”

“How to plan projects and manage outcomes, presentation skills, social media skills, planning skills.”

“Further marketing knowledge and creative business experience.”

“Team working and researching skills.”

“Gained knowledge about different materials, standards, manufacturing as well as 3D design and practical experience in physically building something.”

72% of academics (slightly lower than affiliates) noted that they had gained new knowledge and/ or skills as a result of KEEN. The nature of the skills or knowledge gained as a result of KEEN is highlighted below. Several responses referred to updating knowledge in relation to the industry or specific aspects of interest but there was also a connection between theory and practice that was valuable to academics. It is clear that KEEN projects do lead to learning and knowledge transfer to academics:

‘Gaining working knowledge of new design and brand strategies within industry.’

“I had previous knowledge of control system theory; however, it is the application which makes use of it. I had no previous knowledge of the industrial standard control algorithms used in the control of heating systems used for large volume building ventilation (warehouses or plane hangars).”

“Current industry practice and an insight into current standards and levels of building information modelling adoption.”

“New skills and knowledge based on the application rather than the technology being used. The technology is used in other fields but not in environmental and so this has provided new insight which could be used for future research approaches.”

“Mostly new methods in digital marketing to bring me up to date.”

“Specific Computer Aided Design software knowledge and experience.”

Other comments related to general skills concerning mentoring or project management:

“Improved consultancy skills.”

“Human Resources skills in dealing with difficult business relationships.”

“Coaching and mentoring the company and the affiliate.”

Or in one particular case a combination of knowledge in various domains:

“New skills in collaborating with industry. New knowledge on dealing with air pollution. New awareness
of technological solutions to industrial problems.”

11.1.3 Other Outcomes for Universities

More narrowly, there are some benefits to the universities of engaging in the KEEN programme. The benefits listed in the BDM survey were:

- Collaboration with business impacts on the university’s reputation
- Collaboration with business impacts on student experience
- Collaboration with business impacts on the skills of academics
- Collaboration with business impacts on the technology of the university
- Collaboration with business generates income for the university.

The responses from the BDM survey highlighted that the generation of income was the most significant benefit from university/business collaboration. However, this does not apply to KEEN projects as they do not generate profit for the university. Impacts on the universities’ reputation and student experience were also scored highly by the BDM respondents with technology scored as the lowest impact. This final point helps to reinforce the argument that KEEN projects are biased towards knowledge transfer towards the business, their declared objective, as opposed to executing an equitable knowledge exchange.

11.1.4 Recommendations of Respondents

One of the final questions in the surveys asked the respondents to state whether they would recommend KEEN to others. Across the academic, affiliate, and company contact surveys there was broad agreement that university/business collaboration would be recommended to others. 93% of companies would recommend university/business collaboration to other firms, whilst 91% of academics would recommend university/business collaboration to other academics. However, the highest rating was given by the affiliates, with 97% of the respondents stating that they would recommend this type of project to other graduates.

11.1.5 Other Comments

The final question on the survey enabled respondents to make additional comments about the KEEN project. Of the company respondents, 16 participants made further comments about the KEEN programme. Of these comments, five respondents alluded to problems in payment terms and claims. Examples included:

“Payment terms are a major issue – as a small company being reimbursed quickly is vital to our cash flow and this does not happen as a matter of course – whenever we have got paid reasonably on time, it has been as a result of the university directly intervening to help us rather than the project paying as planned.”

“The process of receiving funding payments needs better arrangement and communication. Payments were often late, and there was no communication as to why or when we might receive them unless we chased the department.”
“The process for getting monthly payments is laborious.”

The more positive responses included the benefits that KEEN has brought to their company, with a further five comments along this basis including:

“This has been an excellent project and allows SMEs to work with universities whilst having an affiliate based within the company.”

“The KEEN programme offers an excellent opportunity to nurture academic talent and build collaborative ventures with the university, which hopefully will help shape some of its future focus.”

Indeed, one company cited they had recommended a university to other businesses:

“We have already successfully recommended the university and the KEEN project to at least one other company.”

From the affiliate survey, 18 respondents made further comments. Like the company responses, some of these comments referred to the financial aspect of the project with claims identified as a weakness. There are two references to training with one participant suggesting that there should have been a brief training session at the start of the project. However, this training was not placed in terms of knowledge transfer, but was more to the procedural elements of KEEN and how to complete justification forms. The second respondent who cited training noted the funding restrictions in place on claiming back training expenses.

There were positive responses, with an affiliate suggested that KEEN was a ‘bridge’ for graduates:

“I think KEEN is a key bridge for those leaving university and in need of gaining real world work experience. I have learnt more in my time on KEEN than I have done over my entire degree course.”

Perhaps one aspect of potential for improvement might be the establishment of a social network or forum for affiliates to share their own personal experiences. One affiliate noted:

“I feel some form social network/ forum maybe of some use to affiliates for FAQs/ best practice/ general advice.”

Some of the 22 academic responses to this question highlighted that knowledge transfer has important benefits:

“KEEN projects are great projects for academics like me who want to undertake practical research who do not write academic papers or have a research grant.”

“Excellent opportunity to engage with industry leaders and exchange knowledge to especially aid my teaching.”

“The project benefits the graduate as they have time to develop skills learnt at university. The projects are very useful to keep up to date for academics and to put back into practice application.”
“This is an excellent programme to get industry and academia collaborating.”

Whilst these presented a positive picture of KEEN, some academics were not as complementary:

“I hold a positive view over the merits of the programme, but it needs to be sustained for an extended period since the process of engaging with a company, recruiting the affiliate and completing the project takes a minimum of 18 months.”

“Need greater engagement of the academic in the early stages of the project –pre-contractual.”

The two quotes above relate to the initiation phase of a project. They suggested that a greater consideration of the time requirement needed from the academic before the project kicked off should be taken into account:

One academic felt that more time was needed throughout the project:

“The amount of time suggested to the academics of approximately an afternoon per week was grossly off target.”
12.1 Key Findings and Recommendations

Initiation/ project start-up

- Only 41% of company respondents had completed a knowledge audit prior to the commencement of the project. A knowledge audit identifies what specific knowledge the business already has in order to highlight where knowledge gaps exist in the context of the objectives and the nature of new knowledge that is required.

Recommendations: All companies should establish a clear need by conducting a knowledge audit to create a project definition.

Recommendations: Future projects should consider offering a common knowledge audit toolbox for all potential project applicants to help them to determine knowledge gaps in their company and better inform their project plan.

- 39% of company respondents had previously engaged in some form of university/business collaboration.
- 37% of the academic respondents had completed some form of collaboration with the project company in the past.

Recommendations: Universities should develop publicity materials that showcase specific knowledge transfer possibilities for SMEs based on their research and development portfolios.

- 92% of BDM respondents and 72% of academic respondents had assisted companies in applying for the project and in preparing the project plans for the affiliate which confirmed the university’s commitment and understanding of the project.

Recommendations: Documentation of the project plan should be uniform, developed jointly between the business and the university and regularly updated.

- 55% of BDM respondents noted that there had been difficulties in recruiting an appropriate graduate. Recruitment became protracted in certain cases owing to difficulties finding suitable graduates to match the projects.

Recommendations: Recruitment support needs to be integrated into the administrative function of the programme, and steps taken to take advantage of the available pool of institutions graduands.

- The survey indicated that there is little formalised training of knowledge transfer process expertise amongst the participants.

Recommendations: Training programmes should be set up to offer participants knowledge transfer concepts and models to adapt dependent on company needs. Key participants should be offered training in knowledge brokering, including mentoring and facilitating knowledge and skills.
Implementation stage

- More than 50% of the respondents in all of the survey groups considered that new knowledge added to the current knowledge base was the most popular form of knowledge transfer into the business.
- Resistance to change was cited as a significant barrier by academics and affiliates but not by BDMs or companies.
- Project management responsibility was unclear on some projects.

**Recommendations:** The introduction of change management techniques as part of the initial training for affiliates and academics. Ensure project management responsibility is identified in project plan – perhaps appoint affiliate as day-to-day project manager but use a company representative to act as strategic project manager.

- Companies were critical of the amount of paperwork and slowness of payments.

**Recommendations:** Simplify paperwork where appropriate. Devise payment processes that are readily understood and have reduced impact on cash flow of the business.

Ramp-up stage

- The respondents noted that the level of confidence in the academic, affiliate and company is generally high.
- 27% of company respondents took positive steps to improve confidence levels in the partnership.

**Recommendations:** All KEEN projects to schedule regular keep in touch meetings with academic, company, and affiliate to ensure goals are being met.

- Knowledge is mostly shared using verbal and practical methods and not through formally documented approaches.

**Recommendations:** Training and encouragement for affiliate to understand the use of non-verbal means of sharing knowledge.

Integration Stage

- In the company survey, 85% of the responses were in agreement that the project had met or exceeded its objectives.
- 85% of responses indicated that the project had generated new ideas.
- 65% of company replies claimed the new ideas were put into practice within the company illustrating the projects had reached the final stage of the KT process – integration – and with it the potential sustainability of the process.
- The new ideas, all innovations to these companies, were developed in four main categories new markets, new processes, new products and the potential for hiring new staff.
- Unexpected positive outcomes generated by the project were recognised by 38% of the respondents.
Recommendations: The universities should showcase the project experiences by producing a short video to capture the change and innovation in SMEs.

Note: The added benefits to companies should not be 'unexpected' as research (REF) has shown that knowledge transfer increases an organisation’s innovativeness and creates added value by exceeding original objectives. It also gives companies a sound platform for (further) innovation and enables the enterprise to exploit entrepreneurial talents.

- The knowledge transfer back into the university from the projects has been sporadic and depended on the actions of the academic or the affiliate.

Recommendations: The universities should instigate knowledge sharing events to raise the profile and highlight learning from business collaborations such as KEEN.

Sustainability and follow-up

- Sustainability of intervention outcomes – 62% of the companies indicated they planned to employ the affiliate on a permanent basis when the project was completed, suggesting investment in their affiliate to continue to identify and use new knowledge.
- 52% of companies were seeking to establish further collaboration with the university.
- 50% of academics planned to continue with companies in the future.

Recommendations: Follow up and exit/ follow-on strategies should be devised for each project to promote sustainability.

Recommendations: Universities should support the lead academics to enable the utilisation of the information and expertise gained from each project.

- 93% of companies would recommend university/business cooperation to other companies
- 91% of academics would recommend university/business collaboration to other academics
- 97% of affiliates would recommend this type of project to other graduates.

Recommendations: Universities should instigate knowledge sharing events to raise the profile and highlight learning from business collaborations such as KEEN.

Future developments to increase the value of university/business collaboration

Recommendations: Introduce university/business collaborations which embody an undergraduate employment scheme. In the scheme, the undergraduate as part of their tutored course is offered one year of in-company work incorporating academic practical study (building on the recommendations of the Wilson study (2012) for the Department of Business, Innovation and Skills)

Use the scheme to build on the university collaborations of the KEEN programme to develop a West Midlands approach to innovation/ entrepreneurship (cf. collaborative advantage identified in the report on the Wilson study (2012)).
12.2 Summary of Results

The general consensus of the survey responses was that KEEN projects have brought new knowledge into companies which have added to their existing base of knowledge and their capacity to develop and grow. The programme has led to the acquisition of new skills by both graduates and academics although the main impacts have been on companies and affiliates. Companies were shown to have selected their partner university through a variety of different factors, with location cited as the most prominent reason and in some cases, the selection influence of previous university involvement in collaboration.

Over the life of the projects, there was typically an improvement in the skills match of the affiliate, and a similar but less significant effect was observed for the academics. Moreover, the level of confidence between the different participants mostly increased over time. Some barriers to progress were highlighted such as resistance to change, but the resilience of the affiliate and the company ability to overcome these barriers were needed to make best use of the new knowledge and to move forward.

For the universities, the benefit of knowledge transfer was more restrained, mainly being associated with gaining new skills, and using project experience to benefit teaching or research. However, these opportunities were not widely disseminated within the university amongst the staff.

A number of fundamental benefits including the generation of new ideas, putting these ideas into practice, and creating a future plan for these ideas have been highlighted by a most respondents. Furthermore, there have also been a number of positive unforeseen outcomes that have led to innovations in business practices and new products. The general view across the respondents was that the productive capacity of the companies who might not otherwise have a) employed a graduate and b) innovated new products, markets and processes. Most of the responses also cite that the capacity of the firm to use knowledge increased.

One of the most satisfying responses is the recommendation to others where:

- 93% of companies would recommend university/business collaboration to other firms
- 91% of academics would recommend university/business collaboration to other academics and
- 97% of affiliates (graduates) would recommend this type of project to other graduates.

In only a small number of cases were the project outcomes stated to be in jeopardy if the affiliate was to leave the company. This further demonstrates that the businesses have developed their capacity to absorb new knowledge which will make them better placed to innovate and grow in the future.
13.1 References


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Karl Royle is the Head of Enterprise and Commercial Development in the Faculty of Education, Health and Wellbeing, University of Wolverhampton, where he works as a Research Project Director. Karl has considerable experience of project management (Certified Scrum Master) and materials development for both screen and print-based media, as well as having a background in teacher education, professional development, and education management. His current interests are around the development of thinking skills in game-based learning, and the digital skills and habits of learners using ubiquitous technology, alongside its transfer to educational contexts.

Dr Gillian Lyons is a Senior Lecturer in the University of Wolverhampton Business School. Her background includes business management and consultancy and her experience covers engineering, hospital management, banking and education. She has a special interest in SMEs, specifically in the marketing, enterprise and knowledge transfer areas. Gillian holds a Masters degree in Marketing Management, a professional diploma in Marketing, and a professional Doctorate in Business Administration. Her research examined the process and outcomes of knowledge transfer in SMEs, with a particular focus on strategic marketing. She has been the lead academic for a number of Knowledge Transfer Partnerships and KEEN interventions, and has provided consultancy assistance through a variety of government funded programmes. Gillian’s experience in both industry and the service sector has included senior management roles in finance and general business management. She is an experienced business consultant and consultant specializing in advising SMEs. Her research interests include university/business collaboration, together with its implication for curriculum development and CPD.

Dr David Boucher is a Research Associate at the University of Wolverhampton. For most of his career, David has worked within the West Midlands automotive component supply industry in the field of research and development, although recently he spent a brief spell employed in supply chain data analysis for an aerospace company. His original academic discipline was chemistry, and David obtained a PhD from the University of Birmingham for research into the catalytic polymerisation of olefins. From polymer synthesis, David moved on into material science in the field of engineering within the Lucas Group. He worked in a variety of roles for the group with responsibilities for research, manufacturing systems, quality, and design. Meanwhile the business became part of Automotive Lighting, a global supplier of vehicle lighting products. Now established in engineering, in 2005 David obtained an MSc with distinction in Advanced Technology Management in Engineering from the University of Wolverhampton. He has brought data management and a long experience in research to this project.

Paula Simeon is a Research Associate at the University of Wolverhampton. Paula’s professional background and experience includes business management innovation and growth, operations management, marketing management, project management, financial management, audits and performance reviews, coaching and consultancy. She has considerable experience of working in private and public sector firms, as accountant, auditor, and business development executive for SMEs. Paula’s interests are in the areas of business innovation, university/business collaborations, mergers and acquisitions, and foreign direct investments. She has an MBA (Master of Business Administration) with a research focus on mergers and acquisitions, as well as an MSc in Finance and Accounting, with a research focus on the efficient market hypothesis, both obtained from the University of Wolverhampton. She is a Fellow of the Chartered Management Institute.

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