KTP Programme

The Impacts of KTP Associates and Knowledge Base on the UK Economy

July 2015
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Steering Group members:
Dan Hodges, Head of Economics and Evidence, Innovate UK
Clive Hayter, Head of Smart, KTP and Innovation Vouchers, Innovate UK
Sue Smart, Head, Performance and Evaluation, EPSRC
Peter Seddon, Senior HE Policy Adviser, Knowledge Exchange and Skills Team, HEFCE
Wendy Mannix, KTP Portfolio Development Manager, Innovate UK

Key Contact

Georgia Siora
E: gsiora@w-ecd.com
2 Snow Hill
Birmingham
B4 6GA
T: +44(0) 121 2313425
www.w-ecd.com
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Executive Summary

Background / Introduction to the Study

This report presents the findings of an independent study commissioned by Innovate UK to evaluate the economic impacts and other benefits, arising for the UK economy from the participation of the KTP Associate and Knowledge Base partner in the Knowledge Transfer Partnership (KTP) programme. Warwick Economics and Development were appointed in July 2014 to carry out this study.

The KTP programme aims to help UK businesses to improve their competitiveness and productivity through the better use of knowledge, technology and skills that reside within the UK Knowledge Base i.e. a higher education institutions, colleges or research organisations.

The programme originated some 40 years ago and has since become well embedded within the UK’s knowledge transfer and business support infrastructure. Innovate UK is the lead funding organisation for KTP, in partnership with the Research Councils, the Devolved Administrations, Department of Health, Department for Environment, Food and Rural Affairs as well as the Nuclear Decommissioning Authority and RSSB (formerly known as the Rail Safety and Standards Board), both of whom have been one off funders of calls for KTPs on specific themes.

Study Findings

The study findings are based on both qualitative and quantitative research including interviews with a wide range of stakeholders, extensive review of the information held in Innovate UK’s KTP databases, surveys with Associates and Knowledge Base institutions participating in the programme and detailed discussions with Knowledge Base organisations.

The findings complement a previous study undertaken in 2010, which established that, between 2001/2 and 2007/08, the overall net additional impacts generated for the UK economy by businesses participating in KTP totalled £1.6-£1.8 billion of GVA. This estimate was based on the annual turnover impact/change reported by businesses participating in the programme.

The approach to quantifying the impact of KTP Associates’ participation on the UK economy has been to estimate the impact of their participation on productivity, as reflected in their salary and related Gross Value Added (GVA). The economic contribution of new businesses started by KTP Associates has also been taken into account for first time in this study.

The study offers a unique insight into the views of programme participants and has produced a wealth of information and the key study findings are summarised below.

Additional Economic Impacts as a result of participation in KTP

- This study has shown that an additional £369 million to the UK GVA, not taken into account in the previous study, has been generated though participation of KTP Associates in the programme in this period. This brings the total net additional impacts secured by KTP between 2001/2 and 2007/08 to £1.97 - £2.17 billion.

- This study also estimates that KTP Associates working in non-KTP participating businesses have generated an additional net direct and indirect contribution to the UK GVA of between £933 million and £968 million over the 30-year period 1984-2014 (for which consistent KTP management and financial data exist).

- Estimates of the Return on Investment (ROI) of the programme have shown that approximately £7.5-£8 of net additional GVA is generated for every £1 of KTP grant funding invested by sponsors through businesses and KTP Associates participating in the programme.
Knowledge Base organisations participating in the KTP programme identified a range of benefits and these are detailed below in the Key Benefits and Added Value section. In addition, it has been estimated that the total additional output in UK economy associated with Knowledge Base additional income through the KTP programme is between £117 million and £127 million over the 30-year period, 1984-2014.

**Key Benefits and Added Value**

**KTP Associates**

- 94% of KTP Associates reported that participation in the KTP programme had resulted in a positive impact on their overall personal and/or career development – with over a third of these respondents stating that the impact of the KTP has been transformational for their development and career.
- 84% of KTP Associates were in employment immediately after completing their KTP, and 98% are currently in employment, including those that are self-employed and running their own high growth businesses.
- A total of 89% of KTP Associates have reported that their income is currently higher as a result of their KTP participation than it otherwise would have been. It is estimated that the overall (additional) contribution of the KTP to an Associate’s salary over a 10-year period following the completion of the KTP, is about £50,200 per KTP Associate.
- 70% of Associates stated that they have seen a career enhancement as a result of their participation in the programme.
- 82% of KTP Associates believe that their participation in the KTP programme has resulted to improvement in their skills.
- The overall additionality of benefits for KTP Associates from participation in the KTP programme is estimated at 75% i.e. only 25% of KTP Associates would have achieved same or better results if they had not participated in the programme.

**Knowledge Base Organisations**

- 82% of respondents cited closer partnerships with industry enabling the development of better understanding of industry as a result of participation in the KTP programme.
- KTPs were noted as a particularly effective method of engaging with SMEs.
- Research related benefits such as research publications, enhanced teaching materials and new research projects and staff skills development all exceeded expectations.
- KTPs provided good quality case study material to demonstrate the impact of their research including as part of the Research and Excellence Framework 2014 (REF 2014) and also to raise the profile of Knowledge Base organisations among the education and business community.
- 74% of respondents reported that participation in the KTP programme had a positive impact on securing new grants (in addition to KTP).
- Three quarters of Knowledge Base participants stated that their KTP participation led to further financial benefits such as improved consultancy incomes, increased teaching income, development of patents and licencing income and spinouts.
- Knowledge Base survey respondents reported that the positive impact of KTP participation reaches far beyond the direct partners involved in the KTP projects including other researchers, other Knowledge Base departments and other Knowledge Base organisations, other businesses in the
same sector and also other sectors. Furthermore some respondents indicated that their KTP participation has an impact outside the UK.

- The benefits generated for Knowledge Base organisations are to a very large extent attributed to the KTP programme, with only 6% of Knowledge Base organisations stating that their participation in the KTP would have been achieved anyway.

Concluding Remarks

This study has found that the concept and rationale of the KTP programme are extremely well regarded and highly valued by both, Knowledge Base organisations and KTP Associates. Exposure to industry and the corporate world appears to be the aspect of the programme most valued by KTP Associates and Knowledge Base organisations alike.

The programme benefits from a high level of advocacy from both, KTP Associates and Knowledge Base organisations, with nearly every respondent stating that they would recommend the programmes to their peers. For example, 99% of Knowledge Base organisations would recommend the KTP programme to other Knowledge Base organisations and 95% of KTP Associates would recommend it to other graduates/post graduates.

KTP Associates and businesses participating in the KTP programme are considered the main economic beneficiaries of the programme. Knowledge Base participants contribute to delivering the programme and while their benefits are mainly non-economic benefits, these are recognised as being of considerable value. In turn, the programme makes a significant contribution to the UK economy through contribution to GVA, productivity, skills development, research and teaching quality.

Feedback received from KTP Associates, Knowledge Base organisations and key stakeholders also suggests that there could be significantly higher demand for the programme and opportunities for scaling it up if more resources were to be made available.

Overall, the study offers a unique insight into the views of programme participants not previously explored and has produced a wealth of information. In terms of methodologies used, the approach to quantifying impacts, including the impact of the KTP Associates’ participation on the UK economy i.e. based on the impact of participation on productivity and creation of new businesses, can inform future research. The study has also shown that by examining various programme elements in isolation, evaluation and impact studies could be underrepresenting the full value of key aspects of the KTP programme.
1. Introduction

1.1. Warwick Economics and Development (WECD) was commissioned in July 2014 by Innovate UK and the sponsoring Research Councils to assess the economic and wider impacts that accrue to the UK economy through the participation of the Knowledge Base and the Associate in the Knowledge Transfer Partnerships (KTP) programme.

1.2. The KTP programme has been running for 40 years, with its origins dating back in 1975 as the Teaching Companies Scheme (TCS). Under the Science and Technology Act 1965, TCS was established by the Science and Engineering Research Council, based on the teaching hospital idea i.e. ‘learning by doing’. Since 2007 the programme has been managed by the Technology Strategy Board (now Innovate UK) and Innovate UK is the lead funding organisation for KTP, in partnership with the Research Councils, the Devolved Administrations, Department of Health, Department for Environment, Food and Rural Affairs as well as the Nuclear Decommissioning Authority and RSSB (formerly known as the Rail Safety and Standards Board), as one off funders of calls for KTPs on specific themes.

1.3. Numerous studies have been undertaken to date reviewing various aspects of the programme. This study aims to complement earlier work by capturing the economic and wider impacts specifically arising from the participation of the KTP Associate and the Knowledge Base in the programme. More detail about the study is provided below.

Context and Scope of the Study

1.4. The KTP programme aims to help UK businesses to improve their competitiveness and productivity through the better use of knowledge, technology and skills that reside within the UK Knowledge Base i.e. a higher education institutions, colleges or research organisations. The key features of KTP can be summarised as follows:

- A partnership is formed between a knowledge base partner and a company partner: the company partner is usually a company (including not-for-profit) but it can also be a health or education organisation or a Local Authority. A knowledge base (KB) partner is a higher education institution, college or research organisation (public or privately funded). The partnership involves partners working together on a project of commercial benefit to the business that requires knowledge not available to the business and can be provided by the knowledge base partner.

- One or more appropriately qualified individuals – the KTP Associate(s), are recruited by the partnership, are employed by the university but embedded in the business to work on the project. Associates are recently qualified university graduates e.g. bachelors, masters or PhD, or, individuals who have completed post-doctoral research or are recently qualified to at least NVQ level 4 or equivalent in an appropriate subject and also ‘have the potential to be a business leader of tomorrow’.

- The KTP Associate is supervised by an academic supervisor who is expected to be spending one half day per week on the business premises in order to assist the Associate with the knowledge and expertise required by the business. The KTP Associate is also allocated a business supervisor to ensure that they have access to the resources they need and to be accountable for the performance of the business’s obligations on the project.

- The costs of the project are supported by a grant that may come from one or more of Innovate UK and the other funding organisations mentioned above - depending on the subject area or location of the project (determined as the location at which the KTP Associate will be based).

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1 KTPs Guidebook for KTP Advisers and Offices – available through Innovate UK only.
The partnership and the development and implementation of projects are supported by a specialist team of KTP Advisers recruited centrally by Innovate UK.

1.5. Numerous studies have been produced to review various aspects of the programme to date, including Quinquennial reviews (since 1991), studies looking at the programme at national level\(^1\) or country level\(^2\) and specific sector KTPs (e.g. BBSRC\(^4\), Social Science\(^5\)). Each of these studies has offered some additional insights into the programme, its working and dynamics, and drivers for success. However, work to date has only captured the impact of the programme on the company partner and the UK economy benefits resulting from improvements in key business indicators\(^6\).

1.6. This evaluation aims to complement and improve on this earlier work by capturing the economic and wider impacts specifically arising from the participation of the KTP Associate and the Knowledge Base in the KTP programme. The intention is therefore that this evaluation will be viewed alongside that earlier work, provide a better picture of the impact of the programme on the UK economy and inform a more comprehensive approach in capturing and monitoring the impacts of the programme as a whole in the future.

1.7. Within this context, the key study objectives were defined as follows:

- To develop a methodology to assess the economic and wider impacts of the Knowledge Base and the KTP Associate on the UK economy;
- To review and assess the economic and wider impacts of KTP that accrue through the participation of Knowledge Base and the Associate in the KTP programme; and,
- To undertake a comprehensive review of the monitoring data currently held/collected in relation to KTPs, with a view to make recommendations of what other data is needed to ensure a comprehensive KTP monitoring plan to assess the impact of all elements of the KTP programme on the UK economy (i.e. not just the Associates and Knowledge Base).

Study Research Framework - Key Evaluation Questions

1.8. In order to assess the impact of participation in the KTP Programme, the study adopted the following lines of inquiry:

- What has been achieved to date (at KTP Associate and Knowledge Base levels)?
- How different are the achieved from the anticipated benefits?
- To what extent are achievements and impacts attributable to the KTP programme? Are activities/benefits sustainable?
- To what extent research outcomes emerging from the KTP are relevant to industry?
- To what extent achievements and impacts go beyond direct participants?
- Does participation lead to further work with KTP business partner/others?
- What has worked well/less well?

1.9. More specifically, in assessing the economic and wider impacts of participation the following issues were explored:

- Whether the KTP has financial and/or career related end effects on participant KTP Associates. For example, participation in KTP, enhances:
  o The earning potential of the Associate;
  o The career opportunities for the Associate;

\(^1\) Knowledge Transfer Partnerships Strategic Review, produced by Regeneris Consulting, 2010 and CIHE, Key Attributes for Successful Knowledge Transfer Partnerships, August 2012 studies.

\(^2\) CM International, Evaluation of the Knowledge Transfer Partnership Programme in Wales, December 2011.

\(^3\) Evaluation of outcomes from BBSRC-supported knowledge transfer partnerships, undertaken by Momenta (DTI’s then Managing Agent for the delivery of KTP), June to November 2005. The research was funded by BBSRC with additional funding from DTI.

\(^4\) Hull University for ESRC.

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- Satisfaction with career choice;
- Quality of research undertaken by the Associate; and
- Quality of teaching/teaching materials produced by the Associate.

- Whether participation in KTP for the Knowledge Base:
  - Enhances quality of research;
  - Generates research relevant to the industry/businesses;
  - Improves quality of teaching/teaching materials; and
  - Enhances the skills of academics/researchers (both in terms of business & commercialisation skills).

1.10. These findings are quantified, where possible, to provide estimates of the attributable effects of participation on the performance of the UK economy over and above the benefits accrued through improvement in business performance indicators in terms of skills, research, productivity (jobs and wages) and growth (in terms of Gross Value Added).

Logic Models

1.12. In order to respond to the foregoing issues, at the core of the evaluation framework lies the development of logic chains aiming to capture the rationale for the KTP programme and the pathways to impacts for the principal players. A substantial number of actors and processes are involved in the management and delivery of KTPs and the pathway from the programme to impacting on the economy and society is not linear. For example, in the process of helping UK businesses to improve their competitiveness and productivity, KTPs generate a number of additional benefits as shown in Figure 1.1, including:

- Provision of business-based training for recently qualified people to enhance their business and specialist skills;
- Enhancement of business-relevant training and research undertaken by knowledge base institutions; and,
- Better understanding and interaction between businesses and academic institutions, and increased awareness of the contribution academia can make to business development and growth.

Figure 1.1: KTP Logic Model - Benefits and Impacts

Source: WECD
1.13. Figures 1.2 and 1.3 present logic chains/pathways to impact have been developed for each of the KTP partners that are the focus of this study. For the purposes of completeness, the logic models also include description of those stages in the logic chains that would require assessment of deadweight (factuals vs counterfactuals) and other additionality factors. Although not all these factors have been tested within the scope of this evaluation, the logic model could be used to inform further research in the future.

**Figure 1.2: Associate Participation and Impacts on the UK Economy – Logic Model**

<table>
<thead>
<tr>
<th>Benefits to Associate</th>
<th>Pathways to Impacts</th>
<th>Impacts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Graduate Level Job</td>
<td>Employment (private/ - other sector)</td>
<td>Salaries/ Productivity (private/other sector)</td>
</tr>
<tr>
<td>Graduate Level Experience</td>
<td>Own/New Business Creation</td>
<td>Follow-on Research Income</td>
</tr>
<tr>
<td>Higher Qualifications</td>
<td>Publications Teaching Material Commercial Awareness</td>
<td>Consultancy Income</td>
</tr>
<tr>
<td>Additional Business Skills Development</td>
<td>Deadweight 1: probability individuals would have achieved these qualifications and skills</td>
<td>Deadweight 3: probability individuals would have these higher salaries, research income, productivity, and as quickly without these qualifications</td>
</tr>
<tr>
<td>Deadweight 2: probability individuals would have these employment or academic achievements quickly without these qualifications and skills</td>
<td>Deadweight 3: probability individuals would have these higher salaries, research income, productivity, and as quickly without these qualifications</td>
<td></td>
</tr>
</tbody>
</table>

Source: WECD

1.14. As shown in Figure 1.2, impact on the economy through the Associate will be mainly generated in the form of:

- **Financial returns** - For the Associates the immediate benefits accrue to the individual through their experience of working in a commercial environment and the opportunity to gain additional business, project management and workplace skills and qualifications, ultimately enhancing the earning potential, employability and career progression pathways of the individual. These direct benefits have the potential to then impact upon the economy though jobs, wages, research income and business creation. It is worth noting that any wage premia of these individuals would also indicate growth/improved productivity.

- **Education/Knowledge Base returns** – Over time, it appears that the majority of Associates enter private sector employment (approximately 70%/80% according to data provided by Innovate UK). Nevertheless, around 10%/15% remain in academia. For the Associates remaining/continuing in academia, the pathways to impact would include enhancing their earning potential, employability and career progression pathways but also publications, research and teaching material (more/higher quality) and follow-on research and commercialisation income. These direct benefits have the potential to then impact upon their academic/research establishment’s income and potentially the economy and society.

1.15. For the Knowledge Base, the benefits include improved understanding of the commercial environment and knowledge to support research and teaching, staff development and academic publications.
Figure 1.3: Knowledge Base Participation and Impacts on the UK Economy – Logic Model

Source: WECD

Study Approach

1.16. To deliver the study objectives a wide range of tasks have been undertaken and both qualitative and quantitative research techniques have been deployed. These are depicted in Figure 1.4.

Figure 1.4: Key Study Tasks and Outputs

1.17. A large part of the study has been dedicated to the mobilisation stage i.e. exploring data, databases and conducting consultations, in order to establish availability of data, quality and
accessibility of information and hence ascertain feasibility of certain methodologies and resourcing required. **It is also worth noting that the methodologies adopted in this study have made maximum use of the available data and information within the scope and resources of this study.** In addition a comprehensive methodological note has been produced outlining an ideal methodology that would further explore causalities and relationships between the various elements of the programme including additional quantitative analyses that could be undertaken to further strengthen the descriptive analyses of the survey, KTP and other administrative data. Recommendations have been also made for improvements in relation to accessibility of databases and data.

1.18. As shown in Figure 1.4, key study tasks have included:

- Interviews with senior members of staff in key stakeholder organisations including Innovate UK Lead Technologists, the Research Councils, the Higher Education Funding Council in England (HEFCE), the Scottish Funding Council, the Welsh Government, Invest Northern Ireland, KTP Advisers and the KTP National Forum. A workshop was also conducted with KTP Advisers. A list of all key stakeholders interviewed during this task is provided in Appendix A.

- Extensive review of KTP databases held and provided by Innovate UK – followed by production of guidance notes and recommendations for refinement of the technical elements of the database in the future.

- High-level descriptive analysis of key KTP facts and figures including numbers of partnerships to date, Associates and Knowledge Base organisations involved, information on the overall investment and contributions by sponsoring organisation to date.

- Development of an overall KTP logic model, individual logic models depicting pathways to impacts arising from participation in the KTP for both the Associate and Knowledge Base partners and a comprehensive evaluation framework.

- Surveys with KTP Associates and the Knowledge Base institutions. The purpose of the surveys was to collect both qualitative and quantitative information about financial, organisational and career benefits for participating individuals and organisations. The surveys have also provided a self-assessment of the programme’s added value for participants based on their experiences from participation and perceived benefits generated for them and their organisations. Questionnaires used for these surveys are provided in Appendix B of this report. The Associates questionnaire was sent to all those individuals with valid contact details held in the Innovate UK KTP database i.e. a total of 3,249 individuals out of approximately 9,800; 264 responses were received (on the basis of a standard 5% margin of error, this response rate provides results with 90% confidence). The Knowledge Base questionnaire was sent to academic supervisors in 137 institutions – responses were received from 72 institutions (139 respondents involved in 922 KTPs to date). Detailed information about the characteristics of both groups of the respondents is provided in Appendix C.

- More detailed desk-based review and discussions with seven Knowledge Base organisations, involving interviews with management staff at University and Divisional/Departmental level, KTP/Knowledge Transfer/Knowledge Exchange staff and KTP Associates in some cases. These discussions have been undertaken with: Edinburgh Napier University, University of Manchester, University of Strathclyde, University of Sheffield, Lancaster University and University of Nottingham.

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7 A small number of organisations and individuals included in the Innovate UK databases opted out of the survey.
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- Extensive desk-based research was also undertaken to identify data and research to inform the development of logic models and the impact analyses including review of Labour Force data, published case studies supporting the Research Excellence Framework (REF) submission and referring to KTPs and private sector graduate programmes.

- Analysis of the information collected as part of the study has informed two types of analysis:
  
a) Descriptive analysis of survey findings and case study material but also of key KTP facts and figures e.g. number of partnerships funded to date, regional distribution and expenditure based on review of databases provided by Innovate UK; and,

b) Economic impact analysis drawing upon the survey findings and background research. Different approaches have been used in capturing and quantifying impacts in each partner case and these are explained in more detail in the respective sections of the report.

1.19. No major statistical analysis (nor econometric analysis) of the KTP databases was undertaken at this stage. The methodological note prepared to inform the evaluation of the programme as a whole, however, describes in detail how this can be undertaken in the future.

1.20. Finally, it needs to be noted that the report is written on the assumption that the reader is already familiar with the management and delivery of the KTP programme. These have been covered extensively in the recent reviews of the programme8. Specific guidance about the overall approach and eligibility for participation is also provided through the KTP team at Innovate UK.

Structure of the Report

1.21. The remainder of this document is structured as follows:

- Section 2 describes selected facts and figures about KTP Associates and Knowledge Base participation in the programme drawing upon information provided by Innovate UK.

- Section 3 presents benefits and impacts arising from KTP Associates participation in the KTP programme, drawing upon KTP database information, survey findings and desk-based research.

- Section 4 reports benefits and impacts for the Knowledge Base and the economy drawing upon KTP database information, survey findings, desk-based research and case study information.

- Section 5 summarises views expressed by KTP Associates and Knowledge Base organisations participating in the surveys to inform the programme in the future.

- Section 6 draws conclusions and makes recommendations for the future.

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8 Knowledge Transfer Partnerships Strategic Review, produced by Regeneris Consulting, 2010 and CIHE, Key Attributes for Successful Knowledge Transfer Partnerships, August 2012 studies.
2. KTP Key Facts and Figures

2.1. This section presents key facts and figures about participation of KTP Associates and the Knowledge Base institutions in the KTP programme. Information has been sourced from programme databases held and provided by Innovate UK. It needs to be noted that management and financial data held by Innovate UK does not cover the full 40 years of the programme to date i.e. since its launch of the programme i.e. 1975. Although some financial data is available since the early 1980s, detailed financial information is limited in the earlier years; for example, breakdown by sponsor is only available from April 1987.

KTP Public Funding

2.2. As shown in Figure 2.1, just over £648 million (£648,155,226) has been committed to the KTP programme over the last 27.5 years (to December 2014). In the last seven and half years i.e. since the establishment of TSB/Innovate UK in 2007, this funding stream’s contribution to the programme has risen from 57% to 69%. The share of Devolved Administrations has also increased from 6% to 13% while the share of European funding such as ESF has declined.

Figure 2.1: Funding Commitment to KTP by Public Sector Stream (04/1987 – 12/2014)

<table>
<thead>
<tr>
<th>Funding Streams</th>
<th>01/04/1987 - 30/06/2007 (20 years)</th>
<th>01/07/2007 - 31/12/2014 (7.5 years)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DTI/TSB/Innovate UK</td>
<td>£237,791,645</td>
<td>£158,040,509</td>
</tr>
<tr>
<td>RDAs and Devolved Administrations</td>
<td>£27,073,936</td>
<td>£29,607,986</td>
</tr>
<tr>
<td>Research Councils</td>
<td>£99,011,714</td>
<td>£33,618,293</td>
</tr>
<tr>
<td>Government Departments</td>
<td>£9,859,283</td>
<td>£4,160,433</td>
</tr>
<tr>
<td>Europe (ESF and ERDF)</td>
<td>£14,027,347</td>
<td>£3,163,080</td>
</tr>
<tr>
<td>Non-specified</td>
<td>£31,801,000</td>
<td></td>
</tr>
<tr>
<td><strong>Total Funding</strong></td>
<td>£419,564,925</td>
<td>£228,590,301</td>
</tr>
</tbody>
</table>

| No of projects committed       | 5,583                             | 2,744                               |
| Average value per committed project | £75,150                 | £83,305                             |
| Average time spent per KTP Associate per committed project (in years) | 2.7                           | 2.7                                 |
| KTP public funding commitment per annum in the specific period | £20,978,246                   | £30,478,706                        |

Source: Innovate UK

Figure 2.2: Public Funding Commitment to Projects over time

Source: Innovate UK

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This is £933,569,210.72 in 2014 prices – based on GDP Deflator Market Prices, Calendar Year - March 2015, UK National Accounts, ONS.
**KTP Completed and Ongoing Projects and Knowledge Base Organisations**

2.3. Figure 2.3 presents information about the programme based on data available since 1982. Analysis of these data shows that:

- 6,731 KTP projects were completed and 681 are still ongoing. Analysis of data indicates that not all committed projects (i.e. projects for which a KTP grant has been committed) are going ahead; some are withdrawn or do not start (approximately 1 in 10). According to interviews with key stakeholders, the two main reasons for projects being withdrawn or not starting (although a grant has been committed) are: 1) failing to recruit an appropriate KTP Associate; and, 2) changes in the company, such as finances, strategy or ownership. This also explains the difference in figures presented in Figures 2.3-2.5 and Figure 2.1.

- As shown in Figure 2.3, the total of 7,412 completed and ongoing projects has involved 176 Knowledge Base organisations with completed and ongoing projects. 96.6% of the Knowledge Base organisations involved in KTPs are HEIs or Colleges. There are also 17 other Knowledge Base organisations such as Public Sector Research Establishments and Research and Technology Organisations that have undertaken 29 KTPs among them in the study period.

- Earlier records of the programme are more likely to be incomplete. For example, as shown in Figure 2.3 out of 5,346 completed projects, financial information exists for 5,304.

**Figure 2.3: Completed and Ongoing KTPs (April 1982- October 2014)**

<table>
<thead>
<tr>
<th>Status</th>
<th>Projects</th>
<th>No. of KBs</th>
<th>Grant</th>
<th>Projects with data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current/Active Project</td>
<td>681</td>
<td>108</td>
<td>£60,997,956</td>
<td>681</td>
</tr>
<tr>
<td>Finished Project</td>
<td>5,346</td>
<td>165</td>
<td>£406,818,225</td>
<td>5,304</td>
</tr>
<tr>
<td>Finished Early</td>
<td>1,232</td>
<td>111</td>
<td>£101,012,949</td>
<td>1,231</td>
</tr>
<tr>
<td>Finished Very Early</td>
<td>153</td>
<td>65</td>
<td>£12,730,043</td>
<td>153</td>
</tr>
<tr>
<td><strong>Total to date</strong></td>
<td>7,412</td>
<td>176</td>
<td><strong>£581,559,173</strong></td>
<td><strong>7,369</strong></td>
</tr>
</tbody>
</table>

Source: KTP Partnership Data provided by Innovate UK, October 2014.

- As shown in Figures 2.4 and 2.5, there is some regional variation in the involvement of Knowledge Base organisations in the programme within the same period, with the regional averages skewed by the large range/variation in participation. For example, the large number of KTPs by Queen’s Belfast University heavily skews the average number of KTPs per organisation in Northern Ireland. Nevertheless across the UK, average grant per completed project to date appears to have been slightly higher in England. The average value of ongoing projects is, however, higher in Scotland.

**Figure 2.4: Completed projects by UK Region (KB Location), 1982-2014**

<table>
<thead>
<tr>
<th>Country</th>
<th>KBs (No)</th>
<th>Projects</th>
<th>Average No of Projects per KB</th>
<th>Businesses</th>
<th>Total Grant</th>
<th>Average Grant per Completed Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>119</td>
<td>4,996</td>
<td>42</td>
<td>4,142</td>
<td>£389,836,763</td>
<td>£78,030</td>
</tr>
<tr>
<td>Scotland</td>
<td>28</td>
<td>747</td>
<td>27</td>
<td>620</td>
<td>£56,028,474</td>
<td>£75,005</td>
</tr>
<tr>
<td>Wales</td>
<td>16</td>
<td>543</td>
<td>34</td>
<td>444</td>
<td>£40,436,311</td>
<td>£74,468</td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>8</td>
<td>445</td>
<td>56</td>
<td>353</td>
<td>£34,259,669</td>
<td>£76,988</td>
</tr>
<tr>
<td>Total</td>
<td>171</td>
<td>6731</td>
<td>39</td>
<td>5559</td>
<td>£520,561,217</td>
<td>£77,338</td>
</tr>
</tbody>
</table>

Source: KTP Partnership Data provided by Innovate UK, October 2014.
The Impacts of KTP Associates and Knowledge Base on the UK Economy

Figure 2.5: Ongoing projects by UK broad regions (KB Location)

<table>
<thead>
<tr>
<th>Country</th>
<th>No. of KB</th>
<th>Projects</th>
<th>Businesses</th>
<th>Total Grant</th>
<th>Average Grant per Ongoing Project</th>
</tr>
</thead>
<tbody>
<tr>
<td>England</td>
<td>81</td>
<td>514</td>
<td>489</td>
<td>£45,864,486</td>
<td>£89,231</td>
</tr>
<tr>
<td>Scotland</td>
<td>16</td>
<td>94</td>
<td>93</td>
<td>£8,938,692</td>
<td>£95,092</td>
</tr>
<tr>
<td>Wales</td>
<td>8</td>
<td>28</td>
<td>27</td>
<td>£2,416,577</td>
<td>£86,306</td>
</tr>
<tr>
<td>Northern Ireland</td>
<td>3</td>
<td>45</td>
<td>43</td>
<td>£3,778,201</td>
<td>£83,960</td>
</tr>
<tr>
<td>Total</td>
<td>108</td>
<td>681</td>
<td>652</td>
<td>£60,997,956</td>
<td>£89,571</td>
</tr>
</tbody>
</table>

Source: KTP Partnership Data provided by Innovate UK, October 2014

2.4. The programme has also given the opportunity to Knowledge Base organisations to work with 5,559 businesses to date (unique references). This is equivalent to 32 businesses on average per participating Knowledge Base organisation over this 32-year period.

2.5. Figure 2.6 lists the top ten Knowledge Base participants in the KTP programme to date since 1985. However, analysis of available data suggests that the extent of participation by Knowledge Base organisations has changed over time as shown in Figure 2.7 that illustrates changes over time in the top 10 participant Knowledge Base organisations.

Figure 2.6: Knowledge Base Participation, Top 10 Participants, 1985-2014

<table>
<thead>
<tr>
<th>Institution</th>
<th>Total Completed Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Queen’s University Belfast</td>
<td>322</td>
</tr>
<tr>
<td>2. The University of Reading</td>
<td>239</td>
</tr>
<tr>
<td>3. The University of Manchester</td>
<td>226</td>
</tr>
<tr>
<td>4. University of Plymouth</td>
<td>206</td>
</tr>
<tr>
<td>5. University of Strathclyde</td>
<td>202</td>
</tr>
<tr>
<td>6. University of Ulster</td>
<td>193</td>
</tr>
<tr>
<td>7. The University of Sheffield</td>
<td>172</td>
</tr>
<tr>
<td>8. London South Bank University</td>
<td>165</td>
</tr>
<tr>
<td>9. Sheffield Hallam University</td>
<td>162</td>
</tr>
<tr>
<td>10. University of Wolverhampton</td>
<td>158</td>
</tr>
</tbody>
</table>

Source: KTP Partnership Data provided by Innovate UK, October 2014.

Figure 2.7: Top 10 Participant Knowledge Base Organisations over time – Completed Projects

<table>
<thead>
<tr>
<th>Rank</th>
<th>KB Partner</th>
<th>No of KTPs</th>
<th>KB Partner</th>
<th>No of KTPs</th>
<th>KB Partner</th>
<th>No of KTPs</th>
<th>KB Partner</th>
<th>No of KTPs</th>
<th>KB Partner</th>
<th>No of KTPs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>The University of Manchester</td>
<td>16</td>
<td>The University of Manchester</td>
<td>19</td>
<td>Queen’s University Belfast</td>
<td>60</td>
<td>The University of Reading</td>
<td>25</td>
<td>Queen’s University Belfast</td>
<td>21</td>
</tr>
<tr>
<td>2</td>
<td>University of Sheffield</td>
<td>33</td>
<td>University of Plymouth</td>
<td>39</td>
<td>University of Plymouth</td>
<td>43</td>
<td>University of Strathclyde</td>
<td>45</td>
<td>University of Sheffield</td>
<td>19</td>
</tr>
<tr>
<td>3</td>
<td>Queen’s University Belfast</td>
<td>28</td>
<td>University of Plymouth</td>
<td>39</td>
<td>Queen’s University Belfast</td>
<td>64</td>
<td>London South Bank University</td>
<td>45</td>
<td>University of Leeds</td>
<td>30</td>
</tr>
<tr>
<td>4</td>
<td>University of Ulster</td>
<td>24</td>
<td>Sheffield Hallam University</td>
<td>38</td>
<td>University of Manchester</td>
<td>44</td>
<td>London South Bank University</td>
<td>44</td>
<td>University of Sheffield</td>
<td>19</td>
</tr>
<tr>
<td>5</td>
<td>University of Strathclyde</td>
<td>45</td>
<td>Edinburgh Napier University</td>
<td>45</td>
<td>University of Manchester</td>
<td>45</td>
<td>University of Leeds</td>
<td>30</td>
<td>University of South Bank</td>
<td>35</td>
</tr>
<tr>
<td>6</td>
<td>University of Birmingham</td>
<td>34</td>
<td>Breakbulk University</td>
<td>49</td>
<td>London South Bank University</td>
<td>44</td>
<td>The University of Reading</td>
<td>40</td>
<td>University of Sheffield</td>
<td>19</td>
</tr>
<tr>
<td>7</td>
<td>University of Leeds</td>
<td>15</td>
<td>The University of Reading</td>
<td>36</td>
<td>Marmore Ltd Manchester</td>
<td>38</td>
<td>University of Strathclyde</td>
<td>45</td>
<td>University of Sheffield</td>
<td>19</td>
</tr>
<tr>
<td>8</td>
<td>University of York</td>
<td>33</td>
<td>University of Manchester</td>
<td>37</td>
<td>Edinburgh Napier University</td>
<td>35</td>
<td>University of Manchester</td>
<td>45</td>
<td>University of Sheffield</td>
<td>19</td>
</tr>
<tr>
<td>9</td>
<td>University of Liverpool</td>
<td>34</td>
<td>The University of Reading</td>
<td>36</td>
<td>Kingston University</td>
<td>33</td>
<td>University of Sheffield</td>
<td>19</td>
<td>University of Sheffield</td>
<td>19</td>
</tr>
<tr>
<td>10</td>
<td>Leeds Metropolitan University</td>
<td>33</td>
<td>The University of Reading</td>
<td>36</td>
<td>Kingston University</td>
<td>33</td>
<td>University of Sheffield</td>
<td>19</td>
<td>University of Sheffield</td>
<td>19</td>
</tr>
</tbody>
</table>

Source: KTP Partnership Data provided by Innovate UK, October 2014.

2.6. Analysis of the KTP take up figures also highlights that 80% of all KTPs to date have involved 55 Knowledge Base institutions (out of 176 participant institutions e.g. 31%). As shown in Figure 2.8, 99% of all KTPs to date have involved 122 institutions (with 1% of KTPs involving 53 institutions).
Figure 2.8: KTPs by Knowledge Base (KB) Organisations (1985-2014)

Source: KTP Partnership Data provided by Innovate UK, October 2014.
Note: Annex E also presents a list of these Knowledge Base Organisations.
2.7. Further analysis by Department (Figure 2.9) shows that among completed projects to date, Departments more likely to be involved with the KTP programme include Management (18%), Engineering and Technology (15%), Computing (14%), Mechanical Engineering (14%), and Electrical Engineering (7%). On the other hand, relatively more STEM subjects are represented among ongoing KTP projects e.g. Engineering and Technology Departments represent 19% of currently live KTPs while Management Departments are involved in only 9% of projects. It is worth noting that take up figures could reflect both, demand (by businesses and Knowledge Base) and KTP eligibility criteria (and hence policy emphasis and drive).

Figure 2.9: Completed and Ongoing KTP Projects by KB Department

<table>
<thead>
<tr>
<th>Department</th>
<th>Projects</th>
<th>%</th>
<th>Projects</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agriculture &amp; Food</td>
<td>191</td>
<td>3</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>Biology</td>
<td>192</td>
<td>3</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>Chemistry</td>
<td>159</td>
<td>2</td>
<td>17</td>
<td>3</td>
</tr>
<tr>
<td>Chemical Engineering</td>
<td>136</td>
<td>2</td>
<td>13</td>
<td>2</td>
</tr>
<tr>
<td>Civil Engineering</td>
<td>246</td>
<td>4</td>
<td>49</td>
<td>7</td>
</tr>
<tr>
<td>Computing</td>
<td>979</td>
<td>14</td>
<td>96</td>
<td>14</td>
</tr>
<tr>
<td>Design</td>
<td>300</td>
<td>4</td>
<td>26</td>
<td>4</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>472</td>
<td>7</td>
<td>40</td>
<td>6</td>
</tr>
<tr>
<td>Engineering &amp; Technology</td>
<td>1,005</td>
<td>15</td>
<td>130</td>
<td>19</td>
</tr>
<tr>
<td>Management</td>
<td>1,211</td>
<td>18</td>
<td>62</td>
<td>9</td>
</tr>
<tr>
<td>Material Technology</td>
<td>125</td>
<td>2</td>
<td>20</td>
<td>3</td>
</tr>
<tr>
<td>Medicine</td>
<td>176</td>
<td>3</td>
<td>42</td>
<td>6</td>
</tr>
<tr>
<td>Mathematics</td>
<td>78</td>
<td>1</td>
<td>21</td>
<td>3</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>931</td>
<td>14</td>
<td>57</td>
<td>8</td>
</tr>
<tr>
<td>Physics</td>
<td>56</td>
<td>1</td>
<td>14</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>471</td>
<td>7</td>
<td>66</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>6731</strong></td>
<td>100</td>
<td><strong>681</strong></td>
<td>100</td>
</tr>
</tbody>
</table>

Source: KTP Partnership Data provided by Innovate UK, October 2014.

2.8. As discussed in more detail in section 4 of the report, the main reason for Knowledge Base organisations getting involved in the programme is for establishing collaborative links with industry and gaining better understanding of businesses. As the following case studies highlight, some research-intensive institutions have become more involved with the programme over time as they see KTPs as a powerful tool to engage academia and businesses, in particular SMEs.

The University of Nottingham was founded as University College Nottingham in 1881 and granted a Royal Charter in 1948. The University is placed 77th in the world and in the top 1% of Universities internationally by the latest (2014) QS World University Rankings. In the Research Excellence Framework 2014 (REF2014), the University has been ranked eight in the UK on a measure of ‘research power’, which takes into account both the quality of research and the number of research-active staff who made REF returns.

The University has a dedicated KTP team. To date (since 1988), the University had 116 KTPs. 55 of these (47%) have taken place in the last seven years, with an increasing number of Departments getting involved, including Engineering (55% of KTPs), Physics and Arts. As noted by the University, businesses are more likely to better understand the role of a KTP in STEM related
areas and therefore they find it easier to participate in such types of projects. The reason is that STEM related KTPs tend to result to physical outputs that businesses can immediately utilise and experience the difference made to their business indicators. However, there is potential for engagement with businesses in other areas e.g. Psychology, and these opportunities are currently being explored.

As a research-intensive University, Nottingham views KTP as the best way to engage academics with businesses and a process to improve both partners’ understanding of the other - hence ‘...enhancing the absorptive capacity of both the businesses and the University’. The University also classes KTPs as research that can be submitted for assessment of research quality and impact of the University e.g. Research Excellent Framework 2014 (REF2014).

Key benefits for the academics include validation of academic research through closer working relationship with businesses. For example, one of the University’s impact success stories is its research on semiconductor materials and devices that led in 2001 to the establishment of a combined manufacturing, research and development facility within the School of Physics and Astronomy by e2v Technologies\textsuperscript{12}. The partnership with e2v has provided a direct route for the exploitation of the team’s semiconductor research and has led to a three-year (08/2012 – 02/2016) KTP.

Other benefits for the academics include: contribution to REF2014, presentations to conferences and refinement of teaching material.

\textbf{The University of Sheffield} has a very strong reputation for world-class research both on the UK stage and internationally. The University has undertaken 553 KTPs in total since 1988. Involvement since 2003 has increased from a relatively low base up in 1988.

The Engineering faculty already has very close relationships with businesses of all sizes including some of the UK’s largest engineering companies but KTPs are seen to be a very powerful tool for working with SMEs. As stated during one of the consultations ‘...For small companies with no history of research – that is where KTP really adds value’.

KTPs are also seen to be tailored to develop better understanding of business needs with their focus on key business performance indicators rather than research. According to the academics interviewed, this means ‘Good transfer of business skills to KTP Associate... and enabling Universities to contribute detailed technical knowledge to places that would not otherwise be able to access this knowledge’.

The University’s Faculty of Engineering accounts for 83\% of the KTPs undertaken by the University of Sheffield. According to the academics interviewed, this is despite the fact that over time it has become difficult to attract the best Associates to KTPs due to higher salaries offered by other opportunities in the market (this issue was also raised by KTP Advisers). Nevertheless, key factors that make the programme attractive to academics at the University of Sheffield include:

- Additional research, research publications and conference papers following the completion of a KTP (for all five academics interviewed). As one of the consultees stated, ‘KTPs are not at a scale to address fundamental problems. So they tend to be technology transfer of existing knowledge. However, you might then make a proposal to a Research Council to undertake further research to address the more fundamental problem.’

\textsuperscript{12} A global manufacturer with its headquarters in England, that designs, develops and manufactures technology systems and components.
• Enrichment of skills i.e. ‘going out into the real world’ particularly for mid-career academics as an alternative to fundamental research.

• Ability to raise additional funding – in one case a £100k new research project that would not have happened in the absence of KTP. As stated by one of the academics involved in KTPs, ‘KTP was crucial to winning the £100k research project - that is 10% of the annual budget for the department’.

• Raising the profile of research in general and its impact.

**KTP Associates**

2.9. In the period between 1982 and 2014, a total of 9,855 KTP Associates participated in the programme. As shown in Figure 2.10, there has been a gradual increase in the number of Associates participating in the programme until 2010/2011, when there was a drop in KTP Associate start dates (coinciding with the time that the overall budget for the programme was reduced).

**Figure 2.10: Total Number of KTP Associates**

2.10. Although Engineering has been the predominant study subject for KTP Associates (for 42% of all KTP Associates to date), over time KTPs have been taken up by other disciplines such as Design, Information Technology and Business Management.

**Figure 2.11: KTP Associates by Study Subject to date**

**Source:** KTP Legacy Database.
In terms of other characteristics of KTP Associates:

- As shown in Figure 2.13, 47% of KTP Associates that have participated in the programme to date held post-graduate qualifications during their time in the KTP programme. As shown in Figure 2.14, the number of KTP Associates with no post-graduate qualifications has declined over time while those with/studying for a PhD has increased.

- The average age of KTP Associates participating in the programme to date is 27 years of age. However, as shown in Figure 2.15 average age of participants has increased slightly over time.

- Three quarters of KTP Associates to date (74%) are males i.e. the distribution of male to females is on average approximately 3:1. However, the presence of women in the KTP programme has increased slightly over time.
2.12. The standard current rate for Associate Salary/Employment Costs is £27,000 for one KTP Associate over 12 months\textsuperscript{13}. However, higher salary is available for a PhD or Masters level KTP Associate (£35,000 and £31,000 respectively).

2.13. The survey of KTP associates has shown that among survey respondents, on average:

- Their KTP salary was 43\% higher than their last job just before the KTP engagement.
- There was a 27\% increase in average salary from their KTP salary to their first job following completion of their KTP.
- The average current salary is estimated at £40,000\textsuperscript{14}.

\textsuperscript{13} For each KTP Associate, the public sector (through Innovate UK and the other funders) makes only a contribution towards the costs of their employment. The Knowledge Base Partner and Company Partner are expected to agree the most appropriate salary for the KTP Associate and any increases deemed applicable. In arriving at that figure, the going market rate, project progress and the salary rates in the Company and Knowledge Base Partners are taken into account. The company is expected to top up the salary in order to attract the most appropriate individual to the Associate post and obtain the best possible outcomes.

\textsuperscript{14} The median pay of doctoral graduates was £40,700 according to a study among Doctoral graduates undertaken on behalf of the Research Councils UK (RCUK) and the higher education funding bodies for England and Wales (HEFCE and HEFCW) – Doctoral impact and career tracking study, by CFE, January 2015.
Figure 2.16: Salary of KTP Associates - (WECD survey data)

<table>
<thead>
<tr>
<th>Stage</th>
<th>Average Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before participation in the KTP project</td>
<td>£15,810</td>
</tr>
<tr>
<td>During the KTP project</td>
<td>£22,590</td>
</tr>
<tr>
<td>After completing KTP</td>
<td>£28,754</td>
</tr>
<tr>
<td>Current salary if had not participated in KTP (hypothetically)</td>
<td>£32,569</td>
</tr>
<tr>
<td>Current after participating in KTPs</td>
<td>£40,088</td>
</tr>
</tbody>
</table>

Source: WECD KTP Survey

2.14. Figure 2.17 illustrates the salaries reported by the Associates both when they completed the KTP and their current salary by the year in which the KTP was completed. The data indicates a relatively consistent initial salary over time of around £27,000 on average on completing the KTP. Current salaries are significantly higher for those that completed their KTP longer ago – as it would be expected given the individuals’ years of work experience contributing to their salary along other factors.

Figure 2.17: Average KTP Associate Salary by time of completion of KTP

Source: KTP Legacy Database

2.15. Figure 2.18 illustrates the current salary of KTP Associates for various age bands. This is compared against graduate salaries at the same age bands from data presented in the Labour Force Survey. For all age groups, average KTP salaries are higher than average Graduates’ salaries.

Figure 2.18: Average Current Salaries of KTPs and Graduates (2014)

Source: KTP Legacy Database and ONS (http://www.ons.gov.uk/dcp0173776_337842.pdf)
2.16. It is recognised that there are other factors at play in this situation – in particular the higher level of qualification among KTP Associates compared with an ‘average’ graduate. However, as it is also more clearly shown in Figure 2.19, the data indicates that KTP Associates have salaries that are around £6,000 higher than the average graduate for those aged under 40 and around £2,700 higher for those aged over 40.

**Figure 2.19: Difference between KTP Associate Salary and Average Graduate Salary**

3. **Benefits for the Associates and Impacts on the Economy**

3.1. This section sets out the benefits to KTP Associates from participation in KTPs drawing upon their responses to the survey. It also provides estimates of the financial and career impacts of the KTP Associates participation in the KTP programme and the resulting impact on the UK economy - combining survey data with data extracted from the KTP databases provided by Innovate UK.

3.2. Review of the characteristics of the sample of survey respondents and the population of the KTP Associates (held in the KTP Legacy Database) reveals that there are differences between our sample and the total population for some of the variables. For example:

- Length of KTP – 25% of the sample have completed a KTP of longer than 24 months compared with just 10% of all Associates;
- Proportion of KTP Associates with a 1st class undergraduate degree (41% in the survey vs 28% of all Associates);
- Proportion of KTP Associates that did a science degree (26% in the survey vs 17% of all Associates); and,
- Proportion of KTP Associate that had already completed a higher degree prior to the KTP (86% in the survey vs 55% of all Associates).

3.3. Most of these differences, however, can be attributed to changes that have taken place to KTPs over the years, since comparing the sample with all Associates that completed between 2007-14 eliminates a lot of these differences. Therefore, the sample appears to be representative of those that have completed a KTP since 2007; however, it might not fully reflect earlier KTPs that appear to have been shorter on average and attracted Associates with lower level qualifications.

**Key Benefits for the Associates**

3.4. Associates were asked about their main reason for participating in the KTP programme. As shown in Figure 3.1, for 50% of respondents their main reason for getting involved with the KTP programme was to get employment; over a third (35%) were looking for a career enhancement.

![Figure 3.1: Main reason for involvement with the KTP programme](image)

**Source:** WECD KTP Survey

3.5. As shown in Figure 3.2, 29% of respondents definitely would not have been able to access a similar programme involving both academia and business in the absence of KTP. For an additional 55% it was unlikely that they would get involved with a similar programme in the absence of KTP. Overall, therefore, over eight out of ten respondents (84%) stated that they would not have been able to access a similar programme involving both academia and business in the absence
of KTP. Only 13% stated would have accessed a similar programme – which suggests that newly qualified graduates and post-graduates perceive the KTP offer as relatively distinctive in involving both academia and business in the market.

Figure 3.2: Ability to access a similar programme in the absence of KTP

![Graph showing ability to access a similar programme in the absence of KTP]

Source: WECD KTP Survey

3.6. In terms of benefits realisation, as shown in Figure 3.3, the employment status of KTP Associates that have responded to this survey has changed significantly post-KTP, with a significant move from full-time studying to employment in businesses, in academia or setting up their own businesses. The survey also found that 52% of respondents were employed by the KTP partner business immediately after the KTP had finished.

Figure 3.3: Employment Status of KTP Associates

<table>
<thead>
<tr>
<th>Employment Status</th>
<th>Prior KTP</th>
<th>Post KTP</th>
<th>Current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanently employed in business</td>
<td>21.1%</td>
<td>54.6%</td>
<td>68.3%</td>
</tr>
<tr>
<td>Temporary employment</td>
<td>23.0%</td>
<td>13.9%</td>
<td>11.5%</td>
</tr>
<tr>
<td>Permanently employed in academia</td>
<td>6.1%</td>
<td>8.7%</td>
<td>8.8%</td>
</tr>
<tr>
<td>Full-time study</td>
<td>36.8%</td>
<td>4.0%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Own their own business</td>
<td>0.4%</td>
<td>2.8%</td>
<td>4.6%</td>
</tr>
<tr>
<td>Unemployed</td>
<td>12.6%</td>
<td>14.7%</td>
<td>1.9%</td>
</tr>
</tbody>
</table>

Source: WECD Survey

3.7. Figure 3.4 shows that in terms of overall benefits, the vast majority of respondents have seen improvement in their skills (82%); over two thirds (70%) have seen a career enhancement – which is also reflected in the change of their employment status as shown above in Figure 3.3; over half have improved their ability to work collaboratively (52%) and work with the industry (58%); and over a third got employment/fast-track job (38%) and acquired higher qualifications (35%).

3.8. Further analysis of KTP Associates’ responses by current employment status also reveals that (Figure 3.5):

- Employment or fast track job was of significantly more benefit in the first place to those in non-academic careers and temporary employment than those in academic careers and full-time study.

- Improved research (in Academia) varied in benefit amongst the groups, with, as would be expected, there being a marked difference between those in full-time study, who found this the most advantageous and those in non-academic careers.
- Career enhancement was the most consistent benefit across the groups with more than half of all groups citing this as a benefit, and more than 80% of those in academic careers.

- Improved teaching (in Academia) and developing entrepreneurial spirit was not prioritised particularly highly as a benefit by any one group, with numbers not reaching more than 30.8%.

![Figure 3.4: Benefits of KTP Participation for KTP Associates](image)

**Figure 3.4: Benefits of KTP Participation for KTP Associates**

- have improved skills
- have a career enhancement
- have improved their ability to work within industry
- have improved their ability to work collaboratively
- have raised career aspirations
- have employment or fast track job
- have higher qualifications
- have improved research in academia
- have developed entrepreneurial spirit
- have improved teaching in academia
- have other benefits

**Source:** WECD KTP Survey

**Figure 3.5: Benefits of KTP for KTP Associates by current employment status**

<table>
<thead>
<tr>
<th></th>
<th>Academic Career (%)</th>
<th>Non-Academic Career (%)</th>
<th>Full-time study (%)</th>
<th>Temporary employment (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Improved Skills</td>
<td>78.3</td>
<td>84.3</td>
<td>76.9</td>
<td>63.3</td>
</tr>
<tr>
<td>Higher Qualifications</td>
<td>43.5</td>
<td>34.6</td>
<td>46.2</td>
<td>23.3</td>
</tr>
<tr>
<td>Employment or fast track job</td>
<td>8.7</td>
<td>44.0</td>
<td>7.7</td>
<td>26.7</td>
</tr>
<tr>
<td>Career enhancement</td>
<td>82.6</td>
<td>68.6</td>
<td>69.2</td>
<td>63.3</td>
</tr>
<tr>
<td>Developing entrepreneurial spirit</td>
<td>26.1</td>
<td>30.4</td>
<td>7.7</td>
<td>13.3</td>
</tr>
<tr>
<td>Raising career aspirations</td>
<td>52.2</td>
<td>41.9</td>
<td>53.8</td>
<td>30.0</td>
</tr>
<tr>
<td>Improving ability to work collaboratively</td>
<td>39.1</td>
<td>53.4</td>
<td>61.5</td>
<td>50.0</td>
</tr>
<tr>
<td>Improving ability to work within industry</td>
<td>39.1</td>
<td>60.7</td>
<td>46.2</td>
<td>50.0</td>
</tr>
<tr>
<td>Improved research (in academia)</td>
<td>47.8</td>
<td>19.4</td>
<td>76.9</td>
<td>43.3</td>
</tr>
<tr>
<td>Improved teaching (in academia)</td>
<td>26.1</td>
<td>2.6</td>
<td>30.8</td>
<td>16.7</td>
</tr>
</tbody>
</table>

**Source:** WECD KTP Survey

**The Added Value of KTP Participation for the Associates**

3.9. As shown in Figure 1.2 in section 1 of the report, added value can be generated and deadweight can occur at various stages in the pathway from participation in the programme to the impact on the skills, qualifications, career development and salary of the KTP Associate and subsequently on the economy. Therefore, KTP Associates were asked a number of questions in order to establish the added value of their participation in the KTP programme. All responses indicate relatively high additionality. For example, KTP Associates were asked whether they would have acquired similar skills elsewhere:

- ✔️ 58.2% thought they could not have obtained similar skills elsewhere
- ✔️ 20.5% thought they could have obtained similar skills elsewhere
KTP Associates were also asked whether they would have achieved the same results they have achieved in terms of their career achievements if they had not participated in the KTP programme. Overall, three quarters (75%) would not have achieved the same results within the same time period and to the same level. The remaining 25% who would have achieved same or better results is equivalent to deadweight loss for the overall programme. As shown in more detail in Figure 3.6:

- 39% would have achieved the same results, but it would have taken longer (time additionality)
- 25% would probably not have achieved the same results (quality additionality)
- 16% would probably have achieved the same results
- 11% would definitely not have achieved the same results
- 4% would definitely have achieved the same results
- 5% would have achieved better results

**Figure 3.6: KTP Associate Career Results in absence of participation in KTP**

Source: WECD KTP Survey

3.11. In December 2007, PwC was appointed by the then Department for Business, Enterprise and Regulatory Reform (BERR) to provide an independent assessment of the impact of the spending by each of the nine Regional Development Agencies (RDAs)\(^{15}\). The study assessed additionality of outputs generated by various RDA interventions i.e. the extent to which outputs would not have arisen without the RDAs’ interventions. For RDA programmes comparable to the KTP programme as a whole\(^ {16}\), the study found that additionality in terms of businesses assisted was on average 35%; for programmes relating to people and skills interventions, additionality of the programmes in assisting people into employment was 51% and for skills development 62%. Additionality figures for the KTP programme (75%) presented in Figure 3.6 could be compared with these latter figures since responses provided by the KTP Associates relate to their personal skills development and professional advancement.

3.12. KTP Associates were also asked about the difference their participation in the KTP programme had made in various aspects of their career. Responses are summarised in Figure 3.7 and more detail is provided below.


\(^{16}\) I.e. programmes supporting business development and competitiveness.
3.13. For example, on a scale 1 to 5, where 1 means made no difference and 5 transformational, responses to the question ‘Were skills and qualifications acquired through KTP important in finding employment post KTP?’ were as follows:

- The importance was transformational for 24.1% of respondents
- 44.8% gave a score of 4
- 19.5% gave a score of 3
- 5.7% gave a score of 2
- The skills and qualifications made no difference to 5.7% of respondents

3.14. The question ‘How would [you/the KTP Associate] rate the role of KTP with regards to your overall personal and career development?’ received the following responses:

- The role of the KTP programme was transformational for 34.6% of respondents
- 44.5% gave a score of 4
- 14.1% gave a score of 3
- 4.2% gave a score of 2
- There was no difference to 2.7% of respondents

3.15. It is worth noting that a study among Doctoral graduates undertaken on behalf of the Research Councils UK (RCUK) and the higher education funding bodies for England and Wales (HEFCE and HEFCW) also showed that 87% believed that their PhD has helped them progress towards their long-term career ambitions.

3.16. Finally, to the question, ‘How important have the skills and qualifications acquired through KTP been for securing increased salary post KTP?’ responses were as follows:

- KTP was transformational for 17.9% of respondents
- 32.3% gave a score of 4
3.17. Respondents have also provided a wealth of information about additional general benefits they perceive the programme has offered them. A selection of KTP Associates’ views about the wider benefits of the programme are presented below and depicted in Figure 3.8.

‘It selects high quality graduates and gives them opportunities to liaise with senior members of staff in both the Industrial partner and the Academic partner, increasing their profile greatly. The training opportunities provided are of enormous benefit as is the specific training budget provided.’

‘My career because of my prior business experience pre PhD means that my salary is unaffected by the KTP. The direct impact however, is that it allowed me to build more research partnerships with the host company and others involved with SMEs due to the network I became part of. Hence, these are the very important tangible effects of the KTP besides salary issues’

‘It has enabled me to be a better professional administrator and a better leader. I feel like a more accomplished and confident manager. I doubted the benefits of the programme at the very beginning, particularly as I was a mature KTP Associate/student but I was quickly won round and found the programme to be so enlightening and edifying.’

‘I think the programme provides the opportunity to realise the research knowledge into practical solution and to gain valuable working experiences and personal development. Overall, it boosts the confidence and a guide for deciding the future career path.’

‘Ideal path to industrial based scientific research’

Figure 3.8: Overview of Wider KTP Benefits for Associates

Source: WECD KTP Survey - based on Associates responses to open-ended questions

‘You get to work with different types of people that you might never have come across.’

‘The crossover between industry and academia is not that common in the arts. The KTP opened an avenue that didn’t exist before the project’.

‘The programme developed my research skills and business awareness. I now have a unique role blending health sciences research within business. The programme changed the direction of my career as it gave me a greater insight into the ways that academia and clinical health care practice interact and how that could be facilitated to work more effectively. So I had been working towards a mostly academic model of career progression and now I am much more focused on bridge spanning types of work.

I found the training aspect of the KTP very enlightening since I was forced to consider ideas beyond my immediate sphere of practice.

This led me to successfully apply for a novel funding stream within the NHS (NIHR Knowledge Mobilisation Fellowship) which focuses on taking research into clinical practice. The training I received during the KTP led me to consider alternative models for this (e.g. I am using marketing approaches to develop interventions, I would never had understood the opportunities in that if I hadn’t had the management training’.

3.18. It is also worth noting that academic supervisors that were interviewed as part of this study were asked about the importance of KTP Associates’ skills and qualifications for securing leverage i.e. additional funding. As shown in Figure 3.9, half the respondents stated that skills and qualifications of Associates are extremely important for securing leverage with an additional 35% rating these skills and qualifications as important. Only approximately 5% considers them not important. The following statements from academic supervisors reflect these findings.

‘The Associate was excellent. Would not have expected to recruit or retain such a high calibre person without KTP behind the project’

‘KTP provides quality funding to help SMEs make significant changes to their business. The KTP Associate is the agent for change within the company.’

Figure 3.9: Importance of KTP Associates’ skills and qualifications to secure additional funding

Source: WECD KTP Survey
Assessment of Economic Impacts of Participation - Approach and Assumptions

3.19. The key building blocks of our thinking to assess the economic impacts of KTP Associates’ participation are as follows:

- The approach to quantifying the impact of the KTP on the UK economy has been to estimate the impact of participation on the productivity of the KTP Associate as represented/measured by their salary and related Gross Value Added (GVA).

- In addition to estimating the level of salary that the KTP Associates would have earned in the absence of the KTP (or alternatively, they have earned as a result of their KTP participation), other assumptions have been made to account for impacts that are generated by KTP Associates and have not been included in previous studies’ estimates. For example, as shown in the figure below, it is expected that the impact of KTP Associates working for businesses participating in the programme has already been included in estimates of the impact of the KTP on the business partners in the previous study. Therefore, this impact has not been taken into account in this study. In addition, a number of Associates have established new businesses, which have been attributed to KTP. The net additional contribution of these new business starts to GVA has been taken into account for first time in this study.

Approach to Capturing the Additional Impact for the UK Economy through KTP Associates

- Survey respondents put a financial value on several other impacts of the KTP partnership, including research funding secured, one-off payments and consultancy income. Research funding secured has been considered under the Knowledge Base impacts. The one-off payments and consultancy income were relatively small to be included within the impact on lifetime earnings and have been excluded from the analysis to avoid double counting.

3.20. Appendix D summarises the approach adopted and presents in detail all assumptions made and resulting calculations.

Impact of KTP on Associate Economic Productivity

3.21. The most important source of information for calculating the impact on productivity has been the KTP Associate survey findings related to wages and salaries.

3.22. Within the survey, Associates were specifically asked about their salary at several stages in their career i.e. immediately before the KTP, during the KTP, immediately after the KTP and their current salary. The average salaries reported at each of the points are presented in Figure 3.10 and indicate a clear increase in average salaries at each point.

---

The Impacts of KTP Associates and Knowledge Base on the UK Economy

Figure 3.10: KTP Associate Salaries

<table>
<thead>
<tr>
<th></th>
<th>Average Salary</th>
<th>Number of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before participation in the KTP project</td>
<td>£15,400</td>
<td>163*</td>
</tr>
<tr>
<td>During the KTP project</td>
<td>£22,700</td>
<td>231</td>
</tr>
<tr>
<td>After completing KTP</td>
<td>£28,700</td>
<td>222</td>
</tr>
<tr>
<td>Current Salary</td>
<td>£39,900</td>
<td>209</td>
</tr>
</tbody>
</table>

Source: KTP Associate Survey.
Note: the response rate for the ‘before KTP’ salary is low due to the number of associates that were not in employment.

The counterfactual

3.23. The responses provided by the KTP Associates to the questions about their salaries have been used to estimate the level of uplift in productivity that has resulted from participation in the KTP from the perspective of the Associate. This has been compared with the difference between average graduate salaries and the KTP Associate salaries to further explore the uplift in productivity.

3.24. The KTP Associates were asked to estimate what their salary would have been without the KTP at two points – immediately after the KTP and currently. A total of 89% of respondents who estimated their salary without KTP, report that their income is higher than it otherwise would have been.

Figure 3.11: Estimated Salary with / without KTP

<table>
<thead>
<tr>
<th></th>
<th>Actual Salary</th>
<th>Estimated Salary without KTP</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>After completing KTP</td>
<td>£28,100</td>
<td>£25,500</td>
<td>+ £2,600</td>
</tr>
<tr>
<td>Current Salary</td>
<td>£36,500</td>
<td>£32,100</td>
<td>+ £4,100</td>
</tr>
</tbody>
</table>

Source: KTP Associate Survey

3.25. A complementary approach to estimating the counterfactual has also been to compare average graduate salaries with the salaries of Associates at similar points in their career. The salary data for graduates can be derived from the Labour Force Survey39, which presents the data by age of the graduate. These have been analysed to provide a similar profile of the Associate’s current salary by age of Associate to assess impact on as comparable a basis as possible.

Figure 3.12: Average Graduate Salary and KTP Associate Salary by Age

<table>
<thead>
<tr>
<th>Age</th>
<th>Average Associate Salary</th>
<th>Average Graduate Salary</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>24-29</td>
<td>£32,400</td>
<td>£25,900</td>
<td>+ £6,500</td>
</tr>
<tr>
<td>30-34</td>
<td>£37,500</td>
<td>£31,900</td>
<td>+ £5,600</td>
</tr>
<tr>
<td>35-39</td>
<td>£40,100</td>
<td>£34,100</td>
<td>+ £6,000</td>
</tr>
<tr>
<td>40+</td>
<td>£37,400</td>
<td>£34,600</td>
<td>+ £2,800</td>
</tr>
<tr>
<td>Total</td>
<td>£36,800</td>
<td>£31,300</td>
<td>+ £5,500</td>
</tr>
</tbody>
</table>

Source: KTP Associate Survey and Labour Force Survey

3.26. The KTP Associates’ estimate of their salary without the KTP has been used as the estimate of counterfactual. Using the average graduate salary for each age band does not distinguish

between the types of degrees or the types of occupations that the graduate would be working in. Therefore, it would not be possible to distinguish between the impact of the KTP and other factors, such as a higher degree, the sector in which the Associates are working. Likewise, comparing the salaries on the basis of age does not reflect the length of time since completing a KTP, which appears to be an important dimension to the impact.

**Persistence**

3.27. The KTP Associate survey responses provide some indication about the persistence of the benefits of participation in the KTP programme for KTP Associates. However, the majority of the respondents had completed their KTP in the last 10 years and therefore there is limited information on which to base an assumption about the persistence of benefits for more than 10 years.

3.28. For the purpose of this analysis it has been assumed that the benefits of the KTP to the Associate last for 10 years. Analysing the survey data further based on the length of time since completing the KTP provides an indication of the level of persistence of the impact.

**Figure 3.13: KTP Associate Salary Uplift by number of years since completing KTP**

<table>
<thead>
<tr>
<th>Years since completing KTP</th>
<th>Average difference between estimated salary without KTP and actual salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2 years</td>
<td>+ £1,900</td>
</tr>
<tr>
<td>3-5 years</td>
<td>+ £5,900</td>
</tr>
<tr>
<td>6-8 years</td>
<td>+ £6,900</td>
</tr>
<tr>
<td>9-10 years</td>
<td>+ £3,900</td>
</tr>
<tr>
<td>Overall Average</td>
<td>+ £4,100</td>
</tr>
</tbody>
</table>

Source: KTP Associate Survey

3.29. The analysis of the survey indicates that the level of impact on a KTP Associate’s earning potential is not consistent year on year. For example, there is a period over which the impact builds up in the first few years after completing the KTP and also a period over which the impact appears to decay towards the end of the 10-year period. **The total (additional) contribution of the KTP to a KTP Associate’s salary over the 10-year period following the completion of the KTP, is estimated at £50,200 per KTP Associate.**

**Attribution of impacts to KTP**

3.30. Comparing the difference between graduate salaries and KTP current salaries adjusted for age and also comparing what the Associates estimate their salary to have been without the KTP provides an indication of the uplift in salaries that could be attributed to the KTP.

3.31. Comparing the two figures indicates that the Associate’s estimated salary uplift is 75% of the actual difference between graduate salaries and KTP Associate salaries. It can therefore be inferred that the majority of the difference in salary compared with the graduate average is attributable to KTP.

**Eliminating Double-counting with Business Benefits i.e. Estimating Additional Business Benefits**

3.32. The survey found that a total of 52% of respondents were employed by the KTP partner business immediately after the KTP had finished. Drawing upon the information provided by the Labour Force Survey, it is possible to estimate the proportion of Individuals that could have stayed on with the company over the 10 years over which it is assumed that the impacts persist.
**Figure 3.14: Length of Time Employees Stay with Same Firm**

| % of employees with same firm after 1 year | 86% |
| % with same firm after 2 year | 76% |
| % with same firm after 5 years | 57% |
| % with same firm after 10 years | 38% |

Source: Labour Force Survey (Jan-Mar 2014)

*Converting Wages to GVA*

3.33. To estimate the impact on the UK economy the salary impact is converted into GVA. An assumption is made that the GVA generated by the Associate comprises the same proportion of salary and other elements (such as profit) as the average across the whole economy. This has been derived from the Annual Business Survey that indicates that salaries represent 55% of GVA.

*Business Start Ups*

3.34. There were a number of Associates that responded to the survey who report having established a new business. This represented 6% of the sample, which is slightly higher than the proportion for the whole population based on data from the 2014 UK Global Entrepreneurship Monitor (GEM)\(^2\), which indicates that the 4% of working age people reported that they were a new business owner.

3.35. Analysis of the responses from those who provided details of the turnover of their business indicates that the majority of business starts remain relatively small and the analysis of the salary impacts presented above capture the majority of the benefits of these new businesses – i.e. they are predominantly sole traders. To avoid double counting the benefits resulting from the salary of the business owner and the impact of the business, the focus has been on estimating the number of high-value businesses that have been started by KTP Associates.

3.36. The survey has identified one respondent who reported that their business has a high turnover (i.e. of greater than £1 million). This represents 0.4% of respondents to the survey. Data from the UK GEM found that 17.6% of early stage entrepreneurs have created more than 10 jobs and expect growth of more than 50%. Applying this figure to the 4% in paragraph 3.30 suggests that 0.7% of working age people own a new business with high growth expectations. Assuming that the 0.4% ratio is repeated across all Associates, it is expected that there to be 35 high turnover businesses that have been established by Associates. It is assumed that these businesses generate turnover of £1 million on average.

3.37. The level of attribution of the turnover generated through the business to participation in the KTP has been derived from the survey responses to the question about how the overall benefits cited by the respondents who established new businesses were attributed. Figure 3.15 illustrates the responses and indicates an overall attribution of 76%.

3.38. The overall attribution of benefits to the KTP may be affected by value assigned to the attribution of impacts for respondents who reported that they would have achieved the same results, but it would probably take longer. The base assumption is that bringing forward the benefits means

\(^2\) [http://www.gemconsortium.org/docs/download/2266](http://www.gemconsortium.org/docs/download/2266)
that the KTP has a 75% attribution value (as opposed to 100% for those who answered that they would definitely not have achieved these results)\textsuperscript{21}.

3.39. Based on discussions with the study Steering Group\textsuperscript{22}, an alternative value of 50% has been also applied in order to test the difference in overall estimates. This suggests that the overall level of attribution of the KTP could be adjusted to 57%.

**Figure 3.15: Attribution Assumptions for New Business Formation Impacts**

<table>
<thead>
<tr>
<th>% of turnover of new business established by KTP Associates</th>
<th>Attribution Assumption</th>
<th>Overall Attribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would definitely not have achieved the same results</td>
<td>5%</td>
<td>100%</td>
</tr>
<tr>
<td>Would probably not have achieved the same results</td>
<td>17%</td>
<td>75%</td>
</tr>
<tr>
<td>Would have achieved the same results, but it would have taken longer</td>
<td>78%</td>
<td>50% - 75%</td>
</tr>
<tr>
<td>Would probably have achieved the same results</td>
<td>0%</td>
<td>25%</td>
</tr>
<tr>
<td>Would have achieved better results</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Would definitely have achieved the same results</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>57% - 76%</td>
</tr>
</tbody>
</table>

Source: KTP Associate Survey

**Multiplier Effects**

3.40. The multiplier impact has been taken as the average GVA Multiplier across all sectors included in the 2010 UK Input-Output tables. This provides a GVA multiplier of 1.80; this has been applied to the results.

**Economic Impacts**

3.41. As noted earlier, the details of the impact calculations are presented in a table in Appendix F. A summary of the cumulative impacts for the 30 years from 1984-2014 is presented below.

**Impact of increased productivity of KTP Associates**

3.42. There have been a total of 9,346\textsuperscript{23} Associates that have participated in the KTP programme between 1984 and 2014. Over 40% of Associates have completed their KTP in the last 10 years; therefore, based on the analysis that the impact on salaries lasts at least 10 years, the full impact of their KTP experience has not yet been realized. To model the impacts to date, the salary uplift figures in Figure 3.13 have been applied to the number of years that the Associates have worked since completing the KTP (as mentioned previously, it is assumed that the benefits of the KTP persist for 10 years only).

\textsuperscript{21} Values of attribution have been informed by recommendations in the following documents: Additionality & Economic Impact Assessment Guidance Note, A Summary Guide to Assessing the Additional Benefit, or Additionality, of an Economic Development Project or Programme, prepared by the Scottish Enterprise’s Appraisal & Evaluation Team, 2008; and emda Strategic Programmes 2007/08 – 2009/10, An evaluation toolkit March 2009, copyright of Nottingham Trent University.

\textsuperscript{22} The Study Steering Group consisted of representatives from Innovate UK, the Research Councils and HEFCE.

\textsuperscript{23} 9,346 is the number completed in 2014 or before; 9,855 mentioned earlier in the report includes those that are in ongoing KTPs.
3.43. The results of the analysis indicate that the cumulative impact on KTP Associate salaries to date is £376m. Of this total, £254m has been paid to Associates working outside of the KTP partner business. Using these salaries to estimate the impact on company GVA indicates that the overall direct contribution to the GVA of these businesses is estimated at £452m.

**Figure 3.16: Cumulative increase in the Productivity of KTP Associates 1984-2014**

<table>
<thead>
<tr>
<th>1984-2014</th>
<th>Number of KTP Associates (completed by 2014)</th>
<th>9,346</th>
</tr>
</thead>
<tbody>
<tr>
<td>Salary earned by KTP Associates outside KTP Businesses</td>
<td>£254,178,000</td>
<td></td>
</tr>
<tr>
<td><strong>Ratio of GVA to Salary</strong></td>
<td>1.82²⁴</td>
<td></td>
</tr>
<tr>
<td><strong>Direct Contribution of Associates to the GVA of non-KTP businesses</strong></td>
<td>£462,142,000</td>
<td></td>
</tr>
</tbody>
</table>

**Impact of High Value New Businesses started by KTP Associates**

3.44. The impact of new business started by KTP Associates that is additional to the uplift in salaries and attributable to the KTP is presented in Figure 3.17. Based on the information from the KTP Associates survey, it is estimated that Associates may have established 35 high value businesses with an assumed turnover of £1m each. Using the same persistence factors as for salary uplift – i.e. 10 years and the attribution factor of between 57% and 76% as set out in Figure 3.15, it is estimated that the cumulative impact that can be attributed to the KTP programme on the GVA of these businesses is between £56m and £75m over the 30 year period.

**Figure 3.17: Cumulative increase in GVA of new business starts attributable to KTP**

<table>
<thead>
<tr>
<th>1984-2014</th>
<th>Number of High Value Businesses</th>
<th>35</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average Turnover per High Value business</td>
<td>£1,000,000</td>
<td></td>
</tr>
<tr>
<td>Cumulative 10 year Turnover</td>
<td>£350,000,000</td>
<td></td>
</tr>
<tr>
<td><strong>Attribution to KTP</strong></td>
<td>57%</td>
<td>76%</td>
</tr>
<tr>
<td>Additional Turnover attributable to KTP</td>
<td>£200,664,368</td>
<td>£269,505,000</td>
</tr>
<tr>
<td>GVA as a proportion of total turnover</td>
<td>28%</td>
<td>28%</td>
</tr>
<tr>
<td><strong>Direct Contribution to GVA</strong></td>
<td>£56,186,023</td>
<td>£75,461,000</td>
</tr>
</tbody>
</table>

3.45. In summary, therefore:

Adding up the two impacts generated by increased productivity of KTP Associates in non-KTP participating businesses and new high-value business start-ups by KTP Associates provides an estimate of the direct contribution of the KTP programme to the GVA generated by KTP Associates (not taken into account in the Regeneris Consulting study).

**Net direct economic impact:** This additional direct contribution to the UK GVA from the KTP Associates participation alone is estimated at £518,327,908 - £537,603,000 over the period 1984-2014. This direct GVA generated through participation in the KTP programme by the KTP Associate will have additional wider indirect and induced benefits for the economy as a whole. These have been estimated using a 1.8 multiplier effect derived from the 2010 UK Input-Output tables.

**Wider economic impact:** Applying this multiplier to the direct contribution results to an estimate of the overall contribution of the KTP Associates to the UK economy: £932,990,234 - £967,686,000 over the 30-year period.

²⁴ See paragraph 3.33. This figure is based on 55% salary contribution to GVA.
4. Benefits for the Knowledge Base and Impacts on the Economy

4.1. This section presents the benefits to Knowledge Base institutions resulting from participation in KTPs drawing upon their responses to the survey and case studies. It also provides estimates of the resulting impact on the UK economy.

**Key Benefits for the Knowledge Base**

4.2. The programme either met or exceeded expectations for all respondents. As shown in Figure 4.1, for 59.4% of respondents the programme exceeded and has met the expectations for the remainder i.e. 40.6% of respondents.

**Figure 4.1: Programme Performance vs Expectations**

![Programme Performance vs Expectations](image)

*Source: WECD KTP Survey*

4.3. As shown in Figure 4.2, the vast majority of Knowledge Base institutions (91%) have been involved with the programme for establishing closer industry partnerships; two thirds of institutions got involved for enhancing the impact of their research (66%) and, getting a better understanding of industry (65%).

**Figure 4.2: Knowledge Base KTP Expectations and Actual Achievements from Participation**

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Expected</th>
<th>Achieved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Closer industry partnerships</td>
<td>91.2%</td>
<td>82.2%</td>
</tr>
<tr>
<td>Enhancing the impact of research</td>
<td>66.4%</td>
<td>60.0%</td>
</tr>
<tr>
<td>Better understanding of industry</td>
<td>65.0%</td>
<td>68.9%</td>
</tr>
<tr>
<td>Research publications</td>
<td>57.7%</td>
<td>60.0%</td>
</tr>
<tr>
<td>Improved teaching material</td>
<td>53.3%</td>
<td>56.3%</td>
</tr>
<tr>
<td>Improvement in staff skills</td>
<td>53.3%</td>
<td>43.7%</td>
</tr>
<tr>
<td>New research projects</td>
<td>45.3%</td>
<td>42.2%</td>
</tr>
<tr>
<td>High quality research</td>
<td>32.8%</td>
<td>26.7%</td>
</tr>
<tr>
<td>Contribution to research strategy</td>
<td>32.1%</td>
<td>33.3%</td>
</tr>
<tr>
<td>Enrichment of staff – talent attraction</td>
<td>32.1%</td>
<td>21.5%</td>
</tr>
<tr>
<td>Attracting students to courses</td>
<td>13.1%</td>
<td>8.9%</td>
</tr>
</tbody>
</table>

*Source: WECD KTP Survey*

4.4. Areas that have exceeded expectations include gaining better understanding of industry, production of research publications, making a contribution to research strategies and leading to improvements of teaching materials, as illustrated by the following statements provided by participants to the survey.

- ‘Case studies were produced to illustrate application of lecture course material’
- ‘Material used for Masters teaching and practical’
The Impacts of KTP Associates and Knowledge Base on the UK Economy

‘Used KTP SME as a live case study for final year entrepreneurship module’

‘For applied fields this has been an excellent means of embedding conceptual material in the field, especially relevant for built environment’

‘One new course material for the IT for Managers undergraduate module’

‘A specific validated training programme has been developed for peer support workers who are going to be employed in mental health settings that is the first one in the country. The curriculum and assessment procedures were developed in conjunction with service users, clinicians and academics - which is the first one in the country’

4.5. The following feedback provided by Edinburgh Napier University also illustrates the wide range of benefits and impacts that are accrued by participating Knowledge Base organisations.

**Edinburgh Napier University (ENU)** was originally founded as Napier Technical College in 1964, amalgamating with Napier College of Science & Technology and Edinburgh College of Commerce in 1974, before being awarded University status in 1992. ENU has strong links with business given its history as a technical college and continues to grow its business engagement at the same time as increasing its research focus. It also has a strong historic KTP involvement dating back to 1989 and has undertaken 457 KTPs in total to date. Involvement with KTPs is supported by the East of Scotland KTP centre that assists universities in the East of Scotland in undertaking KTPs and a University internal business development team.

Ten Departments in the University have undertaken KTPs to date, with the School of Engineering and the Built Environment accounting for 77% of these. A highlight of the Department’s involvement with KTPs has been the shortlisting of one of their latest KTP projects for the 2013 Knowledge Transfer Partnership Awards indicating recognition of their work - the project was led by Professor Sean Smith and Dr Elena Prokofieva from the Institute for Sustainable Construction, working in partnership with Icopal, the world’s largest geo-membrane manufacturer.

KTPs are perceived as an important tool of engagement with SMEs, offering a depth of engagement that would not be possible otherwise. All academics interviewed stated that KTPs enabled closer industry partnerships, including in one case, better access to Trade Body Events and membership of formal industry working groups.

In terms of KTPs’ fit in the wider landscape, the general feedback from the consultations was that KTPs are fairly unique. Innovation vouchers could be perceived as an alternative but only provide up to £5k of funding. Consultations also suggested that Interface Scotland could support the development of new KTPs – Interface was created in 2005, aimed at linking business and industry to academia and in receipt of funding from the Scottish Funding Council and the Scottish Government.

Overall the experience from participating in KTPs has been positive. All academics interviewed for this study stated that they really enjoyed participating in the KTP. As stated by one of the consultees, ‘...KTPs are without a doubt the hardest aspects of my job, juggling the interests of multiple stakeholders and approaches, yet I consistently find them to be the most rewarding’. The most significant benefits impacting academics were: contribution to research strategy, improved teaching material and closer industry partnerships. For example, KTPs led to guest lectures from companies and case studies resulting in improved teaching material. One of the interviewed academics also described how the press coverage of a successful KTP attracted students to their course.
Furthermore, for the academics, successful completion of KTPs show that they can work well with industry and probably lead them to a promotion ‘by demonstrating managing the grant and getting a high rating and publications out of the KTP’. For example, the research team involved in the Icopal KTP mentioned earlier have presented their findings to over 200 companies at industry seminars and exhibited at Ecobuild, Futurebuild and the Edinburgh Science Festival.

Financial benefits in the form of consultancy income, patents and licensing income were also achieved. KTPs delivered substantial consultancy income, particularly in engineering generating, where it has been estimated that £30-£40k consultancy income has been generated per KTP. KTPs have also resulted in £38k of licensing income over four years. Patents from KTPs have also led to both cost savings for businesses and income generation for the University. For example, 9 products have come out of 2 particular patents jointly held by the University and a company.

All academics interviewed stated that they would give KTP a high additionality rating as any benefits achieved were accelerated rapidly or, would have not occurred at all. The discipline of a project plan with timetable and the role of the KTP liaison officer plus forcing companies to think longer term than they would otherwise were all seen to be important factors in increasing additionality.

4.6. Furthermore, as shown in Figure 4.3:

- For 82% of respondents, the programme is important for improving the quality of the research produced by the Departments participating and the institution as a whole.
- For just over three quarters of survey respondents (77%), the KTP programme is important for developing general staff skills and the skills of the KTP Associates – with a 26% considering it extremely important.
- For 74% of respondents the KTP programme has an impact on securing new grants (additional to KTP).
- Furthermore, for two thirds of respondents (66%), the KTP programme has an impact on attracting new talent to their department or specific area of work.
- Views are split in terms of the importance of the KTP programme in increasing higher degree registrations i.e. for 49.6% the KTP programme has an impact while for 50.4% the programme is not important.

**Figure 4.3: Importance of KTP in Contributing to Various Organisational Aspects**

Source: WECD KTP Survey
4.7. Three quarters of Knowledge Base partners stated that their KTP participation led to further financial benefits. These benefits include consultancy income, new grants, patents and licensing income and spinouts, as follows:

- 40% have benefited from improved consultancy income;
- 11% from increased teaching income;
- 9% from development of patents;
- 7% from spinouts;
- 2% from licensing income; and,
- 28% cited various other financial benefits generated through success from profile of project, research income, research contracts, journal articles, grant income, further KTP projects and conferences.

4.8. Knowledge Base organisations see also the KTP programme as a mechanism for raising their profile. As stated by respondents to the survey, participation in KTPs has led to:

‘General business awareness growth around the valuable contribution made by media & creative related studies and projects’ (Knowledge Base organisation with a KTP awarded to their Department of Film and Media)

‘Kudos and PR for both individual Academics and the Institution through the Annual KTP Awards programme. This enables us to tell positive stories about the effectiveness of our collaborations with external organisations. It is externally validated evidence of the value of our approach and of our value as a collaborator to businesses and organisations’ (Knowledge base organisation with a Business Leader of Tomorrow award in the Annual KTP Awards)

4.9. As the following example illustrates in more detail, the KTP programme has also provided the material and evidence needed to demonstrate to external stakeholders and funders an institution’s impact including for REF purposes.

The University of Manchester is the largest single-site university in the UK consisting of over 38,000 students. It has strong ongoing KTP involvement and has undertaken 795 KTPs in total since 1986. The Faculty of Engineering and Physical Sciences dominates KTPs accounting for 435 (54.7%) of the KTPs undertaken. The number of KTPs in the faculty peaked in 2007 then declined in the economic downturn before a recovery in 2012.

Academics see establishing an office in the University to specialise in KTPs as a very good thing as ‘this takes the pressure off academics’.

KTPs are seen as an excellent method of engaging with SMEs, sharing the expertise of the University and attracting companies with funding but also boosting the kudos of the University in terms of business engagement and in demonstrating impact e.g. in the Research and Excellence Framework 2014 (REF 2014).

One of the REF2014 case studies submitted was under the title of Mathematical Software for Computing Matrix Functions. These functions underpin computer simulations used to inform decision-making in a wide variety of industries used in the finance, engineering and pharmaceutical industries. A KTP grant (£128,000 in 2010-2013) funded a full-time KTP Associate.

Academics participating in KTPs identify a wide range of benefits generated from their participation. These include new research projects, research publications, contribution to research strategy and closer industry partnerships including better understanding of industries such as Formula 1 and oil and gas.

26 http://results.ref.ac.uk/Submissions/Impact/840
KTPs have also led to research follow-on funding of £500k and other grants of £100k. The discussions at the University also showed that no specific financial benefits were recorded although KTP funding was welcomed for providing the ability to generate other funding. All academics rated KTP benefits as making a difference, with one of the interviewees rating KTP as being transformational.

*Key messages from the academics include the following:*

- ‘Exposure to industry is really important – it gives you strategic understanding and more focus in how you apply your research’
- ‘Establishing links with other groups in the University – KTP has allowed me to grow my network within the University’
- ‘This is one of the most valuable funding schemes that government puts money into. It helps train academics to work with industry’

In general:

- KTPs are seen to be unique in the landscape and particularly relevant for applied research.
- It has been also highlighted that ‘KTP is a good concept and is well managed’. However, it needs to be appreciated that ‘Skills shortages in particular sectors can lead to difficulties recruiting Associates’.
- Consultees also suggested that in order to continue/ensure the success of the programme from the Universities’ point of view, ‘Universities need to understand that their speed of recruitment needs to match to commercial timescales’ and ‘Create an expectation of follow-on research from KTPs’.

### The Added Value of KTP Participation for the Knowledge Base

4.10. As shown in Figure 4.4, four in 10 respondents (39%) would not have achieved the benefits that have been achieved without participating in the KTP programme. An additional four in 10 respondents (41%) have achieved some of the benefits as a result of their participation in the KTP programme while a further 7% have achieved higher quality benefits as a result of the KTP (time additionality) and another 7% have achieved benefits earlier than they would have done without participating in the KTP. Only for 6% of respondents does participation in the KTP represents deadweight.

#### Figure 4.4: Added Value of KTP Participation

![Added Value of KTP Participation](image)

4.11. Knowledge Base organisations were also asked about the extent of the overall impact of the benefits generated as a result of their participation in the KTP programme on their organisation.
On a scale 1 to 5, where 1 means no difference made by the KTP participation and 5 is for transformational results, only under 1% of respondents (0.7%) stated that participation in the KTP programme made no difference to their organisation. Furthermore:

- 9.0% of respondents said the benefits were transformational;
- 45.5% gave a score of 4 (very significant contribution);
- 33.6% gave a score of 3 (significant contribution); and,
- 11.2% gave a score of 2 (some contribution).

As stated by one respondent:

'KTP was crucial to winning the £100k research project - that is 10% of the annual budget for the department.'

**Economic Impacts - Approach and Assumptions**

4.11. In general, the way the financial information is held by Knowledge Base organisations makes it difficult to isolate the specific funding stream supporting expenditure related to KTP activities. Nevertheless, there are three areas of impacts of the KTP programme on the Knowledge Base that have been quantified drawing upon the survey findings. These are as follows:

- In the first instance the programme has provided funding that has supported direct employment in the participating Knowledge Base organisations in the form of supervisors and other administrative support. In addition, the survey identified several other quantifiable impacts. These are:
  - Securing additional research funding (reported by both the Associates and the Knowledge Base); and,
  - Enabling individuals within the Knowledge Base to generate consultancy income.

**Direct Employment**

4.12. The direct employment supported within the Knowledge Base has been calculated assuming that a supervisor spends 1 day every 2 weeks with each KTP Associate. This represents 0.1 FTE per KTP Associate (10%).

4.13. Using the information on the number of KTP Associates starting and completing each year, the number of KTP Associates that are active each year has been estimated. The average over the last 10 years has been 667 KTP Associates. This is therefore assumed to have supported an average of 66.7 FTE supervisor jobs across the Knowledge Base in the last 10 years.

4.14. On this basis, in total between 1982 and 2014, the KTP Programme is estimated to have supported 1,690 years of FTE employment within the Knowledge Base.

**Additional Research Funding**

4.15. Respondents to both the Associates and Knowledge Base surveys reported that the KTP had secured additional research funding. It is highly likely that the values referred to by either the Associate or the Knowledge Base will be the same research funding. Both results have been analyzed to understand the degree to which the figures correlate.

4.16. A total of 5% of the respondents to the Associate survey report that they securing additional research funding was a financial impact of the KTP. The average value of the research funding
secured was £105,000. Assuming a similar proportion of all Associates secured a similar level of funding would indicate that a total of £49.3m of research funding was secured.

4.17. In terms of the Knowledge Base, 20 respondents reported that they had secured additional research funding. In total these institutions reported a combined research income of £7.5m associated with the KTP. These respondents reported that they were responsible for 16% of KTP (146 KTP out of a total of 922 KTP) reported across the whole survey. This income represents an average of £51,000 per KTP. Applying this ratio to the whole population of KTP (7,252) indicates that a total of £58.7m of research funding was secured.

4.18. These figures provide an estimate of the gross additional research funding secured. Overall attribution has been estimated by applying attribution values to the responses to the question ‘in the absence of the KTP to what extent you think you would have achieved these benefits’ (in a similar manner to the one use for estimating overall attribution rate for KTP Associates – paragraph 3.34 and 3.35 of the report).

4.19. As shown in Figure 4.5, the overall additionality figure could range between 73% and 79%.

**Figure 4.5: Knowledge Base attribution to KTP – Secured Research Funding**

<table>
<thead>
<tr>
<th>Attribution Assumptions</th>
<th>Overall Attribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would definitely not have achieved the same results</td>
<td>46%</td>
</tr>
<tr>
<td>Would probably not have achieved the same results</td>
<td>0%</td>
</tr>
<tr>
<td>Would have achieved the same results, but it would have taken longer</td>
<td>23%</td>
</tr>
<tr>
<td>Would have achieved some of these results</td>
<td>27%</td>
</tr>
<tr>
<td>Would have achieved these results but not as high quality</td>
<td>3%</td>
</tr>
<tr>
<td>Would probably have achieved the same results</td>
<td>0%</td>
</tr>
</tbody>
</table>

| Source: WECQ Estimates based on KTP Survey results |

4.20. Similar attribution assumptions were derived from the Associate Survey findings about research income. This indicates a slightly higher level of attribution amongst the research associates that reported securing funding.

**Figure 4.6: Associate Attribution of research funding secured to KTP**

<table>
<thead>
<tr>
<th>Attribution Assumptions</th>
<th>Overall Attribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would definitely not have achieved the same results</td>
<td>24%</td>
</tr>
<tr>
<td>Would probably not have achieved the same results</td>
<td>54%</td>
</tr>
<tr>
<td>Would have achieved the same results, but it would have taken longer</td>
<td>22%</td>
</tr>
<tr>
<td>Would probably have achieved the same results</td>
<td>0%</td>
</tr>
<tr>
<td>Would definitely have achieved the same results</td>
<td>0%</td>
</tr>
<tr>
<td>Would have achieved better results</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
</tr>
</tbody>
</table>

| Source: WECQ Estimates based on KTP Survey results |
4.21. Applying the attribution assumptions to the gross research spending secured indicates that a total of £42.8m - £46.2m of research funding can be attributed to the KTP based on the Knowledge Base assessment and £37.2m - £39.9m of funding based on the Associate assessment.

Consultancy Income

4.22. Consultancy income was reported by 23 of the respondents to the Knowledge Base survey who reported a total of 227 KTP between them, which is 25% of the KTP report across the survey. The combined total of consultancy income reported was £1.3m - this equates to £5,900 per KTP.

4.23. Applying these assumptions to the total number of KTPs indicates that there could have been a total of £10.6m of consultancy income generated by the Knowledge Base. A similar approach to attribution as above indicates that a total of 68%-74% of the consultancy income is attributable to the KTP i.e. equating to £7.5m - £7.8m.

Figure 4.7: Knowledge Base attribution to KTP – Consultancy Income

<table>
<thead>
<tr>
<th>Share by consultancy income</th>
<th>Attribution Assumptions</th>
<th>Overall Attribution (share of funding)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Would definitely not have achieved the same results</td>
<td>40%</td>
<td>100%</td>
</tr>
<tr>
<td>Would probably not have achieved the same results</td>
<td>0%</td>
<td>75%</td>
</tr>
<tr>
<td>Would have achieved the same results, but it would have taken longer</td>
<td>23%</td>
<td>50% - 75%</td>
</tr>
<tr>
<td>Would have achieved some of these results</td>
<td>14%</td>
<td>50%</td>
</tr>
<tr>
<td>Would have achieved these results but not as high quality</td>
<td>13%</td>
<td>50%</td>
</tr>
<tr>
<td>Would probably have achieved the same results</td>
<td>9%</td>
<td>25%</td>
</tr>
<tr>
<td>Total</td>
<td>100%</td>
<td>68% - 74%</td>
</tr>
</tbody>
</table>

Source: WECID Estimates based on KTP Survey results

4.24. In addition to the direct impact of additional research funding and consultancy income an indirect multiplier has been applied to reflect the wider impact on the economy of the additional activities that this income will support. The multiplier is based on the findings of the report *The Economic Impact of Higher Education Institutions*[^7^], according to which HEIs have an economic multiplier of 2.35.

Figure 4.8: Estimated Economic Impacts through Knowledge Base Participation

<table>
<thead>
<tr>
<th>Gross Impact</th>
<th>Net Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supervisor jobs (Average FTE p.a.)</td>
<td>67</td>
</tr>
<tr>
<td>Gross Research Income (1984-2014)</td>
<td>£58.7 million</td>
</tr>
<tr>
<td>Gross Consultancy income (1984 – 2014)</td>
<td>£10.6 million</td>
</tr>
<tr>
<td>Total</td>
<td>£69.3 million</td>
</tr>
<tr>
<td>Total Additional Output in UK economy associated with Knowledge Base additional income through the KTP programme (including HEI Multiplier)</td>
<td>£117.5 – £126.9 million</td>
</tr>
</tbody>
</table>

[^7^]: http://www.universitiesuk.ac.uk/highereducation/Pages/ImpactOfUniversities.aspx
5. **Considerations for the Future**

5.1. Interviews with key stakeholders and the surveys with KTP Associates and the Knowledge Base have provided additional information about the programme and the process to date and have highlighted issues for consideration for the future. These are summarised in this section.

**High Level of Advocacy**

5.2. The KTP programme is highly supported by both KTP Associates and Knowledge Base organisations, with nearly every respondent stating that they would recommend the programmes to their peers.

*Figure 5.1: KTP Advocacy levels by KTP Associates and Knowledge Base Organisations*

<table>
<thead>
<tr>
<th>KTP Associates</th>
<th>Knowledge Base Organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>96% would recommend the KTP programme to businesses</td>
<td>97% would continue to participate in the KTP programme</td>
</tr>
<tr>
<td>95% would recommend the KTP programme to researchers / graduates / postgraduates</td>
<td>95% would work again with their KTP business partner</td>
</tr>
<tr>
<td></td>
<td>99% would recommend the programme to other Knowledge Base organisations</td>
</tr>
</tbody>
</table>

5.3. In terms of the future of the programme, 91% of KTP Associates and 95% of Knowledge Base organisations would like to see the programme continued.

*Figure 5.2: Recommendations by KTP Associates and Knowledge Base Organisations about the future of the KTP Programme*

<table>
<thead>
<tr>
<th>Future of the Programme</th>
<th>% KTP Associates</th>
<th>% Knowledge Base Organisations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continue</td>
<td>91%</td>
<td>95%</td>
</tr>
<tr>
<td>Scale up activity</td>
<td>84%</td>
<td>91%</td>
</tr>
<tr>
<td>Replicate</td>
<td>84%</td>
<td>82%</td>
</tr>
</tbody>
</table>

*Source: WECD KTP Surveys*

5.4. Among the reasons provided for these recommendations by the KTP Associates were the following:

- ‘I see no reason to stop it. If anything, such schemes are probably more important nowadays than they were when I was a KTP Associate (given the current importance of REF Impact)’

- ‘Valued programme, triple win - Associate, Academic, Business, if managed well. An effective knowledge transfer vehicle and a cost effective R&D solution’

- ‘This is a great way to train up the next generation of engineers and technologists. So it should be expanded to make the UK a more knowledge-orientated economy’

- ‘A KTP is a multidisciplinary work which enforces the essence for collaboration. Only such an experience can really stretch the mind of all involved to think out of the box’.

- ‘It is an excellent platform for new graduates/researchers to enter the innovation ecosystem. I feel that it is also a great incentive for businesses to innovate (especially considering the relatively low cost outlays for access to high quality resources)’
5.5. For Knowledge Base organisations, their recommendation for continuation of the programme (95% would like to see the programme continued) has been justified on the following grounds among other reasons:

‘In 15 years of participation, we can’t find a better alternative to drive strategic collaboration with external partners in a way that shares the risks fairly between the collaborators’

‘There is a genuine need for the continuation for the programme as this meets the strategic need for the majority of businesses, without it the companies would continue with their day to day problems and lose the opportunity to develop the business further. This would have a negative impact on the British economy, jobs, growth and suppress innovation within the UK.’

‘KTP is a unique intervention in that its focus is on business growth and wealth creation but it has a massive impact on the professional development of the Associate and university staff and the relevance of academic outputs. Overall, KTP delivers outstanding long-term economic benefit.’

‘It is an exceptionally successful government initiative which consistently delivers improvements in company profits and employment.’

5.6. Furthermore, as shown in Figure 5.2, a significant number of respondents (9 in 10 among the Knowledge Base organisations and 8 in 10 among KTP Associates) made the case for scaling up the programme. The following statements represent examples of feedback provided by Knowledge Base organisations:

‘In the context of the ongoing economic challenges of the UK, investment in a productive interface between Universities, industry and other organisations can play a critically important part in economic recovery and the UK is already investing much less in this than are many other competitor economies’.

‘The scale-up could include direct involvement/creation of combined training programmes to operate both ways (industry to academia and academia to industry) through the development of formal learning materials and information delivery through courses’.

‘The KTP Programme is an excellent programme for company-university engagement and should be scaled up to support more leading edge projects’.

‘There will be considerable value in applying the programme to international partnerships’.

5.7. Proposals from KTP Associates for scaling up the programme mainly refer to: collaboration amongst participating universities, collaboration amongst participating businesses within the business community, use of the model in Europe and internationally and exposure to the global market, inclusion of more sectors and marketing more/extending the programme to colleges.

‘The model can be replicated by tie with international universities and international businesses’

‘A lot of the developing economies have great potential to make use of this model. Coming from India I feel that access to funding and a knowledge base would be a great enabler for SMEs to venture into ‘higher risk’ projects with a high impact potential’

‘I currently live in Greece, a country which is in great need of innovative technologies and new business solutions but has great lack of tools and skills to deliver these. It also lacks opportunities for employment of graduates (currently considered not skilled enough). I think this would be a great scheme for my country’

‘If this model could be used more extensively out with its current capacity or even in the EU, additional collaboration and output could be generated’

‘Apart from the technology-related projects, this might be used in other sectors (e.g., management, public sector etc.) to train up graduates and help various organizations’
The Impacts of KTP Associates and Knowledge Base on the UK Economy

‘Similar to Pharmaceutical industry the application of statistics in other industry through KTP can be replicated to see the cost benefit of employing a statistician in an industry’

‘The programme could open more opportunities for learning and innovation in the arts and heritage organisations’

**Success Factors**

5.8. For KTP Associates, aspects of the programme that work particularly well have been presented in detail in Section 3 of the report and could be summarised as follows:

- **Access to and creation of employment opportunities for graduates and post-graduates** - As also confirmed by one of the Knowledge Base organisations, ‘In most KTPs the Associates were PhD graduates, who were able to take their research outcomes and develop applications to both benefit the industrial partner and the associate themselves - all finding employment with their host companies.’ KTPs are also seen as especially helpful in more niche areas where there are fewer opportunities for employment outside the Knowledge Base organisations.

- **Opportunity to liaise with senior members of staff** - ‘It selects high quality graduates and gives them opportunities to liaise with senior members of staff in both the Industrial partner and the Academic partner, increasing their profile greatly’.

- **Training/upskilling opportunities including both technical skills and leadership development** - ‘The training opportunities provided are of enormous benefit as is the specific training budget provided.’ It is worth noting that since 2011, training offered to KTP Associates has been further refined so that it is relevant to their capabilities and skills.

- **Improving business awareness and providing a unique opportunity to influence the performance of a business** - As it was stated by a survey respondent, ‘KTP offers a unique insight into the culture of a young start-up company and a route out of the post-doc treadmill, to a (slightly) more secure job situation within the KTP sponsor company’. On the other hand, it was recognised that implementation of practices/tools resulting from KTP projects (and hence potential impact on company performance) is not always within the control of the programme. As it was stated, ‘For the programme to be successful, it needs the business to be willing to embrace any new practices brought in by the KTP, otherwise it is pointless because they haven’t learned anything’.

- **Support for practical application of research knowledge** - ‘A good cross-over link between PhD studies and full-time consultancy work. Resources from the University in terms of skills, equipment and access to research papers are very valuable’.

- **The role of the KTP supervisor as an independent expert** – ‘Having an independent expert, i.e. the KTP supervisor, around the business regularly providing day-to-day and long-term objectives was a very successful model’.

5.9. For the Knowledge Base organisations, the aspects of the programme that work well for them are also reflected in the benefits already highlighted earlier in the report e.g. closer working relationship and better understanding of the industry and corporate world, as illustrated by the following statements.

‘For the academic team this is a fantastic opportunity to develop their theoretical knowledge on real time industrial projects’

‘Giving access to real world problems. The knowledge transfer has been very effective and has allowed future projects to be undertaken’
5.10. At the same time, for a small number of Knowledge Base organisations, there may be scope to assess whether more flexibility can be incorporated with regard to the way smaller companies (1-10 employees) with limited resources can relate to the programme. As stated by one Knowledge Base respondent, ‘I work in the digital media sector and the creative industries (in addition to IT) and many of the smaller companies cannot invest the time and effort needed to have a KTP. There needs to be a simple fast track system for smaller SMEs as well as more conducive regulatory environment of course’.

5.11. Location/distance between the Knowledge Base organisation and the business partner has not always worked for all. As it was stated by one respondent, ‘the geographical distance between the KB partners and the company was a bit of a hindrance in terms of spending valuable time in the company’.

5.12. At operational level, a number of aspects that work well and improve both the take up and success rates of the programme have been highlighted by Knowledge Base organisations. These include:

- **Establishing an office/assigning a team in the University to specialise in administration of KTPs** – as this is seen as taking the pressure off academics.

- **Attributing the KTP grant to the lead academic or the relevant Department** – would further incentivise the academic community. As it was mentioned by academics in institutions where this is not the current practice, ‘It would be useful if the academic support money were made available as a grant specifically to the lead and support academics ensuring that money was for their use, and not as general money that can be swept up by the institution’.

- **Co-ordinating and guiding processes in place** - including the role of the KTP Adviser (see feedback from Lancaster University) and the KTP centres in Scotland (as stated by the University of Strathclyde below but also highlighted by the vast majority of respondents based in Scotland). On the other hand, there was agreement that more specialist support and resources may be needed for example, for ‘less traditional KTP projects e.g. those involving the third sector where the transfer is not bound up in a technological or product based advance’.

- **Rigour and intensity of the application process that is seen as contributing to the success of the KTP project** (highlighted in the discussions with a number of Knowledge Base organisations involved in successful KTP projects including Lancaster University – case study below).

5.13. The following feedback received from Lancaster University and the University of Strathclyde confirms the abovementioned issues.

**Lancaster University** (officially the University of Lancaster) was established by Royal Charter in 1964. The University has completed 37 KTPs since 1985 and currently has 5 live KTP projects. The University has had a dramatic increase in the number of departments getting involved in KTPs, from an original 4 departments in 1985 to 11 departments presently. The Engineering Department dominates KTPs, accounting for 33% of all KTPs undertaken to date.

KTPs are seen as invaluable in bridging the relationship between academia and industry and help the university to maintain and improve relationships with their corporate partners. These relations are deepened partly due to the projects’ requirement for consistent contact i.e. ‘There is constant dialogue. Otherwise we might only meet every 3 months for a research project rather than fortnightly for the KTP. Additionally, they allow the university to further demonstrate their strengths and prove why companies should continue to work with them’.
KTPs are also of particular benefit to associates as they provide an opportunity for them to work on high profile projects early on in their career, as well as publish research and a higher probability of them being able to continue to work in industry after a background in academia.

For Lancaster University, the support provided from liaising with the regional adviser was praised as something that works well, 'Where we have engaged with the KTP support network through the regional adviser, this has been brilliant.'

There was also a strong consensus that the success rate for KTP projects is high, at least in part due to the intensity of the application process. It is thought that getting through this stage is highly indicative of a project being successful. The respondents would unanimously recommend KTP to others, as the benefits reaped significantly outweigh any issues. As stated by one academic involved in KTPs, ‘...This a really good scheme and once applied for you have high success rate and lot of benefits to all the parties. It’s a very structured scheme but partners can all get the benefits from it'.

The University of Strathclyde was formed in 1796 when John Anderson, Professor of Natural Philosophy at Glasgow University, left instructions in his will for ‘a place of useful learning’ - a university open to everyone. His vision was realised when Anderson's University opened later that year. Over the following one hundred years the University developed into a major institution with a strong reputation for technological research and learning. In the early 1960s it merged with the Scottish College of Commerce, before becoming the University of Strathclyde in 1964. In 1993, the University merged with Jordanhill College of Education. From 2012 the University has been consolidating its operations on a single campus in the heart of Glasgow - part of a £350 million investment.

The University has participated in 739 KTPs in total from its first involvement in 1986. The Faculty of Engineering has dominated KTP take-up for the University of Strathclyde accounting for 57% of the KTPs undertaken. The University is very successful in blue-sky research. Furthermore, a core value of the University is to be engaged with industry. KTP is seen to be 'an excellent part of that jigsaw'.

KTPs are seen as a fairly unique and effective method of in-depth company engagement. 'KTP is one of the best mechanisms for establishing a deep relationship with a company.' Closer industry partnerships and better understanding of industry is seen as a benefit of KTPs. All academics consulted as part of this study felt that KTPs enabled closer industry partnerships and better understanding, even if it was of company difficulties. It is worth noting that over the past 5 years the KTP portfolio of the University has doubled and many new KTPs are recommendations from industry. The University also runs a week of engagement called 'Engage' to attract companies and has in place an industrial advisory board that KTP company partners have joined.

The following key benefits are attributed to KTPs:

- Follow-on research and conference papers.
- Enhanced teaching materials – KTP Associate produce case studies that demonstrate how a particular concept has been applied.
- Improvement in staff skills 'by getting out to see companies regularly, this being part of the nature of Strathclyde'.
- Offering a promotional tool for the University’s reputation. KTP is also an important performance measure for knowledge exchange in staff appraisals as one of three aspects of academic performance (with research and teaching being the other two).
What works well for the University is that programme is ‘well managed and good personnel’, ‘Enjoyable’, ‘The current version of the online system is very good at getting bids through quickly’. Reducing barriers to academics in being involved is key in the future. As it is stated, ‘The West of Scotland KTP centre go the extra mile and make the job easier. They give you a much higher chance of success’.

The overall assessment of the programme can be summarised by the following statement by one of the academics in the University. ‘KTPs are great; it is all about getting a good match to the interests of both sides’.

5.14. Furthermore, according to feedback provided by KTP Advisers, elements of the KTP programme that work well include:

- A properly structured and well-outlined plan for the KTP project, that is regularly reviewed adapted to reflect relevant policy, operational and planning matters; and,
- Frequent communications between all partners involved, such as at monthly meetings.

5.15. In addition, according to the KTP Advisers, the likelihood of success of the KTP project is increased if the following ingredients are in place:

- Selecting a suitable and dedicated KTP Associate for the KTP project – and to achieve this both the recruitment process of the KTP Associate needs to be rigorous and their compensation needs to be market-competitive.
- Ensuring that all partners share a common vision, have a clear understanding of the programme, agree a plan and remain committed to the project.

5.16. The elements of early planning and commitment have been also highlighted by KTP Associates who participated in the survey. As stated by one respondent, ‘Business deliverables set out at the beginning and a commitment to the project's implementation into the company are key to the success of the KTP and could be improved’.
6. **Summary and Conclusions**

6.1. The main purpose of this study has been to capture the economic and wider impacts specifically arising from the participation of the KTP Associate and the Knowledge Base in the KTP programme, and also make recommendations for data collection and monitoring in the future.

6.2. The roots of the KTP Programme can be found in the Teaching Company Scheme that was introduced by the Science and Engineering Research Council back in 1975 and was based on the teaching hospital idea i.e. with medical students and newly qualified doctors receiving practical training and ‘learning by doing’. However, review of the programme over the last 25-30 years indicates that the concept has evolved significantly. The partnership that is formed between a knowledge base partner and a company partner aims to successfully deliver a specific project that is of commercial benefit to the business and can only happen with the knowledge provided by knowledge partner (and not already available to the business).

6.3. Although the KTP partnership needs to be beneficial to all partners involved, this is clearly a programme that seeks to improve business competitiveness and productivity over the long term through the better use of higher knowledge, technology and skills that reside within knowledge base organisations rather than a programme specifically designed to enhance the skills of individuals or improve their employability and/or support knowledge base organisations in demonstrating and achieving impact. Nevertheless, the extensive consultations undertaken as part of this study with a wide range of stakeholders but mainly with knowledge base partners and KTP Associates have shown that both groups can clearly identify and attribute wider benefits arising from the programme for them personally and professionally and for their organisations. These are presented under the study’s key evaluation questions as follows:

- What has been achieved to date (for KTP Associates and the knowledge base organisations)? How different are the achieved from the anticipated benefits?
- Does the KTP participation generate financial and/or career related end effects on participant KTP Associates? For example, does participation in KTP enhance the earning potential of the Associate and their career opportunities? Does participation in the KTP enhance quality of research for the Knowledge Base? Generates research relevant to the industry/businesses? Improves quality of teaching/teaching materials? Enhances the skills of academics/researchers?
- To what extent are achievements and impacts attributable to the KTP programme?
- To what extent research outcomes emerging from the KTP are relevant to industry?
- To what extent achievements and impacts go beyond direct participants? Does participation lead to further work with KTP business partner/others?
- What has worked well?

**KEY EVALUATION FINDINGS**

6.4. **What has been achieved to date for KTP Associates and the Knowledge Base partner?**

A wide range of benefits are accrued for both KTP Associates and the Knowledge Base: 9,855 graduates and post-graduated have participated in the programme to date. Review of the employment status of KTP Associates also showed that their employment status changes significantly post-KTP, with a significant move from full-time studying to employment in businesses, in academia or setting up their own businesses. 84% were in employment immediately after completing their KTP, 98% are currently in employment including having established and running high growth businesses.
176 Knowledge Base organisations have participated in the programme to date. For Knowledge Base organisations, the key benefit generated from their participation in the KTP is closer partnerships and better understanding of industry (82% and 69% of the respondents respectively). Additional benefits include research related benefits such as research publications, improved teaching materials and new research projects and staff skills development.

6.5. Does the KTP participation generate financial and/or career related end effects on participant KTP Associates? For example, does participation in KTP enhance the earning potential of the Associate and their career opportunities?

The vast majority of KTP Associates stated that that saw improvement in their skills (82%) and over two thirds (70%) have seen a career enhancement – which is also reflected in the change of their employment status; and over half have improved their ability to work collaboratively and work with the industry.

For 94% of KTP Associates, the KTP had an impact on their overall personal and career development – for over a third of these respondents, the impact of the KTP is regarded as transformational.

The KTP Associates were asked to estimate what their salary would have been without the KTP at two points – immediately after the KTP and currently. A total of 89% of respondents stated that their income is higher as a result of their KTP participation than it otherwise would have been.

Analysis of the survey findings over a ten-year period indicates that the level of impact on a KTP Associate’s earning potential is not consistent year on year. For example, there is a period over which the impact builds up in the first few years after completing the KTP and also a period over which the impact appears to decay towards the end of the 10-year period. Estimates, however, indicate that the overall (additional) contribution of the KTP to an Associate’s salary over the 10-year period following the completion of the KTP is at £50,200 per KTP Associate.

6.6. Does participation in KTP enhance quality of research for the Knowledge Base? Generates research relevant to the industry/businesses? Improves quality of teaching/teaching materials? Enhances the skills of academics/researchers?

For 82% of respondents, the programme has been important for improving the quality of the research produced; for just over three quarters of survey respondents (77%), the KTP programme is important for developing general staff skills and the skills of the KTP Associates – with a 26% considering it extremely important; for 74% of respondents the KTP programme has an impact on securing new grants (additional to KTP); and for two thirds of respondents (66%), the KTP programme has an impact on attracting new talent to their department or specific area of work. For 85% of academics the skills and qualifications acquired by the KTP Associates are important for securing additional funding.

It is also worth noting that just over half the participating Knowledge Base partners (58%) enter into the partnership with the expectation to produce research publications and improve other research-related aspects of their organisations. Their expectations, however, tend to be exceeded in all these areas on completion of the KTP project including in terms of production of research publications; the KTP projects making a contribution to research strategy and improvement of teaching materials.

6.7. To what extent are achievements and impacts attributable to the KTP programme?

To a very large extent, key benefits generated for both KTP Associates and Knowledge Base organisations are attributed to the KTP programme –25% of KTP Associates would have achieved same or better results (deadweight) and only for 6% of Knowledge Base organisations participation in the KTP represents deadweight.
Review of evaluations of RDA programmes\textsuperscript{28} suggests that these KTP related additionality levels compare well against, for example, RDA funded business support and competitiveness programmes (with additionality at 35\%) and with programmes relating to people and skills interventions (for which additionality ranged between 51\% and 62\%, depending on whether their focus was on assisting people into employment or skills development respectively).

6.8. **To what extent research outcomes emerging from the KTP are relevant to industry?**

Without conducting interviews directly with business partners, it is not possible to ascertain the extent to which research outcomes emerging from the KTP are relevant to the industry. Some conclusions on this can be deducted from: i) Commercialisation activity of Knowledge Base partners as reported by those participating in the survey; and, ii) Background research undertaken by our team to identify examples of KTP projects that have been submitted as impact case studies in the 2014 REF by Knowledge Base organisations.

**Commercialisation activity:** For example, among 75\% of Knowledge Base partners that stated that their KTP participation led to further financial benefits, 40\% benefited from improved consultancy income; 7\% from spinouts and 2\% from licensing income.

**2014 REF:** Some of the case studies included in this report make specific reference to the impact of their research on industry and how this impact-related information has been used in the REF process. Furthermore our team, in consultation with EPSRC, reviewed 107 REF submitted projects from 62 Universities that made specific reference to KTP grants supporting their impact-generated projects (alongside other grants funding these projects\textsuperscript{29}). On the basis of the 50 projects for which Universities provided financial information, it has been estimated that KTP grants represented just under 3\% of the total grant funding to these projects. It has not been possible to isolate the exact contribution of the KTP grant/support in these cases. However, reported industry benefits from incorporation of research generated from the total grants, demonstrates that research outcomes emerging from research to which KTP is contributing are substantial. These included, for example:

- 36 companies that incorporated research from these projects reported additional turnover of £313 million in total as a direct result of this research.
- An additional 6 companies reported projected turnover increase of £5.2 million in total (on average £867,000 projected turnover per company per annum).
- A further 19 businesses also reported savings of more than £321 million on the basis of research projects (£16.9 million savings per company).

Nevertheless, further research will be needed in the future to establish the nature and extent of the relevance of the KTP research outcomes for the industry and specific sectors (in particular priority sectors and technologies for the UK economy).

6.9. **To what extent achievements and impacts go beyond direct participants?**

As shown in Figure 6.1, according to Knowledge Base survey respondents, the impact of KTP participation reaches far beyond the direct partners involved in the KTP projects including other researchers (58\%); other Knowledge Base departments (44\%) and other Knowledge base organisations (15\%); other businesses in the same sector (42\%) but also other sectors (13\%); and for 10.5\% the KTP has an impact outside the UK.


\textsuperscript{29} Not all projects provided financial information. £178 million was invested in 50 projects; funding has come from many different sources i.e. mainly EPSRC. £5.07 million of funding (2.8\% of total funding for all projects was from KTPs.)
6.10. **What has worked well?**

Section 5 of the report provides a detailed account of what appears to work well at both strategic and operational levels (paragraphs 5.8 to 5.15). Overall, the KTP programme has received a high level of advocacy from both, KTP Associates and Knowledge Base partners, with nearly every respondent stating that they would recommend the programmes to their peers. For example, 99% of Knowledge Base organisations would recommend the KTP programme to other Knowledge Base organisations and 95% of KTP Associates would recommend it to other graduates/post graduates.

**ASSESSMENT OF ADDITIONAL ECONOMIC IMPACTS**

6.11. The study undertaken by Regeneris Consulting\(^3\) established that between 2001/2 and 2007/8, the overall net additional impacts secured by KTP totalled £1.6-£1.8 billion of GVA for the UK economy; this estimate was based on the annual turnover impact/change reported by businesses participating in the programme.

6.12. This evaluation estimates that the net direct contribution to the UK GVA from KTP Associates working in non-KTP participating businesses would be between **£518 million and £538 million** over the 30-year period 1984-2014. This direct GVA generated through participation in the KTP programme by the KTP Associate will have additional wider indirect and induced benefits for the economy as a whole. Including this wider impact, it is estimated that the overall contribution of the KTP Associates in non-KTP participating businesses is between **£933 million and £968 million over the 30-year period** (using a 1.8 multiplier effect derived from the 2010 UK Input-Output tables).

6.13. Additional work has been undertaken for comparability with the results of the previous study i.e. covering similar timelines. This work has shown that an additional £369 million to the UK GVA, not taken into account in the previous study, has been generated though participation of KTP Associates between 2001/2 and 2007/8, thus bringing the total net additional impacts secured by KTP in this time period to **£1.97 - £2.17 billion**.

6.14. Further work has been undertaken to provide estimates of the ROI of the programme taking into account previous estimates presented in the Regeneris report and this study. This work has involved the following steps:

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a. Adjustment of the previous estimates to reflect only the total amount of the public KTP grants investment. The Regeneris report estimated that the ROI of total public investment on the KTP programme is £4.7-£5.2. These estimates, however, are based on public expenditure that includes both the KTP grants and administrative and management costs that are not merely incurred by the KTP programme. Therefore, the ROI of the total public KTP grants investment has been underestimated. Revised ROI figures on this basis suggest that the ROI of public investment on the programme based on the amount of grant figures (excluding administrative costs) is: £6.13-£6.56.

b. Based on financial data provided by Innovate UK (presented in Figure 2.1 of this report) and estimated impacts of KTP Associates (in non-KTP businesses) as described in detail in section 3 of the report, it is estimated that an additional £1.34 of net GVA needs to be added to the above figures reflecting the return on public investment arising from the participation of the KTP Associates not previously taken into account.

c. Taking into account therefore both previous and current calculations, it can be concluded that in total, Return on Public Investment is between £7.5 and £7.9 i.e. approximately between £7.5-£8 of net additional GVA is generated by every £1 of KTP grant funding invested by sponsors through businesses participating in the programme and KTP Associates.

6.15. KTP Associates and businesses participating in the KTP programme are considered to be the key economic beneficiaries of the programme. Knowledge Base organisations are contributing to delivering a service/the programme and their benefits are mainly non-economic benefits such as closer partnerships and better understanding of industry, production of research-related publications, improved teaching materials and new research projects and staff skills development. Nevertheless, it has been estimated that the total additional output in UK economy associated with Knowledge Base additional income through the KTP programme is between £117 million and £127 million over the 30-year period. It needs to be noted that, in general, the way the financial information is held by Knowledge Base organisations makes it difficult to isolate the specific funding streams supporting expenditure related to KTP activities.

Conclusions

6.16. The evaluation has shown that the KTP programme is highly valued by both KTP Associates and Knowledge Base partners. For academics, it offers a wide range of opportunities to further develop their theoretical knowledge on real time industrial projects and gives them an insight into the corporate world. It also offers valuable material for research publications, teaching tools and REF impact case studies. The programme also gives KTP Associates the opportunity to experience both the academia and corporate world and make in informed choice about their career pathway while at the same time improving their employability prospects and enhancing their technical skills.

6.17. The programme appears to have a lasting effect on its alumni, who unreservedly recognise its long-term impact on their career advancement and successes. By all accounts, a high calibre and committed KTP Associate is crucial to the success of the project in the first place; subsequently, their skills acquired in the workplace make a significant contribution to securing additional research grants for their academic teams or, give them an advantage in the labour market (in the form of a job, a promotion or a relatively higher salary) that can ultimately improve the performance of the UK economy. It is, therefore, essential that the investment made on the KTP Associate is well thought through i.e. their recruitment process needs to be rigorous, their compensation package market-competitive and their training/skills development fit for purpose and adding value.
6.18. Academics, trying to juggle multiple priorities of teaching, research and business engagement also regard the KTP projects as greatly rewarding. Their commitment to the project and continuous business engagement is critical for the success of the project and the performance of the KTP Associate. Dedicated administrative resources to support academics in the early stages of the programme and systems in place to enable attributing the KTP grant to the lead academic or the relevant Department may further incentivise the academic community to participate in the programme.

6.19. Overall, as it was mentioned earlier in this section, the KTP programme has received a high level of advocacy from both, KTP Associates and Knowledge Base partners. Furthermore, it appears that there could be significantly higher demand for the programme and opportunities for scaling it up depending on policy priorities and availability of resources.

6.20. The focus of this study has not been on assessing the programme's management and delivery processes. However, during the consultation process with key stakeholders and partners, relevant feedback was provided and some recommendations have been made for some aspects of the programme to be strengthened or become more flexible. No major issues though were raised that might have impacted adversely on the (potential) benefits of the programme on the participants.

**Methodological Challenges and Lessons for Future Research**

6.21. A comprehensive methodological note has been produced outlining a proposed methodology that would further explore causalities and relationships between the various elements of the programme including additional quantitative analyses that could be undertaken to further strengthen the descriptive analyses of the survey, KTP and other administrative data.

6.22. Undertaking this study has also highlighted a number of methodological issues that need to be considered in collating and collecting relevant data for the programme in the future and undertaking future evaluations of the programme.

**Approach**

6.23. The current study offers a unique insight into the views of partners not previously explored and it has produced a wealth of information. It has also shown that by examining various partners in isolation, previous studies may be underrepresenting the value of key aspects of the programme.

6.24. The process by which knowledge is transferred from the knowledge base to businesses and ultimately to the UK economy is a complex one, as a substantial number of organisations and processes are involved in managing and delivering the programme across the UK. Future programme studies need to be designed and resourced to capture the breadth and depth of the programme as a whole including various (current and potential) funding and delivery models.

6.25. Further research could be also undertaken to explore in more depth the reasons that Knowledge Base organisations take up, continue to support and/or drop out from the KTP programme.

**Data and Datasets**

6.26. This is a long-established programme and it is bound to be accompanied by large datasets. However, changes in management of the programme and transfer of data into different types of systems holding management and financial information has resulted into a complex system of data to be navigated in order to extract relevant monitoring and performance review data over a long period of time. Nevertheless, legacy databases hold valuable information that should be relatively accessible and linked to most recent datasets, where possible\textsuperscript{31}.

\textsuperscript{31} A separate note has been produced by our team for Innovate UK making recommendations for simplification of the programme’s legacy databases.
6.27. Furthermore, data collection, collation and analysis need to be resourced to meet the requirements of reporting for both, programme accounting purposes and evidence-based policy. Consistent data and regular monitoring reports designed to provide top line but also detailed/easily accessible information about the performance of the programme as a whole and under, for example, the primary groupings of Associates, Knowledge Base, Companies and Projects, will provide transparent information to external stakeholders and increase interest for support.
## APPENDIX A: Stakeholder Organisations

<table>
<thead>
<tr>
<th>Organisation/Body</th>
<th>Name</th>
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<tbody>
<tr>
<td>Innovate UK</td>
<td>Clare Lindsay</td>
</tr>
<tr>
<td></td>
<td>David Wright</td>
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<tr>
<td>Research Councils</td>
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<td>MRC</td>
<td>Joanne Robinson</td>
</tr>
<tr>
<td>NERC</td>
<td>Perry Guess</td>
</tr>
<tr>
<td>AHRC</td>
<td>Robert Keegan</td>
</tr>
<tr>
<td>STFC</td>
<td>Phil Tait</td>
</tr>
<tr>
<td>BBSRC</td>
<td>Andy Cureton</td>
</tr>
<tr>
<td>Devolved Administrations</td>
<td></td>
</tr>
<tr>
<td>Welsh Government</td>
<td>Natalie Crawley</td>
</tr>
<tr>
<td>Scottish Funding Council</td>
<td>Stuart Fancey</td>
</tr>
<tr>
<td>Invest NI</td>
<td>Karen Hastings</td>
</tr>
<tr>
<td>KB/Universities</td>
<td></td>
</tr>
<tr>
<td>Queen’s University Belfast</td>
<td>Dr. Mary Flynn</td>
</tr>
<tr>
<td>Nottingham Trent University</td>
<td>Professor Kim Cassidy</td>
</tr>
<tr>
<td>Imperial College</td>
<td>Dr. Angela Kingman</td>
</tr>
<tr>
<td>PAG Members (Senior Advisers)</td>
<td></td>
</tr>
<tr>
<td>Fiona Nightingale</td>
<td></td>
</tr>
<tr>
<td>Gerry Black</td>
<td></td>
</tr>
<tr>
<td>Jan Stringer</td>
<td></td>
</tr>
<tr>
<td>Gill Rysiecki</td>
<td></td>
</tr>
<tr>
<td>National Forum</td>
<td>Phil Fiddaman</td>
</tr>
<tr>
<td></td>
<td>Alasdair Cameron</td>
</tr>
<tr>
<td>HEFCE</td>
<td>Peter Sheddon</td>
</tr>
</tbody>
</table>
APPENDIX B: Questionnaires
Assessing the Impact of Participation in KTP
Knowledge Base Consultation

You are invited to participate in an evaluation of the Knowledge Transfer Programme (KTP) on behalf of Innovate UK (https://www.gov.uk/government/organisations/innovate-uk).

The survey should take around 10 minutes to complete. Your participation in this study is completely voluntary but it provides a great opportunity to input into future policy decisions.

In order to progress through this survey, please use the following navigation buttons:

Click the Next button to continue to the next page.
Click the Previous button to return to the previous page.
Click the Save button if you would like to save your responses and come back to them at a later time.
You will be asked to provide your email address which will contain a link enabling you to continue from where you finished off.
Click the Submit button to send us your responses to the survey.

If there are any questions you would prefer not to answer you can skip past these by clicking the Next button.
If you have any questions about the survey please contact Georgia Siora at Warwick Economics & Development by email at gsiora@w-ecd.com.

Thank you in advance for taking the time to complete this survey. To continue with the survey, please click 'next'.

Section A: Categorisation Data

A1 Please complete the following information:
Institution name

Contact name

Contact position

A2 Please provide us with a brief overview of your involvement with KTPs
Date of first involvement

Number of completed KTPs involved before 2004

Number of completed KTPs involved between 2004 and 2014

Number of currently running/ongoing KTPs
Section B: Participation

B1 If, in the course of delivering a KTP, you tend to use additional resources over and above the KTP grant, could you please provide an estimate of the value of these resources (per KTP on average):

Staff resources (£)
____________________________________________
_________________________________

Premises (£)
____________________________________________________________________________
________________

Equipment (£)
____________________________________________________________________________
________________

Additional funding from other sponsors (please indicate monetary amount of funding and sponsors)
____________________________________________________________
________________

B2 Would you be able to undertake the same activities to those of a KTP without the KTP programme?

If you have been involved in more than one KTP, please provide an overall assessment.

☐ Definitely would have been able to undertake the same activities without the KTP support
☐ Likely would have been able to undertake the same activities without the KTP support
☐ Unlikely would have been able to undertake the same activities without the KTP support
☐ Definitely would not have been able to undertake the same activities without the KTP support
☐ Do not know
Section C: Participation - Outputs, Outcomes and Impacts

C1 What were your expectations from participating in the KTP programme? (Please tick all those that apply)

- Higher quality research
- Enhancing the impact of research
- New research projects
- Research publications
- Contribution to research strategy
- Improved teaching material
- Attracting students to courses
- Closer industry partnerships
- Better understanding of industry
- Improvement in staff skills
- Enrichment of staff - talent attraction
- Other?

New research projects - please specify value
____________________________________________________________________________________

Research publications - please specify number
____________________________________________________________________________________

Improved teaching material - please provide real business examples
____________________________________________________________________________________

Other, please specify
____________________________________________________________________________________
C2 What are the actual achievements/benefits of KTPs to you, your research and your institution?

- Higher quality research
- Enhancing the impact of research
- New research projects
- Research publications
- Contribution to research strategy
- Improved teaching material (with real business examples)
- Attracting students to courses
- Closer industry partnerships
- Better understanding of industry
- Improvement in staff skills
- Enrichment of staff - talent attraction
- Other?

New research projects - please specify value

__________________________

Research publications - please specify number

__________________________

Improved teaching material - please provide business examples

__________________________

Other, please specify

__________________________

C3 In the absence of KTP, to what extent do you think you would have achieved these benefits?

If you have been involved in more than one KTP, please provide an average/overall assessment

- Would definitely have achieved these benefits
- Would probably have achieved these benefits
- Would have achieved these benefits, but not of this high quality
- Would have achieved these benefits, but at a later date
- Would have achieved some of these benefits
Would definitely not have achieved these benefits

C4  **Taking all factors above together, how would you rate the KTP programme in terms of benefits to your research/department/institution?** Please use a scale where 1 means no difference and 5 means transformational. If you have been involved in more than one KTP, please provide an overall assessment.

- 1 = no difference
- 2 = some contribution
- 3 = significant contribution
- 4 = very significant contribution
- 5 = transformational

C5  **Has participation in the KTP programme generated any financial benefits to your research and your institution?**

If you have been involved in more than one KTP, please provide an overall assessment.

- Consultancy income
- Teaching income
- Patents
- Licensing income
- Spin-outs
- None
- Other?

Consultancy income, please specify

Teaching income, please specify

Patents, please specify

Licensing income, please specify
C6_ How important were the skills and qualifications of the Associate in your ability to secure this leverage?

- Extremely important
- Important
- Somewhat important
- Not very important
- Not at all important

C7 Taking all factors above together, how would you rate the KTP in terms of financial benefits specifically?

Please use a scale where 1 means no difference and 5 means transformational.

- 1 = no difference
- 2 = some contribution
- 3 = significant contribution
- 4 = very significant contribution
- 5 = transformational
### C8 How important was KTP in your ability...?

<table>
<thead>
<tr>
<th></th>
<th>Extremely important</th>
<th>Important</th>
<th>Somewhat important</th>
<th>Not very important</th>
<th>Not at all important</th>
</tr>
</thead>
<tbody>
<tr>
<td>To develop your general staff skills/the Associate - in business skills, project management</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>To attract new talent to your department/area of work</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>To secure new grants</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>To increase higher degree registrations</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>To improve the quality of the research produced by the Department/Institution</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

### C9 Does your participation in the KTP programme impact upon others not directly involved in the KTP?

- ☐ Other institutions
- ☐ Other departments
- ☐ Other researchers
- ☐ Other businesses in the same sector
(87,200),(175,213)
- ☐ Other sectors
- ☐ Other countries

Other institutions, please specify

__________________________________________________________

Other departments, please specify
Section D: Participation - Lessons learned

D1 Overall did participation in the KTP meet your expectations or exceed them?
   - Met expectations
   - Exceeded expectations

D2 In what ways has the programme worked particularly well?

D3 What has worked less well?

D4 What potential improvements could be made?
D5  Would you continue participating in the KTP programme?
   - Yes
   - No

D6  Would you work with your KTP business partner again?
   - Yes
   - No

D7  Would you recommend the programme to other institutions?
   - Yes
   - No

D8a In terms of the future of the programme, is there a case for continuation for the programme?
   - Yes
   - No

   Please briefly expand

D8b In terms of the future of the programme, is there a case for scaling up the activity?
   - Yes
   - No

   Please briefly expand
In terms of the future of the programme, is there a case for replicating the model elsewhere?

- Yes
- No

Please briefly expand:

__________________________________________________________________________________________________________________

__________________________________________________________________________________________________________________

If you are holding any additional monitoring information over and above what is provided for the KTP programme, please do consider emailing us the proforma you are using to gsiora@w-ecd.com. It would assist in improving future KTP monitoring arrangements.

Do you have any other comments you would like to make?

__________________________________________________________________________________________________________________

__________________________________________________________________________________________________________________

__________________________________________________________________________________________________________________

Thank you for taking the time to complete this questionnaire. To send us your responses please click on the submit button.
Assessing the Impact of Participation in KTP Associates' Consultation

You are invited to participate in an evaluation of the KTPs on behalf of TSB and BIS.

The survey should take around 10 minutes to complete. Your participation in this study is completely voluntary.

In order to progress through this survey, please use the following navigation buttons:

Click the Next button to continue to the next page.
Click the Previous button to return to the previous page.
Click the Save button if you would like to save your responses and come back to them at a later time. You will be asked to provide your email address that will contain a link enabling you to continue from where you finished off.
Click the Submit button to send us your responses to the survey.

If there are any questions you would prefer not to answer you can skip past these by clicking the Next button.

If you have any questions about the survey please contact Georgia Siora at Warwick Economics & Development by email at gsiora@w-ecd.com.

Thank you in advance for taking the time to complete this survey. To continue with the survey, please click 'next'.
Section A: Categorisation Data

A1 Please complete the following information:
University or Research Training Organisation Name
Associate name
Associate position

A2 Please provide us with a brief overview of involvement and role(s)
Date of first involvement
Host company involved
Nature of KTP

A3 Where do you live/ work?
Live UK Abroad
Work

Section B: About KTPs

B1 How did you first hear about KTPs?
☑ From supervisor
☑ From someone else in the University
B2 What was the main factor that encouraged you to get involved?
- Career enhancement
- Looking for a challenge
- Looking for a job
- Nothing else planned at the time
- Supervisor was keen
- Other
Please specify

B3 Would you have been able to access a similar participation/engagement involving both the academia and business in the absence of KTP?
- Definitely
- Likely
- Unlikely
- Definitely not
- Do not know

B4 Were your expectations met overall from the KTP? Please use a scale where 1 means expectations not met and 5 means expectations exceeded.
- 1 - expectations not met
- 2
- 3
- 4
- 5 - expectation exceeded
Section C: Participation - Outputs, Outcomes and Impacts

C1 What is your employment status now?
- Permanently employed in business
- Permanently employed in academia
- Temporary employment
- Own business
- Full-time study
- Part-time study
- Unemployed

If unemployed, please state how long

C2 What was your employment status immediately prior to the KTP?
- Permanently employed in business
- Permanently employed in academia
- Temporary employment
- Own business
- Full-time study
- Part-time study
- Unemployed

If unemployed, please state how long

C3 What was your employment status immediately after the KTP?
- Employed in same business
- Employed in academia
- Temporary employment in same business/academia
- Own business
- Full-time study
The Impacts of KTP Associates and Knowledge Base on the UK Economy

- Part-time study
- Unemployed
  If unemployed, please state how long

C4  What were the benefits of KTP to you as an individual associate (non-quantifiable choose all that apply)?
- Improved skills (informal)
- Higher qualifications (formal)
- Employment or fast tracked job
- Career enhancement
- Developing entrepreneurial spirit
- Raising career aspirations
- Improving ability to work collaboratively
- Improving ability to work within industry
- Improved research (if in academia)
- Improved teaching (if in academia)
- Other
  Please specify

C5  Do you think that you could have obtained similar benefits elsewhere?
- Yes
- No
- Do not know
C6 If relevant, how important were the skills and qualifications gained during your KTP in your ability to find employment post-KTP? Please use a scale where 1 means no difference and 5 means transformational.

- 1 = no difference
- 2
- 3
- 4
- 5 = transformational

C7 Taking all factors above together, how would you rate the KTP in terms of your overall personal and career development? Please use a scale where 1 means no difference and 5 means transformational.

- 1 = no difference
- 2
- 3
- 4
- 5 = transformational

C8 So we can fully understand your journey, please tell us about your role and salary (if applicable) before, during and after the KTP:

Before - role

Before - salary

During - role

During - salary

After - role

After salary
C9 If employed, has the KTP impacted upon your salary? For example: (If you are unable to provide precise numbers please provide a range).

What was your salary following completion of KTP?

What would it have been if you did not have the KTP experience?

What is your salary today?

What would it have been if you had not participated in the KTP project?

C10 What, if any, have been the other financial benefits of KTP to you as an individual since the project ended?

- Consultancy income post-KTP (please specify)
- One-off payment related to the KTP (please specify)
- Starting own business (turnover and profit per year)
- Secured research funding (amount)
- None
- Other

Consultancy income post-KTP, please specify

One-off payment related to the KTP, please specify

Starting own business, please specify turnover and profit per year
Secured research funding, please specify amount
__________________________________________________________________________________
Other, please specify
__________________________________________________________________________________

C11  **Taking all factors above together, how would you rate the KTP in terms of uplift in your annual salary? Please use a scale where 1 means no difference and 5 means transformational.**

- 1 = no difference
- 2
- 3
- 4
- 5 = transformational

C12  **If relevant, how important were the skills and qualifications gained during your KTP in your ability to secure increased salary post-KTP? Please use a scale where 1 means no difference and 5 means transformational.**

- 1 = no difference
- 2
- 3
- 4
- 5 = transformational
- Not applicable

C13  **If relevant, how important were the skills and qualifications gained during your KTP in your ability to secure research funding post-KTP? Please use a scale where 1 means no difference and 5 means transformational.**

- 1 = no difference
- 2
- 3
- 4
C14  **In the absence of KTP, what do you think would have happened to you in terms of career?**
- Would definitely have achieved the same results
- Would probably have achieved the same results
- Would have achieved the same results, but it would have taken longer
- Would probably not have achieved the same results
- Would definitely not have achieved the same results
- Would have achieved better results

**Section D: Assessment of Lessons Learned**

**D1 In what ways has the programme worked particularly well?**
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________

**D2 What has worked less well?**
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________
__________________________________________________________________________________

**D3 Would you recommend it to researchers/graduates/postgraduates**
- Yes
D4 Would you recommend it to businesses?
- Yes
- No

D5 What potential improvements could be made?
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________
___________________________________________________________________________________

D6 In terms of the future of the programme, is there a case for:

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Continuation?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Scaling up the activity?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Replicating the model elsewhere?</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

D7 Please explain your answers to the above:

<p>| |</p>
<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
<td>Continuation?</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Scale up activity</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>
Replicating the model elsewhere

We are looking to follow up with case studies, would you be interested in taking part in a case study/further conversation about your KTP participation?

- Yes
- No

If yes, please provide your contact details below:

Thank you for taking the time to complete this questionnaire. To send us your responses please click on the submit button.
APPENDIX C: Survey Responses

KTP Associates

Number of survey recipients from first involvement in KTPs

<table>
<thead>
<tr>
<th>Year</th>
<th>Survey Recipients (No.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1995</td>
<td>2</td>
</tr>
<tr>
<td>1996</td>
<td>0</td>
</tr>
<tr>
<td>1997</td>
<td>0</td>
</tr>
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</tr>
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<td>2000</td>
<td>2</td>
</tr>
<tr>
<td>2001</td>
<td>5</td>
</tr>
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<td>2003</td>
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<td>2009</td>
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<td>2010</td>
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<td>2011</td>
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<tr>
<td>2012</td>
<td>20</td>
</tr>
<tr>
<td>2013</td>
<td>3</td>
</tr>
<tr>
<td>2014</td>
<td>1</td>
</tr>
</tbody>
</table>

Respondents Work and Residence: 88% of respondents live and work in the UK

Initial knowledge about KTPs

- 39.2% of respondents first heard about KTPs through the internet
- 22.7% first heard about KTPs from their supervisor
- 16.5% first heard about KTPs from someone else in the university
- 7.3% first heard about KTPs from a job advert
- 6.2% first heard about KTPs from a word of mouth / friend / colleague
- 1.5% first heard about KTPs from a leaflet
- 6.5% first heard about KTPs from other means
## APPENDIX D: Calculations for KTP Associate Impacts

<table>
<thead>
<tr>
<th>Persistence of Impact</th>
<th>Year 1</th>
<th>Year 2</th>
<th>Year 3</th>
<th>Year 4</th>
<th>Year 5</th>
<th>Year 6</th>
<th>Year 7</th>
<th>Year 8</th>
<th>Year 9</th>
<th>Year 10</th>
<th>Cumulative Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increased Productivity of Associates</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of associates (by number of years post KTP)</td>
<td>9,346</td>
<td>9,130</td>
<td>8,800</td>
<td>8,309</td>
<td>7,852</td>
<td>7,453</td>
<td>7,059</td>
<td>6,613</td>
<td>6,144</td>
<td>5,749</td>
<td></td>
</tr>
<tr>
<td>Annual Salary Uplift per associate</td>
<td>£ 1,938</td>
<td>£ 1,938</td>
<td>£ 5,943</td>
<td>£ 5,943</td>
<td>£ 6,882</td>
<td>£ 6,882</td>
<td>£ 6,882</td>
<td>£ 3,909</td>
<td>£ 3,909</td>
<td></td>
<td></td>
</tr>
<tr>
<td>% of Associates working outside KTP Host Company</td>
<td>48%</td>
<td>55%</td>
<td>61%</td>
<td>64%</td>
<td>67%</td>
<td>71%</td>
<td>73%</td>
<td>75%</td>
<td>77%</td>
<td>79%</td>
<td></td>
</tr>
<tr>
<td>Direct uplift in wages to associates working outside KTP company</td>
<td>£8,694,023</td>
<td>£9,799,612</td>
<td>£31,684,463</td>
<td>£31,071,048</td>
<td>£36,222,090</td>
<td>£33,960,059</td>
<td>£18,401,746</td>
<td>£17,668,148</td>
<td>£254,178,036</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ratio of employment costs to GVA</td>
<td>1.82</td>
<td>1.82</td>
<td>1.82</td>
<td>1.82</td>
<td>1.82</td>
<td>1.82</td>
<td>1.82</td>
<td>1.82</td>
<td>1.82</td>
<td>1.82</td>
<td></td>
</tr>
<tr>
<td>Estimated direct impact of increase productivity of associates on non-KTP firms GVA</td>
<td>£15,807,315</td>
<td>£17,817,476</td>
<td>£57,608,114</td>
<td>£57,087,319</td>
<td>£56,492,815</td>
<td>£65,858,345</td>
<td>£64,143,316</td>
<td>£61,745,562</td>
<td>£33,457,719</td>
<td>£321,239,05</td>
<td>£462,144,884</td>
</tr>
</tbody>
</table>

### High Value Business Start Ups

| Number of High Value Business Start Ups | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 | 35 |
| Turnover per Start Up | £1,000,000 | £1,000,000 | £1,000,000 | £1,000,000 | £1,000,000 | £1,000,000 | £1,000,000 | £1,000,000 | £1,000,000 | £1,000,000 |
| Attribution of start-up to KTP | 76% | 76% | 76% | 76% | 76% | 76% | 76% | 76% | 76% | 76% |
| Turnover for high value business start-ups | £26,950,487 | £26,950,487 | £26,950,487 | £26,950,487 | £26,950,487 | £26,950,487 | £26,950,487 | £26,950,487 | £26,950,487 | £26,950,487 |
| GVA as a % of turnover | 28% | 28% | 28% | 28% | 28% | 28% | 28% | 28% | 28% | 28% |

### Total GVA impacts of Associates (excluding KTP host company impacts)

| Direct | £23,353,451 | £25,363,612 | £65,154,250 | £64,633,455 | £64,039,951 | £73,404,482 | £71,689,452 | £69,291,698 | £41,003,856 | £39,670,041 | £537,603,249 |
| Direct and Indirect | £42,036,212 | £45,654,502 | £117,277,651 | £116,340,219 | £115,270,112 | £132,128,067 | £129,041,014 | £124,725,057 | £73,806,941 | £71,406,074 | £967,685,848 |

The Impacts of KTP Associates and Knowledge Base on the UK Economy
## APPENDIX E: List of Knowledge Base Organisations (Figure 2.8)

<table>
<thead>
<tr>
<th>No.</th>
<th>Knowledge Base Organisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Queen's University Belfast</td>
</tr>
<tr>
<td>2.</td>
<td>The University of Reading</td>
</tr>
<tr>
<td>3.</td>
<td>The University of Manchester</td>
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