



# **Case study on the ICURE pilot programme, United Kingdom**

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Contribution to the OECD TIP Knowledge Transfer  
and Policies project

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## **Case Study on the ICURE pilot programme, United Kingdom: Contribution to the OECD TIP Knowledge Transfer and Policies project**

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## Executive Summary

This case study describes the impact of the ICURe pilot programme, which was introduced in the UK in 2014 and evaluated in 2017. The rationale for the programme was primarily to address the barriers that constrain knowledge transfer and hold back commercialisation of university research. It was originally developed within the regional boundaries of universities in the South of England. The evaluation provides encouraging evidence to show that ICURe is an effective instrument for accelerating the commercialisation of academic research and producing a range of wider benefits in strengthening links with industry and enhancing the entrepreneurial skills of early career researchers.

The evaluation confirmed that the ICURe pilot achieved all of its objectives and there was a high rate of additionality associated with its results, with the benefits of the pilot programme exceeding its costs. The evaluation estimated that the programme created £3.94 of economic benefits for every £1 invested to date. ICURe also increased the number of additional spin-offs produced, with 44 new spin-off companies of which approximately 24 would not have been created in the absence of the programme. Participants indicated that they committed more time to developing a spin-off, and allocated the majority of their time to developing a management team. The most common challenge encountered by all applicants was raising equity or other private investment. Around 40 percent of participants reported their spin-off received private investment and spin-off employment grew faster for participants. In light of these positive findings, Innovate UK is expanding ICURe in 2018 to incorporate two additional delivery partners in Northern Ireland and in Warwickshire.

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## 1. Main features of the ICURe Pilot Programme

### 1.1. ICURe key objectives and main characteristics

The ICURe pilot programme was established in 2014 in response to a House of Lords Inquiry<sup>1</sup> that found that while the UK has an internationally competitive base of scientific research, accounting for 16 percent of the world's most highly cited articles, more should be done to create a commercial demand for university research. The Lambert Review<sup>2</sup> highlighted this as a key issue that needed to be addressed if the UK was to increase the flow of productive knowledge between universities and the economy.

The Innovation and Commercialisation of University Research pilot programme<sup>3</sup> (ICURe) aims to tackle several barriers to the commercialisation of university research, including levels of commercial awareness and entrepreneurial skills amongst academic personnel, weak networking between academic and industrial communities, and cultural conventions and reward systems. The programme provides commercialisation support for teams of academic researchers wishing to explore the commercial potential of research originating in universities.

The ICURe pilot programme has the following objectives:

- Increase the probability of the successful commercialisation of academic research by providing options signposting and the spinning out of high potential new companies.
- Develop entrepreneurial skills and market knowledge in a new cadre of early career researchers.
- The pilot also aimed to provide lessons on how a national rollout could be optimally implemented

Initial funding of £3.2m was made available for three pilot cohorts (later extended to six), of which £2.8m was secured from the HEFCE Catalyst Fund, a £30m annual fund that aims to increase excellence and efficiency in higher education and £400k from Innovate UK. Complementary resources were brought to the programme in the form of the time inputs of the Technology Transfer Offices (TTOs) associated with participating academic institutions. TTOs were tasked with managing their institutions' involvement in the programme, promoting the programme to academic staff, and supplying Technology Transfer Officers to support project teams. Business advisors (BAs) assigned to each participating project teams supplied their services and time on a pro-bono basis.

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<sup>1</sup> <https://publications.parliament.uk/pa/cm201213/cmselect/cmsctech/348/348.pdf>

<sup>2</sup> [http://www.eua.be/eua/jsp/en/upload/lambert\\_review\\_final\\_450.1151581102387.pdf](http://www.eua.be/eua/jsp/en/upload/lambert_review_final_450.1151581102387.pdf)

<sup>3</sup> <https://innovateuk.blog.gov.uk/2018/04/11/innovation-to-commercialisation-of-university-research-icure/>

## 2. Development of the initiative

### 2.1. Rationale for ICURe implementation

The rationale for the ICURe programme was primarily to address the barriers thought to constrain knowledge transfer and hold back commercialisation, which included:

**Commercial awareness and capability of academic personnel:** There is evidence that the skills of academics are important in achieving optimal commercialisation outcomes. The variety and frequency of university researcher interactions with industry are also influenced more by individual characteristics than the characteristics of their host departments or universities, with researchers holding previous industry collaboration experience more likely to engage in future industry collaborations.

**Bounded networks in academic research:** Overlaps between academic networks within institutions or research fields and business communities may be fragmented. Weaknesses in these networks are likely to introduce delays into the commercialisation process or introduce lock-in effects for suboptimal technologies, resulting in the slow realisation of the economic benefits.

**Incentives:** The set of rules and conventions that govern academic institutions as well as reward systems may impede innovation and commercialisation activity. A number of studies exploring barriers to commercialisation have identified insufficient rewards from engaging in such activity as an obstacle. For example, the Dowling Review<sup>4</sup> (2015) highlighted that pressures to publish can create tensions with business engagement for universities

**Financial market imperfections:** The conversion of research undertakings into commercial businesses carries a high degree of risk and this is especially true for high technology R&D activity. Several financial market failures constrain availability of capital for start-ups and justify public intervention. These include the presence of information asymmetries that can cause issues of adverse selection if investors cannot observe the true risk of a project or company, or accurately value their intangible assets. Moral hazard issues also arise, as it is not straightforward to monitor activity after an investment is made, and the transaction costs of doing so can be high, deterring small investments. In addition, there are a set of broader market failures and barriers which pervade this area: externalities such as knowledge spill-overs from innovations that are not valued by investors, coordination failures between actors and institutional weaknesses.

**Other complementarity failures:** National, regional and local innovation systems may also fail to provide the complementary assets required to commercialise academic research in an optimal manner. For example, complementary technologies may fail to emerge in a timely fashion (and may exhibit public good qualities themselves). Additionally, weaknesses in local factor markets may inhibit exploitation attempts (e.g. the extent to which an appropriate commercial team can be appointed will be linked to the strength and depth of local labour markets).

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<sup>4</sup> <https://www.raeng.org.uk/policy/dowling-review>

## 2.2. ICURe tailored application

The ICURe pilot programme was introduced to help overcome some of these barriers and market failures. The programme involves tailored support to develop the commercial awareness and skills of project team members and introduce an understanding of appropriate commercialisation strategies for research. While several programmes offering financial and business support exist in the UK, few focus on the development of a team and most focus on company creation. In addition, few offer seed capital alongside commercialisation support.

### *2.2.1. Application process and support available for programme participants*

**Application and assessment process:** Each cohort required project teams (made up of an early career researcher (ECR) that had completed their PhD, Principal Investigator (PI), and a Technology Transfer Officer (TTO) to make an online application explaining their technology, its commercial potential, and their motivations for taking part in the programme. Places on the programme were awarded on the basis of a scored assessment. A total of 167 applications were received (against a target of 150), with 78 teams being selected (exceeding the target set of 50).

**Orientation and start-up training (Bootcamp):** An intensive residential training programme is delivered over several days to project teams. This focuses on developing participants' understanding of lean start-up principles, a hypothesis driven validation and business model identification process. For the hypothesis validation the scheme was designed for the nature of the target group by asking them to come up with hypotheses regarding the nature of the value proposition, and asking them to conceive of the market validation process as means of testing those hypotheses. The majority of the 'Bootcamp' is delivered to the ECR with the other team members contributing at a later stage to support strategy and planning. The staging of the training exercise attempts to create a level of professional distance between the ECR and the PI, to help ensure that the former is not diverted to other activities (e.g. delivering on-going research projects). This helped to avoid the risk that the ECR would complete research tasks for the PI unless this pattern was broken. In some cases, this meant moving the ECR to an entirely different part of the building.

**Three-month market validation exercise:** The ECR then leads a focused market assessment of the commercial potential of the research with support from the programme team. This primarily involves forming new contacts with potential customers, suppliers, collaborators and/or competitors. The aim of these interactions is to:

- Collect the information needed to validate the presence and level of market demand for the technology under development;
- Understand any adjustments that may increase its value to consumers;
- The price point that could potentially be obtained;
- How the product or service could be sold into the market;
- The practicalities that may be involved in commercialising the technology.

**Business mentorship:** Each project team is assigned a business advisor to support the business model discovery process. Initially the teams were responsible for finding the business advisor, but this caused problems when the advisor sought to obtain a stake in the spin-off. So then the Technology Transfer Officers established a pool of business advisors which had appropriate skills and understanding of the technologies. These were required to engage on a ‘good-will’ basis whereby they do not expect any commercial benefit from their involvement in the programme. They provide the team with guidance as the market validation exercise unfolded and support the refinement and presentation of the findings.

**Options Roundabout presentations:** After the market validation exercise, project teams draw on what they learnt and attend a one day ‘camp’ to further develop their business models. The results are presented to an independent panel of business experts at an event named the ‘Options Roundabout’. The panel provides recommendations on the optimal commercialisation strategy based on the presentation. Projects are assessed against a range of criteria, including the quality of the market validation exercise, business model development, the size of the commercial opportunity, team strength and consideration of the next steps for the project. The criteria included the extent to which the team were likely to be able to secure funding in the absence of financial aid (i.e. an additionality test).

**Aid for Start Ups:** Projects identified as potentially scalable businesses, but needing public funding to help them move at the pace required to capture the opportunity, were recommended to apply for Aid for Start Ups funding. Thirteen grants of up to £0.5m were made available to support the development of spin-offs. Applications require project teams to submit a full business plan for review which is assessed using normal Innovate UK grant application processes.

**Business plan development:** Participants that were recommended to apply for Aid for Start Ups were given additional financial support of up to £35k to further develop their findings into a concrete business plan. Project teams at SETsquared institutions were given an opportunity to make use of incubator facilities at a reduced cost.

### 3. Interactions with policy mix

#### 3.1. Previous policy mix gaps

The ICURE pilot programme was originally developed within the regional boundaries of universities in the South of England. In 2018 Innovate UK will expand the ICURE programme to incorporate two additional delivery partners: Queens University Belfast and the University of Warwick will join SETsquared to run and grow the ICURE programme across the UK over the next 12 months<sup>5</sup>. This will enable more teams to be involved, and up to 48 new projects to be supported. As a result ICURE will increase its interaction with the wider national policy mix for knowledge transfer and commercialisation and is widely viewed as a positive complement to existing programmes, in particular the Knowledge Transfer Partnerships (KTP). The KTP programme has been operating for over 30 years in the UK and aims to help businesses improve their competitiveness and productivity through

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<sup>5</sup> <https://www.gov.uk/government/news/8-million-expansion-of-programme-to-commercialise-research>



the better transfer and use of knowledge, technology and skills that reside within the UK Knowledge Base i.e. higher education institutions, colleges or research organisations. An impact study of KTP<sup>6</sup> provided positive evidence of impact for both the research base and also the businesses involved.

### 3.2. Policy instruments in line with ICURE's objectives

There are also a number of other public schemes and support programmes have been developed to support early career researchers in various aspects of their careers, addressing some of the key barriers and failures, as identified above. A description of their aims and objectives and activities is provided below, as well as a discussion of their similarities with/differences from ICURE:

**Researcher to Innovator (R2I):** The R2I is another programme delivered by SETsquared which lasts around four weeks with the aim of providing a light touch introduction to commercialisation and entrepreneurship to PhD candidates who are interested in understanding the extent to which their own research and ideas could result in a commercially viable business prospect.

**SETsquared Business Incubator:** The provision of working space and business support to teams and companies originating from in and outside SETsquared institutions.

A subset of participating ICURE teams are offered the opportunity to make use of the incubator and reduced rates to support business development activities. The focus of the programme is relatively more focused on the development of the commercial awareness of participants rather than completing a market validation exercise.

**Royal Academy of Engineering (RAEng Enterprise Fellowship):** This 12-month fellowship provides successful applicants with engineering projects that have demonstrated proof of concept in both lab and operational settings (TRL4 or above) tailored mentoring and up to £60,000 of funding to develop a business plan and seek investment. It differs from ICURE in that its focus is on developing a business plan and raising investment for a start-up.

**Enterprise Fellowship Scheme:** The Royal Society of Edinburgh offers a fellowship that provides a years' salary (typically around £37,000) for 12 months to support the development of a business plan and securing external investment, with an overall aim of supporting fellows to develop a commercial case for a spin-off company. Fellows can be supported by either Scottish Enterprise, the UK Quantum Technology Hub, the Biotechnology and Biological Sciences Research Council or the Science and Technology Facilities Research Council. However, fellows supported by research councils must have previously received public grant funding from the same research council. Again, this scheme is different to ICURE in that it assumes a spin-off is the selected commercialisation route.

**Private seed accelerator and incubator programmes:** A number of private and corporate-backed start-up support schemes provide seed funding to newly formed companies, sometimes in exchange for an equity share in the company, and advisory support, typically in the areas of business administration, recruitment and business development. Examples include Wayra, Techstars, Oxygen and startupbootcamp. These

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<sup>6</sup> <https://www.gov.uk/government/publications/the-knowledge-transfer-partnership-programme-an-impact-review>

programmes, like ICURE, tend to focus on market validation and favour lean start-up principles, but have historically focused on digital/ICT companies.

Overall, ICURE appears to have complemented the set of programmes that exist to support commercialisation activity in the UK. The training support schemes discussed above are either narrower in technology or they emphasise the use of a start-up as a vehicle for bringing a technology to market. While ICURE is more general in these two dimensions, the programme caters for technology at an early stage of development where the technology does not have a firm commercial exploitation strategy.

## 4. Impacts

### 4.1. ICURE impact evaluation

ICURE has been delivered by the [SETsquared Partnership](#) and has funded 160 early career researchers creating 44 new companies and 120 jobs in the UK. The SETsquared Partnership is the enterprise collaboration between the universities of [Bath](#), [Bristol](#), [Exeter](#), [Southampton](#) and [Surrey](#), and in February 2018 was ranked by [UBI Global](#) as the World's Top Business Incubator managed by a university.

An evaluation of the ICURE programme<sup>7</sup> published in 2017 provides early evidence of the positive impact that this programme is having on both the research base and wider commercial outcomes. The evaluation developed a theory of change describing the expected linkages between the activities funded, and the outcomes and impacts, with the logic model used to summarise this analysis and associated pathways to impact. This identified some key outcomes for the individuals participating on the programme and the institutions involved.

### 4.2. Key outcomes of the pilot programme

#### **Outcomes for the individual:**

**Commercial awareness:** Participation in the ICURE programme is expected to produce an increased commercial awareness on the part of Early Career Researchers (ECRs) and Principal Investigators (PIs), which combined with experience in designing and implementing a business development strategy, is expected to increase their capability to effectively engage with businesses.

**Commercial intent:** the programme may produce other attitudinal changes relating to intentions to commercialise and increases in their belief in their ability to do so (i.e. self-efficacy).

**Commercial skills:** Participation will build the capabilities of participants to start-up a new venture successfully.

**Research agenda:** One anticipated effect of participation in the programme is that it will orient the direction of the research towards more commercial activities. These effects would be achieved by encouraging academics to give more consideration to the impact and

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<sup>7</sup> <https://www.gov.uk/government/publications/icure-evaluation-of-pilot-programme>

potential uses of the research outputs they produce. Improved understanding of the needs of potential customers may also guide future research plans.

**Ongoing engagement with new contacts:** Network theory suggests that those that are more central to networks are exposed to more opportunities to benefit from those networks (e.g. as a conduit for the transmission of knowledge or ideas or through the creation of more opportunities to collaborate). Maintenance of new relationships formed through the market validation process may produce ongoing benefits by creating opportunities for researchers to pursue the commercialisation of their research.

**Reputational effects:** Participation in ICURe could also produce important outcomes in terms of raising the reputation of individuals involved with regard to their capabilities to engage with industry and the commercialisation process more generally.

In turn, this may encourage internal colleagues and others to seek out relationships with those individuals, further increasing the density and potential value of networks.

**Institutional outcomes expected:**

**Visibility and capability of TTOs:** TTOs are likely to benefit from the programme through increasing their knowledge of the distribution of academic research being conducted in their institutions and strengthening their business and financial networks (including amongst non-participants who may benefit by being referred to other forms of support with their ideas).

The signposting and the inclusion of a TTO in ICURe project teams may result in an improved understanding and ability to work more collaboratively, cohesively and efficiently within their institutions.

**Greater university-industry collaboration:** The ICURe programme may result in the generation of knowledge of more effective means for academic communities to engage with industry. This could be visible in greater levels of collaboration with industry and changes in the research agendas of the individuals concerned. Learning-by-imitation processes may also be present, whereby the knowledge gained through the programme is transferred to adjacent colleagues (helping to produce a wider cultural change within the institutions concerned).

**Improved reputation for impact:** The reputation of academic institutions for commercialising technologies may also increase as a result of participating in ICURe. A proven record of commercialisation may also lead to a greater likelihood of receiving basic and/or translational research funding. Clear examples of impact may aid the production of impact case studies which feed into the Research Excellence Framework and have direct consequences for the amount of quality related research funding received.

### Box 1. Headline impacts from ICURe pilot evaluation study

- We used unsuccessful teams as our counterfactual (and difference-in-differences to estimate effects) to assess the impact from the pilot study
- 78 teams benefitted from the first six rounds of ICURe at an approximate cost of £8.9m (of which £6.5m was awarded to 13 teams as Aid for Start Ups seed funding).
- Participation in the programme increased and deepened links between participating academics and industry, accelerating the commercialisation and the technology development process.
- An estimated 24 additional spin-offs were created, with an average age of one year at the time of this evaluation, raising a total of £6.9m in private equity finance. This valued the firms at a total of £35m. A larger proportion of Aid for Start Ups recipients reported they had secured private equity investment than those spinning-out privately (74 versus 31 percent).
- Spin-offs employed an average of three workers and were generating an average of £86,000 in revenues by January 2017. Spin-offs taken forward with Aid for Start Ups funding grew more rapidly, reporting an average of six FTEs employed and average turnover of £145,000. The total present value of licensing agreements signed as a result of the programme was £8.7m.
- The ICURe programme is estimated to have created £3.94 of economic benefits for every £1 invested to date. There are unobserved factors that may result in the estimate over or under-statement of the effects of the scheme (and ambiguity as to which of these factors are likely to dominate)

## 5. Implications

### 5.1. ICURe future implications

In line with the [Government's industrial strategy white paper](#), the ICURe focus remains on training early career researchers to find the right route to commercialisation, and will help them to develop the necessary business skills, connections and expertise to pursue their ideas.

### 5.2. Broader implications useful for other countries

Some of the broader implications that can be drawn from this case study which may be useful for other countries include the following findings from the pilot evaluation study of ICURe:

Achievement of policy objectives: The evaluation provides encouraging pilot data to suggest that ICURe is an effective and an economical instrument for accelerating the commercialisation of academic research and producing a range of wider benefits in strengthening links with industry and enhancing the entrepreneurial skills of early career

researcher. The programme achieved all of its objectives, there was a high rate of additionality associated with its results (81 percent), and its benefits exceeded its costs. The findings are supportive of a case for a wider roll out of the programme given the complementary links with other policies in this domain.

Spin-offs: Evaluation evidence indicates that the ICURe programme has increased the number of additional spin-offs produced. 44 new spin-off companies by January 2017 of which approximately 24 would not have been created in the absence of the programme. Participants indicated that they committed more time to developing a spin-off, and allocated the majority of their time to developing a management team. The most common challenge encountered by all applicants was raising equity or other private investment. Around 40 percent of participants (especially those receiving Aid for Start Ups) reported their spin-off received private investment and spin-off employment grew faster for participants (with even faster employment growth for Aid for Start Ups spin-offs).

Licensing: Eighteen percent of participants had secured a licensing agreement (with an average value and duration of £145,000 and seven years) at February 2017 (implying 14 licensing agreements had been signed by teams participating in ICURe, resulting in a total present value of future licensing income of £11m, £9m of which wouldn't have been realised in the absence of ICURe). A further 41 percent were in discussions with third parties about licensing the IP associated with their project. The majority of this activity was completed by teams that had developed a spin-off.

Business Model Development: Participating teams made more rapid progress in resolving business model development issues than those that did not. The econometric modelling indicates that participating teams progressed further against the set of common business model issues presented to them in the survey (a 16-21-point increase in the business model index constructed by the study team).

Technology Development: Evidence suggests that participating teams double their technology progress (approximated using TRLs) and all applicants completed additional private and publically funded R&D. Private and public research contracts were secured by participants at an average amount of £90,000 and £360,000 respectively.

Wider Effects: Evaluation evidence provides some indication that the programme was associated with wage increases and broadened career opportunities for ECRs and provided evidence that was used to guide previous and future basic and translational R&D completed at participating HEIs. Finally, 20 percent of non-participants also indicated that they went on to pursue a commercial outcome and secure funding to complete R&D after submitting their application.