

Annex A: Econometric Analysis

This Annex sets out the key findings and methods from an econometric analysis exploring the causal effects of ICURe on its intended outcomes and impacts.

1.1 Methodology

1.1.1 Choice of Counterfactual and Selection Bias

A robust assessment of the causal effects resulting from participation in the ICURe programme (i.e. those effects that would not have happened in the absence of the programme) requires the selection of an appropriate group of teams or academic institutions that did not participate in the programme. Eligibility to participate in the programme was not assigned at random (either at a team or institution level), creating some complexities in selecting an appropriate counterfactual. At a team level (a subsequent analysis exploring effectiveness at an institutional level will follow once HEBCIS results for 2015/16 are available, expected in April 2017), these issues include:

- **Self-selection into treatment:** The decision to apply is a choice taken by the project team and the Technology Transfer Office and therefore there may be systematic differences between those that choose to apply and those that do not. For example, more experienced teams may not apply as they do not think they require coaching on topics covered in the boot camp. There was also evidence that at least some TTOs were filtering candidates at the application stage and only putting forwards teams they believed had the greatest probability of success. This could lead to an understatement or overstatement of the impacts of ICURe participation if basic comparisons were to be made between applicants and non-applicants.
- **Application process:** This first problem can potentially be addressed by exploiting the competitive nature of the application process. All applicants can be assumed to share a set of common characteristics that motivated their application to the programme, and drawing a comparison sample of teams from the pool of applicants that were ultimately not awarded a place on the programme represents an improvement on a sample drawn from the general population of academic staff. However, places on the ICURe programme are awarded on the basis of a scored assessment against a number of criteria. This process introduces selectivity and provided that these judgements are made effectively, the ex-ante expectation would be that participants would outperform non-participants regardless of their participation in ICURe. For example, feedback from stakeholders suggested that many teams not awarded places on the programme were deemed at too early a stage in the development pathway to benefit from participating in the ICURe programme. As such, basic comparisons between the two groups would likely overstate the impact of the programme on the commercialisation outcomes of interest.

In light of these issues, applicants not awarded a place on ICURe are used in the analysis as the most appropriate, available counterfactual. This avoids issues associated with self-selection treatment, though, any effect of selectivity introduced through the application process requires handling through the application of appropriate econometric methods.

1.1.2 Econometric Set-Up

The architecture of the ICURe programme raises the possibility of applying highly robust quasi-experimental methods to uncover the causal effects of the programme. In each round of ICURe, the scoring process creates a minimum scoring threshold above which teams are awarded places on the programme. On the assumption that idiosyncrasies in the scoring

process creates random variation in scores around this threshold, those just above the threshold can be assumed to be equivalent to those just below in terms of their observable and unobservable characteristics. Comparisons between the two (an approach known as Regression Discontinuity Design) can give results equivalent in robustness to a Randomised Control Trial. However, the number of observations available for analysis (there were less than 80 teams awarded places on the programme, and less than 60 that were not) places severe restrictions on the statistical power of these methods. Additionally, application scores were not available for all rounds of the programme, and this approach was deemed infeasible (though would be possible if the programme were to be scaled up).

In light of these constraints, a simpler difference-in-difference framework was applied in which the outcomes of interest (y) are determined by the (1) pre-treatment characteristics of the team and the proposed project (X) – interacted with time to preserve these controls in the estimated model, (2) participation in ICURe (P , a dummy variable taking the value of 1 if the team was awarded a place on the programme and 0 otherwise), (3) a set of unobserved team and project characteristics that do not vary over time (λ) and time (t , which allows for all teams making some degree of progress over time):

$$y_{it} = \phi + \alpha t + X_{i0}\beta t + \partial P_{it} + \lambda_i + \varepsilon_{it}$$

The first difference of this equation can be estimated using econometric methods, and as unobserved characteristics are assumed to be constant over time, the first difference estimator controls for both observed and unobserved differences between team members and their associated projects:

$$y_{it} - y_{it-1} = \Delta y_{it} = \alpha + X_{i0}\beta + \partial \Delta P_{it} + \varepsilon_{it}$$

1.1.3 Issues with the Interpretation of Results

The following issues should be borne in mind when interpreting the results:

- **Time varying unobservables:** Clearly the model does not allow for time varying unobserved differences between teams. The case study evidence suggests that some key unobservables – such as motivation or commitment to the commercialisation of academic research can change rapidly over time, with the potential to bias the findings. The presence of these types of issues cannot be formally tested and the results cannot be considered more robust than Level III on the Maryland Scale.
- **Validity of the counterfactual scenario:** The analysis compares teams that were awarded and not awarded places on the ICURe programme. This makes the assumption that the teams not awarded a place on the programme either would have had some involvement in the commercialisation of the research or that they had knowledge of the commercialisation outcomes of interest. This assumption is partially weakened by evidence uncovered in the research that TTOs may choose to undertake the market validation process internally or engage an external party, and estimates of the effects of the programme on network development need to be interpreted in this context (i.e. the results are valid in the sense that they estimate the additional relationships formed by participating teams, though some of those links may have otherwise been made by the TTO and this is not reflected in the results).
- **Crowding out:** It is possible that ICURe increases the commitment of TTOs to supporting teams awarded places on the programme (or receive a positive signal from the Options Roundabout that commercialisation is a viable option). If such an increase is accompanied by reduced commitment to parallel or future commercialisation projects, there may be offsetting effects that are not captured in this analysis. No evidence of this nature was uncovered during the evaluation, though institutional level analysis will help validate the extent of any crowding out.

1.1.4 Data

The data used for the analysis has been taken from a census survey of all team members associated with applications to ICURe. This gave a dataset of 222 individual responses covering ECRs, Pls, TTOs and BAs associated with 109 applications. Many TTOs and BAs were associated with multiple applications, and where this was the case, the respondent was asked to give their responses with respect to an application selected at random from their portfolio. The survey was used to collect baseline (i.e. pre-application) and follow-up measures of the outcomes of interest (January 2017) alongside a range of observable characteristics.

In terms of caveats associated with the information feeding into the analysis, the observations gathered could not be validated against independent sources and are self-reported in nature, and are therefore potentially subject to recall bias and other sources of measurement error. The assumption is also made that members of the team have accurate knowledge of the commercialisation outcomes achieved. For those awarded a place on the programme, the survey results suggested that in the large majority of cases, academic staff had a degree of involvement in the commercialisation process, and as such, there is a high degree of confidence that this assumption holds. However, for those not awarded a place on the programme, it is unknown how far academic staff will be able to accurately report the commercialisation results (where respondents reported that they did not know, these observations were dropped from the analysis, though the risk arises where respondents reported inaccurate outcomes).

The primary dataset included multiple perspectives regarding the outcomes and characteristics of the same project that were not always consistent across team members (and there was variable coverage of team members across individual applications). While this would not necessarily systematically distort findings if these variations were random, if there were different levels of response to the survey across teams that were connected with the outcomes of interest then this would have the potential to bias findings. These risks are minimised by the high response rate secured in the survey (76 percent) and the strategy of randomising the project of interest where team members were involved in multiple projects.

Nevertheless, to verify the validity of the results based on individual level data, a secondary dataset organised at a project level was developed. This involved aggregation of the data by averaging the responses given by individual team members associated with a project with each member of the team given equal weight (with rounding applied to binary outcomes such that they reflected the balance of opinion across the team). This process reduces the number of observations available (109 project level observations) and consequently the statistical power of the analysis.

1.1.5 Key Outcomes

The econometric analysis examined the impact of ICURe on the following key outcomes measured prior to the application to ICURe and in January 2017:

- **Change in the number of contacts engaged in connection with projects** - covering potential customers, suppliers, competitors, and investors.
- **Change in the business model readiness index:** The survey collected observations on how far teams had progressed against 9 dimensions of business model readiness (reflecting the key aspects of the Business Model Canvas used in the ICURe programme) using a scale of 1 to 10. The responses were aggregated to give an overall business model readiness index (from 10 to 90). The dimensions of this framework are described in section 1.4. The results here should be interpreted in light of the use of the Business Model Canvas in the ICURe programme: the key dimensions will have been familiar concepts for those participating in the programme (and those that had participated in the Research to Innovator

Programme) but not for those that were not awarded a place. This may have a distortionary effect on the observations collected, though will not distort the findings of the analysis if any biases are present in both reported baseline and follow-up measures.

- **Change in the TRL level:** This is used to analyse the progress of the technology at the heart of the application which, though not explicitly a focus of ICURe, could be affected either positively or negatively by the programme. It has been calculated as the difference between the reported level before application and the stated level at the time of the survey, using the 9-point Technology Readiness Level scale.
- **Likelihood of pursuing a licensing deal or spin-out:** The dependent variable for this analysis is a dummy variable that takes the value of one if the respondent reported pursuit of a licensing deal or spin-out and zero otherwise.
- **Likelihood of achieving a licensing deal or spin-out:** The last variable of interest, the likelihood of achieving a licensing deal or spin-out is also a dummy variable, this time taking the value of one if the respondent indicates either outcome as being achieved and zero otherwise.

1.1.6 Controls

A number of control variables were included in the model as outlined in the list below:

- **Application score:** The score given to the initial ICURe application is used as the only way to control for the quality of the project that forms the focus of the application. This is therefore the only way the models presented can control for selection bias.
- **Prior attempts to commercialise the technology:** This variable takes the form of a dummy variable indicating whether or not the technology has been the subject of previous commercialisation activity.
- **Commercial experience of respondent:** This variable takes the average number of years the respondent stated that they had of carrying out commercialisation, or commercial activity.
- **Participation in Researcher to Innovator programme:** This dummy variable takes the value of one for respondents who are ECRs and participated in the aforementioned programme.
- **Prior progress against business model issues:** This controls for the prior level of business model development and is the index value before application constructed from the survey.
- **Technological readiness level before application:** The TRL before application controls for the technological progress prior to application.
- **Number of contacts engaged before application:** This variable controls for the amount of engagement activity that had been conducted prior to application to ICURe.
- **Institutional data:** This data includes the number of disclosures made in that university in 2014/15 to compensate for the culture of commercialisation at the local level in addition to the number of staff in the institutions TTO including those interacting with commercial partners as its own separate variable.

- **Time elapsed:** This variable takes the value of the number of years that have elapsed since application to control for time passed that is likely to impact the outcome variables (i.e. teams participated in earlier cohorts will have had more time to realise the commercialisation outcomes of interest).

1.1.7 Interactive Effects

Finally, models were also developed to test a number of hypotheses regarding the relative effectiveness of elements of the programme and the role of external factors in contributing the outcomes observed:

- **Participation in the Researcher to Innovator programme:** The interaction between the dummy variable denoting participation of the ECR in the Researcher to Innovator programme and the dummy variable denoting whether a team was awarded a place on the ICURe programme was used to explore the extent to which the two programmes complement each other.
- **Business mentor experience:** This interaction takes the form of a continuous variable taking the value of the number of years' experience the business mentor has in commercialisation activity if a team were participating in ICURe and zero if they were not. This elicits the additional impact on the outcomes that can be gained from having a more or less experienced mentor amongst the team.
- **Technology transfer officer experience:** This variable is similar to the one described immediately above except is related to the experience of the TTO carrying out commercialisation activity.
- **Business mentor background:** A dummy variable taking the value of one if the business mentor has a background in the same field as the technology that forms the focus of the ICURe application and zero otherwise has been interacted with the success variable (to test the hypothesis that alignment of backgrounds increases the likelihood of positive results)
- **Business mentor involvement in underlying research:** This dummy variable interaction accounts for any additional effects that may be derived from having a business mentor that was involved in the underlying research (which is taken as proxy for the business mentor having a financial or other interest in the project).
- **Perceived quality of TTO support:** In the survey ECRs were asked to rate the quality of support they received from both their TTO and the business mentor separately. Their responses out of 10 have been interacted with the success dummy to shed light on additional effects on outcomes if perceived support was better.
- **Perceived quality of BA support:** Similarly, this variable instead looks at the perceived quality of support from the business mentor.

It should be noted that just because a variable is not shown to be statistically significant in the data available does not mean that effects are not present. The inclusion of interaction terms reduces the statistical power of the models, and signals of potential effects are highlighted in the analysis (i.e. where coefficients are significant at levels lower than 95 percent).

1.1.8 Comparing those awarded a place on ICURe and those not awarded a place

In order to verify the validity of using the non-participant applicant group as a suitable counterfactual, a number of t-tests were conducted to examine differences in a number of observed characteristics prior to application. Table 1.1 shows that there were no statistically significant differences in all but one of the observed characteristics. The only significant difference

between the two appears to indicate that those not awarded a place had progressed further in terms of business model development. The results therefore support the use of those not awarded places on ICURe as a suitable counterfactual.

Table 1.1: Comparison of participant and non-participant samples

	Awarded a place in ICURe	Not awarded a place in ICURe	Difference in means	t-statistic	Significance
	Mean	Mean			
Attempted to commercialise previously	0.26	0.15	-0.11	-1.65	-
Commercial experience	5.38	6.03	0.65	0.6	-
Participated in Researcher to Innovator	0.24	0.24	0	0.01	-
Prior business model index score	31.69	39.64	7.95	3.8	99.9% sig. level
TRL prior to application	3.73	3.42	-0.31	-1.6	-
Contacts engaged prior to application	7.64	8.06	0.42	0.19	-

Ipsos MORI analysis; Applicant Survey January 2017.

1.2 Results: Individual Level

This section sets out the results from the analysis of individual responses. Standard errors used in the individual level analysis have been clustered at the project team level and therefore take into account a degree of variation in the responses provided across team members.

1.2.1 Summary of Key Findings

The findings suggest that ICURe:

- **Increased number of contacts engaged since application:** The models produced suggest that participating in ICURe led to between 59 and 83 more contacts being engaged (accounting for effects both during and after the market validation exercise).
- **Improved resolution of business model issues:** The estimated models imply that participating ICURe project teams progress further against the set of common business model issues presented to them in the survey as a result of the programme. The estimated size of this effect varies from between a 16 and a 21-point increase in the index constructed by the project team depending on the model examined.¹
- **TRL levels:** Impacts are evident on the technological development of a project which suggest that ICURe projects progress further along the TRL scale than non-participating projects. The magnitude of this effect is shown in table 1.3 below.

¹ Nine issues are presented to survey respondents and they are asked to report their progress against these out of 10 at the point before application and then, subsequently, their current progress. These have then been summed up (out of 90) and the change calculated.

- **Increased likelihood to pursue a licensing or spin-out outcome:** A significant impact on the likelihood of teams to pursue a commercialisation outcome has been detected. The models imply that participating ICURe teams are more likely to pursue a commercialisation outcome (details on the quantitative magnitude of this effect is set out below).
- **Increased likelihood of achieving a licensing deal or starting a spin-out:** There is also a clear impact on the achievement of a commercialisation outcome, defined as a licensing deal or the setting up of a spin-out. Again, details of the quantitative magnitude of this effect is set out below.
- **Participation in Researcher to Innovator & ICURe:** Interactive effects imply that participating ICURe teams speak to as many additional contacts regardless of whether the ECR completed the Researcher to Innovator programme or not. However, participation in Researcher to Innovator appears to increase the likelihood that a commercial outcome is achieved, and that there may be diminishing marginal returns to participating in these types of programmes.
- **Business advisor experience and background:** Findings related to the experience of the business mentor suggest that effects are likely present on the achievement of a commercial outcome, progress resolving business model issues and TRL change. The results suggest that each year of experience on the part of the BA results in an increased likelihood of licensing or spinning out a company and accelerate the resolution of more business model issues², while if the mentor has a background in the same broad field as the technology at the heart of the ICURe project the results imply that they are more likely to achieve a commercialisation outcome.³ There is a lower degree of confidence in these results, due to the smaller sample sizes involved.
- **Effect of the TTO:** Overall, no evidence is found that the impacts are linked to the perceived quality of support provided by the TTO or BA (as perceived by the ECR) aside from one unexpected result in the table below that suggests that better perceived support from the TTO leads to fewer contacts engaged (which may be an artefact of the data).

1.2.2 Marginal Effects on Likelihood of Achieving Commercialisation Outcome

The table below shows the quantitative impact of ICURe on the likelihood of a commercialisation outcome (i.e. a spin-out or licensing deal). These figures imply a gross additionality rate of around 80 percent (i.e. $1 - (0.08/0.40)$).

Table 1.2: Change in probability of pursuing a licensing deal or spin-out and achieving one

	Predicted probability of pursuing a licensing deal or spin-out	Predicted probability of achieving a licensing deal or spin-out
Without ICURe	0.148	0.080
With ICURe	0.790	0.402

Ipsos MORI analysis; Applicant Survey January 2017.

² These effects are significant at or around the 90 percent confidence level but not at the 95 percent confidence level.

³ Again, these effects are significant at or around the 90 percent confidence level but not at the 95 percent confidence level.

1.2.3 Effects on TRL progression

Table 1.3 shows the impact of ICURe on the technological development of the projects at the heart of the applications. It suggests that, on average, participation in ICURe moves projects along the TRL scale twice as rapidly.

Table 1.3: Comparison of predicted TRL changes

	Predicted change in TRL levels
Without ICURe	0.80
With ICURe	1.41

Ipsos MORI analysis; Applicant Survey January 2017.

1.2.4 Individual level results tables

	Change in contacts engaged								Change in business model issue index							
	OLS								OLS							
Success dummy	82.55***	101.1***	104.3	1.232	154.1*	196.4**	189.2***	59.03	16.67***	18.95***	-11.98	1.478	1.242	0.298	16.75	15.20
Application score	33.44	34.55	27.37	22.76	-11.87	17.22	45.76	43.79	10.93*	10.24*	9.426	22.25*	12.74	11.14	10.15	9.219
Project commercialisation attempt previously dummy	-32.71*	-41.18*	23.41	-4.401	11.62	18.74	-33.71*	-33.77*	-2.385	-2.719	4.587	0.674	4.627	6.212	-2.687	-3.317
Commercial experience	-0.654	-0.0620	1.279	-6.127	1.378	2.600	-0.279	-0.401	0.305	0.312	-0.118	-0.460	0.125	0.139	0.273	0.262
R2I dummy	9.629	52.10***	-127.2	-2.419	-88.05	-165.0*	-7.622	10.58	2.088	7.555	1.103	5.211	-2.888	-2.614	2.255	2.266
Baseline business model index score	-0.773	-0.692	-0.989	-0.835	-0.236	-0.926	-1.147	-0.852	-0.688***	-0.682***	-0.984***	-0.984***	-0.959***	-0.929***	-0.700***	-0.727***
Base TRL	-13.39	-12.32	-13.89	-3.698	-8.313	-27.74	-18.38	-9.508	-2.318	-2.272	1.320	-5.064*	-0.0399	-2.627	-2.048	-1.928
Base contacts	0.440	0.353	-7.271*	6.687	-3.518	-7.738*	0.385	0.467	-0.0701	-0.0902	0.144	2.332**	0.390	0.439	-0.119	-0.134
Years elapsed	-2.491	6.795	95.23	-35.27	31.83	122.6	-3.866	-7.445	6.150	7.606	5.950	-10.00*	14.81	13.02	6.014	4.568
Number of disclosures (14/15)	0.0782	0.0895	0.0683	0.298	0.657	-0.259	0.102	-0.0692	0.0954*	0.0943*	0.0941	0.0828	0.0370	-0.00907	0.0819	0.0854
Overall TTO staff	0.122	0.0691	-2.322	-1.078	-1.249	-4.685	-0.0559	-0.0335	0.0407	0.0300	-0.472	-0.271*	-1.115	-1.082*	0.0422	0.0440
Commercially facing TTO staff	-0.304	-0.244	3.403	1.308	2.162	7.529	-0.105	-0.0254	-0.0893	-0.0772	0.864	0.313	2.028	1.957*	-0.0899	-0.0864
Success*R2I		-58.08*									-8.836					
Success*Years of exp. BA			4.660								0.939^					
Success*Years of exp. TTO				3.558								-0.175				
Success*BA background same as project					-31.41								-0.627			
Success*BA involved in research						-3.663								10.55		
Success*TTO support							-13.45*								-0.0861	
Success*BA support								2.557								0.101
Constant	83.54	52.54	-94.41	146.6	-72.36	-98.88	118.6	87.54	22.35	19.57	31.82	79.60***	14.79	29.43	24.01	27.72
N	96	96	40	42	36	40	86	84	136	136	62	53	57	63	123	119

Significance levels: ^ <0.10; * p<0.05; ** p<0.01; *** p<0.001

	Change in TRL							
	Negative binomial							
Success dummy	0.568*	0.684*	0.277	0.393	1.122	1.423**	1.152	0.468
Application score	0.629	0.658*	0.569	0.859	0.932	0.782	0.703	0.613
Project commercialisation attempt previously dummy	-0.00313	-0.0300	0.245	0.222	0.340	0.275	0.0584	-0.00807
Commercial experience	-0.0183	-0.0162	-0.0332	-0.0530	-0.00867	-0.0205	-0.0156	-0.0189
R2I dummy	-0.407	0.0393	-1.745*	-0.0385	-2.586**	-2.069*	-0.552	-0.529
Baseline business model index score	0.0113	0.0112	0.0182	0.00365	0.0140	0.0181	0.0109	0.0101
Base TRL	-0.198	-0.193	-0.176	0.0552	-0.283	-0.374*	-0.223	-0.173
Base contacts	0.0110*	0.0102*	-0.0400*	0.0952	-0.0501*	-0.0381	0.0156**	0.0150**
Years elapsed	0.123	0.209	0.603	-0.327	0.918	1.176**	0.195	0.177
Number of disclosures (14/15)	0.00118	0.000912	0.00130	0.00314	-0.00319	-0.00553	0.00246	0.00286
Overall TTO staff	-0.00214	-0.00304	-0.0221	-0.0153*	-0.0611*	-0.0682**	-0.00359	-0.00445
Commercially facing TTO staff	0.00330	0.00440	0.0350	0.0201*	0.102*	0.116**	0.00517	0.00670
Success*R2I		-0.617						
Success*Years of exp. BA			0.0627**					
Success*Years of exp. TTO				-0.00545				
Success*BA background same as project					0.697			
Success*BA involved in research						0.426		
Success*TTO support							-0.0592	
Success*BA support								0.0287
Constant	-0.509	-0.685	-1.674	-0.646	-1.967	-2.188	-0.704	-0.746
N	184	184	84	74	79	85	163	158

Significance levels: ^ <0.10; * p<0.05; ** p<0.01; *** p<0.001

	Likelihood to pursue a commercialisation outcome								Likelihood to achieve a commercialisation outcome							
	Logistic regression								Logistic regression							
Success dummy	4.156***	4.443***	5.871	2.298	8.495*	7.870*	4.469**	2.017	2.796***	3.429***	5.382*	0.527	5.931**	6.873**	4.234**	2.115
Application score	1.575*	1.650*	4.793**	0.676	4.558**	4.826**	1.691*	1.556*	1.933**	2.235**	4.742**	5.039*	5.251**	5.062**	2.259**	2.069*
Project commercialisation attempt previously dummy	0.0696	0.00562	-2.780	0.918	-2.460	-2.049	0.402	0.355	-0.863	-1.192	-0.996	-0.566	-0.558	-0.702	-0.728	-0.941
Commercial experience	0.0288	0.0312	-0.000175	-0.0469	0.0267	0.0465	0.0493	0.0424	0.0673*	0.0802**	0.0809*	-0.00916	0.137*	0.135*	0.0728*	0.0713*
R2I dummy	-1.042	-0.469	-0.987	-1.952	-1.325	-1.554	-1.238	-1.222	1.199	2.611**	-2.152	0.673	-3.288*	-2.305	0.948	1.123
Baseline business model index score	0.0448*	0.0450*	0.0137	0.0772*	0.0172	0.0107	0.0364	0.0305	0.0201	0.0191	0.00936	0.0301	0.00174	0.00728	0.0175	0.0187
Base TRL	-0.499*	-0.521*	-0.877	-0.157	-1.081	-1.255*	-0.436	-0.233	-0.217	-0.190	0.257	0.326	0.229	0.0269	-0.293	-0.131
Base contacts	-0.0283	-0.0300	-0.155	0.175	-0.171	-0.167	-0.0558	-0.0592	-0.0167	-0.0227	-0.147	0.517***	-0.128	-0.144	0.000579	-0.00430
Years elapsed	1.629**	1.841**	6.086*	0.0564	7.175*	6.469	1.836**	1.564*	1.643	2.145*	6.106*	-1.642*	5.141**	5.992**	1.693	1.592
Number of disclosures (14/15)	0.0212**	0.0220**	-0.0130	0.0242	-0.0242	-0.0141	0.0232**	0.0229**	0.0244**	0.0257**	0.0201	0.0611**	0.0212	0.0153	0.0215*	0.0216*
Overall TTO staff	-0.00460	-0.00555	-0.137	-0.0409	-0.199	-0.162	-0.00347	-0.0146	-0.0337**	-0.0414**	-0.299*	-0.176***	-0.310**	-0.322**	-0.0416**	-0.0445*
Commercially facing TTO staff	0.00301	0.00391	0.216	0.0554	0.326	0.263	0.00207	0.0202	0.0480*	0.0586**	0.501*	0.223***	0.522**	0.542**	0.0596**	0.0653*
Success*R2I		-0.855									-1.837*					
Success*Years of exp. BA			0.174									0.122^				
Success*Years of exp. TTO				0.0670								-0.0932				
Success*BA background same as project					-0.792								1.540^			
Success*BA involved in research														1.021		
Success*TTO support								-0.0464								-0.168
Success*BA support									0.243^							0.0984
Constant	-6.539***	-6.977***	-11.87**	-4.610	-13.14**	-11.81*	-7.028**	-6.599**	-7.971**	-9.294**	-20.97**	-5.261	-19.43***	-20.21**	-7.785*	-8.009*
N	186	186	84	75	79	74	165	160	186	186	84	75	79	85	165	160

Significance levels: ^ <0.10; * p<0.05; ** p<0.01; *** p<0.001

1.3 Results: Project Level

1.3.1 Summary of Key Findings

The key findings from the project level analysis are consistent with those from the individual level analysis but are limited in terms of their statistical power. The key findings are:

- **Positive impact on the number of contacts engaged:** As in the previous individual level analysis, a significant effect on the number of contacts engaged is present in the data. The effect size is estimated to be smaller in this analysis.
- **Progress on resolving business model issues** A positive effect on the resolution of business model issues is also present in the project level data suggesting that participation in ICURe results in a 20-point increase in the index constructed above what would have been achievable otherwise.
- **Increased technological progress:** This analysis shows an impact equivalent to moving projects along the TRL scale at twice the rate of non-participating projects just as the individual level analysis does.
- **Increased likelihood to pursue a licensing deal or spin-out:** The results show that teams participating in ICURe were more likely to pursue a commercialisation outcome as defined as seeking a licensing deal or attempting to spin-out.
- **Increased likelihood to acquire a licensing deal or spin-out:** The models also suggest that participating teams were more likely to achieve a commercialisation outcome.

There were no evident effects on the TRL level and interactions were not tested as they further reduced the observations available.

1.3.2 Marginal Effects on Likelihood of Pursuing and Achieving Commercialisation Outcome

As in table 1.2, the table below illustrates the changes in the probability of the two outcomes estimated via logistic regression. These are also consistent with the individual level analysis and imply that ICURe participation results in an increase of _ percentage points in the probability of pursuing a licensing deal or spin-out. There is evidence of an 83 percentage point increase in the probability of achieving a licensing deal or spin-out for teams that are awarded a place on ICURe (i.e. 1-(0.075/0.429)).

Table 1.5: Change in probability of pursuing a licensing deal or spin-out and achieving one

	Pursuing a licensing deal or spin-out	Achieving a licensing deal or spin-out
Without ICURe	0.230	0.075
With ICURe	0.826	0.429

Ipsos MORI analysis; Applicant Survey January 2017.

1.3.3 Project level results table

	Change in contacts engaged	Change in business model issue index	Change in TRL	Likelihood to pursue a commercialisation outcome	Likelihood to achieve a commercialisation outcome
	OLS		Negative binomial	Logistic regression	
Success dummy	56.98***	20.15***	0.725***	3.422**	2.888**
Score	-14.95	-2.199	0.450*	-2.021	-0.593
Prior business model index score	-0.187	-0.203	0.00712	0.0233	-0.00966
Project attempted to be commercialised previously dummy	-4.197	5.136	-0.0309	4.468**	0.415
ECR participated in R2I	-7.240	-3.813	-0.407	2.953	0.525
Base TRL	-5.274	-0.739	-0.173**	-0.634	0.0156
Base contacts	0.423	-0.174	0.00864*	-0.0860*	-0.00139
Years elapsed	11.45	6.716	0.231	1.006	2.594*
Number of disclosures (14/15)	0.150	0.0779	0.00118	0.00602	0.0265*
Overall TTO staff	0.233	0.0354	-0.00112	0.0137	-0.0150
Commercially facing TTO staff	-0.437	-0.0759	0.00210	-0.0321	0.0153
Constant	-1.798	-0.904	-0.800	-0.807	-9.411*
N	67	67	67	67	67

Significance levels: ^ <0.10; * p<0.05; ** p<0.01; *** p<0.001

1.4 Business Model Index

The business model issues described in the survey of ICURe applicants are representative of those that form the focus of the business model canvas that ICURe participants undertake (information on these can be found online at: <https://strategyzer.com/canvas/business-model-canvas>). These nine core areas are described below:

- 1. Identification of the core value proposition:** This relates to what the product/service offers that meets the needs of its customers and identifying what the key element separating it from its competitors is forms a part of understanding the market for the product. Higher scores on this measure would be indicative of someone who understands what their product in particular has to offer and what to focus on when engaging potential customers.
- 2. Establishment of the relationships with key partners required:** This measure assesses the extent to which respondents feel that they have developed the relationships with the key partners that are required for the product/service. Higher scores would represent a higher degree of relationship establishment.
- 3. Definition of the key activities involved:** Scores here indicate the degree to which respondents have identified and defined the activities that they need to focus on in order to develop the business model. This would include activities such as establishing an effective supply chain, where relevant, and respondents giving higher scores here would exhibit a greater degree of understanding what is required to develop the value proposition.
- 4. Identification of key resources needed (e.g. IP or human capital):** Development of the business model requires resources and the identification of what resources and in which quantities forms a part of the business model canvas. Higher scores on this measure would be expected from those respondents who feel that they have a good understanding of the resources, capital, employees, IP etc. required to develop further.
- 5. Definition of cost structure:** Defining the cost structure and the subsequent characteristics of the cost structure are important aspects of the business model canvas. Here, individuals will need to determine what sort of cost structure (such as cost-driven or value-driven) is most applicable taking into account things such as the fixed costs associated with the product, variable costs and economies of scale and scope. Higher scores indicate more progress in the understanding of the cost structure.
- 6. Definition of the core customer segments:** This measures the extent to which the segments of interest have been defined by the individual. Higher scores here would show a greater understanding of the core markets and where extra effort would yield greater results.
- 7. Establishment of customer relationships required:** This refers to the identification of the relationships that are desired by customers e.g. assistance, community-based or self-service, and then the establishment of these. Higher scores would be indicative of a higher degree of establishment.
- 8. Identification of channels to market:** This measures the degree to which individuals feel that the route to market(s) has been identified. A score of ten here would indicate that has been completed.
- 9. Clarified the anticipated revenues:** The last aspect measures the extent to which individuals think that the revenue streams and scale of revenues have been uncovered. A score of 10 would indicate that the anticipated revenues have been explored and are understood.

Responses to these were aggregated to form an index, both prior to the point of application and at the time of the survey and changes between these points were analysed in the econometric analysis above.