Innovate UK evaluation framework

Challenges and mitigations

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Overview

- Evaluation in Innovate UK: the history
- Challenges we face and mitigations we've developed
- The future

Evaluation in Innovate UK

- The history:
  - Ad hoc, single-point-in-time evaluations
  - Generally launched some years after projects had finished
  - Limited use of a control group

- Economics and Performance team formed in 2013
- Key initial focus of implementing a robust evaluation framework across all our activities
- Developed into new evaluation framework, setting out our guiding principles in designing and implementing evaluation.

- Performed a prioritisation exercise, to determine which areas to initially focus on.

Evaluation challenges – paucity of data

Problem:

- Innovation grant programmes support a relatively small number of participants.
- Where programmes have different strands or segments, sample size issues can be significant.

Example:

- 2015 Evaluation of Smart used a two year cohort, attaining 293 treatment, 189 control.
- Sufficient for headline analysis, but breaking down to different segments we quickly lost sample size.

Solutions:

- Track cohorts in real time to enhance data quality, and encourage participation.
- Keep in touch with sample between survey waves.
- Use cohorts from longer time periods to increase sample.

Evaluation challenges – heterogeneity

Problem:

- Businesses are not all the same – they differ by size, region, sector, and structure, as well as objectives and motivations.
- Business data tends to have only limited control variables, so some factors cannot be controlled for.
- Many statistical models assume homogeneity where sufficient controls cannot be included – this may lead to (ambiguous) bias in results.

Related problem:

- Innovation programmes are often targeted at particular types of businesses. With such a diverse population, it is important for evaluations to assess whether the population the programme reaches is the ‘right’ one – the one which can benefit the most.

Evaluation challenges – low observability

Problem:

- Many outcomes and impacts of innovation support are not well documented.
- Primary output – knowledge - can be embedded in innovation project outputs (e.g. products)
- It also moves with people, to different companies, industries, and applications, creating benefits elsewhere.
- These spillover impacts are impossible to predict and difficult to track, observe, and measure.

Solutions:

- In our evaluation of Smart, we asked direct beneficiaries whether any customers, suppliers, or competitors would have benefited from the project.
- Asked what form those benefits took, to build a typology of different spillovers.
- Asked for contact details to interview the indirect beneficiaries, to follow up.
- Experienced difficulties in contacting indirect beneficiaries, limited analysis to non-representative qualitative view.

Evaluation challenges – low observability

Spillovers research: findings

- Found a substansive difference in the perceived spillover impacts reported by direct beneficiaries, and those reported by the indirect beneficiaries.
- Pointed towards optimism bias amongst direct beneficiaries, over-stating the spillover impact the projects were having.
- Suggests evidence from direct beneficiaries is not a reliable indicator of actual spillovers
- The approach of reaching indirect beneficiaries via programme participants would require significant resource to be successful.
- Incentives to participate may reduce some of the difficulties in gaining interviews.
- The approach was only suitable to investigate some types of spillovers, primarily those accruing to suppliers or collaborators.
- There was evidence of positive feedback loops between collaborators and direct beneficiaries, which could be investigated in future evaluations.

Evaluation challenges – fluidity

Problem:

- Companies are fluid: they change frequently and unpredictably.
  - Introduction of new products or processes
  - Entry to new markets
  - Changes in strategy or leadership
  - Mergers and acquisitions

Solutions:

- Innovate UK have been using external data to gain a better understanding of changes in company ownership and exit strategies.
- Provides a clearer picture as to how companies we support change over time, and can tie in with evaluation activities to understand whether grant support impacts survival or company structure.
- Looking at advanced analytical techniques to dynamically analysis internet data to look for product launch activity.

Evaluation challenges – skewed and lagged effects

Problem:

- Statistical models often assume a ‘Normal’ distribution of observations around a mean.
- Impacts of innovation tend to be highly skewed towards a small number of very successful projects with a long tail of low or no impact projects.
- Many evaluation techniques seek to estimate the average treatment effect; the mean impact of an intervention on a participant, but this profile of impacts can be difficult to capture in sample-based analysis.
- Impacts also happen over many years, generally long beyond the duration of support.
- In initial years following support, returns can appear to be low or even negative.

Solutions:

- Innovate UK evaluations span long time periods, from the start of projects to at least 3 years beyond their end.
- Recent evaluation of support for argi-tech conducted fieldwork 6 years after the programme started, intending to go back again after 8. Initial survey found only ¼ of projects had completed, so have moved second wave back a further 2 years.

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Evaluation challenges – attribution

Problem:

- Innovation support acts as part of a complex science and innovation system
- Multiple actors and programmes at national and sub-national levels
- Companies may receive support from several programmes across multiple organisations
- Attribution of any observed impact to any single intervention can be very difficult, with each programme being necessary but not sufficient to achieve outcomes.

Solutions:

- Surveys can ask about other forms of support received, although self-reported information is likely to be flawed and incomplete.
- Greater linking of administrative data would allow for a more detailed analysis.
- Innovate UK have linked data to others programmes delivered by BEIS or the British Business Bank to look at the overlap of support.
- Nesta have been compiling data from local support schemes to provide the sub-national picture.

Data linking to enhance and complement evaluation

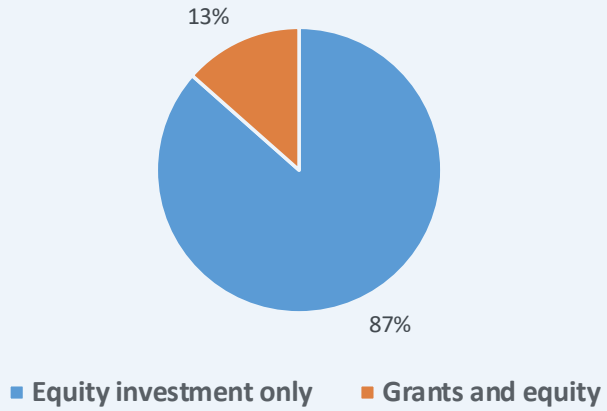
With issues around sample sizes, self-reported data, non-representative cover, and attrition of contacts, surveys can lead to insufficient data to assess impact alone.

Innovate UK has increasingly looked to match our portfolio to government and third-party databases to obtain verified business performance data without the need for surveys.

One example is our subscription to Beauhurst – a private database of all known equity investment deals involving UK companies. This has provided details on equity investments to companies we have supported, either before, during, or after grant support. Evaluations are now commonly using such data linking to provide wider evidence on outcomes.

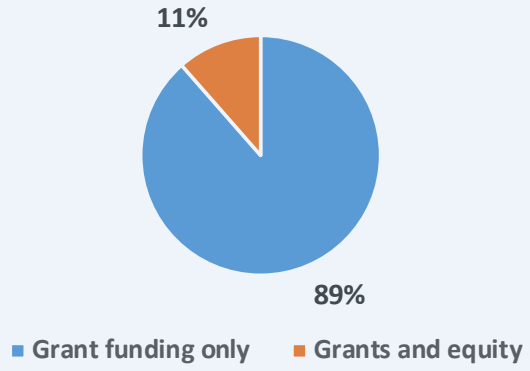
Equity fundraising and the Innovate UK portfolio (Beauhurst analysis 1/1/11 – 30/6/16)

Equity investment companies receiving Innovate UK grants



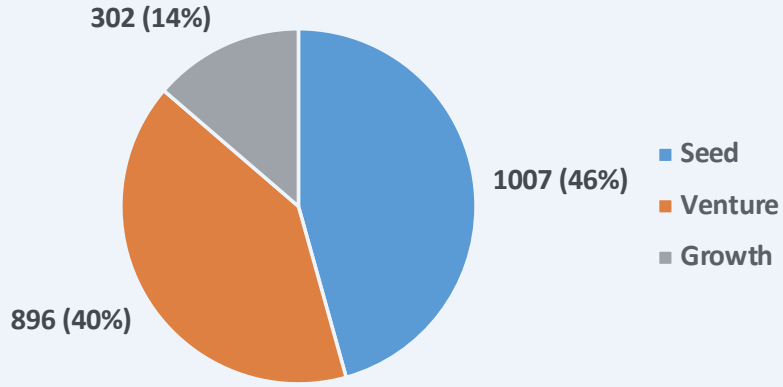
- On average, 13% of the near 7,000 companies who received equity investment in this period also received an Innovate UK grant.
- This figure increased for companies receiving grants worth more than £50k, up to 20% for grants worth £100k-£500k.

Innovate UK grant recipients receiving equity investment



- 11% of all grant recipients also received equity investment. Of these;
  - 19% received equity only before the grant
  - 38% received equity only after the grant
  - 43% received equity before and after the grant.

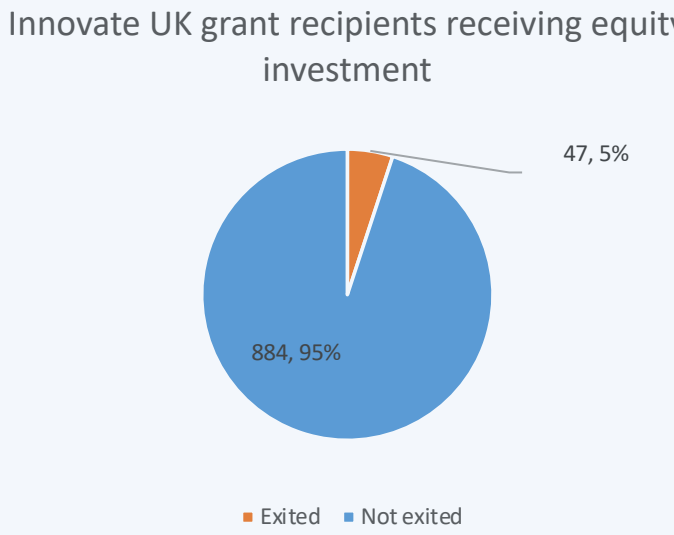
Investment rounds by stage



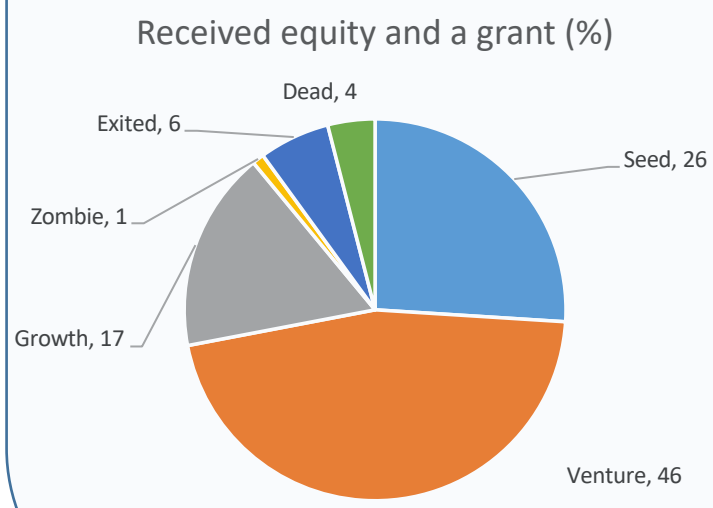
- 2,259 investment rounds involving 954 Innovate UK backed companies
- Just over £4bn raised, with average investment size of £1.85m
- Average stake offered 21%
- Latest average confirmed valuation is £9m
- These companies have been supported by 2,150 grants worth nearly £350m
- Top investor types for Innovate UK backed companies were;
  - Private equity/Venture Capital firms: 157 (43% of total population of such firms in the database)
  - Angel networks: 45 (64% of population)
  - 32 corporates (58% of population)
- Top investors:
  - Imperial Innovations (£393m round values)
  - Crowdcube (46 investments)

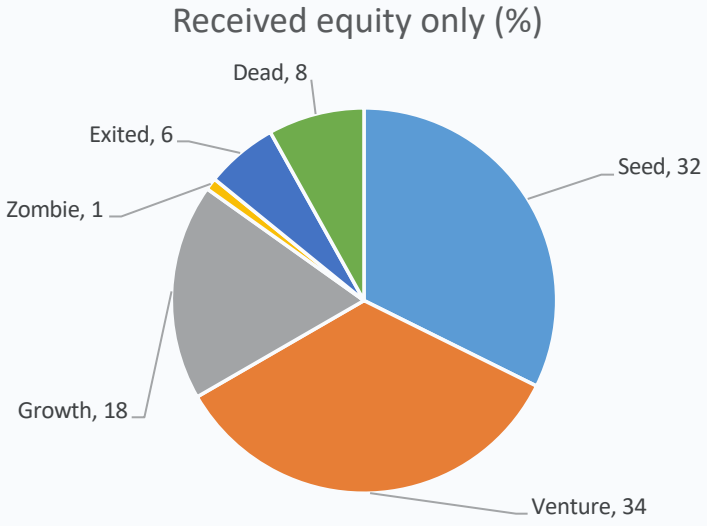
Equity, grants, and exits

5% of Innovate UK grant recipients who received equity investment from January 2011 have had a successful exit (floated or acquired). This is a slightly higher rate than all companies who received equity investment (4%).



Companies who received equity and a grant were between 2011 and 2014 were as likely to exit successfully, but half as likely to fail (4% compared to 8%) than those who only received equity investment.





Further findings from the analysis

- Receiving multiple grants is associated with a greater likelihood of receiving equity investment. Companies who only received one grant were the least likely to have received equity.
- Companies are most likely to receive equity at the same stage (seed, venture, growth) as they receive a grant.
- Companies older than ten years are less likely to receive equity investment in addition to grants compared to their younger counterparts. Companies that are currently around two years old are most likely to receive equity investment in addition to a grant.
- Of technology companies that have received equity investment, nanotechnology companies were most likely to have also received a grant. Software companies were least likely.

Important to keep in mind…

- Correlation does not necessarily mean causation: the above findings only report on correlations seen in the data. For example, the fact that companies which have received more grants are more likely to receive equity does not imply that providing more grants to companies will necessarily lead to more equity investment.

Summary

- Evaluation should be designed into programmes from the beginning – it's never too soon to start planning an evaluation.
- Evaluation of innovation support is difficult, with several sometimes intractable challenges. This doesn't mean evaluation shouldn't be attempted – instead, ensure the most robust methods practical are applied to each element of the programme. A mixed methods approach is usually most suitable.
- Data is key – know what data will be required for the evaluation, and ensure sufficient data collection processes are in place.
- Sample size is fundamental – design an evaluation which enables a sufficient sample size in both the treatment and control group. This may mean using a cohort from over a longer time period.
- Don't get too preoccupied with a single number – evaluation findings will always come with some gaps and uncertainties. The headline return on investment figure is important, but there'll be a significant margin of error around it. The narrative and lessons around it will inform decision making just as much, if not more.

Summary

- Survey data is usually required, but is also imperfect. Complement and verify this by linking your evaluation data to third-party data sources.

- Be innovative when evaluating – it's important to ensure you're measuring what you can as robustly as you can. But with this core in place, look at where you can try novel techniques, and push the boundaries of the evaluation a bit further.