

NEW RUNNING EXPERIMENTS IN INNOVATION AND GROWTH POLICY: WHAT CAN WE LEARN FROM RECENT EXPERIENCE?¹

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INTRODUCTION

Although experimentation is not new to policy in general (Oakley, 1998), it has only recently started to be used in the field of innovation and growth policy. The case for using robust experimentation techniques, such as randomised controlled trials (RCTs), is clear (Bravo-Biosca, 2016), and yet the field has lagged others, such as development or education (Dalziel, 2018).

Nevertheless, the number of impact evaluations using the RCT design in the field of innovation, entrepreneurship and business growth policy has grown. The IGL Database, which attempts to collect all RCTs in this field, currently counts 130 such experiments¹, of which over two thirds took place in the past decade. IGL has played a role in this growth, through the IGL grants programme², funding in the past five years over 30 randomised impact evaluations in this field, and also assisting a number of government agencies in their own journey to experimentation³.

This paper is an attempt to synthesize the findings from this wave of experimentation, with a focus on trials relevant to innovation policy. It does so in the context of IGL's work, drawing lessons both from experiments our organisation has been involved with and the work it has done directly with government agencies around the world. It aims to provide a primer on the lessons that policymakers and researchers can draw on the use of experiments to evaluate innovation and growth policies.

It is structured in two parts. The first section reviews recent experiments in this field and provides an account of the evidence that they have generated. A second section investigates what these recent experiences can teach us about the practice of running experiments to test interventions in innovation and growth policy.

A BRIEF NOTE ON SCOPE AND METHODOLOGY

Neither of the two sections that conform this paper aim to provide a comprehensive review of the evidence in this field.

The first section covers a number of RCTs, starting from those funded

or indirectly supported by IGL; it often draws from other experiments carried out recently. It makes reference to both published and forthcoming research. It does not attempt to conduct an evidence review on any of the particular sub-policy domains, as this would be beyond the scope of this paper⁴.

The second section is based on the direct experience of the authors working on experimentation with public organisations in the field of innovation and growth policy.

LEARNING FROM RECENT EXPERIMENTS

Innovation and growth policy covers a wide spectrum of instruments and goals. Here, we have organised lessons from experiments along two broad policy aims. The first one focuses on expanding the number of people who participate in innovation activities to include those who would not usually participate. The second category reviews a number of interventions that support existing innovators (entrepreneurs, firms, or researchers) through a variety of schemes aimed at facilitating collaborations, improving skills, and ensuring the best ideas are backed. A final section focuses on an overarching question that might be of special interest to policymakers, namely, what are the best ways to fund innovation?

MAKING INNOVATION MORE INCLUSIVE

An often overlooked aspect of innovation is who gets to be involved in it – and who is excluded. In their recent research, Chetty and colleagues marshalled a large dataset of inventors in the US, providing data on test scores and the amount of innovators they were surrounded by during childhood (Bell et al, 2017). They showed that coming from a family or area with many inventors is a strong predictor of becoming one, but that for children from disadvantaged backgrounds – even the brightest ones – the path to a career in innovation is much more difficult; they posit that a lack of exposure to innovation early on is a big part of this story. This finding has important economic consequences (we could have many more inventions if more people had been exposed to innova-

¹ This essay has benefitted extensively from prior work undertaken by the authors as well as other colleagues at the Innovation Growth Lab, including in particular Lou-Davina Stouffs and Albert Bravo-Biosca. The authors would like to thank them or their contribution to this essay, as well as two anonymous referees for their comments.

tors as children) but also a wider societal impact, since this mechanism is likely a contributor to inequality.

There have been a number of experiments that address this challenge. An intervention funded by the IGL Grants Programme in Denmark showed that a simple online course on entrepreneurship for 9-grade pupils could positively affect their sense of self-efficacy and intention to pursue a career in entrepreneurship⁵. Now another IGL-funded RCT, and led by the World Bank group, aims to expose 19,000 students in a Latin American country to entrepreneurship and STEM through an online intervention⁶.

The research by Chetty and colleagues also pointed to the value of role models in promoting an innovation mindset (Bell et al, 2017). This effect seems to have a strong gender component. A recent trial by an IGL-affiliated researcher focused on this aspect and showed that women role models can help improve the entrepreneurial attitudes and intentions of young women; the experiment explored the mechanisms through which this effect operates, and sheds light on how role models can be leveraged in an educational context (Bechtold and Rosendahl Huber, 2018). The power of female role models seems to persist even for actual entrepreneurs, as shown by an earlier trial in Chile, and to be a cost-effective approach to boost income when compared to more expensive consulting services (Lafortune and Tessada, 2015).

Another set of experiments has explored other ways to include people who do not usually partake in innovation activities. Two RCTs funded through the IGL Grants Programme stand out. The first one, carried out within a corporate environment in the Netherlands, used behavioural ‘nudges’ to increase the number of ‘intrapreneurs’ – employees providing innovative ideas to the company. The changes introduced were small – eg making the submission of ideas a default, or using examples of previous company intrapreneurs – but had significant effects; crucially, the increase in the quantity of ideas proposed did not come at the expense of their average quality (Weitzel and Rigterig, forthcoming). A similar experiment with engineering students at a US university found that using monetary incentives increased participation in an innovation contest, also without a decrease in quality (Graff Zevin and Lyons, 2018).

What these experiments show is that there are a number of interventions that can be used to make innovation a more inclusive endeavour, bringing in new people who would have otherwise not participated. But what can be done to support those who are already trying to innovate? The next section turns to a number of experiments that focus on this question.

SUPPORTING INNOVATORS

Having more people involved in innovation does not guarantee that they will be successful. Often innovators need support to be effective, eg by helping them find the right collaborators, or giving them training and advice. Here we focus on a number of experiments providing academic researchers, firms and entrepreneurs with the right tools to innovate.

A key component in the production of knowledge and innovation is collaboration (Wuchty et al, 2007; Santamaría and Nieto, 2007), and yet there is little robust evidence on how it comes about. An IGL Grants Programme trial is currently exploring the role of physical proximity by randomly assigning groups of researchers within a building (taking advantage of a temporary move); the authors aim to find out if being closer to a fellow researcher increases the likelihood of collaborating (Catalini and Ganguli, forthcoming). This follows a previous experiment by Boudreau and colleagues showing that bringing together medical researchers (who worked at the same institution) for a 90-minute session could raise their likelihood to collaborate on a grant application by 75% (Boudreau et al, 2017). When it comes to collaboration among firms, an experiment focused on a similar intervention – bringing business owners together on a regular basis to share information – also led to positive results, with increases in sales and knowledge sharing (Cai and Szeidl, 2018).

But how about collaborations between researchers and firms? This is a policy goal that is central to many policymakers, especially in Europe (European Commission, 2007). A policy instrument that has been increasingly used is ‘innovation vouchers’ – credits given to SMEs to connect with researchers. The implicit assumption is that once a connection is made, and the firm is comfortable reaching out to researchers, there will be long-term positive effects. Yet the evidence from experiments suggests this might not be the case. An RCT on a Dutch voucher programme found that an initial strong positive impact faded within the space of a few years – with firms that had received the voucher not performing any better than those that did not (Cornet et al, 2006)⁷. Nesta, where IGL is based, carried out an RCT to test the effects of ‘Creative Credits’, a voucher scheme focused on connecting SMEs with creative industry providers; it also found an initial impact that faded in the longer term (Bakhshi et al, 2015). More recently, IGL has supported one of its governmental partners with an RCT on their innovation vouchers programme⁸.

These experiments point to a key advantage of RCTs: by comparing firms that were similar across all characteristics, but varied only in the randomly assigned reception of a voucher, and tracking outcomes for several years, they were able to go beyond the initial positive impacts and provide results that can inform a cost-effectiveness decision on the voucher programmes.

Another approach to support innovators has focused on giving advice and training to entrepreneurs to improve their skills and their ventures. Once again, however, there is not a lot of robust evidence on exactly what type of advice or training is most effective; a number of experiments have been recently run to investigate this question. An RCT conducted by the World Bank in West Africa compared two models of entrepreneurship training: one focused on ‘traditional’ business skills (eg financial management, marketing); the other on fostering a proactive mindset and entrepreneurial behaviours (Campos et al, 2017). It found that the latter was much more effective. Now an IGL Grants Programme trial is comparing similar training programmes in Jamaica⁹. Two other IGL Grants Programme RCTs are exploring how to improve the ways accelerators help new ventures through training. The first one, in Italy, has shown that teaching entrepreneurs to see their startups in scientific terms, framing each new move as a science experiment, can have a large positive impact on their customer activation and fundraising (Camuffo et al, 2017). The other, in Chile, is currently investigating whether ‘structured accountability’ – asking founders to periodically present on their strategy and progress on goals – can help startups succeed¹⁰. Previous experiments have also shown that small interventions can make a difference; for instance, an RCT presented at the IGL2017 conference showed that the value of providing founders with feedback already collected when the applied to be part of the Startup Chile accelerator: startups by founders who received the feedback were later on more likely to have survived and raised significantly more money (Wagner, 2016). Now IGL is supporting one of its partners in replicating these results, to help them decide whether internal evaluations of applicants should be shared with them as feedback.

There have also been a number of experiments testing the effectiveness of consulting services on firms. Bloom and colleagues demonstrated the strong positive impact on productivity of management consulting for manufacturing firms with an experiment in India (Bloom et al, 2013); the intervention was intensive and costly, but they found that the gains in productivity offset the costs. They also followed up several years later and found that many of the effects persisted (Bloom et al, 2018). A more recent example, using a less intensive consulting intervention for SMEs in Mexico, found strong effects on employment (Bruhn et al, 2018).

WHAT IS THE BEST WAY TO FUND INNOVATION?

The two sections above highlight the range and variety of interventions to support innovation. Governments also often choose to directly fund research and innovation through grants. However, there is surprisingly little research on what are the best ways to evaluate and select the best proposals in grant funding calls. The details might matter significantly. Some experimental evidence, for instance, has shown that evaluators tend to give lower scores to proposals in their own areas of expertise and to highly novel proposals (Boudreau et al, 2016). Now an IGL Grants Programme trial is further exploring this question in the context of a matching-grant scheme for Mexican SMEs¹¹.

At IGL we are currently exploring a number of questions around this topic, and carrying out research with governmental partners on their grant-making processes. This work is part of our ongoing collaboration with a number of innovation agencies across the world. These collaborations have taught us a number of useful lessons on how experimentation can be applied to the work of public organisations. We now turn to these lessons.

LESSONS FROM EXPERIMENTING IN INNOVATION AGENCIES

The rise in experiments in the field of innovation, entrepreneurship and growth has been primarily led by academic researchers. However, several public organisations have begun to use experiments to evaluate their own programmes, as well as better develop new ones. A key example is the UK's Department for Business, Energy and Industrial Strategy (BEIS). BEIS, one of IGL's original governmental partners, went from never having used RCTs in its evaluations of business programme, to running one of the largest business support RCTs to date¹². More recently, BEIS has launched a large experimentation fund to support projects aiming to spread technology and management practice diffusion among SMEs¹³. This follows the announcement by the European Commission of a fund to support innovation agencies with their own RCTs¹⁴. Despite these positive examples, it remains difficult for public organisations to embrace the idea of experimentation. In this section, we review a number of practical lessons we have gathered from working with innovation agencies on experimentation.

MESSAGING TRIALS ARE A POWERFUL ENTRY POINT FOR EXPERIMENTATION

Oftentimes, innovation agencies can find the process of running an RCT quite challenging at first. In our experience, a useful starting point is to run messaging trials – behavioural experiments to find out what language is most suitable to achieve a certain goal, such as convincing firms to take up a programme. However, running this type of experiments requires involving several teams from the organisation together, and they are most powerful when used as part of a larger strategy, rather than in an *ad hoc* fashion.

NEW TYPES AND SOURCES OF DATA ARE NEEDED TO GET BETTER RESULTS

This lesson is probably applicable to all types of evaluation, although it is particularly useful for RCTs. We have found that relying exclusively on surveys can bring a number of problems – such as low response rates or survey bias. This can be a problem, especially in the context of RCTs, since surveying control group firms that received nothing from the organisation can be difficult. Novel data sources – such as web-scraping or other 'Big Data' tools – can be coupled with more traditional datasets to achieve better results. Moreover, better dataset matching – especially with administrative datasets such as tax data – can be a powerful tool in running successful experiments.

EXPERIMENTATION AS A POLICY APPROACH

RCTs are a tool to validate a hypothesis – ie find out whether a certain policy intervention works as intended. However, experimentation is not restricted to validating, but can be used to explore new and innovative solutions to policy challenges, with techniques such as design thinking and horizon scanning¹⁵. In our experience, innovation agencies achieve the best results when they think experimentally throughout the policy cycle.

MORE THINKING IS NEEDED ON OUTCOME MEASURES

Although RCTs are a robust method of causal inference, the value of the results depends on the quality of the outcome measurements used. Experiments, unlike retrospective studies, frontload the evaluator's work, so that the majority of the planning, decision-making, and analysis happen before the intervention even started. This has its advantages, but it also means that once the trial has begun it is very difficult to change any of its parameters. This is why more care is needed when selecting the outcome measures to be used. In our experience, evaluators need to think not just about first-order, but also second- and third-order effects, to ensure the indicators used capture the policy's real effects. For instance, an intervention connecting SMEs to research institutions might aim to foster better collaborations; researchers should think hard about how exactly this improvement will materialise: is it more connections, or higher frequency, or larger projects? A simple measurement, such as number of collaborations, might miss a more profound change taking place because of the intervention. Because the survey can only be run once, asking the wrong question can compromise the whole project. Wherever possible, we recommend using a logic model to understand what effects one might expect.

CONCLUSION

This paper has focused on lessons from recent experiments on innovation, entrepreneurship and growth policy. It has reviewed the approaches tested, and the findings (where available), of a number of RCTs in this field. The first set of experiments surveyed show that it is possible to use interventions to expand the reach of innovation activities beyond current levels. Another group of RCTs described provides evidence on a number of ways to support innovators, from facilitating collaborations to providing intensive management consulting services. An open question remains on what are the best ways to structure evaluation and selection processes in grant-funding programmes.

These examples highlight two key elements of experiments. The first one is that RCT, when well run, can provide a clean estimate of the effects of a programme; these estimates can be used to investigate the cost-effectiveness of a programme and compare it to its alternatives. The second is that sometimes even small interventions – such as changing the language used to communicate, or sharing feedback that an organisation was already collecting – can really make a difference; this kind of inexpensive but impactful opportunities should be sought after and implemented wherever possible.

An important caveat to all these findings is that, despite their strong internal validity, RCTs do not necessarily have external validity. In other words, even though an experiment can give policymakers confidence that a programme worked in a particular context, this does not mean it would work elsewhere, or with different participants. This is not a limitation exclusive to RCTs – other impact evaluation techniques usually run into similar concerns. But it does point to the fact that evidence from these trials should be understood in context. Wherever possible, replications of these studies should be carried out to build more evidence on the effectiveness of the interventions studied in other contexts.

Moreover, the paper has also presented a number of practical lessons on how to experiment within public organisations working on innovation and growth. These include starting from small experiments, using new data sources, and devoting more consideration to the choice of outcome measures. In our experience, experimenting is not something that comes naturally to a lot of public organisations. Nevertheless, we hope this paper shows that it is an approach that holds immense potential – as one tool among many.

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Endnotes

- 1 Available at <https://innovationgrowthlab.org/igl-database>. The most recent version of the Database is forthcoming.
- 2 The IGL Grants programme is funded by the Ewing Marion Kauffman Foundation, the Argidius Foundation, and Nesta to support randomised controlled trials (RCTs) that build the evidence base on the most effective approaches to increase innovation, support high-growth entrepreneurship and accelerate business growth. <https://www.innovationgrowthlab.org/funding-opportunities>
- 3 A list of our current partners is available at <https://innovationgrowthlab.org/partners>. Moreover, we have worked with the Dutch Ministry of Economic Affairs, Business Finland, Swedish Growth Analysis group, and the Danish Business Authority.
- 4 The Nesta supported 'Compendium of Evidence on Innovation Policy' provides a more comprehensive review <http://www.innovation-policy.org.uk/compendium/>. Further evidence reviews in this field, drawing on a number of studies with different methodologies, have been produced by the What Works Centre for Local Economic Growth, available at <http://www.whatworksgrowth.org/policy-reviews/>.
- 5 Cf K Moberg (forthcoming). The effect of online-based entrepreneurship programmes. Project page available at <https://innovationgrowthlab.org/projects/assessing-effect-online-courses-entrepreneurship>
- 6 Project page forthcoming.
- 7 For the original report (without longer term effects), see (Cornet et al, 2006); more recent results are currently being prepared, however, one of the authors presented some preliminary results in an IGL Webinar.
- 8 Cf Rosendahl, L., M. Kleine and J. Heite (forthcoming). The effect of Innovation Vouchers on innovation activity of SMEs in the UK: A randomized controlled trial. Project page available at <https://www.ip.mpg.de/en/projects/details/the-effects-of-innovation-vouchers-on-innovation-activity-and-performance-of-smes-in-the-uk-a-randomized-controlled-trial.html>
- 9 Ubfal, D. and A. Maffioli (forthcoming). Unbundling the effects of entrepreneurship education. Preliminary results available at <https://innovationgrowthlab.org/blog/impact-soft-skills-training-microentrepreneurs-jamaica>
- 10 Cf M. Leatherbee (forthcoming), Does structured accountability drive entrepreneurial performance? Project description available at <https://innovationgrowthlab.org/blog/does-structured-accountability-drive-entrepreneurial-performance>
- 11 Iacovone, L., D. Atkin, E. Verhoogen (forthcoming). Promoting high impact entrepreneurship in Mexico: An impact evaluation. Project page available at <https://innovationgrowthlab.org/projects/promoting-high-impact-entrepreneurship-mexico-impact-evaluation>
- 12 One of us was deeply involved in BEIS' (then BIS) early steps in experimentation, for an account of these early steps, see the following blog: <https://innovationgrowthlab.org/blog/taking-first-steps-business-policy-experimentation>
- 13 Cf <https://www.gov.uk/government/news/government-launches-new-fund-to-support-small-business-growth>
- 14 Cf <http://ec.europa.eu/research/participants/portal/desktop/en/opportunities/h2020/topics/innosup-06-2018.html>. IGL recently delivered two webinars to help potential beneficiaries to prepare their trial designs and implementation plans for the second stage of the selection process.
- 15 For a review of these techniques, see the following blog <https://www.nesta.org.uk/blog/exploring-the-unobvious-an-overview/>.