European Commission

Research and Innovation

A New Approach for Impactful Research & Innovation Policymaking

Strategic recommendations for advancing policy experimentation in Europe

R&I PAPER SERIES
POLICY BRIEF

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Strategic recommendations for advancing policy experimentation in Europe

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A New Approach for Impactful Research & Innovation Policymaking

Strategic recommendations for advancing policy experimentation in Europe

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2025 Directorate-General for Research and Innovation

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1. Introduction

Policymakers increasingly face complex, interdependent challenges - from digital transformation to climate adaptation - for which traditional solutions are either inadequate or untested. The rapid diffusion of emerging technologies, such as artificial intelligence (AI), calls for agile policymaking. Achieving ambitious objectives, such as closing Europe's innovation gap, requires accelerating scientific breakthroughs and innovation, requiring a rethinking of Research and Innovation (R&I) policies.

Facing growing complexity, EU policymakers increasingly recognise the importance of policy experimentation (Box 1) to explore alternative policy interventions, assess potential risks, and establish robust, causal evidence of the most effective solutions. The EU AI Act, for example, explicitly encourages the use of experimental approaches, such as regulatory sandboxes, to enable real-world testing and ensure that regulation keeps pace with technological change (European Union, 2024). Similarly, the Heitor expert group on the interim evaluation of Horizon Europe has called on the EU to establish an experimental unit to test new programmes and instruments, using trials and pilots to evaluate their impact and scale up what works (Commission Expert Group, 2024).

In this brief, we review different types of policy experimentation and the barriers to deploying it in the EU, drawing on the results of a contract between the Directorate-General for Research and Innovation and the Innovation Growth Lab (based at Nesta and the Barcelona School of Economics). This brief builds on a scoping review of the literature analysing over 300 scientific articles and on fieldwork on policy experimentation in the context of the EU Missions. Our analysis provides insights that enable us to identify key bottlenecks and significant potential in policy experimentation, and to suggest a new approach that leverages it to foster R&I in the EU.

Box 1. List of EU initiatives that refer to policy experimentation

- The **New European Innovation Agenda** promotes experimental regulatory approaches through sandboxes, test beds, living labs, and innovation procurement.
- The **Partnerships for Regional Innovation Pilot** encourages higher education reform pilot projects to explore new, collaborative, and adaptive policy models.
- The **EU Competitiveness Compass** calls for faster, evidence-based improvements in innovation, decarbonisation, and security, supported by spaces for testing and piloting new policy options.
- The **EU Better Regulation Agenda** strengthens incentives for evidence-informed policymaking and the use of experiments to guide regulatory design.
- **EU Missions** adopt a mission-oriented approach, promoting iterative learning and policy experimentation through living labs and real-world test environments.
- Preparatory action for the **creation of a European Community of Practice for policy experimentation**
- **Supporting experimentation in innovation agencies** to incentivise innovation agencies to undertake greater policy experimentation and to use RCTs to evaluate their impacts.
- **European Regional Competitiveness Policy Lab** to embed experimental approaches in Member States' investment in competitiveness programs focusing on regional impacts.

2. What is policy experimentation?

The OECD (2024) states that "*Experimentation in STI [science, technology and innovation] policy refers to the deliberate implementation of small-scale and/or temporary policy interventions designed to test the outcomes of new approaches. The goal is to assess whether these interventions should be scaled up if successful or phased out if they do not achieve*

desired results. Both the experimentation phase and the decision to scale or discontinue are crucial for innovation policy making."

In broader terms, different methods can be used to carry out experimentation. A key distinction is between experimental approaches that introduce targeted variations in policy design or delivery to generate causal evidence (such as randomised controlled trials or A/B tests) and observational or model-based approaches (such as quasi-experimental methods or simulations). While the former can provide the most rigorous test of the causal impact of a new idea by creating a controlled counterfactual, the latter provide valuable insights by exploiting existing data or projecting long-term system dynamics.

When embedded in the policy cycle, experimentation offers several practical benefits. It helps policymakers navigate complexity and uncertainty by testing promising interventions on a smaller scale, comparing alternative designs and their trade-offs, and generating more timely counterfactuals than traditional ex post evaluations. It also supports earlier, more structured learning, encourages collaboration between policymakers, practitioners, and researchers, and links intervention design to a clear measurement strategy. Policy experimentation can be used both for major programme impact evaluations that inform whether a policy should be adopted at scale and for smaller trials that adjust concrete design and implementation choices.

Another distinction can be made between methods used to evaluate impact and frameworks designed to facilitate innovation. The most established method for generating causal evidence is the randomised controlled trial (RCT), By randomly assigning participants to a treatment group (who receive a new approach) or a control group (continuing as usual), RCTs can create a rigorous counterfactual that allows policymakers to isolate the specific impact of the tested intervention. In contrast, regulatory sandboxes are an enabling environment. A controlled space where businesses and regulators can test innovative products and services under less stringent rules and close supervision of a competent authority. Sandboxes and experimentation clauses are also included in the Better Regulation Toolbox. Sandboxes therefore facilitate learning about legal and technical feasibility but must be combined with specific evaluation methods to generate evidence (European Commission, 2023).

Beyond these, other methods can also be used to develop and test policy interventions. For example, A/B tests allow for rapid, real-world comparison of specific design elements. System dynamics simulations offer a safe, ex-ante environment to model long-term complex interactions. Finally, Quasi-experimental designs (QEDs) are valuable for evaluating impact ex-post when randomisation is not feasible, by exploiting natural variations in the data. Box 2 below provides an overview of these methods.

Box 2. Types of Policy Experimentation

- **Randomised Controlled Trials (RCTs)** – a rigorous way to identify what works in policy. By randomly assigning participants to receive different forms of an intervention, which might include none at all, RCTs isolate the direct impact of an intervention while avoiding bias. In R&I policy, they can test measures such as innovation vouchers, SME grants or behavioural incentives, helping determine whether funding mechanisms truly drive innovation. RCTs are not inherently costly; most resources go to data collection and integration with policy delivery. They are most valuable during policy design, when solid causal evidence is needed before scaling up.
- **A/B testing and online experiments** – simplified RCTs used to compare two or more versions of a policy element, for example different messages encouraging participation in a public consultation. They are low-cost, fast to implement and suitable for continuous improvement in real time. However, they capture short-term behavioural effects rather than long-term or system-wide outcomes.
- **Survey-based experiments –** randomisation embedded within surveys to examine how different framings of a policy affect respondents' stated attitudes or intentions. For instance, one group may see a programme described as "boosting innovation" and another as "creating local jobs." Comparing their responses helps isolate the effect of communication. These experiments measure intentions in a controlled setting rather than actual behaviour, but they provide quick, low-cost insights to refine messages before implementation.
- **Quasi-experimental studies** – statistical techniques used when randomisation is not possible. They estimate what would have happened without the policy by comparing affected and unaffected groups, regions or time periods. Common approaches include Differences-in-Differences, Regression Discontinuity Design and Propensity Score Matching. These methods are particularly useful for ex post evaluations and can capture longer-term impacts using existing data. Their reliability depends on data quality and the validity of assumptions about comparability that are often difficult to be directly tested.
- **Quantitative and simulation-based approaches** – system dynamics and other modelling tools that simulate feedback loops and long-term interactions to explore the future impacts of policy portfolios. They cannot establish causal impacts empirically but are useful to test assumptions, project long-term outcomes and identify options worth empirical testing.
- **Regulatory sandboxes** – controlled environments that allow innovators to test new solutions under adapted regulatory conditions and close supervision. They help policymakers identify risks, bottlenecks and opportunities for adjustment before broader rollout. Although not always experimental in the strict sense, they generate valuable evidence for adaptive regulation and innovation governance.
- **Combining approaches** – no single method answers every policy question. Qualitative methods and theory-based approaches are essential for understanding how and why an intervention works, providing useful context for interpreting and responding to the causal evidence generated by RCTs, A/B tests or quasi-experimental studies. Meanwhile, sandboxes and simulations explore implementation and systemic effects. Used together, all of these approaches can create an iterative learning cycle, where short-term testing informs long-term strategy and strengthens the reliability of policy decisions.

3. Policy experimentation in action

In our study, we explored policy experimentation in action, investigating the barriers and benefits of using experimental approaches in research and innovation policy. The core analysis combined a scoping review of more than 1,000 scientific articles, policy reports and programme evaluations, together with an examination of registered experimental trials. This work resulted in a consolidated database of 150 policy experiments across over 30 countries, illustrating how experimental methods have been applied to address a wide range of research and innovation policy challenges. From this database, a shortlist of 40 studies was examined in depth to draw specific lessons for policymaking.

The analysis provides an overview of how experimentation is being applied to improve public interventions, the outcomes it generates, and where its use remains limited. It reveals a growing body of evidence showing that experimental approaches can enhance programme effectiveness, strengthen learning loops and support more adaptive policymaking, even as broader adoption is slowed by structural, institutional and behavioural barriers.

3.1. Benefits of using policy experimentation

3.1.1. Learning through iteration

Experimentation before full-scale implementation allows policymakers to test, learn what works best, and adjust accordingly. Early trials that fail can still generate knowledge to improve subsequent designs. For example, Åstebro & Hoos (2021) tested social entrepreneurship training: the first trial showed no impact, but lessons led to curricular changes that later increased the creation of new ventures.

3.1.2. Turning research insights into better programmes

Policy experimentation provides the method for turning research insights into better, evidence-based programmes. For example, Camuffo et al. (2019) found that nascent startups trained in scientific decision-making experienced benefits in decision-making and client acquisition when compared to the same level of support with a more traditional approach. A follow-up study by Novelli & Spina (2021) replicated this approach, finding similarly positive results for entrepreneurs in a different country and development stages.

3.1.3. Experimentation funds as engines of innovation

Dedicated funds are a key enabler, providing funding and support to test a portfolio of solutions addressing a specific policy challenge. For example, the UK's Business Basics Programme and France's Fonds d'Expérimentation pour la Jeunesse financed multiple experiments exploring ways to boost productivity and youth entrepreneurship, respectively. Similarly, the EU's INNOSUP-06 programme funded innovation agencies to test new support schemes across Europe. Results were actively collected and shared, and the UK's Business Basics Programme, for example, ran over three iterative rounds, using the findings from each to refine the next.

3.1.4. Managing risk through time-limited trials

Experimentation can serve as a safeguard when policy effectiveness is uncertain. By defining a clear, temporary timeframe, governments can manage risk while collecting evidence on impact before scaling up. The UK's Growth Vouchers Programme was launched amid uncertainty about its effectiveness. Its fixed duration and experimental design allowed policymakers to assess its value and make evidence-based decisions on future support for SMEs.

3.1.5. Cost-effective learning and idea progression

Even when experiments do not meet expectations, they save resources by revealing ineffective approaches early and preventing costly scaling. This principle of "successful failure" is only possible through low-risk, controlled testing. Many of the experiments funded through experimentation failed to achieve their expected impacts, but the alternative could have been to only identify the issues after much greater investment had been made. However, experimentation can provide the space to develop novel ideas that show promise. Azzolini (2021) describes the 200 SME Challenge, which evolved from earlier EU programmes to test new support ideas in a controlled, low-risk setting.

3.1.6. Challenging assumptions

Experiments can uncover counterintuitive results and make public processes more effective and equitable. Breinlich et al. (2017) tested a common assumption that providing export information is always beneficial. Contrary to expectations, the experiment showed that the non-exporters who received an information brochure went on to export less than those who did not. This finding highlights that well-intended policies can be counterproductive and underlines the importance of testing.

3.1.7. Strengthening evaluation and resource allocation

Experimental methods produce more reliable cost–benefit evidence than traditional analyses and help optimise how grants are awarded. Bakhshi et al. (2015) revealed that a creative grant scheme boosted SME innovation in the short term but not beyond 12 months, an effect missed by non-experimental evaluations. Similarly, Nunez-Chaim et al. (2024) demonstrated that propensity score matching, a common non-experimental method, introduced a sizable upward bias to the estimated impacts from a business advice programme, an error that grew over time.

The application can extend beyond improved evaluation of programme outcomes to also provide insights for optimising implementation processes. For instance, Lane et al. (2022) and Mendoza et al. (2018) demonstrated how testing evaluator criteria and selection panels can improve the effectiveness of grant allocation. Finally, experimentation can help in efforts to make processes and resource allocation more effective and equitable. For example, Ho & Larrimore (2020) and Pairolero et al. (2022) showed how adjustments in patent evaluation and targeted support can make innovation systems fairer and more efficient for all participants.

3.2. Barriers to the adoption of experimentation

3.2.1. Fear of failure and negative perceptions

Governments may fear public or political backlash if an experiment reveals that a policy is ineffective. This can discourage testing new ideas and create pressure to deliver only “successful” results. For example, Breckon (2015) notes that public bodies often avoid randomised trials because negative findings might be seen as reputational failures rather than learning opportunities. However, this fear could be misplaced: evidence from this project shows that the public can be highly supportive of governments' testing policies through experimentation even if they think others might not be (Baeck et al., 2025).

3.2.2. Ethical and stakeholder concerns

Randomisation can be perceived as unfair or unethical, particularly when it limits access to support or funding. Stakeholders may resist approaches that challenge established processes or threaten their influence. Yet, as Bravo-Biosca (2019) argues, random allocation is often fairer than arbitrary or first-come-first-served systems that lack transparency or evidence of effectiveness - particularly when used to select from a pre-screened pool of high-quality applicants (Bendiscioli et al., 2022).

3.2.3. Limited skills, incentives and institutional capacity

Running policy experiments requires specialist expertise in data, design and evaluation, which is scarce in many administrations. Officials may also lack motivation if they believe they already know what works or draw conclusions from observation alone. Even when presented with new

evidence, decision-makers can be slow to update their beliefs, as illustrated by Vivalt and Coville (2023).

3.2.4. Legal, procedural and resource constraints

Rigid funding rules, procurement systems and delivery contracts can make it difficult to embed flexibility or adapt interventions based on findings. Experiments may also be seen as too slow or resource-intensive compared with political cycles. For instance, the early UK Innovation Vouchers experiment succeeded precisely because oversubscription created a natural opportunity to allocate support randomly within existing rules, showing how design constraints can also enable experimentation.

3.2.5. Fragmented connections between research and policy

Many experiments remain distant from policy decisions. Academic-led studies, for instance, are often set up outside of the direct policy process. They are incentivised to produce novel, generalisable findings, which may not align with the immediate and specific questions that policymakers need answered. The opportunities available to researchers, for funding, data access, and publication, are often in contexts that make it difficult to channel the findings directly into actionable policy insights. Timing also matters. Windows for experimentation often close quickly once programmes are launched. Examples like the INNOSUP-06 and Business Basics initiatives, and more recently the European Regional Competitiveness Policy Lab, demonstrate how early involvement of motivated teams and clear institutional links can bridge this gap and embed experimentation in real decision-making by structuring their funding and project development to combine implementation with rigorous evaluation from the outset, thereby embedding experimentation in real decision-making.

3.3. Experimentation in action: examples from the project

Building on the lessons from previous R&I policy trials, the project applied experimental principles directly within the context of the EU Missions. This was done through two complementary activities: an experimental survey across six EU countries to explore the drivers of citizen participation, and a series of field experiments in European cities testing interventions to increase engagement in local initiatives connected to the Missions. The detailed results are available in the published project materials; this section provides a concise overview of their scope, objectives, and key insights.

Together, these actions aimed to demonstrate how experimentation can inform more effective, citizen-centred policymaking in Europe.

3.3.1. Experimental survey

To understand how to better involve citizens in tackling major societal challenges, the project conducted a large-scale online experimental survey in June-July 2023 with 4,648 respondents across six EU countries (Finland, France, Ireland, Italy, Poland, and Romania). The survey explored citizens' awareness, motivations and preferred ways of engaging with the five EU Missions: Climate Adaptation, Cancer, Oceans and Waters, Climate-Neutral and Smart Cities, and Soil Health.

Its purpose was to identify behavioural drivers and barriers to citizen participation and to generate insights that would inform the design of subsequent field experiments. The survey preceded the local trials to provide an evidence base on how Europeans perceive mission-oriented action, what motivates them to participate, and how different framings influence their

willingness to engage. A defining feature was its embedded experimental design: thirteen randomised tests examined how variations in framing, incentives, and wording affected attitudes and intentions. These helped uncover how factors such as trust, perceived fairness, and personal versus collective motivation shape engagement decisions.

The findings, available in full in Baeck et al (2025), show that most citizens strongly support being directly involved in addressing societal challenges and that public acceptance of experimentation is higher than often assumed. References to “experiments” or “random selection” did not reduce support, suggesting that citizens view experimentation as a pragmatic and responsible approach to policymaking rather than a risky one.

Overall, the survey provided the analytical groundwork for the field experiments, confirming both the importance of citizen engagement and the feasibility of using experimental methods to better understand and strengthen it.

3.3.2. Field experiments: EU Missions

The project developed three field experiments to demonstrate how behavioural insights and experimental methods can enhance citizen participation in activities connected to the EU Missions. Two trials were completed in Cluj-Napoca (Romania) and Turku (Finland) and a third, co-designed with the EchoSoil project, was not launched but provided valuable learning on the operational realities of applying experimentation within complex international initiatives.

In Cluj-Napoca, the experiment focused on increasing citizen participation in the city’s participatory budgeting process. The municipality, which had never before used direct email communication with residents, collaborated with the project team to design a randomised trial testing how different message framings influenced citizens’ likelihood to vote. The exercise showed that simple, evidence-informed outreach can significantly improve engagement. Beyond the measurable increase in participation, the experience built new technical and analytical capacity within the city administration and introduced a more systematic, data-driven way of designing communication strategies.

In Turku, the experiment explored how to recruit volunteers for the city’s Climate Ambassador Network, an initiative central to its plan for carbon neutrality by 2029. With digital contact lists restricted by data protection rules, the city tested a novel approach using door-to-door flyers to reach households. Two message framings were compared: one focused on collective, community benefits and another highlighting personal gains, such as skills development or recognition. The results showed that the personal framing generated stronger interest, and that physical outreach can effectively complement digital campaigns by reaching segments of the population, particularly older residents, who are less active online. The process, conducted in just a few weeks and at minimal cost, helped the municipality develop confidence in running experiments and provided a model for rapid, low-cost testing.

The third experiment, designed with EchoSoil, aimed to test whether different email reminders could increase response rates to a citizen science survey on soil health. Although the trial was not implemented, the preparation phase revealed key challenges common to collaborative projects, including coordination across partners, data management and privacy compliance. These lessons underscored the importance of clear governance, timing, and technical protocols for integrating experimentation into larger European research initiatives.

Together, these experiences demonstrate that policy experimentation can be realistically embedded in local government practice. The trials confirmed that small, low-cost tests can produce actionable evidence within short timeframes, while also helping institutions build the skills and confidence to make decisions based on data rather than assumptions. They also exposed practical barriers, such as limited access to behavioural data, coordination difficulties, and the absence of sustained internal structures for experimentation, that need to be addressed to make this approach routine.

Although modest in scale, these experiments illustrate the power of what might be called "small-gear" experimentalism: simple but well-structured trials that build momentum for evidence-informed policymaking. They serve as concrete proof that local authorities can experiment responsibly, learn quickly, and feed those insights into wider European learning about how to design and implement policies that genuinely engage citizens. As discussed earlier, this approach is at the small-scale optimisation end of the experimental spectrum, complementing the large-scale, comprehensive impact evaluations that can answer more substantial questions about economic impacts.

4. Discussion and policy reflections

Our review indicates that making research and innovation policy more experimental across Europe requires a combination of tools, incentives and institutional changes. There is no single lever that can overcome all existing barriers. Instead, progress depends on creating the right mix of motivation, ability and opportunity for policymakers and delivery partners to test, learn and adapt. This calls for a coordinated effort that blends awareness-raising, capacity-building, new learning networks and dedicated funding.

The following insights outline where action is most needed to strengthen Europe's experimental capacity in R&I policy:

- **Building the capacity to experiment**

Experimentation requires specific skills that remain scarce across European administrations. Many officials are unfamiliar with how to design and interpret trials, while researchers often lack the understanding of policy constraints needed to apply their methods effectively. Regular training programmes, secondments, and joint workshops between governments and research institutions can help bridge this gap. Building this shared literacy is essential for ensuring that experimentation becomes a credible and trusted part of the policymaking process.

- **Creating opportunities through institutional support**

Embedding experimentation in policy practice depends on having the right mandates, structures and resources. Agencies need both the flexibility and the legal space to pilot new approaches and adjust programmes based on evidence. Dedicated experimentation funds and units, early-stage prototyping budgets and lightweight approval procedures can make it easier for programme managers to test new ideas without fear of disrupting delivery. The Commission and national governments can play a key role by supporting units or centres specialised in experimentation that guide and assist others.

- **Strengthening motivation and incentives**

Even when skills and resources exist, policymakers often lack incentives to take the risks associated with experimentation. Encouraging leadership support, celebrating successful tests, and recognising "constructive failures" as sources of learning can shift organisational culture. Experimentation should be framed not as a challenge to authority but as a responsible way to ensure that public funds deliver results. Clear communication about its value, for instance, showing how small trials can prevent large-scale policy mistakes, can increase both political and managerial buy-in.

- **Fostering collaboration and knowledge exchange**

Practical know-how about how to design and run experiments often sits within small, disconnected teams. Creating cross-country and cross-agency learning networks would allow practitioners to share lessons, methods and evidence. Platforms such as peer learning groups,

experimental taskforces and EU-wide research networks could reduce duplication, connect policymakers with researchers, and accelerate the diffusion of successful approaches.

- **From isolated pilots to integrated learning systems**

Our analysis shows that only a handful of experiments are currently central to policy decisions, and none are yet fully integrated into organisational practice. Achieving this level of maturity requires moving from one-off pilots to sustained, iterative learning. Governments can start by embedding experimentation in standard programme cycles, testing before scaling, evaluating during delivery, and using results to inform future designs. Over time, this can create a self-reinforcing culture of evidence-based improvement across Europe's innovation ecosystem.

In summary, Europe has made important progress in testing new ideas and methods, but experimentation remains fragmented and peripheral. Expanding its reach demands stronger institutional capability, leadership commitment and shared learning infrastructures. The reward would be a more adaptive, evidence-informed and impactful European innovation system, one capable of continuously improving how it supports research, entrepreneurship and societal transformation.

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As complexity rises, from climate adaptation to fast-diffusing AI, EU-policy must become more agile. This brief explains policy experimentation, maps key approaches (trials, pilots, sandboxes and quasi-experiments) and the barriers to wider EU uptake. Based on a DG RTD-Innovation Growth Lab study and EU Missions fieldwork, it identifies bottlenecks and proposes a pathway to test, learn and scale R&I instruments to close Europe's innovation gap.

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