

# ECONOMIC BENEFITS OF INTERNATIONAL RDI COLLABORATION: Evidence on Product and Process Innovation (phase 2)

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## Executive Summary

This report presents an econometric analysis of the additionality of international Research, Development, and Innovation (RDI) collaboration for UK businesses focusing on both Business-to-Business (B2B) and Business-to-University (B2U) collaborations. Specifically, the study examines the innovation benefits of collaboration by comparing firms that engage in partnerships with businesses and universities against those that do not collaborate. Additionally, it assesses whether collaborating with international partners provides greater innovation benefits compared to working exclusively with domestic counterparts. By contrasting firms that collaborate versus those that do not, and firms that collaborate internationally versus domestically, this analysis provides valuable insights into the added value of engaging with international partners on self-reported innovation outcomes. Building on the evidence review conducted by Ozusaglam et al. (2024) in Phase 1 of this project, this research addresses key gaps in the literature by evaluating the innovation benefits of international collaboration relative to domestic-only collaborations in the UK context.

## Data and Approach

The analysis is based on data from the UK Innovation Survey (UKIS), which provides a representative sample of innovative businesses in the UK. As the UKIS is conducted biennially, the dataset covers seven observation periods between 2009 and 2021 with each wave covering a three-year period. The study focuses on key innovation outcomes, including process innovation, new-to-market (N2M) product innovations, and new-to-business (N2B) product innovations. To estimate the causal effect of collaboration versus no collaboration,

and international collaboration versus domestic collaboration in B2B and B2U contexts, we employ a Propensity Score Matching approach combined with a staggered Difference-in-Differences (DiD) estimator proposed by Callaway and Sant'Anna (2021). Together, these approaches mitigate concerns of endogeneity, self-selection and omitted variable bias. In particular, the staggered DiD estimator is suitable for this econometric analysis since businesses are treated at different point in time.

## Key findings

- » RDI collaborations matter for product and process innovations. UK businesses engaging in RDI collaborations with other businesses (B2B collaboration) are 21 percentage points more likely to introduce process innovations and 9 percentage points more likely to introduce new-to-market (N2M) product innovations in respect to businesses who do not collaborate. Those collaborating with universities (B2U collaboration) are 11 percentage points more likely to introduce process innovations. However, B2U collaborations do not significantly increase the likelihood of introducing new-to-market (N2M) or new-to-business (N2B) product innovations.
- » International collaborations are even more important than domestic ones. Compared to UK businesses that exclusively engage in domestic RDI collaborations with other UK businesses, those that collaborate with foreign businesses (international B2B collaborations) are 13 percentage points more likely to introduce process innovations and 7.3 percentage points more likely to introduce new-to-market product innovations. Similarly, those that engage in collaboration with foreign universities (international B2U collaborations) are 11 percentage points more likely to introduce process innovations. However, international B2U collaborations do not significantly increase the likelihood of introducing new-to-market or new-to-business product innovations.

## Actionable insights

- » The findings suggest that collaboration with other businesses, regardless of their origin, is likely to improve business innovation outcomes by enabling UK businesses to engage in radical innovations and enhance business processes.
- » In addition, the findings also suggest that business innovation outcome benefits gained through international collaboration with foreign businesses exceed those from purely domestic collaborations.

- » Similarly, collaboration with universities, regardless of their origin, is likely to enable businesses to adopt better processes. However, despite a marginal difference, the potential innovation benefits gained through international university collaboration is similar to that from purely domestic university collaborations. This highlights a potential value of domestic B2U collaborations for enhancing business efficiency.
- » Collaborating with foreign universities is unlikely to yield additional benefits over collaborating with domestic university in terms of enabling businesses to introduce new or significantly improved products and services.

## Limitations

- » **Collaboration measures:** The analysis only considers collaborations with businesses and universities; it excludes collaborations with other organisations such as third sector organisations, and government or public research institutes which may have a distinct influence on business innovation.
- » **Innovation measures:** While we consider innovation of different types and of different degrees of novelty, our innovation measures are self-reported outcomes based on businesses' own assessments of their innovation activities.
- » **Mechanisms and moderating effects:** Our data does not allow us to analyse the mechanisms through which the effects identified occur. In addition, we do not observe the characteristics of collaborating partners, such as technological or cognitive proximity to UK businesses. Although these may influence the extent of impact, due to heterogeneity in innovation types and their commercial potentials, it is difficult to provide an estimate of monetary value of innovations at an aggregate level.
- » **Timing of collaboration and innovation:** The UK Innovation Survey (UKIS) is carried out every two years, with each survey covering the previous three years. For example, UKIS 2021 collected information on innovation activities from 2018 to 2020. Because of this setup, we cannot tell exactly when a business introduced an innovation or started collaborating during the three-year period. However, we employ appropriate econometric methods to address this limitation as far as possible, although it cannot be entirely resolved due to the structure of the data.

## Next Steps

This econometric analysis serves as an initial step in a broader research agenda aimed at deepening our understanding of the role of RDI collaboration in delivering economic impact

for the UK. Future analyses will seek to address the limitations of this study by incorporating additional datasets and methodologies:

- » A parallel study uses a matched dataset linking Gateway to Research (GtR<sup>1</sup>) data with UK Intellectual Property Office (IPO) data to assess the economic benefits of public funding for RDI collaborations, with a particular focus on intellectual property (IP) outcomes. This provides a complementary view of innovation outcomes using more objective measures.
- » A further iteration of the empirical analysis will integrate Gateway to Research (GtR) data with the Business Structure Database (BSD) to capture broader business performance metrics and introduce a wider set of control variables, providing a more comprehensive evaluation of the impact of international collaboration.

A third strand of this study will involve collecting qualitative data through interviews with businesses that have received public support for international collaboration. These interviews will offer valuable insights into the benefits of international partnerships between universities and businesses. They will also explore the various pathways through which UK university-led international collaborations contribute to economic impact in the UK, examining how and why these mechanisms' function. This qualitative analysis will complement and enrich the quantitative findings.

Now that you have read our report, we would love to know if our research has provided you with new insights, improved your processes, or inspired innovative solutions.

Please let us know how our research is making a difference by completing our short feedback form [via this link](#).

You are also welcome to email us if you have any questions about this report or the work of the IRC generally: [info@ircaucus.ac.uk](mailto:info@ircaucus.ac.uk)

Thank you

The Innovation & Research Caucus

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<sup>1</sup> GtR is an online platform managed by UK Research and Innovation (UKRI) that provides open access to information about publicly funded research projects in the UK.

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## About the Innovation and Research Caucus

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