'The Dynamics of Open Innovation'

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Summary

There is considerable evidence on the benefits to firms of what has been called 'open innovation'. Open innovation suggests that in a world of widely distributed knowledge, companies cannot afford to rely entirely on their own knowledge to generate innovation. Instead, they also need to draw on knowledge outside the firm and combine this with internal knowledge to develop new innovations.

In this project we aim to test the hypothesis that the benefits of increased open innovation stretch well beyond an individual firm. For example, more widespread adoption of open innovation may lead to more effective knowledge sharing between firms and creating new applications and income streams. Second, more widespread adoption of open innovation may lead to demonstration or learning effects, which could enhance the effectiveness of individual firms' implementation of open innovation. Either mechanism may generate positive industry-level benefits, effects which are likely to be stronger the more widespread the adoption of open innovation in an industry.

Economists call this type of effect 'positive externalities' - positive effects which benefit society but which would not be taken into account by individual firms in their decisions about whether or not to adopt an open innovation model. At a national level, this could lead to a relatively low level of openness in innovation which is seen as optimal by each firm but does not maximise the total benefits to the economy as a whole. Evidence of externalities would provide a justification for policy intervention to promote 'openness' and national innovation performance.

Testing our hypothesis about these positive externalities requires data on the dynamics of open innovation. This would enable us to consider, for example, whether open innovation become more common through time and how this has influenced firms' innovation performance and the extent of any positive externalities. Over the last two decades the applicants - with others - have built a unique longitudinal or dataset on individual firms' innovation organisation and performance in Ireland and Northern Ireland. This covers the period 1991 to 2009 and comprising information from six representative postal surveys including a total of around 5,000 observations. The data includes information on two key aspects of open innovation; the extent and nature of external knowledge sources in innovation; the extent and nature of internal knowledge sharing within the firm, through the use of cross-functional skill groups in innovation.

The longtitudinal nature of our data will enable us to evaluate the firm-level benefits of open innovation and to test our hypothesis relating to positive externalities from increased 'openness'. The results will have practical benefits both for firms and for public policy. Understanding the firm-level dynamics of open innovation will lead to ideas for upgrading managerial practice to maximise the private benefits of open innovation. If the 'spillover' dynamics of open innovation prove positive, this would provide support for new public policy agendas around the active promotion of openness in innovation.

Research Questions

The project will address the following research questions:

- RQ1: How does open innovation contribute to innovation and business performance?

Are those firms which adopt open innovation systematically more innovative and productive than those which do not? How do these firm-level effects differ between time periods and industries? Are there limits to the benefits of open innovation? Our results here have potential implications for managerial practice and firms' strategies towards open innovation.

- RQ2: Are there dynamic economies in firms' effective implementation of open innovation?

Implementing open innovation is itself an organisational innovation for many firms. Is there evidence of 'dynamic economies of scale' as firms learn to implement OI more effectively? Have those firms which have adopted open innovation become systematically more innovative and productive than those which have not, and is there evidence of dynamics in this process? Results here have implications for organisational learning and the time profile of firm-level benefits which might be anticipated from adopting open innovation.

- RQ3: How has the level (and profile) of adoption of open innovation changed through time?

Has the anticipated 'paradigm shift' shift towards open innovation actually occurred? Does the extent of adoption of open innovation (and therefore the potential for dynamic economies and externalities) differ between industries?

- RQ4: Are there dynamic externalities from open innovation?

Is there evidence that increased adoption of open innovation can generate positive externalities or spillovers, enhancing innovation productivity at the industry-level? Are these dynamic externalities inter-industry or intra-industry effects? Has the increasing adoption of open innovation generated learning or demonstration effects which have improved individual firms' implementation of open innovation?

- RQ5: What are the dynamics of the limits to open innovation?

Recent analysis has suggested that there are limits to the benefits of open innovation. For example, there is evidence that that increasing both the breadth and depth of external search enhances innovation performance, but does so at a decreasing rate, so that beyond some limit the returns to increased breadth and depth of search become negative. Have these limits to the benefits of open innovation changed through time? If so, has this arisen because firms have learned to implement open innovation through their own efforts, or because they have absorbed aspects of best practice from other firms through time?

Possible impact

We envisage two main non-academic groups of users of the research outputs

- Firms with an interest in open-innovation or upgrading their innovation practices. The research will provide evidence of the firm-level benefits of open innovation which may encourage firms to upgrade their innovation practices. It will also hightlight the potential dynamic - learning - benefits of open innovation at the firm level which may encourage firms to embed systems or mechanims to enhance organisational learning.
- Policy makers with an interest in supporting good practice in innovation. Providing evidence on the externalities of openness would establish openness as a valid focus for policy intervention and encourage interest in promoting increased openness in innnovation.

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