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ZEW policy brief

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Public Funding of Innovation Projects: Is it Time for a More Flexible Approach?

SEEK

Essential Issues

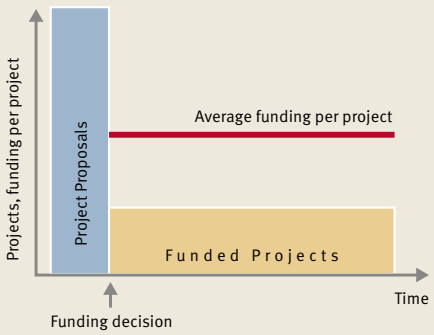
Research Question and Relevance

Increasing investment in innovation has been a major goal of research and innovation policy in Europe over the past decade. Yet to secure competitive advantage and achieve growth, R&D investment has to be translated into successful innovations, and this is first and foremost the task of firms. Turning R&D into successful innovation is a tricky business, however. Consequently, managerial economics has proposed a variety of approaches for getting the most out of R&D investments. A recent study funded under the SEEK research programme examined the use of flexible resource allocation as a management tool for achieving successful product innovation.

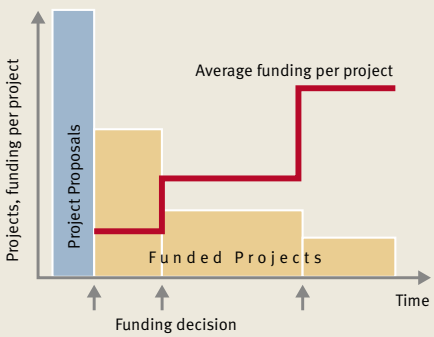
Key Messages

The study found that R&D investment enjoys higher prospects for success when firms are flexible in their approach to innovation – i.e. when they pursue a broader range of innovation projects, when there is a greater willingness to abandon projects that prove to be unpromising, and when projects are funded in a staged manner, as opposed to all at once. These findings stand in sharp contrast to the funding practices of the public sector, which are rarely flexible in nature. In order to boost the beneficial economic effects of public funding for innovation projects, policymakers should experiment with more flexible approaches for resource allocation in grant programmes such as the EU Framework Programme for Research and Technological Development (RTD). The figure below illustrates how a more flexible approach could look compared to traditional one-step funding decisions.

Traditional public funding of projects



Flexible public funding of projects



Key Messages

Lessons from Management Practice

Many governments run programmes for the financial support of private-sector R&D and innovation projects. However, these programmes often display a number of weaknesses in terms of funding flexibility. First, funding is typically restricted to a rather small number of projects. Second, resources are normally allocated at the very beginning of a project based on a detailed project plan. Third, projects are rarely stopped before completion. And if they are, they are usually regarded as a failure by project performers and programme managers. We believe that there is room for the more flexible allocation of public money to R&D and innovation projects. Greater flexibility has definitive benefits, for research shows that firms can be more successful in developing product innovations if they allocate resources to projects flexibly. Clearly, policymakers can learn from successful innovation management practices in firms in order to optimize grant programmes that fund R&D and innovation projects:

- Public funding programmes could easily increase the breadth of supported projects by funding a larger number of project proposals. Yet in the absence of more flexible funding approaches, solely increasing the number of supported projects would mean granting insufficient funding in many cases.
- Greater breadth in funding should therefore be combined with the interim evaluation of funded projects. Some projects that do not fulfil prior expectations should be stopped in due time in order to provide more promising projects with sufficient resources.
- Selectiveness in project funding suggests a sequential approach for resource allocation. For example, a larger number of project ideas could be tested with regard to their relevance and feasibility in an initial stage that demands limited funding. Furthermore, a small number of promising ideas could receive higher funding (though at a lower subsidy rate) for the development of prototypes.

Avoiding Moral Hazard

When applying a more flexible approach to the public funding of innovation projects, there are at least two critical issues to be considered. First, more flexibility in resource allocation requires higher management capabilities with a view to programme administration in order to evaluate the prospects of project proposals and assess the progress of funded projects at each stage. Second, programme managers need to prevent moral hazard from arising among project performers. Since project performers are naturally privy to more information about a project's progress, they may present the prospects for success in an overoptimistic light in order to receive further funding. To mitigate such behaviour, project performers who admit that their projects lack feasibility or relevance should be treated preferentially in future funding applications, e.g. by offering them a "second chance" or allowing them to apply unused funding to a new project.

Research Question and Relevance

Transforming R&D into Successful Innovations

The Lisbon Agenda and Barcelona Objective (which targeted spending 3% of GDP on R&D by 2010) both emphasised increasing R&D expenditure as a means of making Europe the most competitive knowledge-based economy. The Europe 2020 initiative reiterated the goal of higher R&D expenditure as a prerequisite for growth. Yet to secure competitive advantage and achieve higher growth, R&D investment has to be translated into successful innovations. This is first and foremost the task of firms. Governments can support them by bearing part of the risk of innovation and by providing a favourable environment for the commercialisation of innovations (e.g. effective intellectual property regime, competitive product markets, and a sufficient supply of risk capital and qualified labour). Turning R&D into successful innovation is a tricky business. Consequently, managerial economics has proposed a variety of approaches for getting the most out of R&D investments.

A study funded under the SEEK research programme investigated the use of flexible resource allocation as a management tool for achieving successful product innovation. The study aimed to identify the impact of three management parameters on product innovation success: the breadth of the project portfolio, selectiveness in funding projects, and sequencing of resource allocation to projects. In addition, the study analysed whether the effects of flexible resource allocation vary in relation to the R&D intentions of the firm as well as the level of market uncertainty it faces. The findings are brought in relation to current project management practices in public-sector R&D and innovation programmes in order to identify ways in which such programmes might be improved.

Research Results in Detail

Options for Flexible Resource Allocation

There are various areas in which innovation managers can make decisions that are of relevance for the flexibility of innovation activities:

- Managers can define the breadth of their project portfolio. A broader portfolio means that a firm pursues a greater number of innovation projects compared to other firms of similar size.
- Managers can make decisions about the financial resources devoted to each innovation project. Since the total amount of funding for innovation projects is restricted in most firms, there is a trade-off between portfolio breadth and the intensity of funding per project.
- Managers may choose between the staged or all-at-once allocation of funds. When opting for a sequential approach, the number of stages for resource assignment is an additional decision parameter.
- Managers may opt for a selective approach that "weeds out" unpromising projects at various stages in the innovation process. In this way, not all innovation projects need to be carried out in accordance with the project plan; it can be beneficial to stop projects prior to completion when progress is less favourable than initially foreseen.

The success of different resource allocation strategies is likely to depend on the combination of these choices as well as the context in which an innovation project is carried out. Relevant context variables may include the novelty of the targeted innovation (i.e. ambitiousness of the project) as well as the uncertainty surrounding user adoption and competitor response. More ambitious innovations and uncertain market environments are likely to reduce a firm's ability to immediately hit upon a successful innovation, and may require continuous modifications in response to changing environmental factors. In such situations, flexible resource allocation promises to augment the success of R&D activities.

Data from the Mannheim Innovation Panel (MIP)

We used data from the Mannheim Innovation Panel (MIP) collected in 2009 to test the effect of flexible resource allocation on product innovation performance. The MIP is the German contribution to the Community Innovation Surveys (CIS). In contrast to standard CIS surveys, the 2009 MIP survey contained a separate question on the number of innovation projects a firm had pursued in the previous three year period, including the number of completed and abandoned projects, thus allowing us to obtain indicators for breadth (i.e. the number of projects adjusted for firm size) and selectiveness (i.e. the share of projects stopped before completion). Sequencing of funding was measured directly by asking firms whether they allocated resources to projects all at once or in stages.

Product innovation performance refers to the extent to which a firm generates commercially successful new products, as evidenced by revenue from new product sales. To account for potential differences in the novelty of the new products generated, we distinguished between three categories: sales originating from products new to the market, sales from new products that had no predecessor product at the firm ("new-to-firm products"), and sales from all new and significantly improved products. "Ambitious innovative intent" refers to innovation objectives that seek to expand into new

product categories or enter new markets. The degree of market uncertainty is measured by the variation of demand over time.

Based on a sample of more than 1,400 firms with product innovation activity during 2007 and 2009, we arrived at the following results:

Performance Effects of Flexible Resource Allocation

- The breadth of the of project portfolio has a significant positive direct impact on all three measures of innovation performance. Furthermore, this effect is greater with higher product novelty. The magnitude of the breadth effect on innovation output depends crucially on the innovation context. Firms with more ambitious innovative intent benefit from greater breadth whereas firms with less ambituous intent fail to see any significant performance effect. A similar result is found for market uncertainty. The positive effect of breadth on new product sales is two to five times higher if the market environment of firms is characterised by high volatility, although the degree of product novelty has a strong modulating influence in this regard.
- Resource intensity (expenditure per project) has only a small impact on innovation performance. Compared to breadth, its effect is significantly smaller. A broader allocation strategy appears to be more worthwhile than one of higher resource intensity.
- Selectiveness does not directly contribute to higher innovation success but it has a moderating effect on the influence of breadth. The usefulness of breadth increases further if firms apply a selective approach to resource allocation. This means that the funding of a larger number of innovation projects (with limited resource intensity in the beginning) should be combined with abandoning less promising projects in later stages. This, in turn, frees up resources to better finance projects that will be continued until market launch.
- A sequential allocation of funding turns out to be beneficial for increasing sales of more novel products but has no impact on total sales of new or significantly improved products. This positive effect of staged funding is independent from other resource allocation strategies.

Project Profile

Research Team

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Publications

Klingebiel, Ronald and **Christian Rammer** (2011), “Resource Allocation Flexibility for Innovation Performance: The Effects of Breadth, Uncertainty, and Selectiveness”, ZEW Discussion Paper No. 11-073, Mannheim.

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