

Innosuisse – Swiss Innovation Promotion Agency

Impact analysis of R&D project funding – phase II

Summary

Zurich, 7. February 2019

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Starting point, goal

The Commission for Technology and Innovation CTI (relaunched 1 January 2018 as Innosuisse) is the federal funding body for science-based innovation. The CTI/Innosuisse, has been tasked with promoting science-based innovation in Switzerland in the interests of industry and society. To this end, the CTI/Innosuisse pursues four main activities:

- R&D project funding (research and development projects).
- Promoting entrepreneurship and start-ups.
- Knowledge & Technology Transfer (KTT) support.
- Setting up and managing Swiss Competence Centers for Energy Research (SCCER) for renewable and efficient energy as of 2013.
- Supporting so-called bridge projects in a joint programme with the Swiss National Science Foundation (SNSF) with the aim of strengthening the transfer from basic research to applied research (since 2017).

In 2015, the CTI commissioned INFRAS/KOF Swiss Economic Institute at ETH Zurich to evaluate the impact of regular R&D project funding and the 2011/2012 special measures. At the same time, the CTI awarded two other evaluation mandates, one for start-up promotion (CTI Start up) and another for their CTI Entrepreneurship funding lines.

The following evaluation relates to R&D project funding and the 2011/2012 special measures and was conducted in two phases:

- In the first phase between November 2015 and December 2016, the evaluation team once again reviewed the effects of the special measures, thus concluding the evaluation of the special measures. For regular R&D project funding, the first phase involved the evaluation team assessing its concept, implementation and effects.
- In the second phase from 2017 to 2018, there was a somewhat different focus and Innosuisse concentrated only on the longer-term effects of R&D project funding that were at the core of the impact assessment. For this reason, the first impact analysis, which focused on industry partners, was adapted and supplemented and then conducted again two years later.

This report covers the results of the second impact assessment of R&D project funding among industry partners. The report summarises the results by way of comparison. All detailed results of the online survey can be found in a separate volume of materials (INFRAS and KOF 2018).

Evaluation methodology

The second phase of the evaluation focuses on online surveys among industry partners who have carried out R&D projects within the framework of regular R&D project funding and special measures which were completed in the years 2012-2013 (2012/13 cohort) and 2014-2015 (2014/15 cohort). For the results of the research partners, please refer to the results of phase I (INFRAS and KOF 2017¹). The results of the survey were evaluated using descriptive statistical and econometric methods. We were able to fall back on a broad control group from KOF's innovation survey and thus examine the effects of CTI funding using comparative econometric methods (matching method).

The standardised online surveys were conducted between May and July 2018. A total of 1,300 industry partners were contacted, of whom just under 450 completed the questionnaire in full, which equates to a response rate of 35%.

Main findings of phase II

In the following, we will discuss the main findings of phase II. These particularly include aspects that have recently been incorporated into the survey. We also highlight other important points such as the deadweight loss, economic benefits and the influence on the Knowledge and Technology Transfer KTT based on the assessment of the companies surveyed.

The interpretation of the results can also be applied to current project funding at Innosuisse since the majority of the framework conditions and funding principles will be continued in their current form.

Half of the funded projects are based on digital technologies

Digitalisation is becoming an ever-important driver of innovations. Such new technologies are already very widespread among the CTI's R&D projects. As the phase II survey shows, half of the funded projects of 2014/15 are based on these technologies. Digital technologies serve as a significant or integral part (more than 50%) in almost one-fifth of the projects. It should also be noted that half of the industry partners do not use digital technologies.

The majority of innovations are incremental or radical in nature

Innovations can be of a radical or incremental nature. Their characteristics vary greatly between the different projects. Since the transfer is smooth, the majority of respondents speak of "more incremental" or "more radical" innovations: for example, for industry partners who

¹ [Link to study](#)

completed a project in 2014 or 2015 a third had a project featuring a “more incremental” innovation while another third carried out a project with a “more radical” innovation. About two-fifths of the respondents can assign their projects clearly: half of them see clear incremental innovations or clear radical innovations in their projects. This provides insights for the first time into what type of innovation is involved in the funded projects.

Isolated companies are pursuing business model innovations

The new type of business model innovation surveyed in phase II only results from funded projects in the case of isolated industry partners. This type of innovation occurs more frequently among companies in the 2014/15 cohort (7%) than among those in the 2012/13 cohort (4%). Possible reasons for this include the increasing importance of business model innovations or the varying mix of sectors among the two cohorts.

Moving the funded projects through the innovation maturity stages (TRL)

Technological innovations go through various stages of maturity. The technology readiness level (TRL) is a scale to evaluate these stages and was surveyed for the first time in phase II. The findings from the analysis of the TRL stages at the beginning and end of technology-based projects completed in 2014 or 2015 indicate that the projects had moved significantly through the TRL stages towards the further developed maturity stages. They also suggest that only a certain number of stages can be effectively implemented throughout the project. It is normally not very realistic for projects in an experimental set-up to successfully achieve market implementation during the CTI project (stage dependency).

High overall benefits for industry partners

On the whole, the industry partners rate the overall benefits of the project more positively than the immediate economic benefits: more than two-thirds of the industry partners rate the overall benefits as very high or rather high, with around half of them rating the economic benefits similarly. In the 2014/15 cohort, the industry partners rate the economic benefits somewhat better than those in the 2012/13 cohort. The differences are easy to explain, as project funding not only generates instant economic benefits, but also further benefits in the form of improved networks or KTT (additionality in behaviour).

Positive effects on economic variables and competitiveness in the majority of cases

In addition to the benefits, the industry partners were asked about the effects of CTI funding on a range of economic inputs and output variables. We also asked more detailed questions

about the effects of competitiveness as an output variable. Two-thirds of industry partners reported a positive effect on at least one economic variable or a competitiveness factor.

More precisely, around half of the industry partners reported positive effects on the sales of new and improved products or services and around one-third on sales overall. One-third reported increases in employment, both across the board and just in R&D staff. Companies were most often able to strengthen their competitiveness through a better market position in Switzerland and abroad as well as an accelerated launch on the market.

Higher level of expertise and better networking with research partners

By supporting joint knowledge-based innovation projects between research and industry partners, the CTI's funding focuses on intensifying cooperation and KTT between research and industry and promoting knowledge-based entrepreneurship. The forms that this transfer takes were examined in more detail in phase II, with the results showing that the majority of industry partners were able to improve their level of expertise and expand their network of research partners. A majority of respondents also claim that the R&D project funding is helping to initiate new R&D projects in the company's own area of research and to explore new ideas. These results can be interpreted in such a way that, according to estimates by industry partners, the project funding not only has an impact on the input and output variables of companies but also results in a change in behaviour (behavioural additionality of project funding).

Most of the innovation projects launched on the market after completion of the project

Almost one-third of industry partners from the 2014/15 cohort of phase II launched their innovation project on the market as soon as the project was concluded. Just under one-third of industry partners launched the project on the market with a delay, either with or without implementing additional projects. One-fifth of the industry partners did not pursue the project any further or abandoned it.

Projects contribute to social and ecological sustainability

Almost one-third of funded industry partners from both cohorts make a high or rather high contribution to social sustainability. The two cohorts differ in terms of contribution to ecological sustainability. With a proportion of just under a fifth of the projects, the contribution of the 2012/13 cohort is smaller than that of the 2014/15 cohort, which stands at a good third of the projects.

Additionality is achieved

Additionality is defined as the contribution (attribution) of project funding to various aspects. Additionality can be divided into three levels: input, behavioural and output additionality. The following additionality is apparent from the online survey (subjective assessment of the industry partners) and the econometric analysis:

- **Input additionality:** A good third of the industry partners report an increase in employment of R&D staff. The results of the econometric analyses show that funding significantly boosted expenditure and gross investment per employee in companies compared with those in the control group.
- **Behavioural additionality:** More than three-quarters of the industry partners were able to strengthen their specialist knowledge and expand their network of research partners.
- **Output additionality:** Half of the industry partners report an increase in sales of new improved products or services and on a third of sales overall. According to their own information, the R&D project accelerated the market launch for 87% of the industry partners and improved the market position in Switzerland and abroad for 80% of them. Almost a third report positive impacts on production. The econometric analysis did not find any additionality for the surveyed output variables of sales and the sales share of innovative products.

The full deadweight effects came to 5%. Other larger deadweight effects amounted to 21% of the funded projects.

Deadweight effects can come into play if the innovation projects would have been implemented – regardless of whether or not they were funded by the state. Deadweight effects are difficult to measure empirically. Due to an amended survey method, the deadweight effects in phase II could be clarified more precisely by about a quarter: The 5% corresponds to the full deadweight effects. The 21% refers to the other larger deadweight effects. Conversely, about 75% of the projects can be classified as having no or only low deadweight effects.

In phase I, no correspondingly differentiated interpretation of deadweight effects was possible, as the corresponding question had been asked in a less nuanced way. At that time, deadweight effects in the *narrower sense of the term* were reported in 15-20% of the funded projects.

Results of phase II compared to phase I

The results from phase II largely confirm those from phase I. Although minor deviations are apparent for individual aspects, they usually remain within the scope of sampling inaccuracy. Below, we discuss individual salient aspects and in particular examine the results of the econometric impact measurement.

Industry partners provided their own impetus more frequently

We were able to observe differences in the results of phase I and II in terms of impetus to submit an application. In phase II, the industry partners from the 2014/15 cohort provided their own impetus for submitting applications more frequently (47%). This proportion was still 26% in phase I, with this being most frequently the case for research partners (38%).

Results of the innovation projects

Half of the funded projects of both cohorts resulted in prototypes, pilot and demonstration facilities or new/improved products. These are the most frequent results of the funded projects in phases I and II. Other frequent results of the innovation projects of both phases include publications and the establishment of foundations for further projects.

Effects on economic variables and competitiveness

In both phases I and II, half of the industry partners surveyed reported an increase in the share of sales accounted for by new or improved products or services. The only difference in the effects of economic variables between phases I and II can be seen in the increase in the number of R&D staff members. In phase I, less than a third of the industry partners reported an increase in R&D staff. This proportion was higher than one-third in phase II. This finding also goes hand in hand with answers to the question of whether the industry partners hired staff from the university partner as a result of the project. In phase I, this was the case for only a few partners, and in phase II for just under a quarter of the industry partners in the 2014/15 cohort.

Nevertheless, there were no marked differences in the effects on competitiveness. In phases I and II, companies were most often able to strengthen their competitiveness through a better market position as well as an accelerated launch on the market.

Fewer industry partners did not continue the project after completion

Almost one-third of industry partners from the 2014/15 cohort of phase II launched their innovation project on the market as soon as the project was concluded or at a later date. These proportions were similarly high for phase I regular R&D funding projects. On the other hand, there are differences between the answers in phases I and II and in the proportion of industry partners that abandoned or did not continue their project after completion: this was one fifth of the industry partners in phase II and one third in phase I. A reason for this difference could

be the inclusion of projects under special measures in the 2014/15 cohort of phase II. For projects under special measures, the proportion of industry partners who abandoned or did not continue their project was much lower in phase I (9%).

Results of the econometric impact measurement confirmed

The findings for the 2012/13 cohort support the results from phase I. Both the expenditure and gross investment per employee in funded companies are significantly higher than those in the control group. This indicates a positive effect of the funded project on the input expenditure of the funded company.

The results in terms of output variables differ between phase I and II but they point in the same direction. In terms of the output indicators, no effects can be identified that indicate the positive influence of the funding on the average of the funded enterprises.

The results for the 2014/15 cohort show the same pattern as for the 2012/13 cohort. The input effects are also clearly positive in this case, with the output side effects being negative or statistically not significant.

These results can be interpreted as being a clear indication of the robustness of the findings as well as the sustainability of the funding effect on R&D expenditure and gross investment.

Valuation of the results

Findings from phase I largely confirmed in phase II

Both in the descriptive statistical evaluations of the survey and the econometric impact assessment, the results of phase II largely confirm those of phase I. Thus, the different project characteristics indicate only minor differences in both phases. Similarly, the effects and benefits of the funded projects are assessed very similarly by the industry partners surveyed across both phases. Minor deviations are evident in individual aspects, but overall we do not see any relevant differences in the responses from the two phases. Finally, the results of the econometric analysis complete this picture: the results here are also practically identical to those of phase I, from which we can conclude that the evaluation results, as presented in the final report on phase I, are very robust overall.

Half of the industry partners rate the economic benefits of the project as high

Half of the industry partners rate the immediate economic benefits as very high, high or rather high. The proportion of industry partners who also rate the overall benefit of R&D projects as at least rather high, is larger. This means that the benefit of R&D funding is not only manifested in a direct economic benefit, but also in other areas that can be advantageous to companies,

e.g. innovation culture, expertise, networks or staff recruitment (behavioural additionality). This result is also reflected in the effects on knowledge and technology transfer (KTT), with results showing that the majority of industry partners were able to improve their level of expertise and expand their network of research partners. The industry partners also assess the effects of the other KTT aspects surveyed, e.g. initiating new R&D projects in their own area of research and exploring new ideas, as being predominantly positive.

R&D project funding mainly has a positive effect on input expenditure

The results of the econometric analysis from both phases show positive effects of the funded project on the input expenditure of the companies, i.e. on R&D expenditure and gross investment per employee. On the other hand, no effect or only negative effects can be observed for the output indicators, i.e. the sales of “innovative” products and total sales per employee. These results can be interpreted as a clear indication of the sustainability of the funding effect on R&D expenditure and gross investment.

The following two factors could be considered as possible reasons for the non-positive effects on output variables in both cohorts:

- The number of younger companies among the funded companies is greater than among the non-funded ones. Younger companies may take longer to market their new products compared to older companies. One-third of the funded companies employ fewer than 10 people.
- The cooperation projects with the universities contain a higher proportion of “R” (research) than the projects of the comparable companies, which can lead to a longer lasting “innovation maturing process” but also to a higher degree of innovation than that of the recently launched products. This argument is further reinforced by the fact that numerous funded companies reported that the CTI project resulted in new R&D projects being initiated or rather, to new ideas being explored, where objectives did not necessarily lead to higher profits.