Mutual Learning Exercise on measures to stimulate business research and innovation

Horizon 2020 Policy Support Facility

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EXECUTIVE SUMMARY

At a workshop organised with Member State representatives on 22 October 2014 to discuss their potential needs for the Policy Support Facility many Member States expressed their need to benefit from external expertise and sharing of best practice, focusing on the practicalities of specific R&I policies at the design, implementation, monitoring and evaluation phases. In relation to previous mutual learning exercises this marked a change calling for a more hands-on approach for such exercises.

This report summarises the outcome of the work of an Expert Group, appointed by the Commission to develop a new methodology for in-depth Mutual Learning (MLE) between national policy-makers. In its task the Expert Group was to focus on measures to stimulate business research and innovation and to use that area as a testing ground for the methodology that would facilitate Mutual Learning. The Expert Group finished its work at the end of August, 2015.

The Expert Group developed a new methodology for Mutual Learning that it is project type of collaboration among a small group of MS and is driven by policy challenges and their commonalities among the participating MS. Learning within a MLE project is supported by experts providing background knowledge of the take-up and effectiveness of policy instruments used to tackle the specific challenges as identified by the participating MS. Learning from peers, other participating MS, is a vital element of the process. All participating MS exchange knowledge and experiences on an equal basis. There is emphasis on hands-on learning and learning by doing whereby the process might indicate more or less effective ways for goal-achievement to implement the initiatives the participating MS are planning, but not to recommend policy choices.

This report outlines the key elements of the MLE methodology widely described in a separate document. tI also summarises the 'challenge papers' prepared by the Expert Group members on the measures to stimulate business research and innovation. These papers provide examples of the kind of expert knowledge that can serve the process as background information and inspiration for the identification of policy challenges that could be tackled through a MLE process.

The Expert Group tested its preliminary ideas about the methodology and the 'challenge papers' with a small group of countries that were especially interested in and able to attend a mini workshop held in Brussels on 28 April, 2015. MS reactions to the methodological approach and the 'challenge papers' informed the Expert Group in its task leading to modifications in the ideas developed and improvements in the output.

On 30 June, 2015, a full workshop with all the MS and AS was organised in Brussels to obtain feedback on the proposed methodology and to discuss potential ideas for MLE projects. The new methodology was positively received. After the workshop the Expert Group members prepared draft proposals for potential pilot MLE projects based on the ideas suggested at the workshop. These draft proposals were circulated to the MS for their expressions of interest and are now leading to two pilot MLE projects being launched on topics which are most advanced as potential MLE project ideas: R&D tax credits and Public-Private Partnerships.

INTRODUCTION AND METHODOLOGICAL APPROACH

The June 2014 Commission Communication on "Research and innovation as sources of renewed growth"[1] set out three priority axes for reform in order for Member States to increase the quality and improve the impacts of Research and Innovation (R&I) public spending. These relate to reforms at the levels of R&I strategies, programmes and R&I performing institutions. The Communication also indicated that a new Policy Support Facility, financed under Horizon 2020, would be used to support Member States with the challenges of designing, implementing and evaluating these reforms.

Against this backdrop, a workshop was organised with Member State representatives on 22 October 2014 to discuss their potential needs for the Policy Support Facility. Many countries expressed their need to benefit from external expertise and sharing of best practice, focusing on the practicalities of specific R&I policies at the design, implementation, monitoring and evaluation phases. In relation to previous mutual learning exercises[2] this marked a change calling for a more hands-on approach for such exercises. A new Mutual Learning Exercise (MLE) required a methodology enabling greater policy learning across participating countries as well as agreement on a number of lessons applicable in the context of other countries that may not participate directly.

At the workshop with Member States (MS) on the Horizon 2020 Policy Support Facility (PSF) on 22 October, 2014, it was agreed that the first new type of mutual learning exercise (MLE) be launched on the topic of stimulating business investment in research and innovation.

The Commission appointed an Expert Group[3] to develop a methodology for and to support in-depth mutual learning between national policy-makers at the beginning of 2015. In its task the Expert Group was to focus on measures to stimulate business research and innovation and to use that area as a testing ground for the methodology that would facilitate such learning.

The Expert Group started its work in January 2015 and completed it by the end of August 2015. In addition to a proposal for in-depth Mutual Learning, as part of their task individual Expert Group members prepared reviews of the different measures to stimulate business research and innovation and according to the methodology, called them 'challenge papers', as follows:

- Jacek Warda: Challenges in Design, Implementation, and Evaluation of R&D Tax Incentives
- Vanja Rangus and Jacek Warda: Financial Instruments Challenge Paper
- Ammon Salter: Challenges for grant based funding of business R&D

In addition, the Group was able to draw on the work of the OECD on strategic public-private partnerships.[4] Summaries of these papers are included in Appendix 2 of this report.

It is essential for the new methodology that it is project type of collaboration among a small group of MS and driven by policy challenges as identified by and having commonalities among the participating MS. Learning within a MLE project is supported by expert knowledge and the peers, other participating MS, that are all on an equal footing in the project.

The 'challenge papers' are part of the process by providing background knowledge of the support instruments pertinent to the identified problems, but also by helping MS to identify ways to tackle their challenges, thus contributing to the process of formation of MLE projects.

The Expert Group tested its preliminary ideas about the methodology and the 'challenge papers' on measures to stimulate business R&D with a small group of countries that were especially interested in and able to attend a mini workshop held in Brussels on 28 April, 2015. MS reactions to the methodological approach and the 'challenge papers' informed the Expert Group in its task leading to modifications in the ideas developed and improvements in the output.

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1 http://ec.europa.eu/research/innovation-union/pdf/state-of-the-union/2013/research-and-innovation-as-sources-of-renewed-growth-com-2014-339-final.pdf
2 You can find the reports from the previous mutual learning seminars in "ERAC mutual learning exercises" on http://ec.europa.eu/research/innovation-union/index_en.cfm?pg=other-studies.
3 The expert group consisted of Terttu Luukkonen (Chair), Vanja Rangus, Ammon Salter, and Jacek Warda.
4 Strategic Public/Private Partnerships in Science, technology, and Innovation – Final Report, OECD Working Party on Innovation and Technology Policy, DSTI/STP/TIP(2014)15, 02-Dec-2014.

On 30 June, 2015, a full workshop with all the MS and AS was organised in Brussels to obtain feedback on the proposed methodology and to discuss potential ideas for MLE projects. The new methodology was positively received at the workshop. The Expert Group members prepared draft proposals for potential pilot MLE projects based on the ideas suggested at the workshop. These draft proposals were circulated to the MS for their expressions of interest and are now leading to two pilot MLE projects, the first on R&D tax credits and the second on Public-Private Partnerships.

BASIC FEATURES OF THE MLE METHODOLOGY

The MLEs are *MS driven* and *policy challenge*-based activities intended to promote mutual learning between the countries volunteering to take part and supported by the Horizon 2020 PSF. In a MLE a select number of MS, typically three to four, although it is not confined to this number, that are faced with similar or closely related policy challenges get together to explore the best ways to tackle them, acknowledging a need of change in the design and/or implementation of particular policy instruments and wishing to learn from evaluation and experiences of these instruments in other countries. Learning is not confined to EU MS but can be directed to interesting relevant country cases outside the EU. Mutual Learning will lead to a project-type of collaboration for a set period of time (in principle, up to one year) with defined resources and goals.

The aim will be to identify good practice, lessons learned and success factors based on robust evidence about the impacts of the measures and the contextual factors that may explain the impacts. In addition, the objective of this exercise will be to support MS in designing, implementing and/or evaluating different policy instruments, adopting a more hands-on "*learning by doing*" approach supported by external expertise.

Each participating country is expected to gain tailored information and expertise from the process, but is also open to other participants to learn from their circumstances/experiences. Thus, the project is based on open, frank, and confidential knowledge exchange between the participating countries. All participating MS are expected to participate actively, in a forthright manner, and to provide friendly peer support for mutual learning. The specific knowledge interests around the identified policy challenges may vary to some extent between the participating MS, but they are sufficiently close in order that the process can benefit all participants and that learning is mutual. This process is called *peer-supported learning.*

The challenge-based approach

When applied to specific policy areas, the MLE draws attention to the special challenges MS are faced with in their efforts to design and implement major policy reforms or to put into effect fine-tuning and incremental improvement of existing policy instruments and policy mix. In the process the topic-specific experts help the participating MS by providing both general and more specific and tailored information of the policy instruments used to tackle the challenges and any information that is available of their effectiveness and the framework conditions that need to be in place for success. This information will be applied to put the situation of each participating MS in context.

For the MLE process to be effective, the topic area of each MLE project needs to be defined in a sufficiently specific to bring about synergies in and opportunities for mutual learning for the participating MS.

The background data on participating MS that will inform a MLE project will consist of information and data, which will be obtained through different sources: 1) MS will provide data, mostly drawing on their existing data sources; 2) the experts engaged in a MLE project will acquire some of that data; 3) Horizon 2020 PSF will also collect data and information that can be used in the project process. In practice, the type pf data will in each case be decided case-by-case depending on the specific MLE project and its focus area.

The MLE process is not expected to give policy recommendations out of the work. There will be an emphasis on policy learning and learning by doing whereby the process might indicate more or less effective ways to implement initiatives and to achieve goals but not to recommend policy choices. Moreover, all participant MS are expected to exchange experiences on an equal basis.

Adoption of a topic for MLE project

A commonality for participating MS would involve recognition of a joint challenge, though this can take somewhat different forms and usually has a different socio-economic and/or policy context. In order for MS to discover a joint interest, the PSF can promote the process and help MS recognise

their common interests through requesting expressions of interest from the MS about their concerns and potential subjects for MLE processes, suggesting a joint MLE process to a number of MS which seem to be preoccupied with similar types of questions, and helping these countries to organise a specific planning meeting and negotiating with them about the process. The process can also benefit from an interactive workshop organised by the PSF for matchmaking and identifying joint interests in a MLE project. There is also a need for MS to be active and suggest new topic areas and seek potential interested partners at the workshop.

Commitment to the MLE project

The MS express their commitment to a MLE project through two measures, as follows:

- The interested participating MS will give an expression of engagement in the project in a written form signed by a high-level official or Minister (Deputy Minister).

- The MS will write a short *background report* describing the major challenges in the policy area/change they wish to address in the process, former measures taken to address them, and expectations concerning the MLE project. This is to ensure that the joint interests of the participating MS are converging enough to make the MLE relevant and that the MS are sufficiently engaged and will contribute to the process.

A 'standard' MLE project

The methodology describes a 'standard' MLE process, with duration from six to twelve months, with an indicative time schedule. The process is to be regarded as modular, where all or a selection of the phases may be required, depending on the specific topic and available knowledge of the selected topic.

Requirements for the participating MS

The MLE project requires specific action and resources from the participating MS. This includes:
- appointing a sufficiently high-level person as their participant, a person with experience and knowledge of the policy challenges and instruments in the domains selected and in a position to engage their ministry or administration in the process, potentially to be assisted by technical or other national experts in the task;

- providing resources – normally in terms of labour - to prepare *the background report* – more thorough than in the preliminary stage - describing their major challenge and the measures taken to tackle it;

- providing data and information that the process requires; and

- allotting time for their participants to attend the meetings and potential country visits.

- If a country visit is made to a particular MLE participant MS, helping to organise the programme of the country visit.

Role of the Horizon 2020 PSF

The Horizon 2020 PSF provides administrative and substantive support to the MLE project engaging the project coordinator, and together with the coordinator, identifying and then engaging the topic-specific experts (one to two per topic) who will provide expert help to the project. The Horizon 2020 PSF has an important role in the promotion of new MLE projects and helping the MS recognise their common interests through a variety of activities, as outlined in this report.

Role of the coordinator and experts

The project coordinator is a person with experience and understanding of the topic substance area but also, and importantly, experience in managing interactive processes.

In close collaboration with the participating countries and the Horizon 2020 PSF, *the coordinator* helps

- to define the focus of the MLE project,

- in close interaction with the representatives of each participating MS helps them to identify their information needs and plan the activities

- helps to organise the meetings, the workshops, identifying and communicating with experts, and writing the reports the process will produce

- with the Horizon 2020 PSF identifies a potential need and engagement of topic-specific experts in the process
- will ensure that the experts will prepare appropriate material and provide help in the process
- keeps track with project progress and helps to solve potential problems encountered

The topic-specific experts will provide expert help to the participating MS including writing the *challenge papers* and providing further and more tailored information of the policy areas within their expertise, and contributing to the project end report. The MLE project can invite additional experts to its meetings to be able to have oral communication with them.

The background documents, *the challenge papers*, which the topic-specific experts prepare, are challenge and practice-driven overviews and not just scholarly reviews of the topic area. The 'challenge papers' prepared by the Expert Group provide an example of the structure and contents of such reports. The experts need to be acquainted with relevant research literature, evaluations made of the specific tools that are relevant, have experience of interaction with practitioners, and be aware of policy needs.

Appendix 2 of this report includes summaries of the 'challenge' papers that the Expert Group prepared on the measures to stimulate business research and innovation. These are examples of the kinds of information that such 'challenge' papers can contain. 'Challenge' papers can play many roles in the MLE process; they can be used for animating discussions in interactive workshops organised by the Horizon 2020 PSF for matchmaking and identifying joint interests of MS in MLE projects, as part of a MLE process where the topic areas have been identified but still need to be defined in a more focused way, or in a more specific MLE process as information input. In the last case, the participating MS can use the 'challenge' papers to identify relevant points of focus in their own county case.

Outcomes

In addition to tacit learning, in the end there should be a written report drawing lessons for policy design/ implementation/ evaluation, but protecting the confidence of the participating countries. The conclusions of the report will be consulted with participating Member States to ensure the right balance between confidentiality and support for mutual learning.

Because of the 'learning by doing' approach, it is expected that the major outcome from the process will be better informed policies and a well implemented policy change. It also includes incremental improvement of existing policy instruments and policy mix.

Dissemination

Major means to disseminate information and experiences of the MLE processes to other than participant MS include 1) the reports that the MLE projects will produce, and 2) dissemination workshops where project findings will be widely discussed. In addition, if specially agreed upon in a MLE project, projects can admit the presence of non-participating MS in some project-specific meetings.

Evaluation of the MLE

The major project outcomes of MLE projects are expected to be intangible by nature. It would not be possible to envisage all the potential outcomes in advance, but these could be multiple including no visible change in participating MS if that is the learning provided by the project.

After the first few MLE projects, the Horizon 2020 PSF will conduct an evaluation of the perceived usefulness, benefits and drawbacks of the process, and more systematically to explore further development by using independent, external expertise. The evaluation of MLE projects cannot be based on hard data because of the intangible nature of the expected outcomes. These outcomes can still be evaluated using various qualitative means of data collection.

If the evaluation of MLE will uncover that the process is not fulfilling the expectations, the process should be radically renewed or abandoned.

Added value

The added value of the MLE process with regard to the self-initiated activities by the MS is to actively promote informal exchange of information and experiences among a set of MS, helping to provide access to high quality, well-structured, and pertinent expert knowledge, and covering an important part of the costs of this; at the same time, providing peer and expert- based support for

the process of designing and/or implementing policy change or improvement in the implementation of policies.

The MLE will complement other forms of ERAC activities and its design has taken into account existing tools for policy learning in other international organisations and forums and will not be overlapping with them. In relation to options for mutual learning offered by the OECD, Eureka or other international forums and organisations, the MLE process is a more focused and tailored learning exercise within a relatively short period (from 6 to max. 12 months). It provides a small number of countries an opportunity to iterative and active self-learning, to hands-on and in-depth policy learning on country-specific challenges, an opportunity that other organisations and forums do not offer.

The countries are in an equal position in the process and neither experts nor co-learning countries make recommendations concerning the choices a country should make. The expected benefits include a policy change/improvement which is based on improved understanding of the most effective ways to tackle the specific policy challenges that a participating country has.

Costs

H2020 will contribute to the costs associated with the appointment and work of the project coordinator and experts and the travel costs of two MS representatives to MLE project-specific meetings and fact-finding country visits as well as external interviewees invited to the MLE project meetings. The MS will cover the costs of preparing the background material and reports for the project. The MS will cover the travel costs of their representatives to the preparatory and final dissemination workshops and to MLE project meetings when they are observers and not project participants.

NEXT STEPS

Two pilot MLE projects will start in the autumn of 2015: the first will be on R&D tax credits and the second on Public-Private Partnerships. These pilot projects will test and, if needed, further elaborate the MLE methodology and process. These two projects have a head start since they can benefit from the 'challenge papers' prepared by the Expert Group on the MLE development.

APPENDIX 1: SUMMARIES OF THE 'CHALLENGE' PAPERS THAT THE EXPERT GROUP PRODUCED

CHALLENGES IN DESIGN, IMPLEMENTATION, AND EVALUATION OF R&D TAX INCENTIVES[5]

Underpinning rationale for the instrument

As being the most popular, R&D credit and its sister measure - R&D allowance - were an obvious focus for the tax incentives instrument paper. Both reduce the cost of R&D through the tax system. This policy has the virtue of being neutral, i.e. giving a tax relief to any kind of eligible R&D expenditure and any kind of industrial sector performing eligible R&D. Since any firm can apply for the tax credit and benefit from it, the credit is universal. There is no picking of winners: the tax credit allows the firms to decide on the projects they want to carry out. On the contrary, the direct subsidies are typically granted to selected projects and therefore selected firms.

There is a rich accumulated evidence on designing, implementing and evaluating R&D tax incentives as many countries have introduced these policies already in the seventies and then followed with adjustments to the system in the ensuing years. This is evident especially in the European Union with some members (France, Netherlands, Spain, the United Kingdom) having experienced the use of R&D tax incentives for many years along with a number of overseas countries (Australia, Canada, Japan, the United States). However, for the European Union as a whole, the experience is uneven in the sense that there is a lot of tacit knowledge accumulated in incumbent countries about running the tax incentive schemes, while beginners, and particularly those, who might be inclined to introduce more R&D tax incentives, know little in terms of the challenges concerning appropriate design, implementation, monitoring, and evaluation. The purpose of the tax incentive paper was to address these challenges.

Take-up/use of the instrument

According to the OECD, the R&D tax incentives have been on the rise, gradually overtaking the direct support for business R&D. In France, Belgium, Netherlands, Ireland and Portugal, the R&D tax incentives started playing a prevailing role in those country policy mixes. They are closing in on direct support incentives in Austria, Hungary and the United Kingdom.

Among the 28 European Union member countries, 22 countries provide tax incentives for business R&D in the form of a tax credit or allowance. Of those, in three countries - Greece, Latvia and the Slovak Republic – there is, at this point, information to confirm the existence of R&D tax credits or allowances, but their rates and conditions as they apply to enterprises remain unclear. Other three countries - Bulgaria, Cyprus and Poland – do not have R&D tax credits or allowances, but have instituted incentives for technology and intangibles acquisitions, not discussed in this paper. The remaining, three member states (Germany, Estonia. and Luxembourg) do not provide any R&D tax incentives.

Challenges by policy cycle

The paper discusses R&D tax credit challenges according to three policy cycles: design, implementation (including monitoring) and evaluation. Among the EU countries, there exist numerous variations in details, which in practice can matter importantly for generosity and influence the uptake of an incentive.

These variations come from differences in statutory rates, caps, definition of eligible R&D expenditures, carry-forward rules, and other practical details such as refundability of the tax credits. Dimensions affecting whether and the extent to which there is entitlement to tax incentive include the following: eligible expenditures, firm size, taxes to which credits or allowances are applied, their rates and their designs (levels or increments). All these elements are quite interconnected and pose challenges to the design of R&D tax incentives, which also has implications on their implementation and even on whether and how incentives are evaluated.

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5 The report on tax credits was prepared by Jacek Warda.

Design

The paper outlined a number of challenges for the design phase, with those of note for the implementation and monitoring phase discussed below. Other challenges elaborated in the paper include setting the effective rates of the tax credit, including the role of caps, and making the unused tax credits refundable.

Defining R&D for tax purposes

The Frascati definition of R&D is a standard to which most countries adhere. According to this definition, the eligible work must meet the criteria of scientific advance, systematic investigation and uncertainty of outcome. The trend today is to broaden this definition by including some elements of innovation. Clarity of the definition to business is important as it impacts the preparation of compliant documentation and an overall uptake of the incentive.

Defining eligible expenses

Countries are free to select the type of expenses, within the meaning of the R&D definition, in which they wish to base their tax credit. Thus expense bases can vary among countries, from all expenses (i.e., capital and current) to some items only (e.g., wages and salaries of researchers). All this has an impact on the level of generosity and degree of easiness to file a claim.

Choosing the delivery mechanism

Typically, the R&D tax credits operate within the corporate income tax system. This makes them generally more complex in design and implementation. An alternative followed by a few countries (e.g., Belgium and Netherlands) is to use payroll-based taxes as a vehicle to deliver R&D tax credits. Channeling tax credits via payroll taxes appears to be less sensitive to economic cycles, simpler to manage for the authorities and for businesses which require less documentation for approval, and more quickly rewarding the recipient through automatic payments (refunds). All these features are not readily available within the corporate income tax system.

Choosing the type of tax credit

Countries can select among two types of the tax credit and those undecided may opt for a hybrid (volume-incremental) formula. A volume-based tax credit is characterized by its broad scope, applicable to all eligible companies on the level of R&D expenditure incurred in the tax year. This expenditure can be greater or lower than in the previous year but the tax credit applies to all. Such type of the tax credit favours catching up on innovation by all companies in the country, but may pose a risk of deadweight loss (i.e., companies are rewarded for the R&D that would be incurred even in the absence of the tax credit). An incremental tax credit may eliminate some of this deadweight loss but involve other costs, as it may be prone to strategic behaviour by firms and may be more costly to monitor and comply depending on the complexity of the incremental formula.

Selecting the target audience

Tax incentives are especially amenable to selective targeting. Targeting the small-sized enterprises for enhanced tax credit support is the most common policy. The overriding rationale is that small firms face financial constraints in raising R&D funds. However, the universal treatment of all firms by the tax credit poses a risk of subsidizing not growing incumbent firms, particularly if incentives diminish with company growth thresholds. Targeting based on the age of the firm is not common (Young Innovative Companies in France and Belgium) but increasingly seen as a preferred way of supporting truly innovative small firms. It requires, however, a number of policy parameters to establish and monitor, such as eligible age and length of enhanced support.

Within the activity themes, collaboration is one area of R&D activity where enhanced R&D tax credits could be especially applied. Preferential tax treatment of R&D collaboration with science organizations may be a right response to the challenge of leveraging knowledge and resources. Several EU member states offer enhanced tax credits for collaboration with science-based organizations.

Implementation and monitoring

A real test of effective implementation is the tax incentive's uptake by business, where such factors as legal stability, predictability or certainty of receiving the reward, and consistency in determining eligibility of claims, become the attributes of the system's operational efficiency. It consists of administering and monitoring the appropriate use of the incentive, along with promoting it to the business community (outreach activities). All these aspects will influence the uptake. In the implementation phase, two issues are of particular significance as presented below.

Choosing a delivery mechanism

Two opposite cases are possible: a hands-off (an honour or self-assessment based) control system or hands-on control system. Both come at a cost. Hands-on control system will typically involve a high cost of administration for government. It requires client-oriented programmes to ease the compliance burden for companies. A hands-off control system will be less costly for government to operate and will pose a smaller compliance burden for business. However, less control may involve a free-riding cost, resulting in the perception of a lack of fiscal accountability for the incentive. In practice, a mix of these two opposite cases will exist, largely being a factor of the governance mechanism adopted and the accepted comfort level by the country in question.

Promoting the incentive

Active promotion, including outreach to enterprises, may help influence the successful delivery of a tax incentive. Working with customers at face-to-face workshops and through effective websites on how to apply for and document the claim will help increase the client comfort level and make it worthwhile to file a claim. This makes the system more predictable and ensures greater uptake.

Evaluation

According to the paper, the impact of R&D tax credits has been measured in-and-out by numerous evaluation studies. The international evaluation evidence suggests that tax incentives for R&D may help companies to increase R&D expenditures. But this is a qualified "yes", as most official evaluations and academic research have concentrated on the level of first-order effects (i.e. input-additionality influences on R&D of the firm). Instead of focusing on the technical challenges in modeling the impact of tax incentives, this paper believes that countries need to focus on the process, in particular planning for evaluation, gathering data in advance, and looking for more cost-effective evaluation approaches.

Planning ahead

The paper calls for a proactive approach to evaluations. Committing to evaluation ex-ante provides an opportunity to think about the evaluation requirements ahead of the actual work, ensuring better data collection. An early planning also helps to generate constructive interest and involvement of stakeholders.

Building database

A major cost of evaluations is related to data gathering. The choice of evaluation method in many cases will be determined not by what ideally is best, but by the data at hand. Lack of data in some cases could lead to a perpetual postponement of the evaluation until sufficient statistics were in place and would make it difficult to present a timely and policy relevant outcome.

Searching for new ways of conducting evaluations

The parametric methods of evaluation such as cost-benefit analyses, and meta-analyses, utilizing the reviews of past evaluations, can be both cost-effective and on-time for policy decision-making. They may provide a tentative solution compared to evaluations conducted from scratch. The cost-benefit analysis, for example, is based on values of benefits and costs assembled form from evaluation literature. It assesses the net economic impact of R&D tax incentives.

CHALLENGES IN DESIGN, IMPLEMENTATION, AND EVALUATION OF FINANCIAL INSTRUMENTS[6]

Underpinning rationale for the instrument

Financing innovative firms is risky. First, this is because the returns to innovative activities are highly uncertain making it difficult for investors to assess risk. Second, entrepreneurs tend to know more about their company characteristics and performance than investors themselves - the so-called information asymmetry factor – causing investors to demand a risk premium or to abandon investing in start-up firms. Therefore, innovative firms tend to have difficulty in accessing risk capital.

To ensure the supply of, and encourage demand for, capital funds, government approaches include the following modes of public support:

- Institutional financing: subsidized and soft (repayable) loans, and loan and equity guarantees offered to banks and related institutional lenders

- Tax system: chiefly through the tax relief for angel investors

- Capital markets: seed and venture capital funds that co-invest in emerging companies along with the private equity funds

- Regulatory frameworks governing the access to and disposition of capital in the country, including protection for the evolving alternative forms of private financing

Take-up /use of the instrument

Loans are one of the most common tools for access to finance for entrepreneurial companies during the entire technology life cycle and constitute a major yet traditional source of funding for innovative investments in all MS. Most countries offer reduced interest rate loans or make loans repayable (soft loans) only if the project succeeds. To ease the access to loans for SMEs especially to start ups some governments introduce *equity/loan guarantee schemes*.

Tax credits for risky investments exist in just a few MS, with the United Kingdom operating presumably the most advanced set of programmes of tax incentives for angel investors.

Venture capital represents the most common form of risk financing in all MS. However, mostly all new MS lack knowledge of VC instrument and the culture of private investors/angels is far away from what is needed to establish a VC market. In order to catalyse the supply of early stage VC, governments intervene. Instruments include venture capital funds of funds but these are often seen as inappropriate due to political interfering, and lack of investment skills of bureaucrats. As a remedy, a capital participation approach is currently pursued by many governments.

Alternative finance sources: crowd-funding has been a new way of raising risk capital for innovative ventures. It has taken off across MS but remains to be seen how it could fill the finance gap, in particular for start-ups and rapidly growing firms.

Challenges by policy cycle

The paper discusses financial instruments (loans, guarantees, tax incentives, venture capital, alternative financing) challenges according to three policy cycles: design, implementation and evaluation. Among the EU countries, there exist numerous variations that come from differences in regulation, entrepreneurial/investor culture, needs of SMEs, knowledge.

Challenges for loans and guarantees

Governments can offer reduced interest rate loans or make loans repayable only if the project succeeds. Government can also intervene by under-writing some of the risk or uncertainty with guarantees. Typically, governments would offer loan guarantee scheme that gives collateral to SMEs in order to secure loans. There are challenges in the design and implementation of the loans and loan guarantee schemes that call for the prudent proceeding by government.

6The report on financial instruments was prepared by Vanja Rangus and Jacek Warda.

Understanding the financial market

Designing a guarantee scheme requires understanding of the market, especially weaknesses in the access to finance for innovative companies. Part of the challenge is reluctance of entrepreneurs to access bank loans cognizant that institutional lenders are hesitant about awarding loans to fledgling companies because of the lack of collateral. In designing their loan and loan guarantee instruments, MS have to be familiar with the absorption capacity or demand for loans by entrepreneurs on the one side, and with the ability of banks and other private lending institutions to assess the risks of lending, on the other side. Educational training/awareness building on both sides could further promote this traditional form of innovation financing to gain its momentum.

Setting up an effective governance system

The challenges in setting up an effective governance system include, i.e., deciding on the number of supervisory boards that need to be established according to the legislation; defining the roles of different boards, clearly and distinctly; ensuring that all members of boards are qualified to effectively assess and select all determinants in awarding the loan support; as well as ensuring independence of board members.

Ensuring timely delivery of a loan/guarantee

The decision concerning the loan should be made in a timely fashion and preferably take no longer than one month. There are countries which experience close to one month timeframe (e.g., the United Kingdom) but in other countries the waiting time can be more than five months.

Setting appropriate service fees

Companies that wish to obtain a loan guarantee are usually obliged to pay a fee calculated on the outstanding loan amount. The challenge for MS offering loan incentives is to set a balanced service fee by choosing an appropriate percentage of the fee and ensuring that it covers all administrative costs and the mark-up while not unduly burdening the recipient.

Making loan incentives work well within the innovation policy mix

By design, loans and loan guarantees represent a direct subsidy for the innovator. The challenge for MS is to ensure that these incentives strengthen the policy mix offered and, in particular, are complementary to the system of grants in the country..

Challenges for angel investor tax credits

Addressing quality of investor

Governments introducing an angel tax credit need to be cognizant about the type of investors they wish to attract. Tax credits have the potential of reaching broadest possible base of investors - doctors, lawyers, dentists, executives, etc. Some of these will be knowledgeable investors but some will be novices. Professional angels differ from novice investors in that they are better diversified, more patient and capable to offer advice and active involvement in running the business. Novice investors may not offer the required level of support.

Targeting the credit

For government, angel tax credits offer good targeting opportunity to those types of companies and innovative purposes (e.g., product development, marketing, training etc.) the government intends to support. The question is to what extent. Too much targeting may be seen as micro-managing by government resulting in an increased cost of compliance that may diminish the take up of the incentive. It may discourage both investors and entrepreneurs from using the incentive. A balance needs to be drawn as to what level of targeting is appropriate and what is not.

Implementing the credit

Authorities pondering the introduction of angel tax credits remain ill-equipped as there is scarcity of informed evaluations of those credit schemes largely because the programmes in existence are relatively new. The oversight cost will likely depend on how interventionist the government wants to be as it may require additional administrative apparatus. The regulatory pre-assessment of such schemes might include a question on whether there is a chance for bridging the financing gap for the early start-up companies and whether the cost is socially justified

Challenges for equity financing

Lack of collateral and corporate history as well as high costs of valuation and monitoring limit the availability of conventional funding to early-stage companies. Availability of venture capital from private funds is also limited as returns from venture capital are high-risk. Thus, M intervene to leverage private financing in order to reduce this financing gap. The challenges include setting up an effective governance system (e.g., regulation, ownership, management, distribution of profit, exit strategy), boosting the knowledge of SMEs for investment readiness, raising awareness on business angels, and financial support for angel networks, etc. The paper presents a set of challenge questions including: *How to set up a governance system? What should be the ownership structure of the fund? Who will manage the fund? How to design the financial instrument for regional needs?* Some of the particular challenges covered in the paper are mentioned below.

Building capacity for entrepreneurs and investors

Many businesses seeking finance are not "investment ready". Capacity building (e.g., mentoring, market analysis, technology validation) is needed that is beyond the business plan for start-up companies. Investment education (e.g., training programmes) can provide investors with the specialist knowledge and skills that they require to invest successfully. For entrepreneurs, it can help them to articulate their demand for risk funding. Government could have a lead role in facilitating such activity. In both cases, government could set a certain percentage of the fund for capacity building.

Establishing co- investment vehicles

Co-investment funds invest alongside VC and angel groups to enable them to make larger follow-on investments. These funds differ in terms of how they operate. At one extreme are passive funds which do not undertake its own due diligence and play no part in the investment. Other co-investment funds are more actively managed, inviting investors to bring deals to them, but make their own investment decisions. Government needs to assess the approach that fits best the needs of the country in question before participating in co-investment.

Measuring the impact of government intervention

There is increasing evidence of the value-added - or the lack of - in government activities in the provision of VC funding, though more generally, measuring the impacts of different forms of government intervention in the VC industry and market is still a hurdle. Furthermore, due to time lag involved in making the returns on investment happen, the time perspective goes well beyond normal policy cycles. Governments would need determination and willingness to provide for and design evaluation as part of new intervention they are planning. There is also a need for developing more robust approaches to evaluation including triangulation and the combination of different methodologies. Governments could play an important role in the promotion of of evaluation methodologies, so that the social return on public sector intervention can be demonstrated and the impact of such interventions be measured.

Challenges in alternative financing

The theme of alternative financing sources has been given only a cursory look in the paper. According to its preliminary findings, the current crowd-funding market appears to be sufficiently self-regulated. Up to now, no systemic evidence of abuse or fraud on the crowd-funding platforms has emerged. However, governments have a role to play, not as interveners, but as supporters of the fledgling market through appropriate regulations and protection of investors.

CHALLENGES FOR GRANT-BASED FUNDING OF BUSINESS R&D[7]

Underpinning rationale for the instrument

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7 The report on R&D grants was prepared by Ammon Salter

R&D and innovation grants remain one of the cornerstones of governments' efforts to promote business R&D in Europe. The primary task of R&D grants is to stimulate innovative investment by private firms, focusing on early stage or pre-competitive R&D efforts. However, they are also used as an instrument to achieve social and economic goals. R&D grants are offered by different levels of government, with a significant share of grants provided by sub-national governments within MS. In addition, R&D grants often administered by independent agencies, with delegated authority by governments to select, disperse and evaluative grants.

The traditional argument for the use of direct R&D grants to firms is based on the 'market failure' perspective, which states that due to the incomplete nature of appropriation from R&D investments, firms spend less on R&D than would be social optimal. This is because knowledge created by the R&D process is liable to be subject to knowledge spillovers. As such, direct public funding for industrial R&D helps compensate firms for these leaky investments, helping to return private R&D expenditures to levels that are social beneficial. A second rationale for direct R&D grants is the 'system-failure' perspective. This view suggests that innovation systems may fail to generate sufficient levels of interaction to propel and sustain new or existing industries or technologies. These rationales for R&D grants are largely complementary, but offer different views as to the design of effective grant programmes.

Take-up/use of the instrument

The use of grant programmes is widespread across MS. However, there is no clear pattern in MS in terms of targeted and non-targeted programmes and in the size of effort to support business R&D via direct grants. Most programmes focus on pre-competitive research, but increasingly MS are looking to orient their grant schemes or projects with high and direct commercial value. There is also use of grant programmes to promote collaboration between university and industry, young firms and to integrate grant programmes with national efforts to develop innovation policies or platforms.

Challenges by policy cycle

Design

Targeting or not

It is increasingly common to tie R&D grant schemes to national innovation programmes and plans. One of the advantages of targeted programmes is that they provide a strong signal to applicants about the nature of the goals of the programme, helping to enable project teams and firms to self-select into these areas. In a context of limited funding, targeted programmes offer the allure of more focused, direct and potentially more impactful grants. However, there is a lack of clear evidence of the merits of targeted vs. non-targeted schemes in terms of their effectiveness or their effect on applicants behaviour.

Organizing the selection process

One of the most significant challenges for R&D grant schemes is the selection process, which places a critical administrative responsibility (or burden) on the funding agency. The assessment of proposals requires expert judgment. Since all R&D projects are subject to a high degree of uncertainty about their potential outcomes, the assessment criteria and the characteristics of the assessors themselves shape the outcomes of selection. There is danger of selectors choosing 'false negatives', projects that are deemed to be successful but turn out not to be, or, alternatively, selectors rejecting potentially successful projects, what can be termed 'false positives'. It is also clear that these types of selection processes are subject to significant cognitive or decision-making biases. Relying on external experts/selectors can potentially help to increase the validity of the assessment process. However, external assessment raises the administrative burden of grant programmes and may be unsuitable in some contexts. (e.g. in a small country or where there is a strong need to ensure confidentiality).

Operational issues

Developing an entrepreneurial mindset in the funding agency and encouraging radical innovation
Since public grants are inter-organizational contracts and follow the funding cycle of the public sector, it is often difficult or even impossible to wind them up mid-stream unless there is a clear and manifest violation of the contract, which is rare. This implies that the selection process for projects within the public sector is possibly of greater importance than in the private sector, as in the private sector mistakes, i.e. failing projects, can be corrected at the later gates in the development cycle. To overcome this challenge, it has been common for public agencies to develop two or even three stage application processes or use milestone based payments.

Grant schemes can also offer the potential for governments to help shoulder significant risks associated with radical innovation for businesses. This requires that grant schemes are willing to tackle major system failures. This approach may require a different mentality to the allocation of grants towards projects with high risk/high reward profile rather than focus on well-founded but incremental projects.

Defining the productive 'life' of a grant scheme

In developing a grant scheme, the funding agency needs to consider its lifecycle. There is often a strong inertia in many MS grant schemes. Funding agency needs to judge when the grant scheme benefits have reached diminishing returns relative to the potential to re-use the funds to development alternative schemes. As such, funding agency has to have the capacity to monitor the existing schemes, looking for ways of fine-tuning these schemes to ensure these programmes are efficiently and effectively managed. At the same time, it also needs the capacity to renew its portfolio of schemes to create new and more vibrant approaches.

Defining the geographical scope of a grant scheme

Many MS R&D grant schemes are local in orientation. They require that the project to be based in a particular region or nation, and that the grant is spent and the impact arising from the grant is achieved within that area. However, increasingly firms, even small firms, operate across borders and the impact of the grant they receive may occur outside the home region or nation. As such, it is difficult to determine the geographical impact of the grant.

Evaluation

Tracking funded and unfunded projects

It is extremely difficult to capture data on unfunded projects, and 'near miss' cases, projects that might have been funding but just missed the cut-off point for support. As a result, evaluations tend to focus on process issues, relying on ex-ante information from those funded by the grants. However, building an evaluation upon the views of those receiving the grants raises questions about the validity of the information provided. In addition, time frame of evaluation is challenging, especially when one is dealing with young, innovative firms.

Commissioning an evaluation

A reliance on external contractors for evaluation may be beneficial to help ensure the evaluations are conducted with high technical standards and objectivity. However, external contractors may be subject to control and monitoring by grant giving agency, such as setting the terms of reference for the evaluation. Often there is a tendency to commission 'positive' evaluations. As a result, we can expect a strong publication bias in evaluations, where positive evaluations are published and negative ones are liable to be withheld or kept internally. A good practice for MS would to commit to publish the research protocol for all evaluations and the results (including the underpinning data).

Ensuring that the programmes do not suffer from 'mission creep'

R&D grant evaluations often suffer a find that goals of the programme evolve away from the original objectives to capture other another set of objectives. For this reason, it is important to 'hard-wire' evaluations from the design stages of the programme and to use the initial objectives of the programme as the reference point for the evaluation. Recent attention to 'behavioural additionality' in evaluation reflects an understanding that many of the outcomes of an R&D grant programme lead to changes in attitudes and approach rather than simply an increase in inputs and outputs.

Measuring the effect of a grant

A related challenge for evaluation is that the scale of the grant might be small relative to the range of other investments required to translate an idea or research concept into a fully-fledged business or innovation. This means the policy effect may be modest relative to other downstream investments and skills, such as gaining market access or late stage development efforts. This is especially the case when grant support is concentrated into early stage projects, as the costs will escalate in later stages of the innovation process. Attributing the success of the later stages of the project to the initial investment often assumes that there were no potential substitutes available for this outcome to be achieved, an assumption that is often hard to sustain in practice.

Assessing the joint effect of R&D grants with other support programmes

No single instrument to support business R&D operates in isolation. Most European governments blend grants and tax credits to stimulate business R&D. As such, it is unwise to treat each instrument as a separate domain of activity since for business firms these instruments can mutually reinforce decision with regards to the level of R&D expenditure. Therefore, increased attention has to be given to designing multi-instrument evaluations and assessing the complementarity (or substitutability) of different mechanisms for support R&D.

Targeting average performance or hunting for a few 'big wins'

There is a tendency in evaluation to measure the average performance of a set of projects, yet the average performance may hide a high skew in the distribution of returns. Many grant programmes do not allow for that rate of failure, and tend to 'play safe' in funding projects that meet their milestones, but do not generate new commercial value.

Building more robust and valid evaluations

A typical R&D grant programme is usually subject to an ex-post evaluation. This evaluation tends to focus on the administrative features of the programme, and the inputs and outputs associated by activities funded by the project. Yet, this type of evaluation provides little direct evidence on causal effect of the programme. It may be that the funded project would have happened in any case. The programme may select the highest potential activities, or the high potential teams may decide to bid for the programme. Alternative evaluation approaches may provide stronger and more robust evidence for the programmes. Such evaluation approach makes use of the 'identification revolution' in econometrics, which gives careful attention to identification of the causal relationship between two sets of variables. One approach is to create comparison sets, or a set of matching projects/firms which did not receive the grant and then compare the performance of these projects/firms to the funded (treated) projects. A second new approach is to look at 'near miss' cases and compare them to funded projects. The idea is that the near miss cases closely resemble the funded projects in their quality, but have not been 'treated' by the funding and are therefore a strong comparison set.

A third approach is to conduct randomized control trials. This involves some randomly treated projects/firms with the grant and comparing them against a set of projects/firms that did not receive the grant. In doing so, it may be possible to get close to 'gold standard' evidence used in clinical studies for the efficacy of drugs. The challenges of administering these approaches are high, as they require upfront investments and careful design.

PUBLIC PRIVATE PARTNERSHIPS IN THE FORM OF JOINT FUNDING OF RESEARCH AND INNOVATION ACTIVITIES[8]

With regard to public-private partnerships (PPP) the Expert Group was able to benefit from collaboration with the OECD and to draw on the recent OECD report on strategic PPPs.[9] Hermann Garden from the OECD attended both the April mini workshop and the June workshop and presented the conclusions of the OECD report, circulated to the participants of both events, and participated in the discussion on the topic. The OECD report had a somewhat different focus covering especially 'strategic' PPPs often aiming to address new emerging scientific and technological areas and to promote scientific and technological activities addressing grand challenges while the interest of the MS in PPPs was not pre-defined and was broader. This summary encapsulates some of the conclusions to be drawn on the challenges in design, implementation, and evaluation of PPPs of relevance for the MLE activities.

Underpinning rationale for the instrument

PPPs usually represent longer term contractual agreements between *public* bodies (e.g. governments and their agencies, academia) and the *private* sector (operator and/or financer) to deliver a service or product. PPPs occupy a middle ground between traditional public procurement and full private provision.

Public-Private Partnerships' represent a shift in STI policy from short term contracts with a relatively limited scope to horizontal, multi-stakeholder commitments often to address strategic and challenge-driven questions with a long-term vision. Horizontal multi-partner arrangements often among otherwise competitive partners united by a unifying goal are some of further benefits of PPPs. They also aim to address high risk projects with new financial mechanisms involving shared investments among the partners, expected to commit them to the activities.

Take-up/use of the instrument

One of the basic difficulties when discussing PPP in R&I is the fact that there is still a lack of clarity in the definition of PPPs and the label PPP can be used for a variety of activities. This together with a lack of mapping exercises has the outcome that there does not exist collected data on the uptake of this instrument in R&I unlike, e.g., R&D tax credits.

The Dutch Top Sectors and Finnish SHOKs (Strategic Centres for Science, Technology and Innovation) are recent examples of PPP in R&I activities which, especially in the Dutch case, are influential in the overall R&I policy.[10] In the EU Joint Technology Initiatives provide an example of typical PPP activities.

Challenges by policy cycle

Design and governance

Defining common ground for diverse participants

One of the prerequisites for PPPs involving multi-partner arrangements is strong governance. When designing a PPP and its governance the different interests of the partners of a PPP need to be taken into account. The fact that PPPs usually have multiple, often heterogeneous partners creates complexity to partnership, incentives, and practical management. A failure to define a sufficient common ground and divergence of interests among the partners may entail a risk of a lack of commitment. The partners are often competitors outside the PPP and this can create tensions among them and set particular requirements concerning the nature of the activities in terms of competitiveness issues, long- vs. short-term vision and interests as well as agreements as to ownership and exploitation of intellectual property rights (IPRs). Too many, possibly even contradictory objectives may prevent the PPPs from achieving their objectives.

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8 This summary report has been prepared by Terttu Luukkonen.
9 Strategic Public/Private Partnerships in Science, technology, and Innovation – Final Report, OECD Working Party on Innovation and Technology Policy, DSTI/STP/TIP(2014)15, 02-Dec-2014. The report was prepared by Tomomi Watanabe, Daniel Kupka, Mario Cervantes, Jin Joo Ham, and Daehyun Oh under the guidance of Dominique Guellec
10 OECD Reviews of Innovation Policy: 2014 Netherlands 2014, OECD Publishing: Paris, 2014.

Coordinating policies across ministries

Further questions include co-ordination challenges in research and innovation policies across different ministries and agencies. This is an especially acute problem in strategic type of PPPs which require the commitment and active involvement of more than one ministry to achieve desired outcome. The creation of interdepartmental innovation governance is a particular challenge not easily achieved.

Implementation

To achieve its goals, a PPP is designed as a temporary flexible organisation structure created to co-ordinate, direct and oversee the implementation of a set of related projects and activities. But the setting up of formal collaborations in the PPPs may be problematic for project and policy-managers alike, and can be accompanied with certain challenges, many of which are relevant for other instruments to promote private research and innovation.

These challenges include, e.g., the following:

- too lengthy and inefficient application and proposal evaluation processes amplified by the fast moving knowledge environments and the need to negotiate complex partnership consortia
- changes in the industrial and technological environment, in company strategies, and in policy priorities may create a need to adjust the objectives and rules of a PPP which would require a re-design of the instrument
- a need for programme managers to use a diverse and flexible toolbox and ability to gain pilot experiences
- a need to maintain flexibility in the entry and exit of partners and to prevent the creation of barriers for new entrants
- the creation of financial sustainability for the PPP

Evaluation

There are conceptual and measurement problems that affect performance and productivity assessments of collaborative schemes both when using objective outcome indicators or subjective/qualitative indicators. In general, the evaluations of PPPs share several challenges not only with other collaborative schemes but also with generic innovation support schemes. Since PPPs often represent large scale and long-duration instruments that address grand challenges or systemic problems, traditional evaluation approaches have proved quite insufficient for the task.

Evaluating system-level impacts

No single evaluation method (qualitative and econometric analysis) captures either the full effects of many interventions that PPPs usually entail or individual effects of the whole approach. The degree to which PPPs produce system-level impacts is hard to capture with traditional, individual instrument-focused evaluation approaches. There is also a difficulty in finding control groups for counterfactual analysis because of the large scale and the long-term duration that PPPs often entail. Questions of the timing of evaluation and the time-scales that the impacts of PPPs require to become visible provide further problems for the design and implementation of evaluation. Finally, since PPPs are often used as a policy instrument to help address grand challenges such as climate change, biodiversity and food security, traditional impact assessments which focus on economic impacts are not sufficient to meet policy needs. Questions related to human capital issues and informal relationships are further questions that would need attention.

Evaluating other than purely economic impacts

One way to increase the reliability of evaluation is to use multiple methods and then to compare the results (so-called triangulation). For example, Swedish Agency for Growth Policy Analysis considers a multi-method approach such as the utilization of the open R&D results (e.g. citations, patents and IP rights), follow-up survey of the RTOs' customers (e.g. customer satisfaction survey), quasi-control group approaches (if possible), and benefit-cost analyses for evaluating RISE (Research Institutes of Sweden)[11]. However, a systemic level evaluation cannot be done just by scaling up the evaluation of smaller programmes or activities.

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11 Strategic Public/Private Partnerships in Science, technology, and Innovation – Final Report, OECD Working Party on Innovation and Technology Policy, DSTI/STP/TIP(2014)15, 02-Dec-2014, p. 51.

This publication describes the new in-depth methodology for Mutual Learning (MLE) between national policy-makers under the Horizon 2020 Policy Support Facility. It outlines the principles of this methodology representing hands-on project type of collaboration among a small group of MS and is driven by policy challenges as identified by the participating Member States. The report also contains summaries of the 'challenge papers' on instruments to tackle policy challenges encountered in stimulation of business research and innovation. This was an area in which the methodology was first developed. The 'challenge papers' play a role in the new MLE methodology as providers of background knowledge and can help the definition of new MLE project topics.

Studies and reports