# Towards a comparative overview of innovation programmes in Europe

Second benchmark report 2015-2016 of Taftie's Structural Network on Benchmarking

Taftie

The European Network of Innovation Agencies

## Summary and conclusions

This report summarizes the main findings of the second benchmark of standard indicators on innovation programs managed by innovation agencies. The report is prepared by Taftie's structural network on benchmarking (SNB) with the ambition to set up a comparative benchmark of selected innovation programs they manage. The benchmark summarizes key input and output indicators (like, for instance, budget, grants, beneficiaries and participants) of four types of instruments aimed primarily at business enterprises (R&D grants, cooperative grants, innovation vouchers and competence centre schemes).

As in the last report, the focus of the second benchmark report was primarily a learning exercise. Thus the main conclusions refer to the lessons drawn from this exercise. The *first lesson* is that we - as innovation agencies organized in Tafties' benchmarking network - are able to build a continuous network and to issue a periodic benchmark report of the innovation programs we implement. Based on a comparative framework developed earlier with the help of Technopolis and the first benchmark report (2012-2014), standard input and output key figures on four types of instruments have been compiled, analysed, and reported. However, despite the international progress on new indicators in the field of innovation research, the range of programmes examined in this report has not yet been studied and discussed. This shows that we are not confronting an easy task. Since such data is also not freely available and the interpretation of the data requires context knowledge, the SNB network has a unique role in this context, leading to the assumption that "*who if not us, can collect and analyse such data*". The SNB network succeeded in developing a stable and workable set of indicators which can be reported against on a continuous basis.

The *second lesson* we have learned is that, despite the experience from the first report many dilemmas and definition issues came across during the process of delivering and analysing the data. (see Box 5.1 for some issues we came across in the process). For instance, we noticed some differences how agencies count beneficiaries and participants but also how agencies calculate project connections in cooperative R&D projects and projects in competence centre. These improved insights as compared to the last report are documented in this report (see improvement of our definitions and in table 1.3 and in the Appendix) and are a valuable input for the future activities of the SNB network. As the actual benchmarks in this report are still based on the definitions as used in the first report, these improved insights will be important points of attention for the future. In this context we have noted that it is important to have a robust and written definition, as responsibilities in the agencies change or new agencies join the SNB network. This means also, that due to the many differences between the agencies and the programmes, even though they have been selected for their comparability, the individual numbers reported for the indicators often need additional information to avoid misinterpretation.

Box 1.1 Issues and consensus decisions in indicator definitions which came forward during the process of data delivery

1. The contracted budget rests on the contract decision and not to the actual payment(s).
2. For loans, we use the gross grant equivalent, instead of the sum of the loan.
3. We must be conscious that the following aggregation must be correct. Because we ran into examples where this was not the case we decided to add a category 'other'.

   Contracted budget = contracted budget to enterprises + contracted budget to knowledge institutes + contracted budget to other organizations

4. It was difficult to come up with comparable figures of 'private sector contributions' because in some cases indirect contributions of private entities are also taken up. Therefore, we changed this indicator to 'recipients' own contribution' (irrespective of how and from which organizations recipients got that money from)
5. Clear distinction between number of grants (budget contract decisions), beneficiaries (unique organizations that receive money given the contract decision) and participants (unique organizations that participate in projects irrespective of the question whether they receive money or not)
6. We do not include the indicator beneficiaries for competence centers because of the fact that some agencies count the number of competence centres (already included in the indicator list) and some agencies use a subsection of the number of participants (only those participants that receive money)
7. The number of cooperation linkages should be calculated according to the following formula (with N as the number of participants in P projects) $C = \sum_P \frac{N(N-1)}{2}$

8. As the number of reimbursed vouchers is to be related to the number of issued vouchers it is important that the number of reimbursed vouchers is attributed to the year the voucher was issued (cohort analysis). The key is the year in which the decision (issued voucher) was made.
9. Both successful and unsuccessful applications are attributed to the year the decision was made. The total number of applications is simply the sum of successful and unsuccessful applications.
10. All financial figures are reported in Euros. To recalculate, we use the average exchange rates of the particular calendar year

The *third lesson* we have learned is that the development of new indicators based on a growing database will cause more robust results and interpretation of the differences found with regard to respective programs. In this context we discussed the development of new indicators and new calculation methods. For example, a common indicator is the total amount of public budget and participants' own contribution in a given year. This indicator refers the total amount of funding and the own contributions to the year of the contract. In the competence centre scheme, for example, this calculation method leads to strong variations between the years, as the total amounts for each year are highly dependent on the funding rhythm and timing in each competence centre scheme. The next report will introduce indicators that reflect annual payoffs and thus smooth out annuals variations. Another possible indicator could reflect the share of a selected scheme on the total RDI budget of the agency. This indicator would analyse the relevance of the selected schemes in the agency portfolio. However, an important step for the SNB group in the next years will be the extension of the indicator scope towards output, outcome and impact.

The result of our learning exercise is the benchmark presented in Chapters 2 to 5. The *value of the benchmark* to its target audience (notably managers of innovation programs) is that it gives a first clue how results relate to each other. This comparison between innovation programs of distinct innovation agencies is also highly relevant for agencies to be used in discussions with policy makers, for example when the budget of a programme is challenged. The most important aspect of the SNB network is not the delivery of "numbers", but the insight gained from discussion of the indicators and their definitions, of the differences between the programmes and their implementation. All the programmes covered in the SNB network were chosen for being quite similar and hence easier to compare. However, it turned out that even those seemingly identical schemes turn out to be different in many ways. And these differences are one of the main sources for mutual learning.

What needs to be emphasised: figures given and positions do not justify a normative interpretation (in terms of which agency performs 'the best' or which agencies are 'losing momentum' or 'staying behind'). In general, differences in results relate to differences in the design of the instrument and the context in which the programs are implemented. An illustrative example concerns the differences in leverage (participants' own contribution in relation to the public budget contracted) which without an exception relates to maximum funding intensity in the programs under consideration; a second example would bethe success rates which depend on differences in the call systems, communication with applicants or budget limits. As was concluded in a previous study[1], in this sense, benchmarking different instruments is still a matter of comparing apples and oranges. Therefore, context knowledge of the respective members has a special meaning in connection with the interpretation of the data. The common learning and sharing experiences lead at least to knowledge spillovers between the different agencies.

However, the report does not provide definite answers and still more work has to be done on the interpretation of differences. This work surely is considered one of the main tasks for future benchmarking activities within Taftie.

[1] Technopolis (2014), In search for a benchmark of impact, effectiveness and efficiency of innovation instruments. A report for the Taftie Task Force on Benchmarking Impact, Effectiveness and Efficiency (TFBIEE)

# Chapter 1 Introduction

## 1.1 Purpose

This report is the second benchmark report of Taftie's structural network on benchmarking (SNB). Currently, the network consists of sixteen active members (see table 1.1 for an overview of the participating agencies including an overview of the contact persons per agency). The report at hand presents the main findings by fourteen innovation agencies aimed at providing a comparative overview of key indicators of innovation programmes in Europe in the years 2015 and 2016. Setting up a benchmark entails several underlying ambitions. Firstly, a benchmark gives a first insight in the added value of innovation programmes which form the core of the work of innovation agencies across Europe. Secondly, a benchmark gives an illustration of the possibilities gained through alignment of innovation indicators across European innovation agencies. Finally, as a comparative benchmark is not possible without discussions on monitoring frameworks and indicators definitions, mutual learning across European innovation agencies is a third objective behind the benchmark report.

Table 1.1 Participants of the Structural Network on Benchmarking

| Organization | Country | Contact |
|---|---|---|
| The Portuguese National Innovation Agency (ANI) | Portugal | Cláudia Azevedo |
| Centre for the Development of Industrial Technology (CDTI) | Spain | Ascensión Barajas |
| Danish Agency for Science, Technology and Innovation (DASTI) | Denmark | |
| Enterprise Estonia (EAS) | Estonia | Madis Truupõld/ Karina Yadav |
| Enterprise Ireland (EI) | Ireland | Kevin Flynn |
| Austrian Research Promotion Agency (FFG) | Austria | Rafael Lata, Sabine Mayer |
| Croatian Agency for SMEs, Innovations and Investments (HAMAG-BICRO) | Croatia | Ivana Crnić-Duplančić/Ivona Jerković/Neno Rakić |
| Luxinnovation | Luxemburg | Pascal Fabing |
| Agency for Science, Innovation and Technology (MITA) | Lithuania | Ričardas Valančiauskas |
| Research Council of Norway (RCN) | Norway | Paul Istvan Bencze; Kirsten Voje |
| Netherlands Enterprise Agency (RVO.nl) | Netherlands | Pieter de Bruijn; David Pullen |
| Polish Agency for Enterprise Development (PARP) | Poland | Zuzanna Popis |
| Slovak Innovation and Energy Agency (SIEA) | Slovakia | Renáta Magulová |
| Technology Agency of the Czech Republic (TA CR) | Czech Republic | Zbynek Ružicka, Petr Matolin |
| Business Finland | Finland | Teppo Tuomikoski |
| VINNOVA – the Swedish Governmental Agency for Innovation Systems | Sweden | |

## 1.2 Scope

This report summarizes key indicators of programmes managed by fourteen innovation agencies. The programmes cover four types of instruments aimed at innovative enterprises, namely grants aimed at (in-house) research, development and innovation (RDI), grants aimed at RDI cooperation, innovation vouchers and competence centres. Please note that most agencies included only a subset of their full programme portfolio in this benchmark exercise. The figures presented here are therefore not representative of agencies' full programme portfolio within the instrument types included in this benchmark. Also, although every effort was made to include the correct and up-to-date figures in the report, we cannot guarantee that all figures presented are free from mistakes or errors. See Table 1.2 for an overview of the programmes covered by the first and second benchmark reports. The period covered by the second benchmark report is 2015-2016.

Table 1.2 Overview of programmes taken up in the two benchmark reports

| | | First benchmark report Period 1 (2012-2014) | | | | Second benchmark report Period 2 (2015-2016) | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Agency** | **Instrument** | **R&D grant** | **R&D grant Collaborative** | **Innovation vouchers** | **Competence Centers** | **R&D grant** | **R&D grant Collaborative** | **Innovation vouchers** | **Competence Centers** |
| ANI | R&D grants | | | | | x | | | |
| | Collaborative R&D grants | | | | | | x | | |
| CDTI | CDTI Individual Business R&D Projects[1] | x | | | | x | | | |
| | CDTI Cooperative Business R&D Projects[1] | | x | | | | x | | |
| Dasti | Innovation Vouchers[2] | | | x | | | | | |
| | Danish Strategic Research Council – DSF [3] | | x | | | | | | |
| | Innovation Consortia – IC [3] | | x | | | | | | |
| | Danish National Advanced Technology Foundation – HTF [3] | | x | | | | | | |
| EAS | Vouchers[4] | | x | | | | x | | |
| | Competence Centers[5] | | | | x | | | | x |
| EI | R&D Revenue and R&D Facility Grants | | | | | x | | | |
| | Innovation partnerships | | x | | | | x | | |
| | Innovation Vouchers | | | x | | | | x | |
| | Technology Centres | | | | x | | | | x |
| FFG | R&D grant[6] | x | | | | x | | | |
| | Cooperative R&D grant[7] | | x | | | | x | | |
| | Innovation Voucher[8] | | | x | | | | x | |
| | Competence Centres[9] | | | | x | | | | x |
| HAMAG-BICRO | R&D grants[10] | x | | | | x | | | |
| HAMAG-BICRO | Cooperative R&D grant[11] | | | | | | x | | |

… to be continued on next page

Table 1.2 Overview of programmes taken up in the two benchmark reports– continued from previous page

| | | First benchmark report Period 1 (2012-2014) | | | | Second benchmark report Period 2 (2015-2016) | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Agency** | **Instrument** | **R&D grant** | **R&D grant Collaborative** | **Innovation vouchers** | **Competence Centers** | **R&D grant** | **R&D grant Collaborative** | **Innovation vouchers** | **Competence Centers** |
| Luxinnovation | R&D grants under 2009 RDI Law | x | | | | x | | | |
| MITA | Cooperative R&D grant | | x | | | | x | | |
| | Innovation Voucher | | | x | | | | x | |
| PARP | Measure 1.4 of Innovative Economy OP 2007-2013 | x | | | | | | | |
| | Measure 4.1 of Innovative Economy OP 2007-2013 | x | | | | | | | |
| | Measure 2.3.2 of Operational Programme Smart Development | | | | | x | | | |
| | Measure 3.2.1 of Operational Programme Smart Development | | | | | x | | | |
| | Vouchers: small[12] | | | x | | | | | |
| | Vouchers: big[12] | | | x | | | | | |
| RCN | Cooperative R&D grant[13] | | x | | | | | | |
| RVO.nl | SMEs Instrument Top Sectors: Feasibility Projects | x | | | | x | | | |
| | SMEs Instrument Top Sectors: R&D Cooperation Projects | | x | | | | x | | |
| | SMEs Instrument Top Sectors: Knowledge Vouchers | | | x | | | | x | |
| | Top Consortia for Knowledge & Innovation | | | | x | | | | x |
| SIEA | R&D grant 1.1 | x | | | | | | | |
| | R&D grant 1.3 | x | | | | | | | |
| | R&D grant 1.2.2-02 | | | | | x | | | |
| | Innovation Vouchers | | | x | | | | x | |
| TA CR | ALFA | | x | | | | | | |
| | OMEGA | | x | | | | | | |
| | ETA | | | | | | x | | |
| | EPSILON | | | | | | x | | |
| | Competence Centres | | | | x | | | | x |

… to be continued on next page

| | | First benchmark report Period 1 (2012-2014) | | | | Second benchmark report Period 2 (2015-2016) | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Agency** | **Instrument** | **R&D grant** | **R&D grant Collaborative** | **Innovation vouchers** | **Competence Centers** | **R&D grant** | **R&D grant Collaborative** | **Innovation vouchers** | **Competence Centers** |
| Business Finland | Various R&D grants for individual projects | x | | | | x | | | |
| | Various R&D grants for cooperative projects | | x | | | | x | | |
| | SHOKs | | | | x | | | | x |
| Vinnova | R&D grants | x | | | | x | | | |
| | Collaborative R&D grants | | x | | | | x | | |
| | Innovation vouchers | | | x | | | | x | |
| | Competence Centres | | | | x | | | | x |

[1]Soft loans partially granted. See Box 2.1

[2]from 2014 onwards part of the InnoBooster scheme

[3] in 2014 DSF, IC and HTF were restructured into the Innovation Fund Denmark.

[4] Given the specific design of the instrument this scheme is taken up under the category of cooperative R&D grants to enhance comparability

[5] Regarding the first benchmark report: As the data on EAS' Competence Scheme predominantly focus on 2008 and 2009 the data are included in the data file but not in the first report which focuses on the period between 2012 and 2014

[6] Einzelprojekt (BP) [C3-(E[1])]; Einzelprojekt (Energien 2020) [IF C3-(I[2])]; FEMtech Forschungsprojekte (Talente) [IF C3-(I[2])]; Einzelprojekt ASAP [GLF C3-(G[3])]

[7] Kooperationsprojekte (TP) [C4-(E-I[4])]; EUREKA-Projekt, ERA-Net Projekte [C4-(E-I[4])]; Kooperationsprojekt ASAP [C4-(E-I[4])]; FEMtech Forschungsprojekte (Talente) [C4-(E-I[4])]; Kooperationsprojekt ASAP [C4-(G)]

[8] Innovationsscheck [C2-XS]; Innovationsscheck Plus [C2-S]

[9] Comet (K2, K1) [C8]; Laura Bassi Centres of Expertise [C8]

[10] Proof of Concept 4-5 (for Period1) Proof of Concept 6 & RAZUM (Period 2)

[11] IRCRO (Period 2)

[12] 2008-2014 domestic funds; from 2015 within Smart Development OP 2014-2020

[13] BIA - Brukerstyrt innovasjonsarena; ENERGIX - Stort program energy; MAROFF-2 - Maritim virksomhet og offsh-2; PETROMAKS2 - Stort program petroleum; EUROSTARS; BIONÆR – Bionæringsprogram; NANO2021 - Nanoteknologi og nye material; GLOBVAC - Global helse- og vaksin.forskn; HAVBRUKS - Havbruk - en næring i vekst

### 1.3 Indicators

Necessary condition for producing a comparative overview of key figures of innovation programmes concerns discussion, agreement and alignment of innovation indicators. With the help of Technopolis Group, consensus was reached on a set of basic indicators (so-called primary set of indicators) on inputs, activities and outputs[2]. In the process of gathering data, a few details were elaborated and some minor changes were made at a workshop held in January 2016 in Brussels. The result is the primary set of indicators as used in this benchmark report. The indicators including their definitions are summarized in Table 1.3.

[2] See Technopolis Group (2015), Measuring Innovation Policy Across Europe – Common Indicator Framework, pp. 8/9, available at http://www.taftie.org/content/biee-reports-2015.

Table 1.3 Primary set of indicators included in this report (adapted from Technopolis)

| Element | Indicator | Definition and subindicators | R&D Grants | R&D Collaborative Grants | Innovation Vouchers | Competence Centres |
|---|---|---|---|---|---|---|
| **INPUT INDICATORS: PUBLIC INVESTMENT** | | | | | | |
| Budget | Contracted Budget | Amount of funding contracted in year x<br>- total<br>- all enterprises<br>- large enterprises<br>- SMEs<br>- knowledge institutions<br>- other | x | x | | x |
| Budget | Issued Budget | Value of issued vouchers in year x<br>- total<br>- all enterprises<br>- large enterprises<br>- SMEs<br>- knowledge institutions<br>- other | | | x | |
| Budget | Reimbursed Budget | Value of reimbursed vouchers in year x<br>- total<br>- all enterprises<br>- large enterprises<br>- SMEs<br>- knowledge institutions<br>- other | | | x | |
| **THROUGHPUT INDICATORS: ACTIVITIES** | | | | | | |
| Managing and Operating Grants/ Competence Centres | Awarded Grants | Total number of awarded grants in year x | x | x | | x |
| Managing and Operating Vouchers | Issued vouchers | Number issued vouchers in year x<br>- total<br>- all enterprises<br>- large enterprises<br>- SMEs<br>- knowledge institutions<br>- other<br>- relate both reimbursed and issued vouchers to the year the voucher was issued | | | x | |
| Managing and Operating Vouchers | Reimbursed Vouchers | Number of reimbursed vouchers in year x<br>- total<br>- all enterprises<br>- large enterprises<br>- SMEs<br>- knowledge institutions<br>- other<br>- relate both reimbursed and issued vouchers to the year the voucher was issued | | | x | |
| Managing and Operating Grants/ Vouchers | Application success rate | Application success rate | x | x | x | |

… to be continued on next page

Table 1.3 Primary set of indicators included in this report (adapted from Technopolis) – continued from previous page

| Element | Indicator | Definition and subindicators | R&D Grants | R&D Collaborative Grants | Innovation Vouchers | Competence Centres |
|---|---|---|---|---|---|---|
| Managing and Operating Grants/ Vouchers | Application success rate | Number of applications in year x<br>- total[1]<br>- successful applications in year x<br>- unsuccessful applications in year x<br><br>- Definition: Count the year of application, not the year in which a decision was made. A positive decision is an issued voucher (and successful application), a negative decision is an unsuccessful application. The total number of applications is then simply the amount of 'positive and negative decisions' in a year. | x | x | x | |
| Managing and Operating Vouchers | Reimbursement rate | Reimbursement rate | | | x | |
| Managing and Operating Vouchers | Reimbursement rate | - Number of issued vouchers in year x<br>- Number of issued vouchers in year x | | | x | |
| Managing and Operating Vouchers | Number of Potential Beneficiaries | Number of unique (in a year; in the programme)organizations that vouchers are issued to in year x<br>- total<br>- all enterprises<br>- large enterprises<br>- SMEs<br>- knowledge institutions<br>- other | | | x | |
| Managing and Operating Grants/ Vouchers | Number of Beneficiaries | Number of unique (in a year; in the programme) organizations contracted for grants in year x / Number of unique (in a year; in the programme) organizations that reimbursed vouchers in year x<br>- total<br>- all enterprises<br>- large enterprises<br>- SMEs<br>- knowledge institutions<br>- other | x | x | x | |
| Managing and Operating Grants/ Competence Centres | Number of Participants[2] | Number of unique (in a year; in the programme) organizations active in R&D projects contracted in year x / Number of unique (in a year; in the programme) organizations active in R&D projects in year x in the competence centres<br>- total<br>- all enterprises<br>- large enterprises<br>- SMEs<br>- knowledge institutions<br>- other | | x | | x |
| **OUTPUT INDICATORS: RESULTS** | | | | | | |
| (Collaborative) R&D Projects | Private Contributions | Beneficiaries' <u>own</u> contribution[3] in euro contracted in year x<br>- total<br>- all enterprises<br>- large enterprises<br>- SMEs<br>- knowledge institutions<br>- other | x | | | |

… to be continued on next page

Table 1.3 Primary set of indicators included in this report (adapted from Technopolis) – continued from previous page

| Element | Indicator | Definition and subindicators | R&D Grants | R&D Collaborative Grants | Innovation Vouchers | Competence Centres |
|---|---|---|---|---|---|---|
| (Collaborative) R&D Projects | Private Contributions | Participants' own contribution in euro contracted in year x<br>- total<br>- all enterprises<br>- large enterprises<br>- SMEs<br>- knowledge institutions<br>- other | | x | | x |
| Specific R&D Cooperation Relations | Specific R&D cooperation relations | Number of participation relationships in projects contracted in year x<br>- total<br>- number of company - company relationships<br>- number of company - knowledge institute relationships<br>The formula for calculating cooperation links is:<br>N!/2(N-2)! | | x | | x |
| Specific Knowledge & Technology Generation | Technical success of projects | Number of closed projects in year x<br>- which achieved objectives as planned<br>- which yielded results beyond planned objectives<br>- which achieved its objectives partially<br>- which failed to reach its objectives or were discontinued | x | x | x | x |

[1] This is the sum of the successful and unsuccessful applications in year x. This means that the amount of decisions is counted, and not necessarily the amount of applications in year x.

[2] This indicator was added to emphasize a potential difference between 'beneficiaries' and 'participants': beneficiaries receive grants, whereas participants include organizations that contribute to a project, but may not necessarily receive grants.

[3] Instead of the term 'private contribution' the term 'own contribution' was introduced. It aims to clarify the distinction between the grant of the agency for a project and the own contribution of the project participants. This own contribution can come from a variety of sources. The term 'private contribution' seems to imply that this contribution must necessarily stem from a private source, which is not always the case.

## 1.4 Contents

Chapter 2 to 4 focus on the benchmark results. The chapters are structured around the instrument types covered. Chapter 2 focuses on R&D grants, Chapter 3 focuses on grants for R&D collaboration, Chapter 4 focuses on innovation vouchers and Chapter 5 is focused on competence center programmes. Some concluding remarks are taken up in the summary and conclusions section on the first pages of the report.

# Chapter 2 R&D grants

## 2.1 Introduction

R&D grants concern subsidy schemes with businesses as beneficiaries[3]. This benchmark focuses on programmes managed by eleven innovation agencies (see Box 2.1 below). Given differences in scope (sectors, types of R&D), budget, criteria, target groups and design of the instruments we must be very cautious in interpreting the results. Although the indicators and definitions are the same across agencies and instruments (unless stated otherwise), differences in the context and design lead to a comparison between apples and oranges.

In this chapter the joint presentation is made between the programmes' size in terms of budget, number of grants and beneficiaries. Additionally, the extent to which public budgets relate to private R&D investments (beneficiaries' own contributions) in the projects funded is analyzed. Finally, the share of SMEs in the total number of beneficiaries is taken up.

Box 2.1 R&D grants included in the benchmark

- ANI's R&D grants
- CDTI's Individual Business R&D projects provide funding in the form of soft loans, granted at an interest rate below market rates. The soft loan may have a non-reimbursable part (a grant). Up to 85 percent of eligible project costs may be financed.
- The figures provide R&D revenue and R&D facility grants under the Enterprise Ireland R&D Fund.
- FFG's R&D grant is a combination of four specific programmes focused on single firm project funding, either in generic sense (Einzelprojekt (BP) [C3-(E1)]), or in relation to the future of energy (Einzelprojekt (Energien 2020) [IF C3-(I2)]), gender issues in technology and innovation (FEMtech Forschungsprojekte (Talente) [IF C3-(I2)]) or space applications (Einzelprojekt ASAP [GLF C3-(G3)]).
- HAMAG-BICRO's Proof of Concept (POC) programme is focused both on SMEs and public research institutions.
- HAMAG-BICRO's RAZUM programme is focused on SMEs innovative technology activities: commercialisation and competitiveness of domestic companies and products.
- The R&D grants provided by the Luxembourg Ministry of the Economy with the support of Luxinnovation aim at supporting Luxembourg companies in their R&D efforts. It is a bottom-up scheme meaning that companies can apply any time. Projects are carried out by companies, possibly in collaboration with external partners.
- PARP 's R&D grants
- Feasibility projects is a subcategory within the Top Sector SME Instrument which is carried out by RVO.nl in close cooperation with national and regional authorities. They are aimed at SMEs to map out all technical and economic risks of future innovation projects (through, for instance literature and patent survey, market analysis). They concern feasibility study, possibly complemented by industrial research or experimental development. The maximum funding amounts to 40% of eligible costs with a maximum of EUR 50.000.
- For the 2014-2020 programming period, the Slovak Innovation and Energy Agency (SIEA) is involved in two operational programs the European Union's Structural and Investment Funds. Within the framework of the Operational Program Research and Innovation the SIEA administers challenges aimed at supporting innovation and technology transfer and supporting technological and applied research. The purpose of the implementation of financial instruments under the OP R&D is to provide funds to support the increase of the competitiveness of enterprises, to ensure access to financial resources for companies in Slovakia and to increase investments in support of enterprises, especially in the field of technological development, innovation, research and development. This aid is repayable and can be provided in

[3] With the exception of CDTI's Individual Business R&D projects which comprises a combination of both loans and grants

the form of loans, guarantees, venture capital and other equity financing.

- Tekes' R&D grants comprise both R&D projects for companies for creating new knowledge and competence to serve as a basis for future business and strategic research openings for research organizations (the latter being discontinued since 2015). Although the programmes comprise both grants and loans, in the context of this benchmark report the loans are excluded from the analysis.
- Vinnova 's R&D grants

## 2.2 Financial size

Figure 2.1 shows the total financial project size of the programmes in the years 2015 and 2016. A distinction is made between public funding and participants' own contribution. It is important to note that CDTI provides soft loans for individual R&D projects. For CDTI, the figures represent the so-called Gross Grant Equivalent, which takes into account the non-reimbursable part of the stimulus and the difference between the interest rate and the actual rate on commercial markets .All other figures on public funding relate to grants. Participants' own contributions added up to the amount of public funding lead to the total size of R&D projects subsidized.

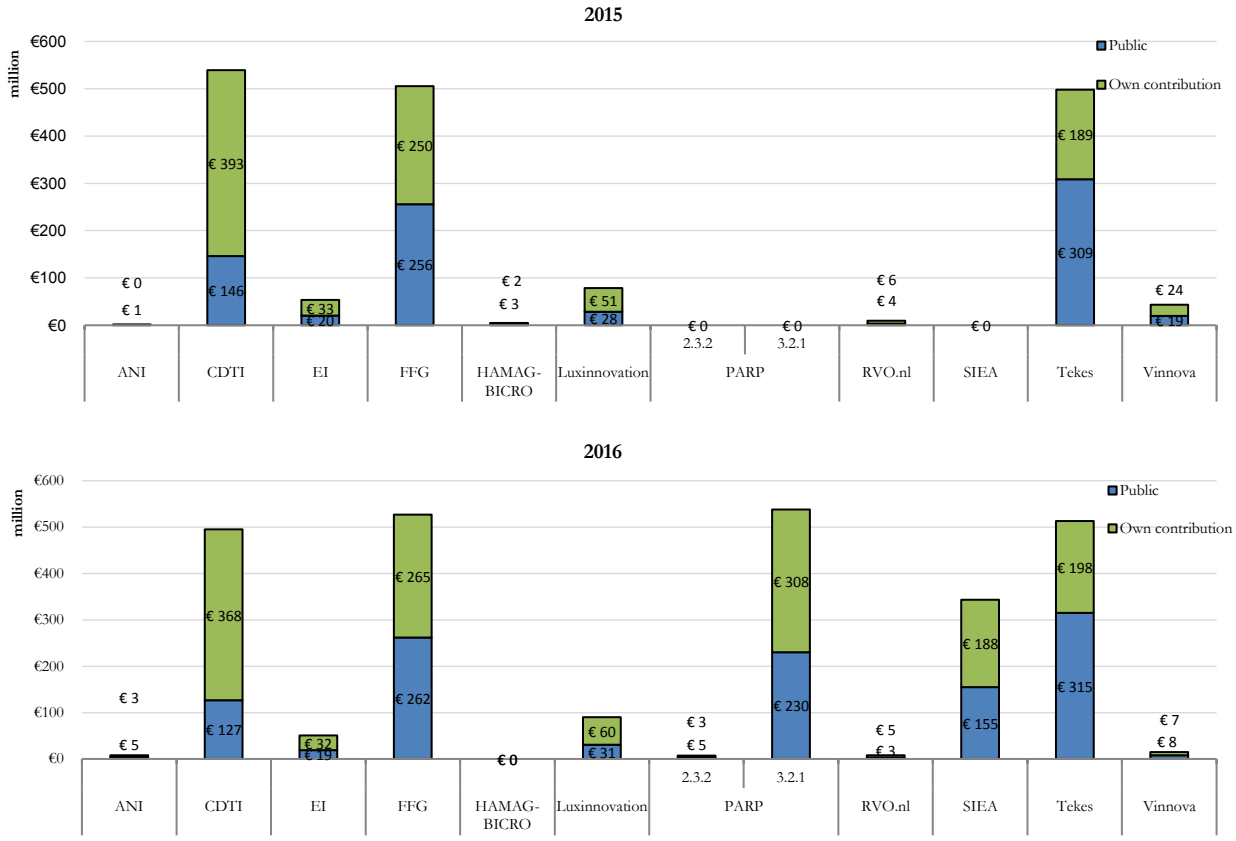
For the total financial size of R&D projects that benefitted from R&D grants, differences between agencies' programmes are considerable. For instance, FFG, Tekes and CDTI's programmes account for around 500 million Euro in R&D projects, whereas the size of RVO.nl, ANI and HAMAG-BICRO's programmes amounts to 12 and 0,9 million euro respectively. These differences do not say anything about the importance of the agency in the national innovation system or about the country's R&D performance. The figures only relate to specific programmes for which agencies decided to involve them in this benchmark exercise.

Apart from the size, the programmes also differ in relation to the financial distribution over the years. For instance, the size of FFG's, Luxinnovation, EI and Tekes' grants is quite stable over the years, as is the case for CDTI's soft loan for R&D business projects. For Vinnova, the size of R&D grants is reduced in 2016 (from 19,5 mio. euro in 2015 to 7,8 mio. euro in 2016). ANI' s commitments on R&D grants (and the total size of the R&D projects) in 2016 were roughly nine time higher than the spending in 2015. For PARP and SIEA's instruments the distribution is even more uneven with peaks in 2016 .

Figure 2.2 focuses on the extent to which public grants evoke private investments in R&D. In this benchmark exercise, we did not compare private investment as such but focused on participants' own contributions instead – partly to also include own contributions from public research institutions and partly to prevent discussions on how and from which sources recipients obtained the money themselves (to keep track of the origin – private or public – of the money). To compare agencies' innovation programmes on the extent to which grants evoke private and other public investments in R&D Figure 2.2 depicts the index of participants' own contributions divided by the amount of public grants invested from the agency's side.

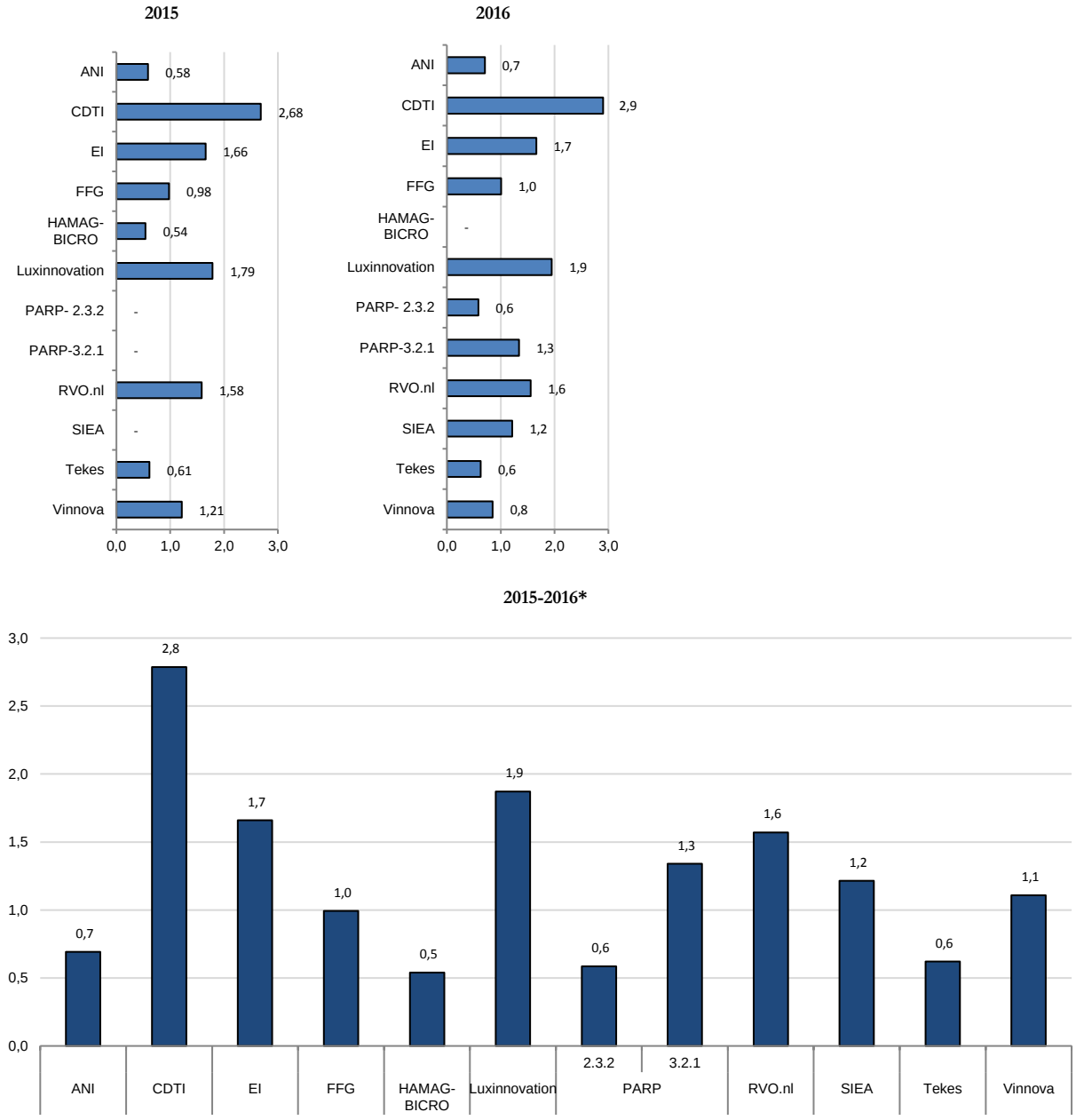
By far, the extent to which public grants evoke other investments in R&D projects is highest for CDTI. As CDTI individual business R&D projects are the only projects in this benchmarking exercise which are stimulated by a soft loan instead of a grant, this result is not surprising. For CDTI, the index amounts to 2,8 (2,7 in 2015 and 2,9 in 2016). Also, Luxinnovation's, Enterprise Ireland and RVO.nl grants index figure are relatively high with values over 1.5.

Figure 2.1 Financial size of selected R&D programmes (public contribution and participants' own contribution), 2015-2016




This means that every euro spent on public grants evokes 1,9 euro (Luxinnovation), 1,7 euro (EI) and 1,6 euro (RVO.nl) additional contribution by project participants. For most agencies this impact has increased between the years 2015 and 2016. It is important to note that differences in these indexes between agencies often relate to the design of the programmes. For instance, in most cases, maximum rates of funding in relation to eligible project costs apply. Differences relate to the nature of the R&D projects stimulated and/or the target group. Agencies make a distinction between the maximum rates for fundamental research, industrial research and experimental development, SMEs and startup, and/or whether the project is conducted within a single company or in collaboration with other entities.

Figure 2.2 Impact – participants' own contribution per Euro public investment (Euro), 2015-2016




*the average over 2015-2016 is dependent on data availability and covers 2015 for HAMAG BICRO's R&D grant and 2016 for PARP programmes 2.3.2 and 3.2.1 and SIEA programmes.

Table 2.1 presents these impact figures for each target group (small and medium-sized versus large enterprises and knowledge institutions). For all agencies granting subsidies to both knowledge institutions and business enterprises, the impact – in terms of recipients' own contribution per euro subsidy granted – is higher for enterprises than it is for knowledge institutions (0,40 against 0,79 for ANI, 0,95 against 1.00 for FFG's R&D grants, and 0.26 against 0,69 for Tekes' R&D grants). In a same manner, the impact for large enterprises is generally higher than it is for SMEs. These differences directly relate to differences in the design of the instruments, specifically the maximum amount of subsidy, which for most agencies is given as a percentage in total project costs. This maximum percentage is generally higher for knowledge institutes (and for fundamental research) than it is for companies (and industrial research or experimental

development). The same applies to the maximum percentage of funding for SMEs and large enterprises. Self-evidently, the higher this maximum percentage is, the lower is the own contribution of recipients needed and the lower is the impact in terms of own contribution per euro subsidy granted.

Table 2.1 Impact – participants' own contribution per Euro public investment (Euro), by target group, 2015-2016*

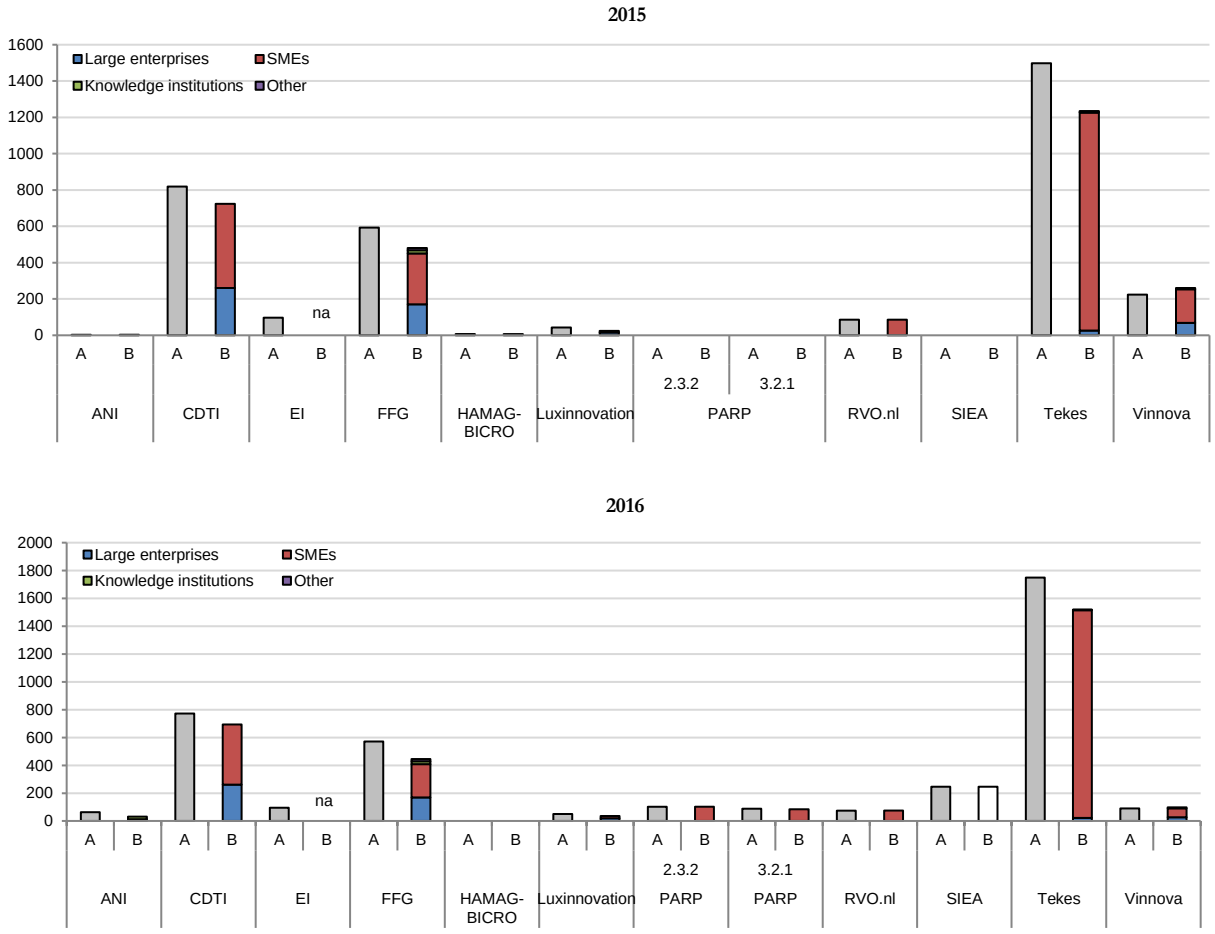
| | Total | Enterprises | SMEs | Large Enterprises | Knowledge Institutions | Other Entities |
|---|---|---|---|---|---|---|
| ANI | 0,69 | 0,79 | 0,80 | 1,45 | 0,40 | - |
| CDTI | 2,79 | 2,79 | 2,45 | 3,09 | - | - |
| EI | 1,66 | 1,66 | 1,50 | 3 | - | - |
| FFG | 0,99 | 1,00 | 0,65 | 1,00 | 0,95 | 0,67 |
| HAMAG-BICRO | 0,54 | 0,54 | 0,54 | - | - | - |
| Luxinnovation | 1,87 | 1,87 | 1,25 | 2,06 | - | - |
| PARP – 2.3.2 | 0,58 | 0,58 | 0,58 | - | - | - |
| PARP – 3.2.1 | 1,34 | 1,34 | 1,34 | - | - | - |
| RVO.nl | 1,57 | 1,57 | 1,57 | - | - | - |
| SIEA | 1,21 | 1,21 | - | - | - | - |
| Tekes | 0,62 | 0,69 | 0,69 | - | 0,26 | - |
| Vinnova | 1,11 | 1,11 | 1,10 | 1,23 | - | 0,97 |

*the average over 2015-2016 is dependent on data availability and covers 2015 for HAMAG BICRO's R&D grant and 2016 for PARP programmes 2.3.2 and 3.2.1 and SIEA programmes;

### 2.3 Beneficiaries

In Figure 2.3 numbers of awarded grants and unique beneficiaries are depicted. The beneficiaries are broken down in SMEs, large enterprises, knowledge institutes and other types of beneficiaries. The large financial size of R&D projects of FFG's, CDTI's and Tekes' R&D projects coincides with a high number of awarded grants for the same instruments. In this respect, a remarkable figure is the number of awarded grants and beneficiaries within Texes programmes. Numbers of awarded grants and beneficiaries are generally quite in line with each other. For most agencies the number of beneficiaries are slightly lower than the number of awarded grants, which is an indication that beneficiaries may receive multiple grants.

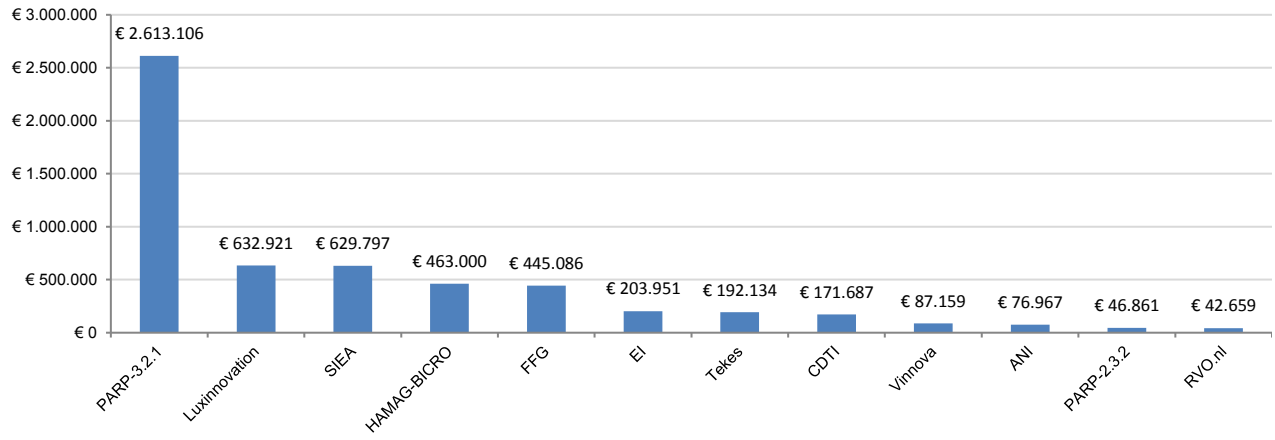
Figure 2.3 Number of awarded grants (A) and unique beneficiaries (B)*, 2015-2016




* for SIEA's R&D programmes a breakdown into categories of beneficiaries is not available. Hence, the beneficiaries of these programmes are shown by a white coloured bar in the chart.

The average size of the grants (in terms of contracted budget per grant) is depicted in Figure 2.4. The average financial size of each grant turns out to differ enormously between the programmes included in the benchmark. The average financial size per grant ranges from over 3 million euro (PARP 3.2.1 measure) to around 40 thousand euro (RVO.nl with an average amount of 42 000 per grant). However, the average financial size of the grants turn out to be quite high.

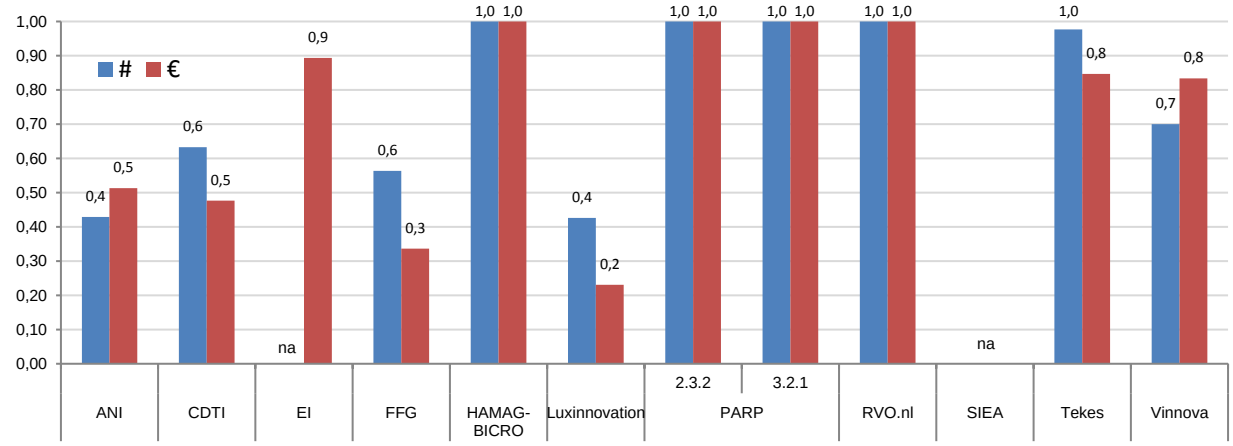
Figure 2.4 Average grant size (euro), 2015-2016*




*the average over 2015-2016 is dependent on data availability and covers 2015 for HAMAG BICRO's R&D grant and 2016 for PARP programmes 2.3.2 and 3,2,1 and SIEA programmes;

Figure 2.5 depicts the importance of SMEs in the R&D programmes included in the benchmark, both in terms of the share of SMEs in the total number of beneficiaries and in terms of the amount of funding SMEs receive as a share in total contracted budget. The programmes of PARP, HAMAG BICRO and RVO.nl are exclusively focused on SMEs. For five agencies (CDTI, FFG, Luxinnovation and Texes) the importance of SMEs is higher in terms of numbers of recipients than in terms of money received by SMEs. For two agencies the opposite is true (ANI and Vinnova). The importance in terms of money is higher than in terms of recipients.

Figure 2.5 Small and medium sized enterprises: number of SME beneficiaries as a share in the total number of unique beneficiaries (#); contracted budget to SMEs, as a share in total contracted budget (€), 2015-2016*

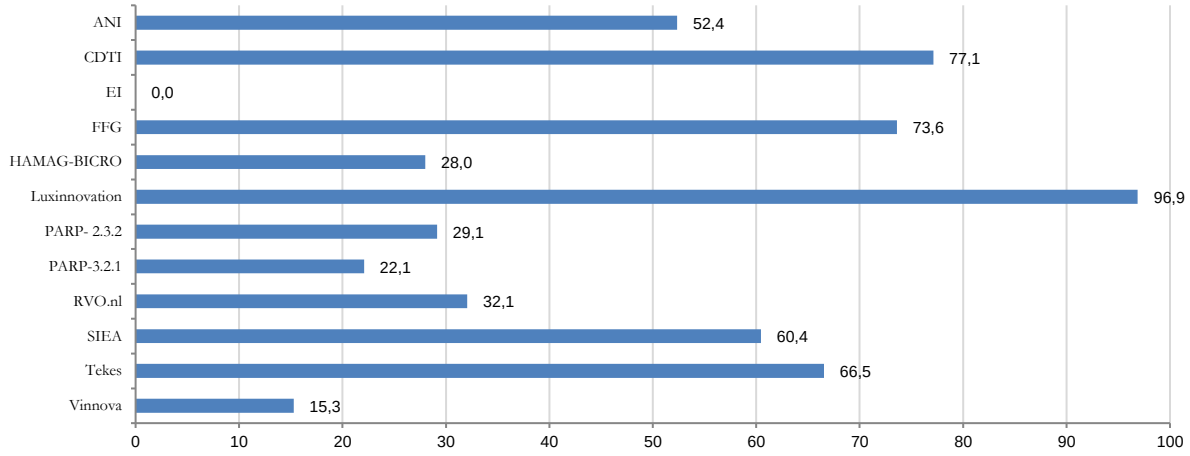



*the average over 2015-2016 is dependent on data availability and covers 2015 for HAMAG BICRO's R&D grant and 2016 for PARP programmes 2.3.2 and 3.2.1

## 2.4 Application success rates

In Figure 2.6 information on the success rate of proposals for each programme is given. The success rate is defined as the number of successful proposals (proposals which are granted subsidy) divided by the total number of both successful and unsuccessful proposals. It is beyond doubt that application success rates differ enormously between the programmes included in the benchmark of individual business R&D programmes. With 77 and 74 percent the success rate of CDTI's and FFG's R&D programmes is relatively high. Luxinnovation's R&D grant stands out with a success rate of 97 percent. A high rate might be an indication that proposers are well guided in preparing their proposals and that criteria for acceptance are well defined, communicated and understood. On the other hand, for the programmes of Vinnova and PARPS's 3.2.1 programme, a relatively high number of applications is not accepted for a grant, given the relatively low application success rates of 15 and 22 percent. A low success rate might be an indication of the popularity of the programme in the target group and the possibility that programme management can be quite critical on the quality of the proposals. Both high and low success rates have their positive and negative sides. For a normative interpretation of success rates more insight in the design of the instrument, the size of the budget and the size and qualities of the target group must be taken into account.

Figure 2.6 Success rates: number of successful proposals as a share in the total number of (both successful and unsuccessful) proposals (%), 2015-2016

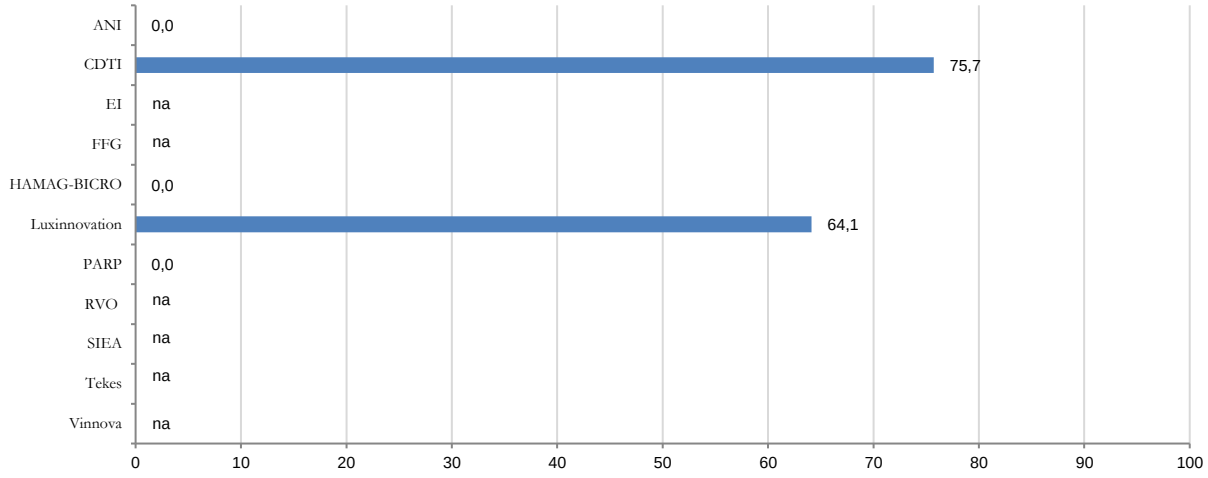



*the average over 2015-2016 is dependent on data availability and covers 2015 for HAMAG BICRO's R&D grant and 2016 for SIEA programmes.

## 2.5 Results

The technical success of projects is defined as the number of projects which achieved objectives as planned or beyond planned objectives as a share in the total number of closed projects. For R&D grants the technical success is given in Figure 2.7. In general, the data availability is fragmentary. For the two agencies displayed, the index ranges between 65 and 76 percent.

Figure 2.7 Technical success, 2015-2016*




* CDTI staffs in charge of technical monitoring of projects assess the performance of each individual project once the technological phase is finished.

# Chapter 3 R&D Collaboration -grants

### 3.1 Introduction

R&D collaboration grants concern subsidy schemes with cooperating businesses and/or knowledge institutes as beneficiaries[4]. This benchmark focuses on programmes managed by eleven innovation agencies (see Box 3.1 below).As with R&D grants in general, given differences in scope (sectors, types of R&D), budget, criteria, target groups and design of the instruments we must be very cautious in interpreting the results. Although the indicators and definitions are the same across agencies and instruments (unless stated otherwise), differences in the context and design lead to a comparison between apples and oranges.

In this chapter the comparison is made between the programmes' size in terms of budget, number of grants, beneficiaries and participants. Additionally, the extent to which public budgets relate to private R&D investments (beneficiaries' own contributions) in the projects funded is analysed. Finally, the share of SMEs in the total number of beneficiaries is taken up.

Box 3.1 R&D collaboration grants included in the benchmark

- ANI's R&D collaboration grants.
- CDTI's Cooperative Business R&D projects provide funding in the form of soft loans, granted at an interest rate below market rates. Proposals are submitted by a group of cooperating businesses (two to six independent businesses). The soft loan may have a non-reimbursable part (a grant). Up to 85 percent of eligible project costs may be financed.
- Enterprise Estonia's voucher scheme has been taken up in the category of R&D collaboration project since it does not actually relate to a voucher in the sense of a cheque that has to be reimbursed in order to convert it to conventional money, but relates to (a relatively small) budget which is granted through a relatively straightforward. simpler and easy application procedure. The scheme has a broad scope in the sense that – apart from collaborative R&D in a strict (Frascati) sense, also innovation services like innovation consulting, design solutions, feasibility, testing, patent registration and consulting are eligible for funding. Up to 80 percent of the costs is eligible for funding to a maximum of 4 000 euro. The voucher scheme is focused on short-term collaboration projects (up to twelve months).
- Enterprise Ireland's Innovation Partnerships Scheme encourages Irish-based companies to work with Irish research institutes resulting in mutually beneficial co-operation and interaction. Companies can access expertise and resources to develop new and improved products, processes, services, and generate new knowledge and know-how. The scheme provides grants of up to 80 percent towards eligible costs of the research project.

… to be continued on next page

[4] CDTI's Cooperative Business R&D projects comprise a combination of both loans and grants

Box 3.1 R&D collaboration grants included in the benchmark – continued from previous page

- FFG's cooperative R&D grant is a combination of five specific programmes focused on cooperative R&D funding (Kooperationsprojekte (TP) [C4-(E-I4)]; EUREKA-Projekt, ERA-Net Projekte [C4-(E-I4)]; Kooperationsprojekt ASAP [C4-(E-I4)]; FEMtech Forschungsprojekte (Talente) [C4-(E-I4)]; Kooperationsprojekt ASAP [C4-(G)]).
- HAMAG-BICRO cooperative R&D grant IRCRO is focused on encouraging SMEs to cooperate with science-research institutions in launching its own research developmental activities. SMEs engage science-research institutions to conduct research activities crucial for project activities.
- MITA[5]'s cooperative R&D grant promotes commercialization of ideas and technologies based on R&D results. It encourages researchers and students to establish start-up or spin-off companies and develop new products or services. A newly founded company must cooperate with a research institution and may receive up to 20 000 euro for a one year's period.
- RVO.nl's R&D cooperation projects is a subcategory within the Top Sector SME Instrument which is carried out by RVO.nl in close cooperation with national and regional authorities. R&D Cooperation projects are aimed at the development of new products, processes and/or services and are carried out by a consortium of companies with at least two SMEs (only the costs at SME entrepreneurs are considered to be eligible for funding). In 2015 and 2016 (just like 2014), the grant amounts to 35 percent of the total eligible project costs. The Maximum amount in 2014 is 200 000 euro with a maximum of 100 000 per SME participant (and a minimum of 25 000 per SME participant).
- TA CR's ALFA and OMEGA programmes focus on cooperative R&D in advanced, technologies, materials and systems, energy resources and environment and sustainable transport (ALFA) and applied social sciences (OMEGA). Both programmes are aimed at joint activities of business entites and research organizations. Maximum funding (which is specified to the character of cooperation, the character of R&D and the size of the applicant enterprise) amounts to maximum 80 percent of eligible project costs.
- For Tekes, R&D collaboration grants in the benchmarking period include grants for research networked with companies and for R&D in large companies as large companies must spend at least 40% of project costs on purchasing services from SMEs and/or research organisations, or otherwise be a genuine collaborative project with SMEs and/or research groups. In the context of this benchmarking report grants have been included and loans excluded.
- Vinnova's R&D collaboration grants.

### 3.2 Financial size

Figure 3.1 shows the total financial project size of the programmes in the years 2015 and 2016. A distinction is made between public funding and participants' own contribution. As is the case with individual R&D projects, CDTI provides soft loans – and not grants – for collaborative R&D projects. For CDTI, the figures represent the so-called Gross Grant Equivalent, taking into account the non-reimbursable grant part of the stimulus and the difference between the interest rate and the actual rate on commercial markets .All other figures on public funding relate to grants. Participants' own contributions added up to the amount of public funding lead to the total size of R&D projects subsidized.

For the total financial size of R&D projects that benefitted from the collaborative R&D grants taken up in this benchmark exercise, differences between agencies' programmes are considerable. Vinnovas and Tekes' collaborative R&D projects stand out in this respect, with a total financial size in a range between 280 and 400 million euros annually. On the other hand, EAS's collaborative R&D programme (marketed as innovation voucher scheme) does not exceed 2 million euros annually in financial size. In comparison with the other instruments taken up in the benchmark, also HAMAG-BICRO cooperative R&D programme, Enterprise Ireland's Innovation Partnership Scheme and TA CR's OMEGA programme are quite modest in size.

The period taken under consideration is a bit short to draw firm conclusions on trends over the years. During 2015 to 2016 however, the collaborative R&D programmes of EI, RVO.nl Tekes and Vinnova decrease in size, whereas the size of' cooperative R&D programmes of ANI, EAS, CDTI and FFG increased in the same period.

[5] Mita had none new contracts for projects in 2015 and 2016. Therefore, the values for mita are given as zero.

Figure 3.1 Financial size of selected R&D collaboration programmes (public contribution and participants' own contribution), 2015-2016

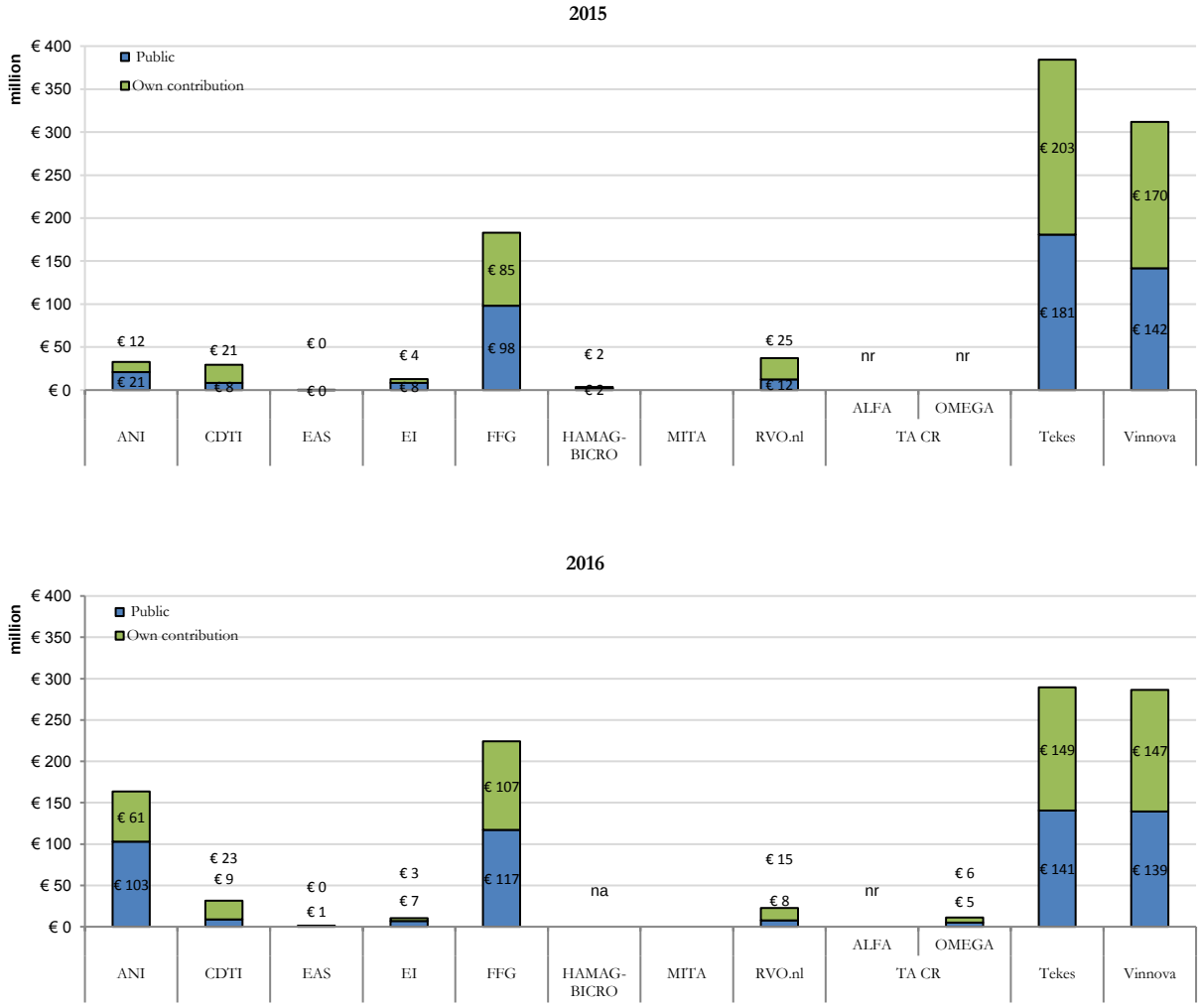
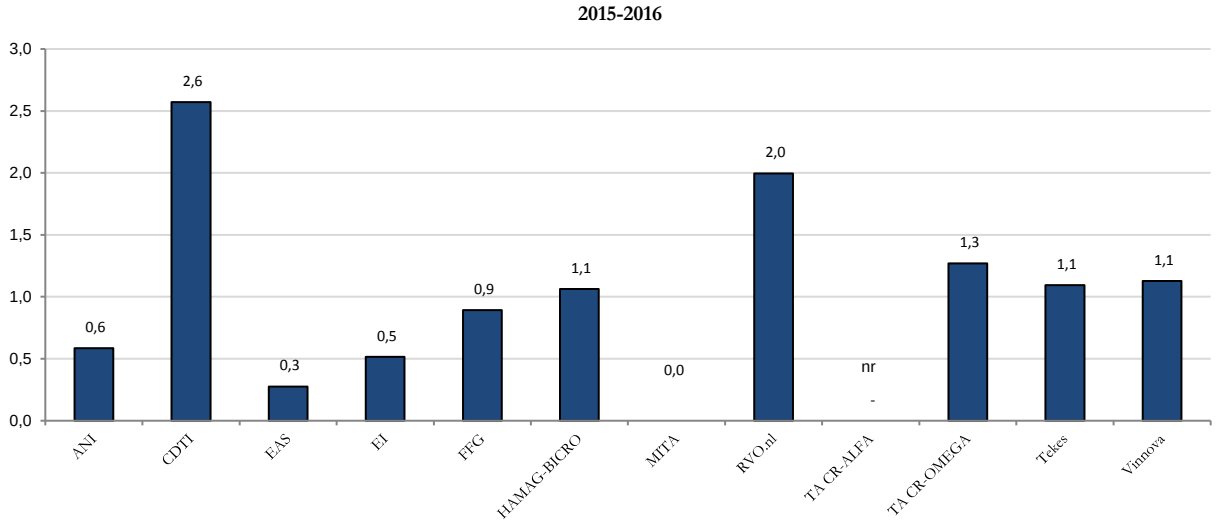



Figure 3.2 focuses on the extent to which public grants evoke private investments in R&D in terms of the financial value of project participants' own contribution per euro public funding[6]. As is the case for individual R&D programmes, also for cooperative R&D programmes the extent to which public grants evoke other investments in R&D projects is highest for CDTI with an index of 2.6. As CDTI cooperative business R&D projects are the only projects in this benchmarking exercise which are stimulated by a soft loan instead of a grant, this result is not surprising. Also, for the cooperative R&D programmes managed by HAMAG-BICRO, RVO.nl, TA CR (OMEGA programme), Tekes and Vinnova, participants' own contributions outweigh the public investment from the side of the government. In general, differences in these indexes between agencies often relate to the design of the programmes. For instance, in most cases, maximum rates of funding in relation to eligible project costs apply. Differences relate to the nature of the R&D projects stimulated and/or the target group. As such, it is not surprising that impact indices are quite stable over time.

[6] In this benchmark exercise, we did not compare private investment as such but focused on participants' own contributions instead – partly to also include own contributions from public research institutions and partly to prevent discussions on how and from which sources recipients obtained the money themselves (to keep track of the origin – private or public – of the money).

Figure 3.2 Impact – participants' own contribution per Euro public investment (Euro), 2015-2016*




*the average over 2015-2016 is dependent on data availability and covers 2016 for TA CR's OMEGA programme; 2015 for HAMAG-BICRO's collaborative R&D Grants

Table 3.1 depicts participants' own contributions by target group as an index to the contracted budget to each of these groups (small and medium-sized versus large enterprises and knowledge institutions). The conclusions for cooperative R&D programmes are – in rough lines - the same as the conclusions drawn for individual business R&D projects. For all agencies granting subsidies to both knowledge institutions and business enterprises, the impact – in terms of recipients' own contribution per euro subsidy granted – is higher for enterprises than it is for knowledge institutions (e.g. 0.7 against 0.4 for ANI). In a same manner, the impact for large enterprises is generally higher than it is for SMEs (e.g. 2.6 against 0.6 for FFG's cooperative R&D programmes). In general, these differences relate to differences in the design of the instruments, specifically the maximum amount of subsidy, which for most agencies is given as a percentage in total project costs. This maximum percentage is generally higher for knowledge institutes (and for fundamental research) than it is for companies (and industrial research or experimental development). The same applies to the maximum percentage of funding for SMEs and large enterprises. Self-evidently, the higher this maximum percentage is, the lower is the own contribution of recipients needed and the lower is the impact in terms of own contribution per euro subsidy granted.

Table 3.1 Impact – participants' own contribution per Euro public investment (Euro), by target group, 2015-2016*

| | Total | Enterprises | SMEs | Large Enterprises | Knowledge Institutions | Other Entities |
|---|---|---|---|---|---|---|
| ANI | 0.6 | 0.7 | 0.6 | 1.1 | 0.4 | 0.9 |
| CDTI | 2.6 | 2.6 | 2.4 | 2.7 | 0.0 | 0.0 |
| EAS | 0.3 | 0.0 | 0.3 | 0.0 | 0.0 | 0.0 |
| EI | 0.5 | 0.5 | 0.6 | 0.6 | 0.0 | 0.4 |
| FFG | 0.9 | 1.5 | 0.6 | 2.6 | 0.5 | 1.1 |
| Hamag-Bicro | 1.1 | 1.3 | 1.3 | 0.0 | 0.0 | 0.0 |
| MITA | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| RVO.nl | 2.0 | 2.0 | 2.0 | nr | nr | nr |
| TA CR -ALFA | nr | nr | nr | nr | nr | nr |
| TA CR-OMEGA | 1.3 | 1.5 | 1.5 | 1.8 | 1.2 | nr |
| Tekes | 1.1 | 1.7 | 0.0 | 1.7 | 0.6 | 0.0 |
| Vinnova | 1.1 | 2.3 | 1.5 | 2.9 | 0.4 | 2.3 |
| | | | | | | |

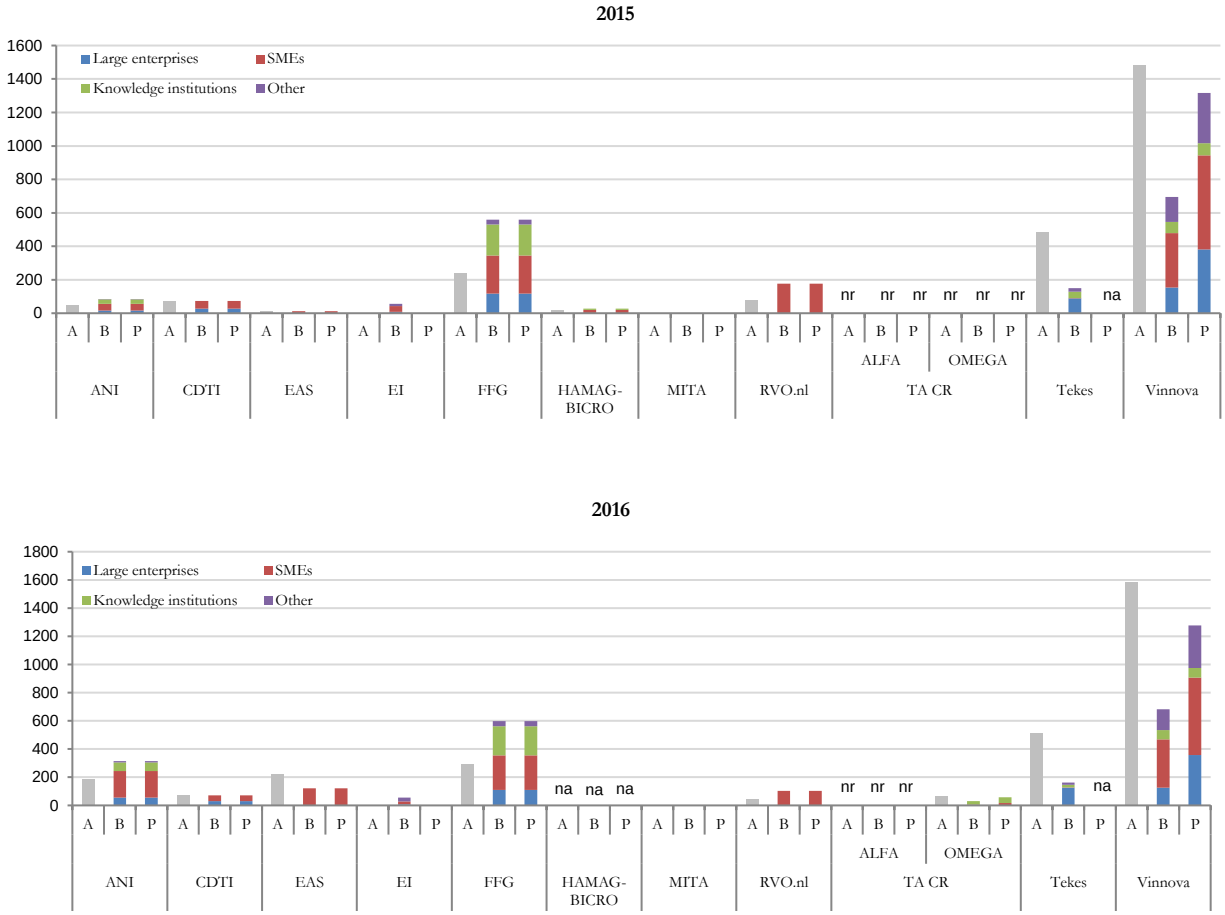
*the average over 2015-2016 is dependent on data availability and covers 2016 for TA CR's OMEGA programme; 2015 for HAMAG-BICRO's collaborative R&D Grants

### 3.3 Beneficiaries

In Figure 3.3 numbers of awarded grants, unique beneficiaries and unique project participants are depicted. Awarded grants refer to decisions on contracted budget, beneficiaries refer to organizations receiving the budget in order to initiate, coordinate and/or participate in collaborative R&D projects and participants refer to the organizations participating in the projects under consideration, irrespective of the question whether they have or have not received budget out of the R&D programme taken up in the benchmark. Both beneficiaries and participants are broken down in SMEs, large enterprises, knowledge institutes and other types of beneficiaries.

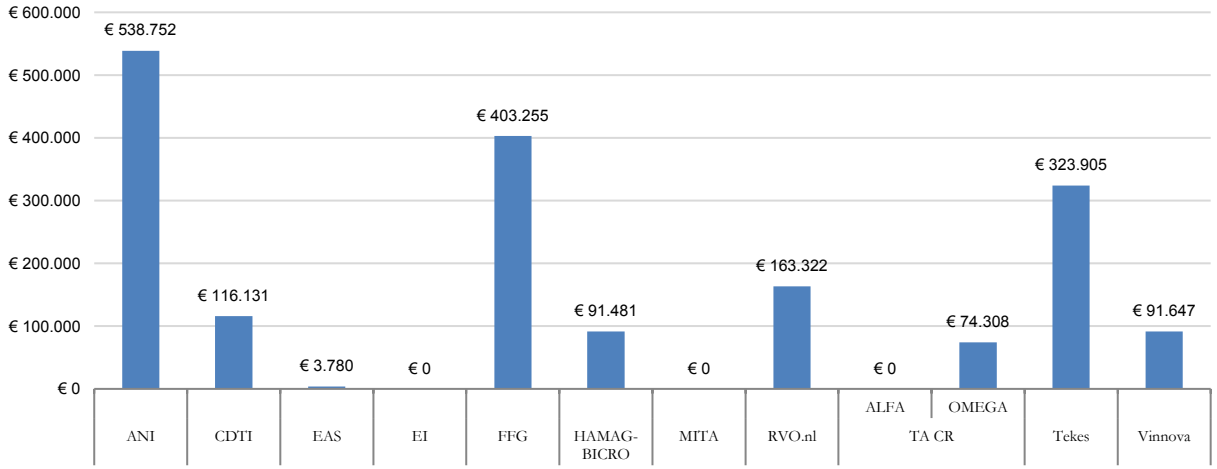
The large financial size of R&D projects of Tekes' and Vinnova's cooperative R&D projects coincides with a high number of awarded grants for these same instruments (around 500 for the programmes managed by Tekes and 1500 for the programmes managed by Vinnova). Vinnova's awarded grants as well as the number of beneficiaries and participants stand out in this respect (around 1500 awarded grants, 700 beneficiaries and 1300 participants annually). However, the ratio between number of grants, numbers of beneficiaries and numbers of participants reflects the design of the instruments. For instance, in Enterprise Estonia's voucher scheme a relatively small subsidy is given to SMEs in order to cooperate with knowledge institutes and/or consultants in their innovation trajectories (in general this concerns bilateral cooperation). In the schemes managed by FFG and RVO.nl each award concerns one R&D project with several beneficiaries participating in the project (note that for these instruments the number of beneficiaries equals the number of participants). In the schemes managed by TA CR, the number of unique beneficiaries receiving the grant is only part of the population of all participants engaged in the R&D projects subsidized.

Figure 3.3 Number of awarded grants (A), unique beneficiaries (B)* and unique participants (P), 2015-2016



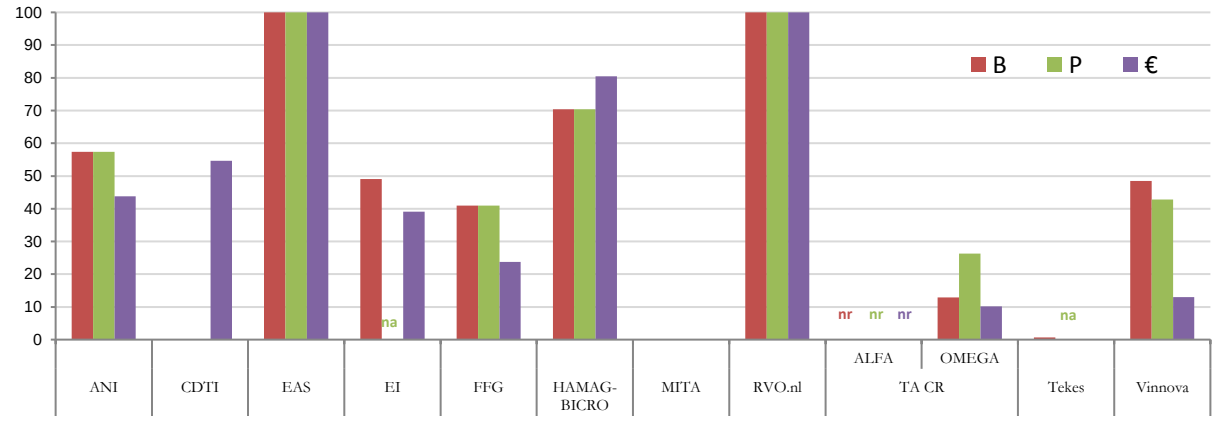

As can be concluded from Figure 3.4, the average grant size differs enormously between the programmes included in the benchmark. Cooperative R&D projects under the programmes managed by ANI have a financial size with each grant around 540 tsd. euro. Other programmes are far more modest in size of the public budget involved, with less than hundred thousand euros ( HAMAG-BICRO, Vinnova and TA CR's OMEGA programme) to even less than ten thousand euros (EAS innovation voucher scheme).

Figure 3.4 Average grant size (euro), 2015-2016*




*the average over 2015-2016 is dependent on data availability and covers 2016 for TA CR's OMEGA programme; 2015 for HAMAG-BICRO's collaborative R&D Grants

Figure 3.5 Small and medium sized enterprises: number of SME beneficiaries as a share in the total number of beneficiaries (B); participants (P) and contracted budget to SMEs, as a share in total contracted budget (€), 2015-2016*




*the average over 2015-2016 is dependent on data availability and covers 2016 for TA CR's OMEGA programme; 2015 for HAMAG-BICRO's collaborative R&D Grants

Figure 3.5 shows the share of SMEs in R&D cooperative grant programmes. This share is analysed in terms of beneficiaries (number of SMEs receiving grants in the total number of beneficiaries), in terms of participants (number of SMEs participating in cooperative R&D-project as a share in the total number of participants) and in terms of contracted budget (budget received by SMEs as a share in the total sum of budget contracted). EAS' Innovation Voucher scheme and the SME Top Sector R&D cooperation grant managed by RVO are exclusive focused on SMEs and hence score 100 percent. Other programmes score in majority within a range between 30 and 60 percent. The share of SMEs is a bit higher in HAMAG-BICRO' scooperative R&D programmes, with a share of SMEs in the total number of beneficiaries and participants of 70 percent (80 percent of the contracted budget)The number of SMEs as a share in the total number of beneficiaries, is relatively low for Tekes (0,6 percent) and TA CR's OMEGA programme (13 percent). For most programmes, the share of SMEs in terms of beneficiaries is somewhat higher than the budget contracted for the benefit of SMEs. The exception is HAMAG-BICRO cooperative R&D programme. Here the share of SMEs in total number of beneficiaries amount to 70 percent, whereas the share of budget contracted to SMEs is even higher at 80 percent.

### 3.4 Organizing capacity

The objective of collaborative R&D grants is to support sustainable relationships between private and/or public partners. An important aspect of this so-called organizing capacity is the extent to which organizations are brought together to cooperate in joint R&D projects. Figure 3.6 depicts the number of relationships in the projects within the cooperative R&D programmes included in this benchmark. This indicator is based on the number of unique participants per project and the assumption that organizations which are working in the same project per definition are cooperating in this project and hence stand in a cooperation relationship with each other[7]. A distinction is made between company-company relations, company-knowledge institute relations and other relations (knowledge institutes mutually, companies and/or knowledge institutes with other organizations than knowledge institutes and/or companies)

For the cooperative R&D programmes of TA CR's OMEGA, RVO ,HAMAG-BICRO and EAS's the number of relations stays limited to a range of 12 to 230 connections a year. The cooperative R&D programmes managed by ANI and FFG build up a large number of relations a year (during 2016 the number of relationships within R&D projects ranges between 800and 1700 relations). However, in terms of the number of relations within cooperative R&D projects Vinnova stands out with over 12000 connections during 2015 and over 9000 connections in 2016.
Table 3.2 summarizes a few indices on organizing capacity which put the number of participants and connections between them in relation to the number of grants awarded and the total budget contracted. In terms of the average number of participants, FFG programme and ANI's cooperative R&D programmes stand out with 2.2 and 1.7 participants involved in each grant decision. In terms of participants per euro budget contracted EAS's cooperative R&D scheme, attracts 150 participants per million euro public investment.

[7] The number of C connections between N organizations in P projects is calculated through $C = \sum_P \frac{N(N-1)}{2}$

Figure 3.6 Cooperation relations, 2015-2016

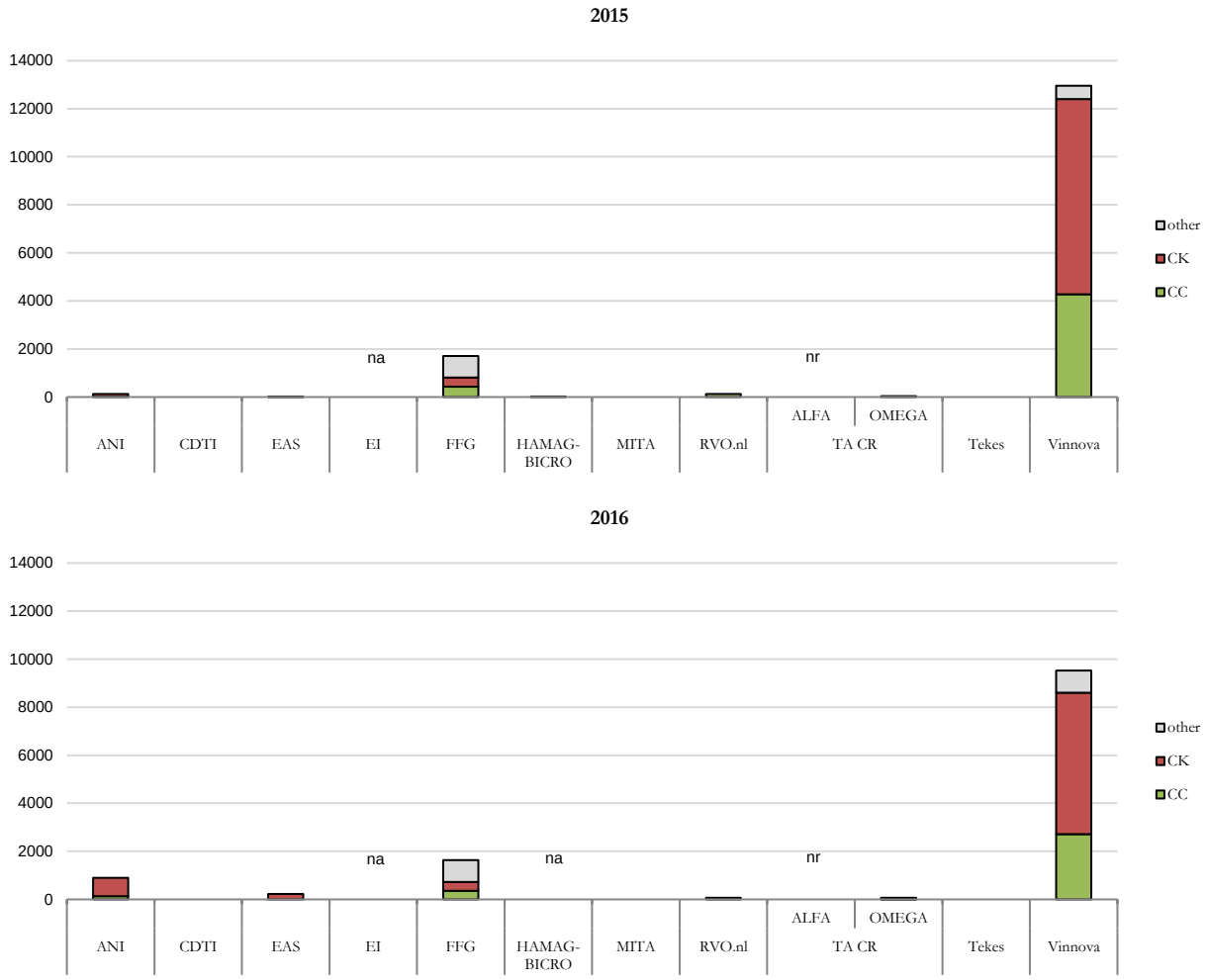


Table 3.2 Organizing capacity: participants per grant awarded and per euro budget contracted, 2015-2016*

| | | Participants per grant awarded | Participants per million euro budget contracted |
|---|---|---|---|
| ANI | | 1.7 | 3.2 |
| CDTI | | 0.0 | 0.0 |
| EAS | | 0.6 | 150.2 |
| EI | | na | na |
| FFG | | 2.2 | 5.4 |
| Hamag-Bicro | | 1.4 | 15.5 |
| MITA | | 0.0 | 0.0 |
| RVO.nl | | na | na |
| TA CR | ALFA | nr | nr |
| TA CR | OMEGA | 0.9 | 11.6 |
| Tekes | | na | na |
| Vinnova | | 0.8 | 9.2 |

*the average over 2015-2016 is dependent on data availability and covers 2016 for TA CR's OMEGA programme; 2015 for HAMAG-BICRO's collaborative R&D Grants

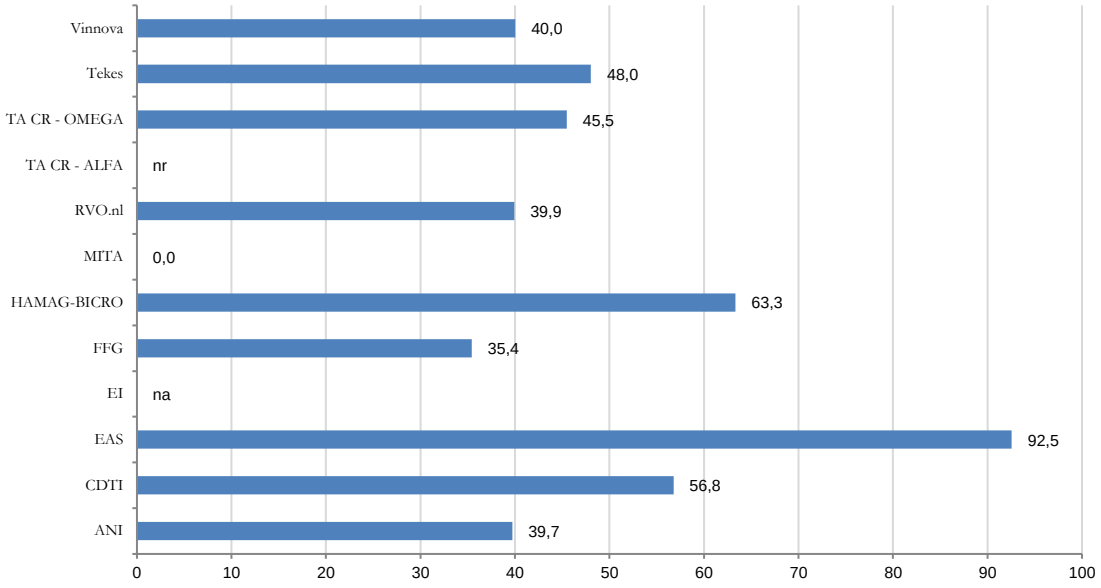
### 3.5 Application success rates

In Figure 3.7 information on the success rate of proposals is given. The success rate is defined as the number of successful proposals divided by the total number of both successful and unsuccessful proposals[8]. A high rate might be an indication that proposers are well guided in writing their proposals and that criteria for acceptance are well defined, communicated and understood. A low success rate on the other hand might be an indication of the popularity of the programme in the target group and the possibility that programme management can be quite critical on the quality of the proposals. For a normative interpretation of success rates more insight in the design of the instrument, the size of the budget and the size and qualities of the target group must be taken into account.

In comparison with the other programmes, applications for the cooperative R&D programmes managed by FFG have a relatively low chance to be accepted to receive a grant, with success rates around 35 percent.. On the other hand, EAS' Innovation voucher scheme and the cooperative R&D programmes managed by HAMAG-BICRO have relatively high success factors of 93 and 63 percent.

[8] For most agencies, the number of successful proposals equals the number of proposals that received funding. However, in TA CR Alfa and Omega programmes, the success rate is defined on the basis of the number of proposals that successfully through the project selection's evaluation process. Because of budget restrictions and a possibility that applicants do not sign the agreement of support the number of awarded grants in TA CR's ALFA and Omega programme sis significantly lower than the number of successful proposals.

Figure 3.7 Success rates: number of successful proposals as a share in the total number of (both successful and unsuccessful) proposals (%), 2015-2016*




*the average over 2015-2016 is dependent on data availability and covers 2016 for TA CR's OMEGA programme; 2015 for HAMAG-BICRO's collaborative R&D Grants

# Chapter 4 Innovation vouchers

## 4.1 Introduction

Innovation vouchers generally provide SMEs with a cheque representing a small sum of money to be used by SMEs to buy innovation related services, typically from a research institute, university and/or consultant. This benchmark focuses on innovation voucher schemes managed by seven innovation agencies[9]. See Box 4.1 for an overview. The usual disclaimer applies to be cautious in interpretation of the results because of differences in scope (sectors, types of R&D), budget, criteria, target groups and design of the instruments. Although the indicators and definitions are the same across agencies and instruments (unless stated otherwise), differences in the context and design lead to a comparison between apples and oranges.

In this chapter the comparison is made between the programmes' size in terms of budget (in terms of the sum of values ion both issued and reimbursed vouchers) and the number of applications, issued and reimbursed vouchers as well as the mutual ratio to each other.

Box 4.1 Innovation vouchers included in the benchmark

- The Innovation Voucher initiative by Enterprise Ireland was developed to build links between Ireland's public knowledge providers (i.e. higher education institutes, public research bodies) and small businesses. Innovation Vouchers worth €5,000 are available to assist a company or companies to explore a business opportunity or problem with a registered knowledge provider.
- The voucher schemes managed by FFG concern Innovationsscheck and Innovastionsscheck plus. Both programmes support the first know-how exchange between SMEs and researchers in which innovative ideas are either generated, evaluated or prototypically developed. The external project costs are limited to € 5,000 with a funding rate of 100 percent (Innovationsscheck) or € 12,500 with a funding rate of 80 percent (Innovationsscheck plus). FFG's Innovation Voucher scheme is also eligible for cooperation between large enterprises and other types of organizations, rather than solely focused at SMEs.
- Booasting cooperation between SMEs and science is also the aim of MITA's Innovation Voucher scheme in which supported activities are research, development (including design) and feasibility studies. A company may receive a voucher for up to € 6,000.[10]
- At RVO.nl, the voucher scheme is a part of the SME Top Sector scheme and covers in 2015 and 2016 50 percent of the costs of the knowledge institution providing innovation services to the SME.
- SIEA's Innovation Voucher scheme make a distinction for SMEs and large companies. For SMEs the costs are funded 100 percent with a maximum of € 5,000. For large enterprises costs are only funded for 45 percent with a maximum of € 10,000.
- Tekes innovation voucher is intended for SMEs having a new product or service idea with international growth potential and for which the company needs to purchase external expertise.
- Vinnova's Innovation Voucher scheme.

[9] Enterpise Estonia's voucher scheme has been taken up in the category of R&D collaboration project since it does not actually relate to a voucher in the sense of a cheque that has to be reimbursed in order to convert it to conventional money, but relates to (a relatively small) budget which is granted through a relatively straightforward. simpler and easy application procedure. PARP voucher scheme has been taken up in the category of R&D grants since the application procedure is much the same as in the case of R&D grants and there is no fixed amount of funding per entity – beneficiaries can obtain up to 80000 €.

[10] Mita had none new contracts for projects in 2015 and 2016. Therefore, the values for mita are given as zero.

### 4.2 Financial size

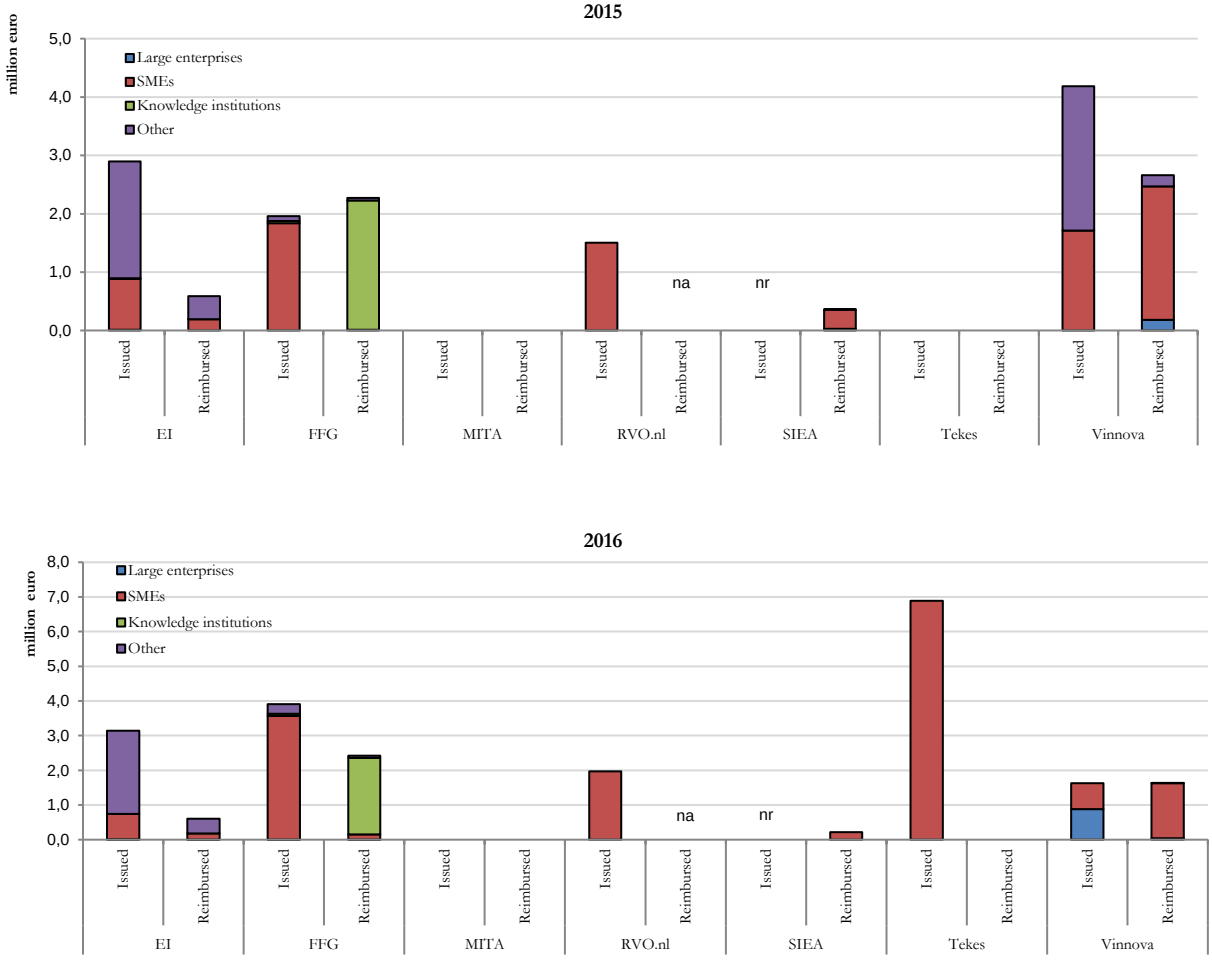
Figure 4.1 shows that budgets in 2016 range from 6,9 million euro (Texes) to 1,6 million euro (Vinnova). In 2015 the budget of Vinnova voucher scheme stands out with a budget of 4,2 million euros. The budget is almost exclusively focused at SMEs to which the vouchers are issued. In general, the reimbursement is also taken care of by the SMEs themselves. The exception to this practice concerns FFG's innovation vouchers which are reimbursed by the knowledge institutes after acceptance and delivery of the service. However, it is important to remark that differences between the value of issued and reimbursed vouchers must be interpreted with caution. Vouchers that are reimbursed in a given year do not necessarily relate to exactly the same vouchers that are issued in the same year since there is also a possibility that the voucher that are reimbursed in a given year were issued the previous year. A comparison between reimbursed vouchers issued in a given year (but not necessarily reimbursed in that same year) and issued vouchers in the same year forms a good comparison to relate reimbursed and issued vouchers with each other because they are based on the same set (cohort) of vouchers (see next section).

The values of the vouchers issued are, without exception, quite modest in size (Table 4.1). In two voucher schemes the average voucher value exceeds the amount of six thousand euros (FFG's voucher scheme and Texes voucher scheme). For the voucher schemes of EI and SIEA, the average value per voucher lies around five thousand euros. The voucher scheme managed by RVO.nl has the smallest values with amounts below four thousand euros.

Table 4.1 Average size of vouchers (euro), 2015-2016

| | 2015 | 2016 | 2015-2016 |
|---|---|---|---|
| EI | 4983 | 5000 | 4992 |
| FFG | 5399 | 6714 | 6209 |
| MITA | 0 | 0 | 0 |
| RVO.nl | 3750 | 3750 | 3750 |
| SIEA | 5286 | 4348 | 4914 |
| Tekes | 0 | 6192 | 6192 |
| Vinnova | na | na | na |
| | | | |

Figure 4.1 Innovation vouchers' budgets: sum of values for issued and reimbursed vouchers

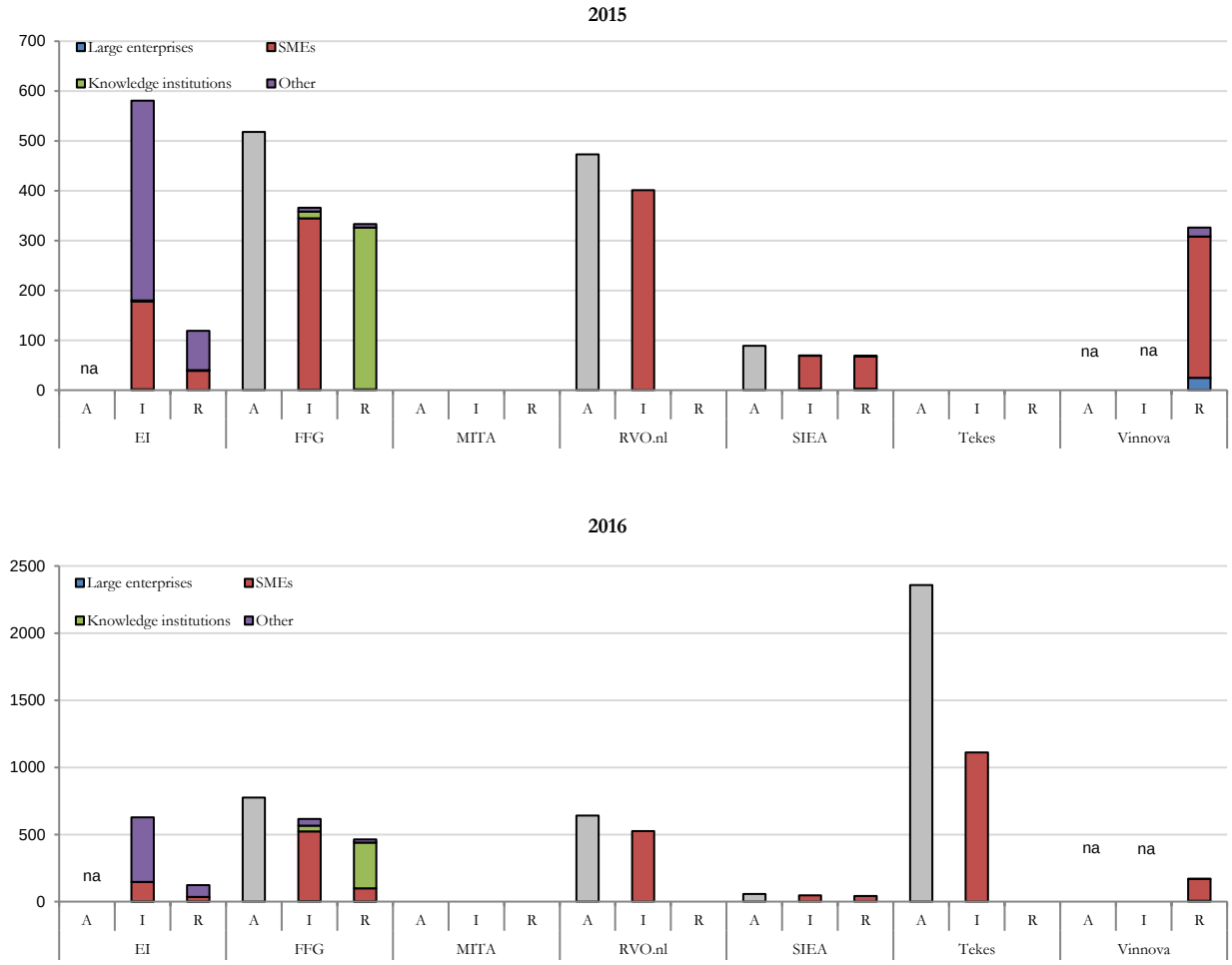


### 4.3 Applications, vouchers issued and vouchers reimbursed

Figure 4.2 depicts the number of voucher application, issued vouchers and reimbursed vouchers. All numbers relate to the same set (cohort) of vouchers. The vouchers (and voucher applications) are attributed to the year on the basis of the date on which the vouchers (successful voucher applications) are issued. By definition, issued vouchers are a subset of voucher applications (only the successful application are issued for the benefit of the applicants) and the reimbursed vouchers are a subset of the issued vouchers (only a part of all vouchers issued are reimbursed). Figure 4.3 relates issued vouchers to voucher applications (the number of issued vouchers as a share in total voucher applications) and reimbursed vouchers to vouchers issued (the number of reimbursed vouchers as a share in the total number of vouchers issued). In terms of numbers the voucher schemes of Enterprise Ireland, FFG, RVO.nl and the vouchers managed by Texes are relatively large in size.

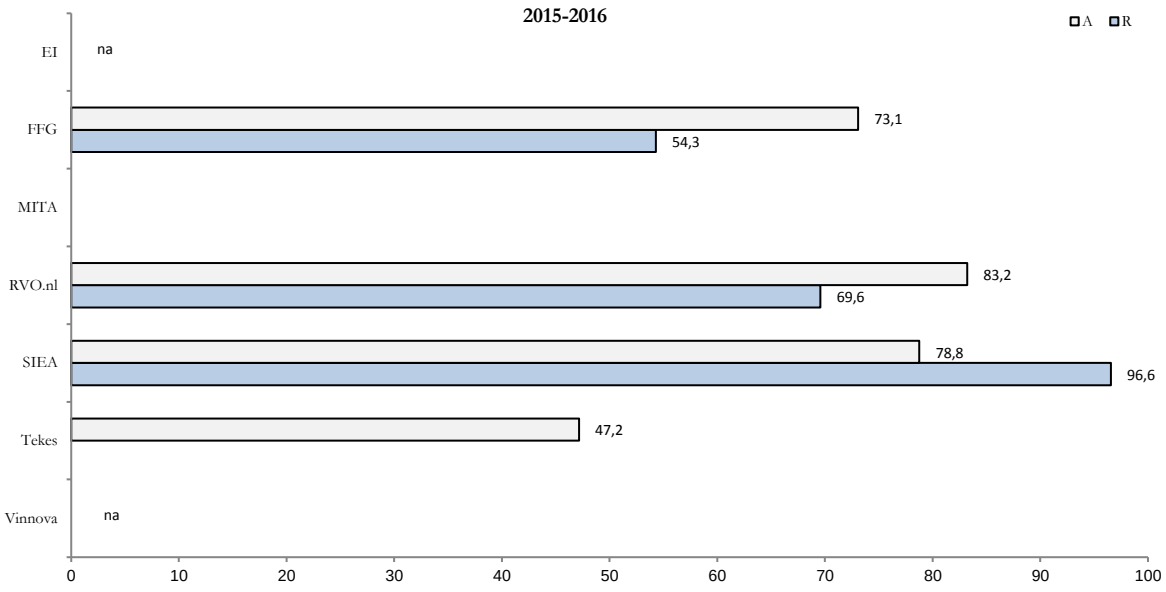
The application success rate differs from 47 percent (Tekes voucher scheme) to 83 percent (RVO's voucher scheme). The voucher schemes managed by FFG and SIEA also show relatively high success rates of voucher applications. Reimbursement rates are quite high for the voucher schemes managed by SIEA and RVO. For SIEA the average reimbursement rate during the period 2015 to 2016 amounts 97 percent. For RVO the voucher reimbursement rates are 70 percent. The average reimbursement rate for FFG is 54 percent.

Figure 4.2 Voucher applications (A), issued vouchers (I) and issued vouchers reimbursed* (R), 2015-2016




* reimbursed vouchers are attributed to the year the voucher was issued (and thus not necessarily the year the voucher was reimbursed)

Figure 4.3 Application success rate (A) and reimbursement rate (R), 2015-2016*




*the average over 2015-2016 is dependent on data availability and covers 2015 for RVO's reimbursement rate

# Chapter 5 Competence centres

## 5.1 Introduction

Competence Centres are collaborative entities established and led by industry and resourced by highly-qualified researchers associated with research institutions who are empowered to undertake market focused strategic research for the benefit of industry. The objective of Competence Centre initiatives is to achieve competitive advantage by accessing the innovative capacity of the research community. Main difference with R&D collaborative projects is that Competence Centres initiatives are not about financing individual R&D projects but are centered on (often thematic) programmes with synergies created through coherence in a bundle of projects.

In this report Competence Centre Initiatives of seven agencies are benchmarked (see Box 5.1). Since the programme design and scope of the programmes differs from agency to agency, we must be very cautious in interpreting the results of the benchmark.

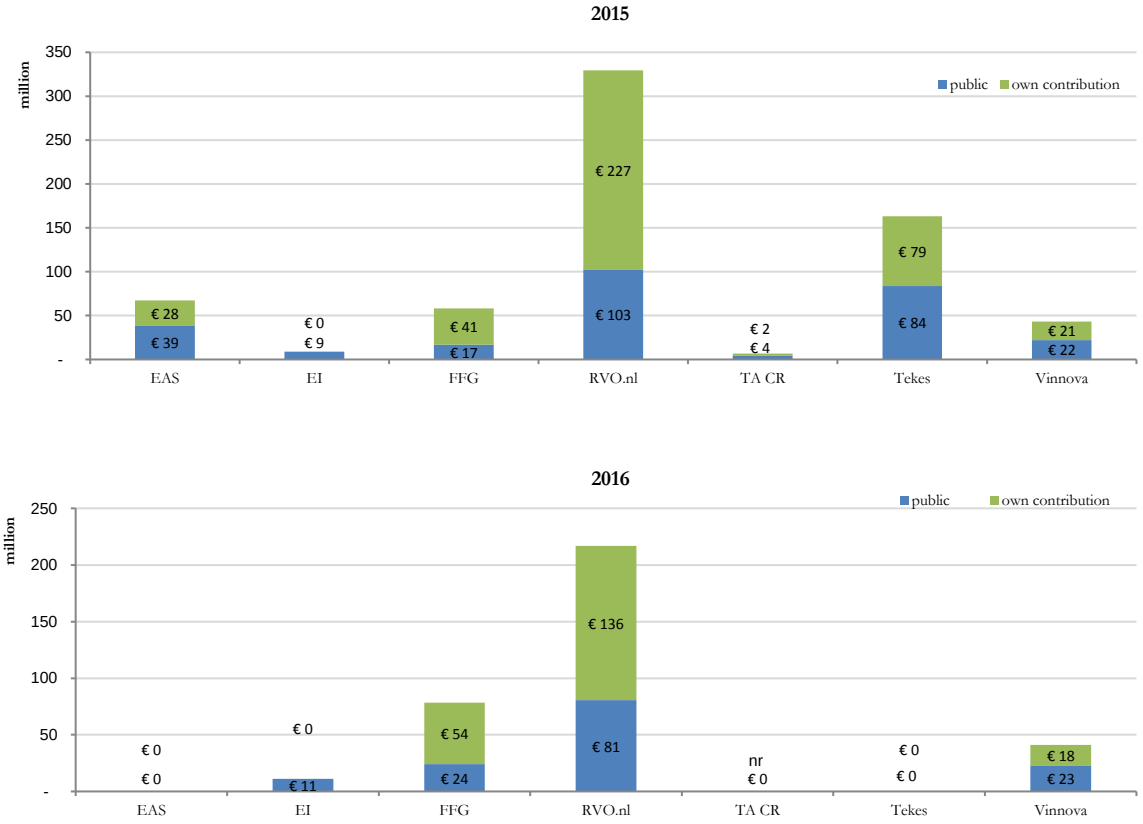
Box 5.1 Competence Centre programmes included in the benchmark

- Technology Competence Centres (Applied Research Centres) supported by EAS are stand-alone registered units whose main activity is conducting research in the areas that are necessary for consortium companies to conduct product development. The focus areas include information and communications technology (ICT) horizontally through other sectors, health technology and services, and valorisation of resources. Benefitting companies will use the results of the research projects to bring new products and services to the market.
- Enterprise Ireland's Competence Centre programmes are focused on the interaction between companies and researchers in industry-led R&D. As a general rough guide, a successful centre operates with public funding in the order of 1 million euros a year over a five year period.
- The Competence Centre initiatives supported by FFG concern Comet and Laura Bassi Centres of Expertise. COMET was launched in 2006 and bundles top-level research competences in physical centres by supporting l;ong-term research cooperation between science and industry. Some 1 500 researchers from science and industry work on jointly defined research programmes at more than 50 centers and networks. Budgets range from 12 million a year for K2 Centres (international outstanding research), 5 million euro a year for K1 Centres (high potential research) and 1 million euro a year for K Projects (specifically oriented at newcomers). Funding amounts to maximum 55 percent of eligible costs. In the Laura Bassi Centers of Expertise, excellent women head research centres at the interface between science and economy. Seven centres conduct research in the field of IT, medicine and life sciences. Public funding amounts to 320 000 euros at maximum 60 percent of eligible costs.
- In the Netherlands, the Top Consortia for Knowledge and Innovation (TKI) focus on industry-science collaboration. There are twelve TKI's active in the fields of the nine top sectors. Collaboration projects are framed within a strategic Innovation Contract which sets out the priorities for each top sector. Project proposals are processed and evaluated by the centers and are publicly supported through a financial grant. The size of the grant (as a share in total eligible project costs), which is managed by RVO.nl depends on the kind of research (fundamental, applied and experimental).
- TACR's Competence Centre run from 2012 to 2019 and support the establishment and operation of centres for research development and innovation in national priorities of targeted research in advanced fields. The approved budget amounts to 6,3 billion CZK and the maximum level of support amounts to 70 percent of total eligible costs.
- Tekes SHOKs programme supports the creation of Strategic Centres For Science Technology and Innovation. The public funding of the SHOKs through a dedicated Tekes' scheme has terminated in 2015. In the centres, companies and research units work in close cooperation, carrying out research that has been jointly defined in the strategic research agenda of each Centre. Their main goal is to thoroughly renew industry clusters and to create radical innovations. Centres (SHOK in Finnish) develop and apply new methods for cooperation, co-creation and interaction. International cooperation also plays a key role in the operation of the Strategic Centres. Testing and piloting environments and ecosystems constitute an essential part of the Strategic Centres' operations.
- Vinnova 's Competence Centre

## 5.2 Financial size

Figure 5.1 depicts the financial size of competence centre schemes. The Top Consortia of Knowledge and Innovation, the competence centre scheme managed by RVO.nl stands out with over 300 million income in 2015. The financial size of the competence centre scheme managed by Texes is also relative high with over 150 million euro (for 2015). The competence centre schemes managed by FFG, EAS and Vinnova are quite comparable in size and fall for the year 2015 within a range of 43 (Vinnova), 58 (FFG) and 67 (EAS) million euros. A relative low financial size indicates the competence centre scheme managed by Enterprise Ireland.

Figure 5.1 Financial size of Competence Centre programmes (public contribution and participants' own contribution in million euros), 2015-2016



It must be noted that the exact amounts each year are highly dependent on the funding rhythm and timing in each competence centre scheme. For instance, the funding of both FFG and TA CR concerns multiple years. Hence, the financial impulse differs extremely between the years.

Figure 5.2 Impact – participants' own contribution per Euro public investment (Euro), 2015-2016[11]

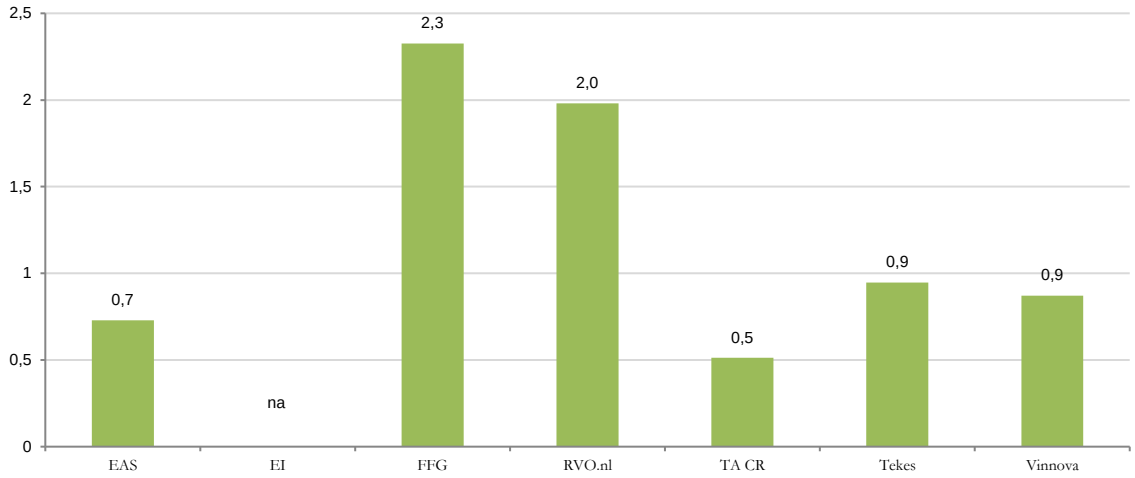



Figure 5.2, which depicts participants' own contributions in competence centres per euro public investment, makes clear that the large financial size of the competence centres in the Netherlands can be fully explained by the relative high private contributions in Dutch competence centres. The participants' own contribution per euro public investment is even higher for the competence scheme managed by the FFG. For each euro invested by government the participants themselves invest over two euros. For the other competence centres schemes the values are lower than 1.

Table 5.1 places the public contribution in the context of the number of competence centres supported. Here, the competence centres managed by RVO stand out with 6,7 to 8,5 million euros per centre supported. The number of competences in the schemes managed by the other agencies varies between 6 and 34 in 2015 and 2016 and hence, the financial support per centre is remarkably lower.

Table 5.1 Average public contribution per competence centre supported (million euros), 2015-2016

| | 2015 | 2016 |
|---|---|---|
| EAS | 6,5 | |
| EI | | |
| FFGnl | 4,2 | 6,0 |
| RVO.nl | 8,5 | 6,7 |
| TA CR | 0,1 | |
| Tekes | | |
| Vinnova | 0,9 | 0,7 |

[11] Relating to RVO.nl the figure excludes subsidies from other sources (e.g. Horizon 2020)

### 5.3 Organizing capacity

Competence centres bring participants together from both industry and science to cooperate with each other on R&D projects in a coherent programme. Figures 5.3 and 5.4 summarize the number of participants and the number of cooperative connections between the participants involved in R&D projects[12]. The number of participants differs to large extent between the competence programmes managed by different agencies. The competence centre programmes managed by RVO.nl bring a relatively large number of participants of around 800 in 2014. The number of participants of the competence centre programme managed by EAS is quite limited with just over 100 participants involved. For the competence centres managed by EAS, TA CR and Vinnova the number of participants is relative stable between the years. However, there is an amount of fluctuation of the number of participants over the years within the same competence centre programme. For FFG numbers fluctuate from 130 in 2015 to 205 in 2016. In the competence centres managed by RVO the number of participants drops from 2015 to 2016 (from 809 down to 713). The number of projects also decreased, as does the total amount of grants.
Table 5.2 summarizes the position of SMEs in the competence centre programmes. In the competence centres managed by Enterprise Estonia the share of SMEs in the total number of participants is remarkably high, 84,3 percent. The competence centres managed by FFG and Vinnova show relatively modest shares of SMEs in the total number of participants with shares ranging from 30 to 38 percent. The Top Consortia for Knowledge and Innovation (RVO.nl) the SHOKs (Tekes) and the competence centres managed by TA CR show shares of SMEs ranging between forty and fifty percent.

Table 5.2 Small and Medium-sized Enterprises as participants in competence centres, as a share in the total number of participants (absolute figures between brackets), 2015-2016

| | 2015 | 2016 | 2015-2016 |
|---|---|---|---|
| EAS | 84,3 (91) | 84,3 (91) | 84,3 (182) |
| EI | na | na | na |
| FFG | 33,8 (44) | 38 (78) | 36,4 (122) |
| RVO.nl | 44,9 (363) | 41,2 (294) | 43,2 (657) |
| TA CR | 43,9 (112) | 43,8 (103) | 43,9 (215) |
| Tekes | 50 (175) | | 50 (175) |
| Vinnova | 31,7 (71) | 30,7 (61) | 31,2 (132) |

In Figure 5.5 some relative figures on participants and cooperative connections are presented. In the figure, numbers of participants are related to public budgets. The competence centres managed by TA CR connect a relatively high number of participants with each other. Per million euros public money invested 109 (unique) participants are brought together in R&D projects. This number is high in comparison with the other agencies.

[12] The indicator on the connections is based on the number of participants per project and the assumption that organizations which are working in the same project per definition are cooperating in this project and hence stand in a cooperation relationship with each other. The number of C connections between N organizations in P projects is calculated through $C = \sum_P \frac{N(N-1)}{2}$

Figure 5.3 Participants in competence centres, 2015-2016

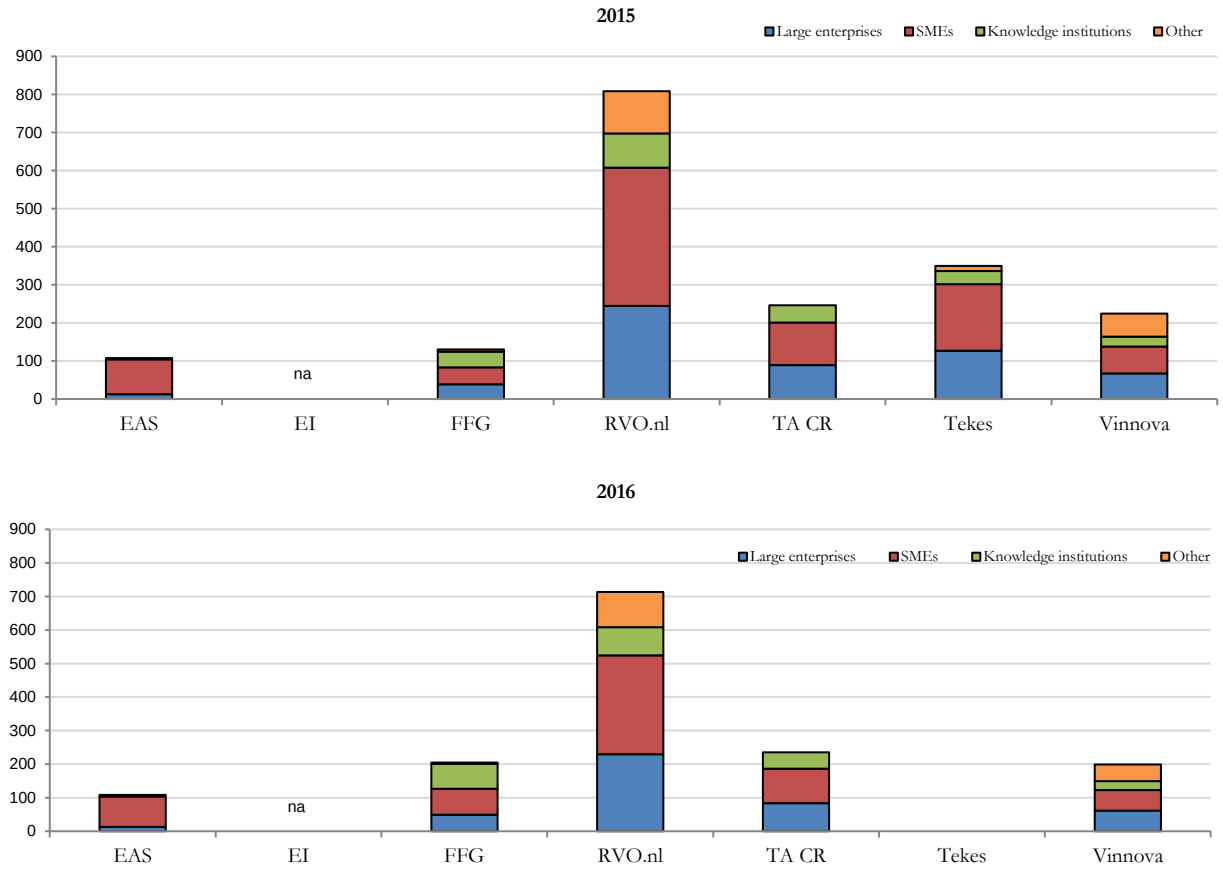


Figure 5.4 Cooperation relations in competence centres, 2015-2016

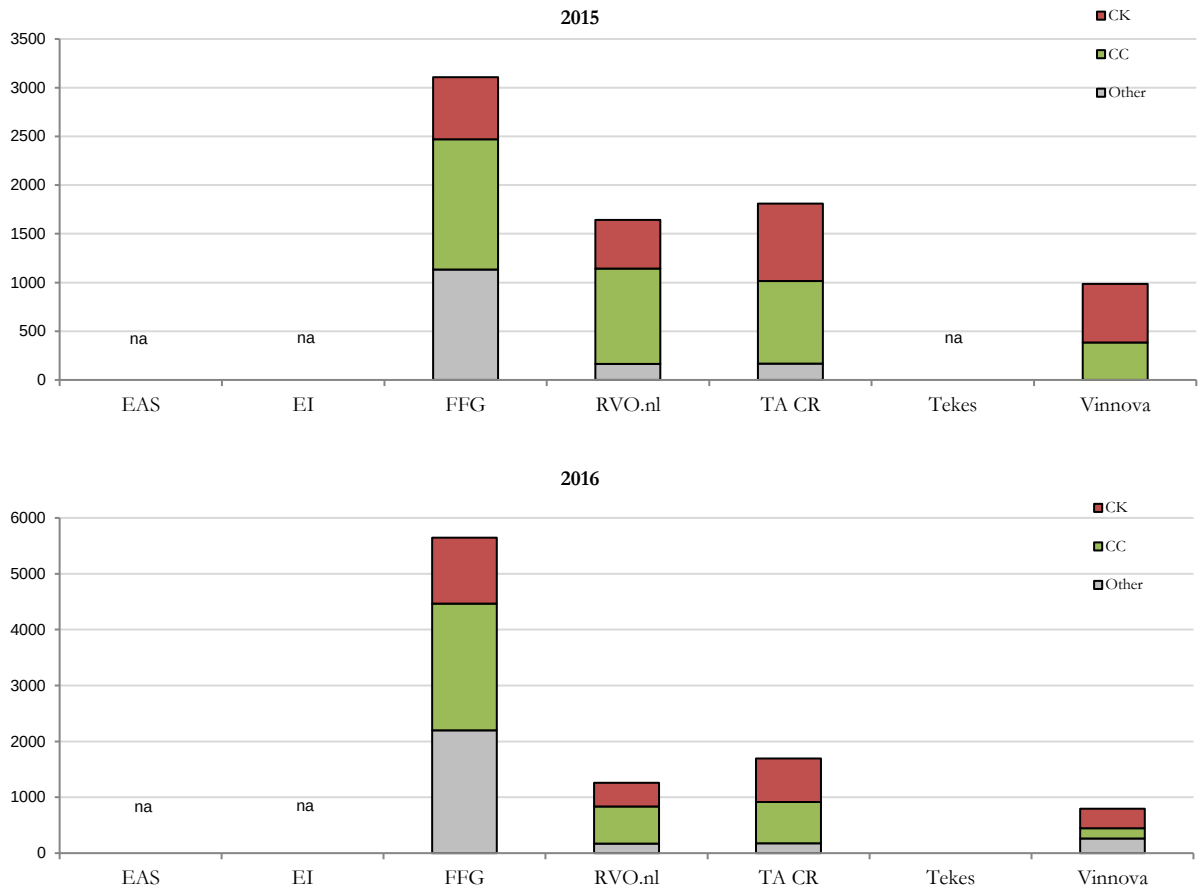
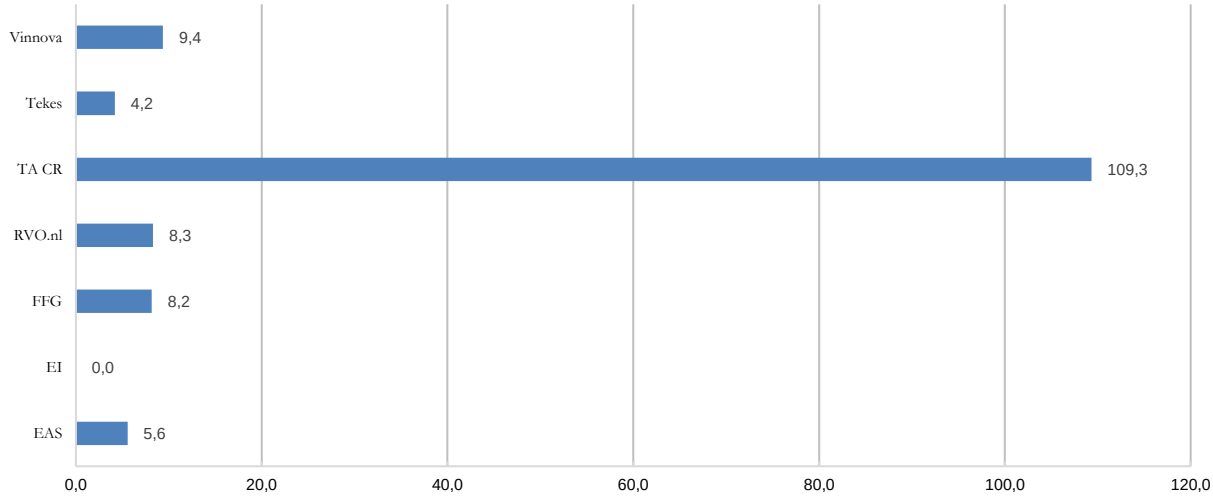
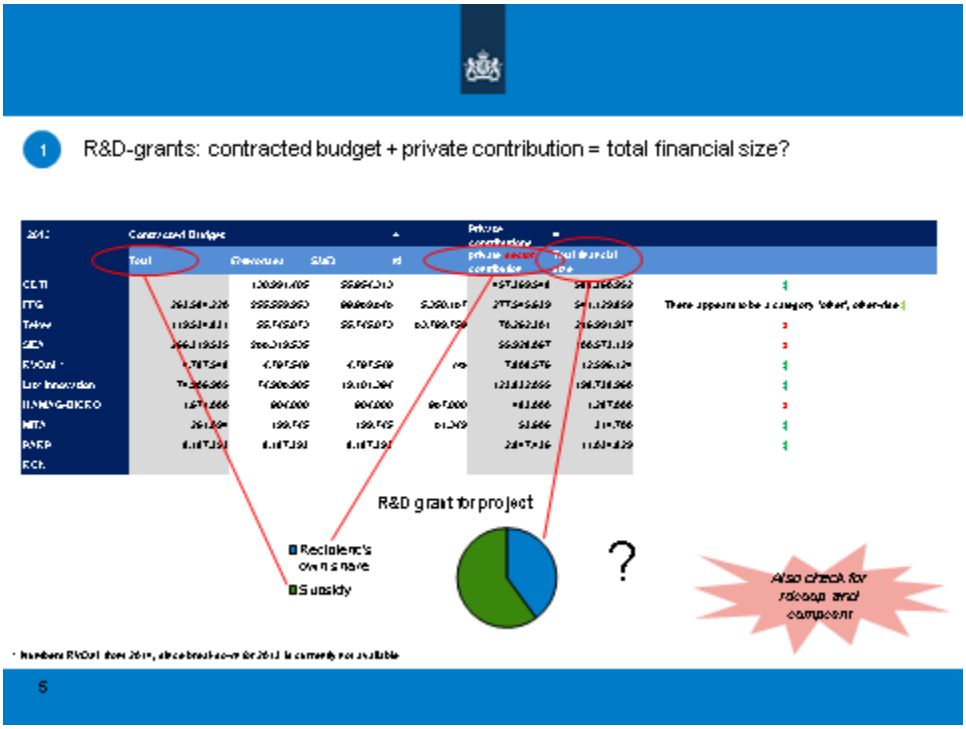


Figure 5.5 Organizing capacity: average number of unique participants per million-euro budget contracted, 2015-2016



# Appendix- SNB Network Meeting 19/1/2016 RCN, Brussels

## 1. R&D Grants: contracted budget + private contribution = total financial size?




### a. R&D grants: total = enterprise + knowledge institutions

| Solution: add category 'other' |
|---|

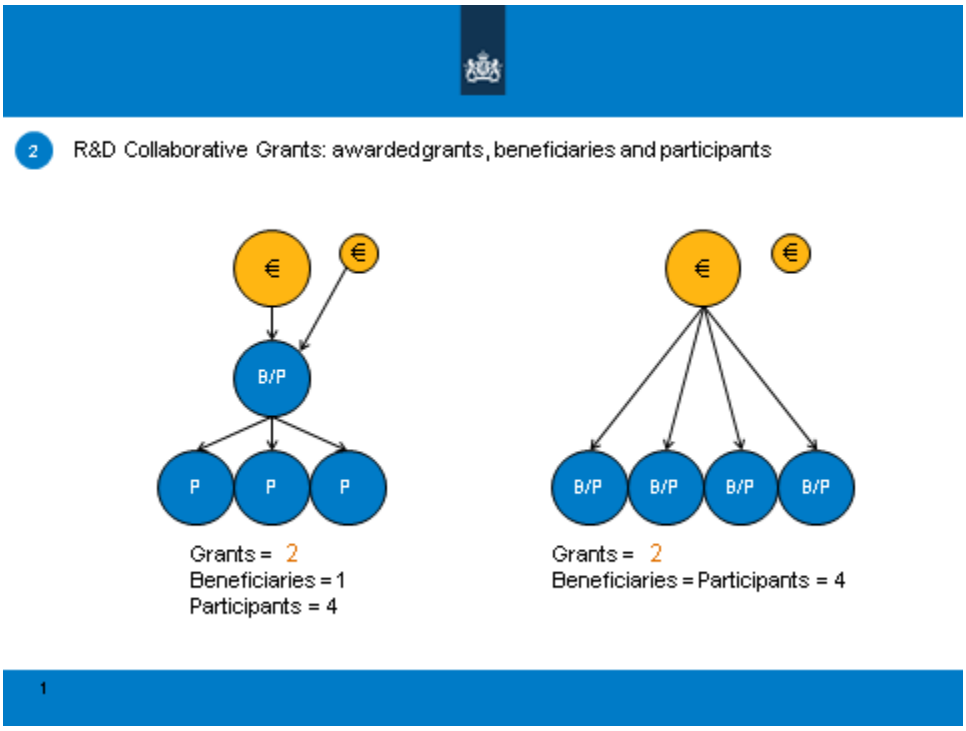
This summation does not always add up. FFG and Vinnova have to deal with a third category intermediate". Therefore we have decided to add the category 'other' as a subcategory of 'Contracted Budget'. Additional advantage of including this category is the possibility to check the total amount, since it can only be the sum of 'all enterprises', "knowledge institutions' and 'other'. Only include figures under this third category as ' last resort' and be really critical what to include here. It is preferable to try to include figures under the headings of " enterprise" and "knowledge institutions".

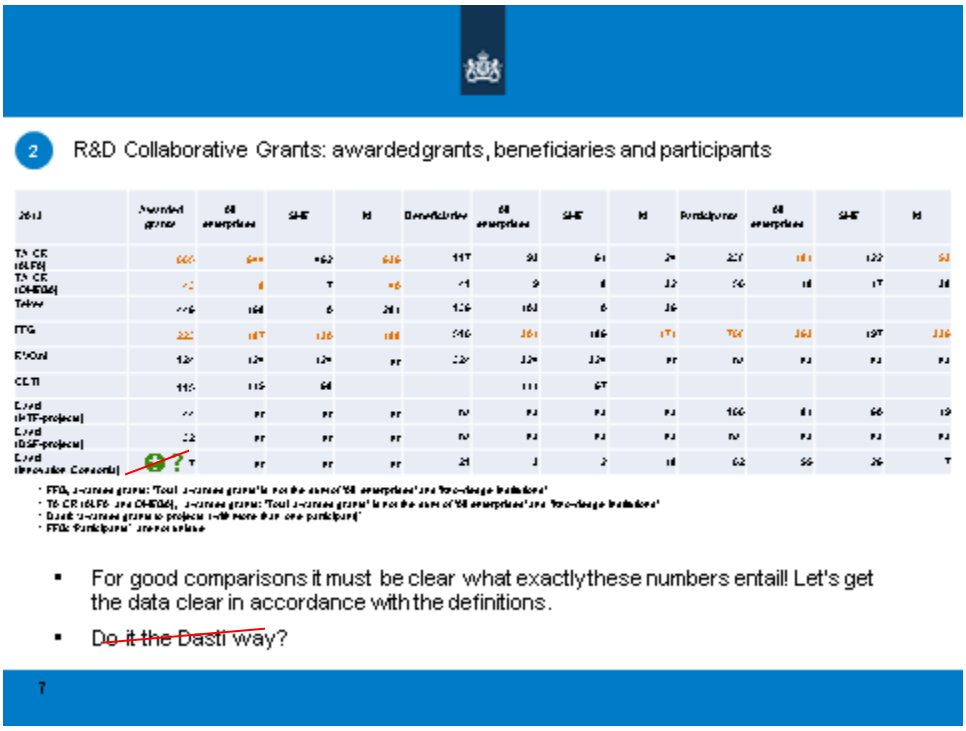
### b. Project size: Total financial size = contracted budget + private sector

| Solution: change 'private sector contribution' into 'recipient's own contribution' and include subcategories 'all enterprises', 'SME', 'knowledge institution' and 'other' |
|---|

We have decided to change the name of the category 'private sector contribution' because it caused confusion: the amount in this category is the recipient's own money, which does not necessarily need to have a private sector source. By changing the name we make clear that this amount is the share of the total financial size of the project that the recipient brings to the table – where they got it from, does not matter – in addition to the grant it receives. Additionally we have decided to add the aforementioned subcategories.

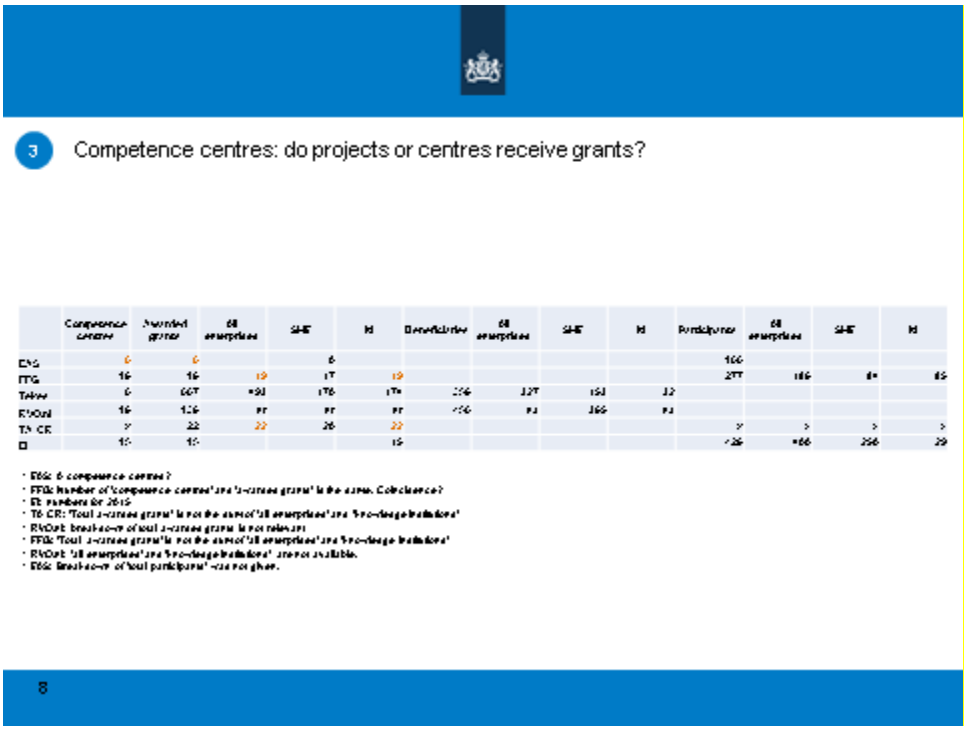
## 2. Clear distinction between awarded grants, beneficiaries and participants

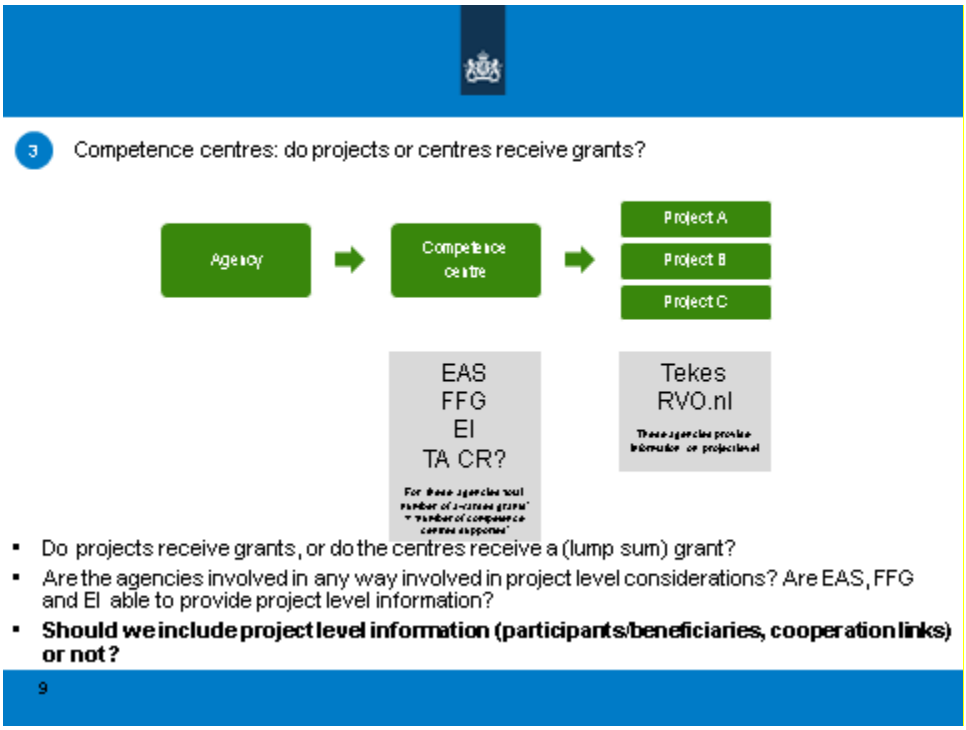


Solution:
*awarded grants*: **no breakdown** into 'all enterprises', 'SMEs', and 'knowledge institutions'
*beneficiaries*: number of unique no. organizations who **receive the money** directly from the agency (including breakdown into subcategories)
*participants*: unique no. of organizations which **participate** in projects (irrespective of the question whether they do or do not receive money for their participation) (including breakdown into categories)

**3. Are we comparing competence centres or projects run by competence centres?**

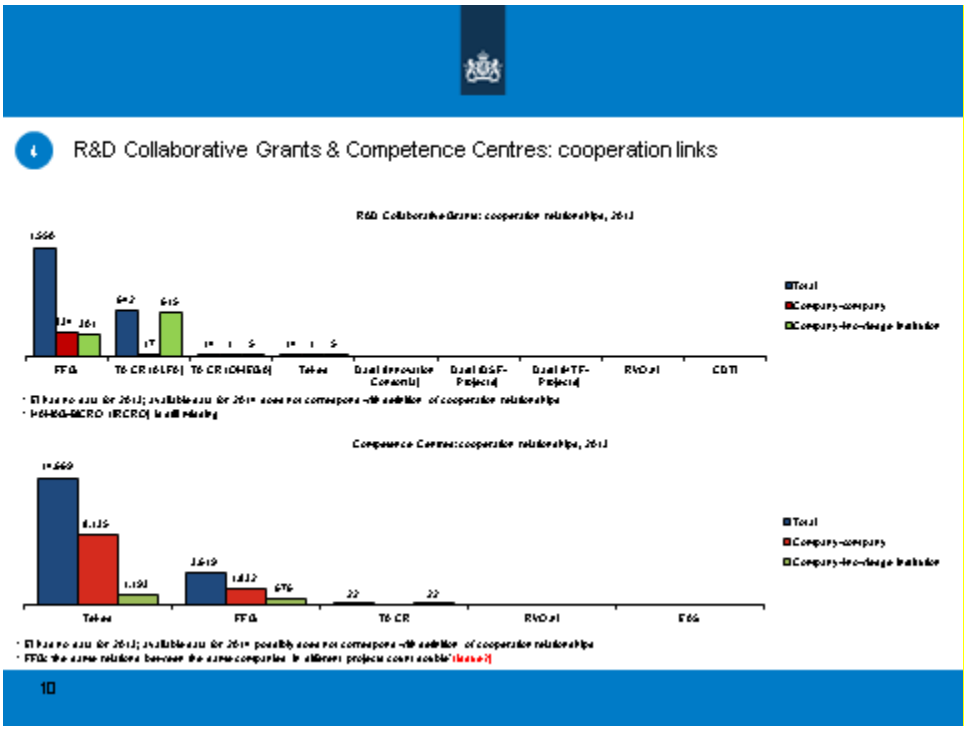


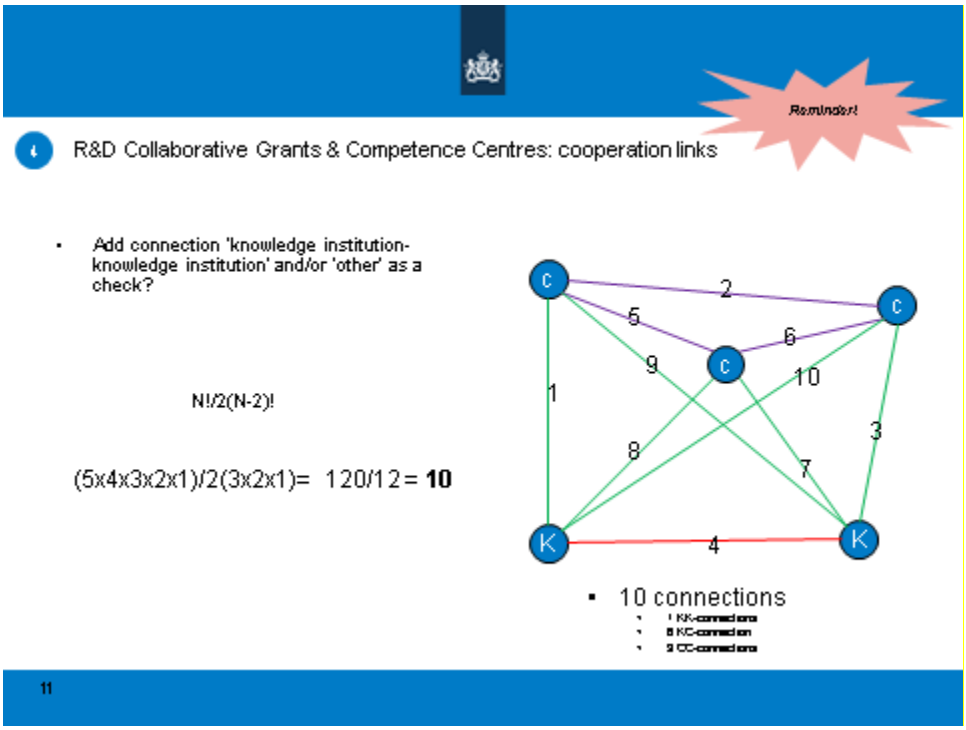




- Do projects receive grants, or do the centres receive a (lump sum) grant?
- Are the agencies involved in any way involved in project level considerations? Are EAS, FFG and EI able to provide project level information?
- **Should we include project level information (participants/beneficiaries, cooperation links) or not?**

Solution:
*awarded grants:* **no breakdown** into 'all enterprises', 'SMEs' and 'knowledge institutions' (either count grants given to competence centres or grants given to projects depending on the design of the instrument)
*beneficiaries*: this indicator is skipped for competence centres
*participants*: number of unique organizations which participate in projects (irrespective of the question whether they do or do not receive money for their participation) (including breakdown into categories)
competence centres: number of running/active competence centres

## 4. How to count cooperation links?

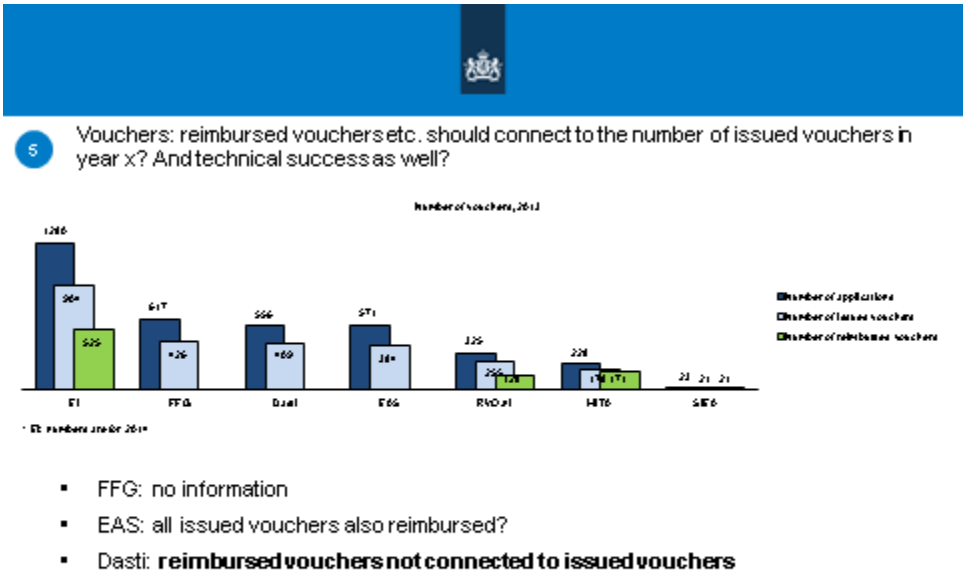


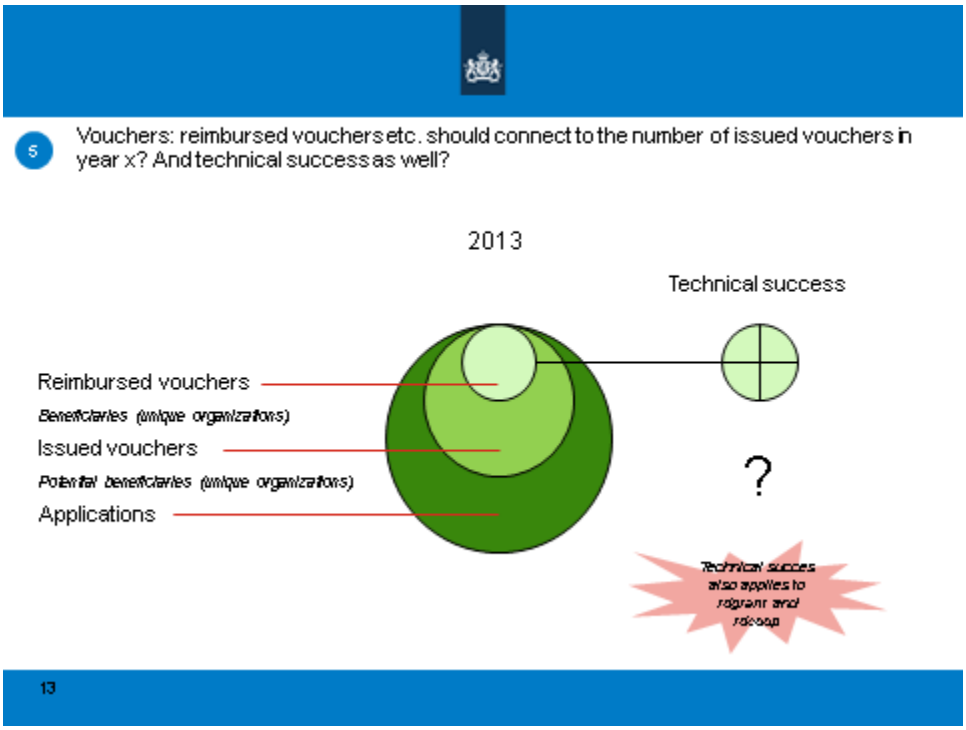



- Use the formula given in the report on the Common Indicator Framework. A more simple version of the formula reads as follows (produces exactly the same results): (N(N-1))/2
    - calculate the number of relations in each project;
    - aggregate over the projects.

Hence, the number of relationships might not be unique (e.g. company A and B cooperate with each other in two different projects lead to two relations and not one unique relation)

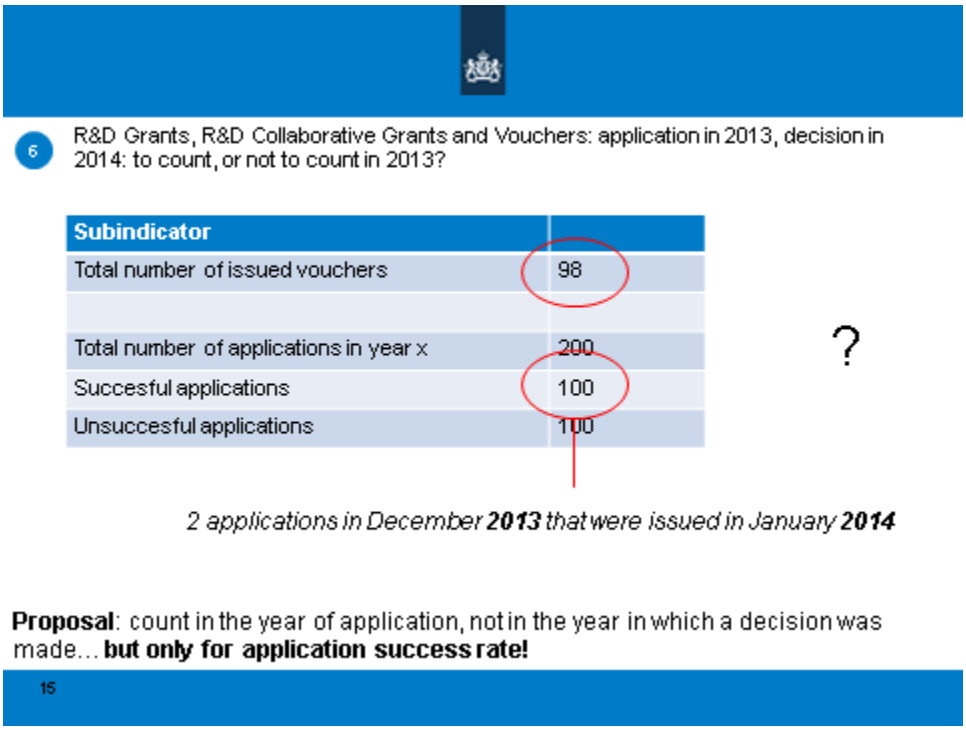
## 5. Voucher return rate




- for EAS this is always 100% (has to do with instrument design)
- for other agencies the rate equals: reimbursed voucher / issued vouchers: relate both reimbursed and issued vouchers to the year the voucher was issued
- The key is the year in which the **decision** was made.

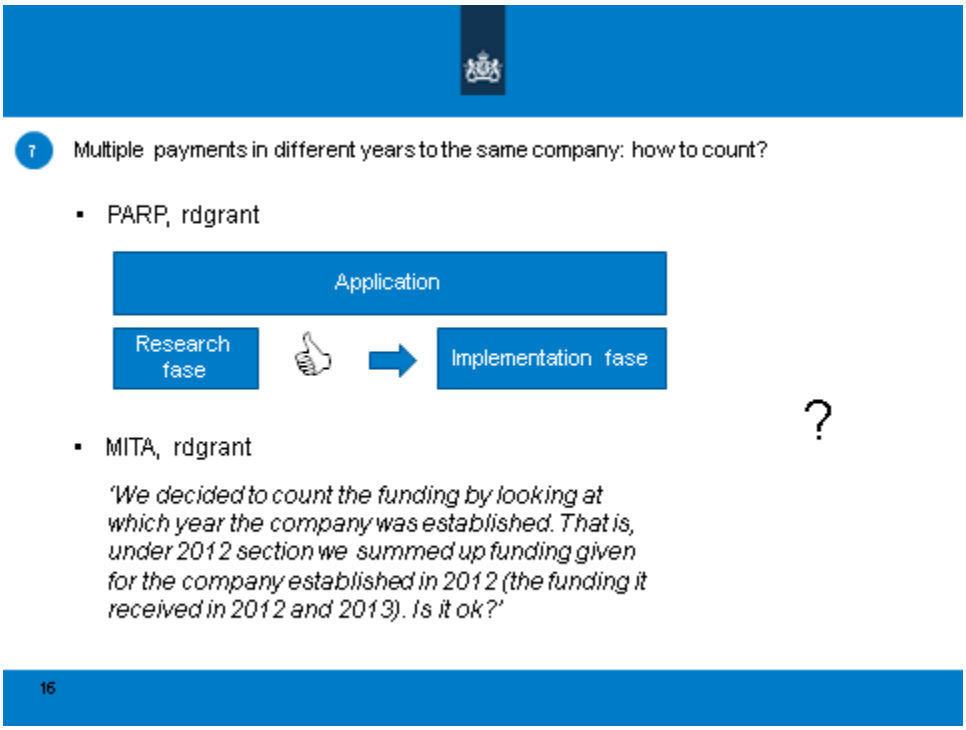
## 6. Application success rate




| |
|---|
| Solution:<br>The key is (again) the moment **a decision** was made. |

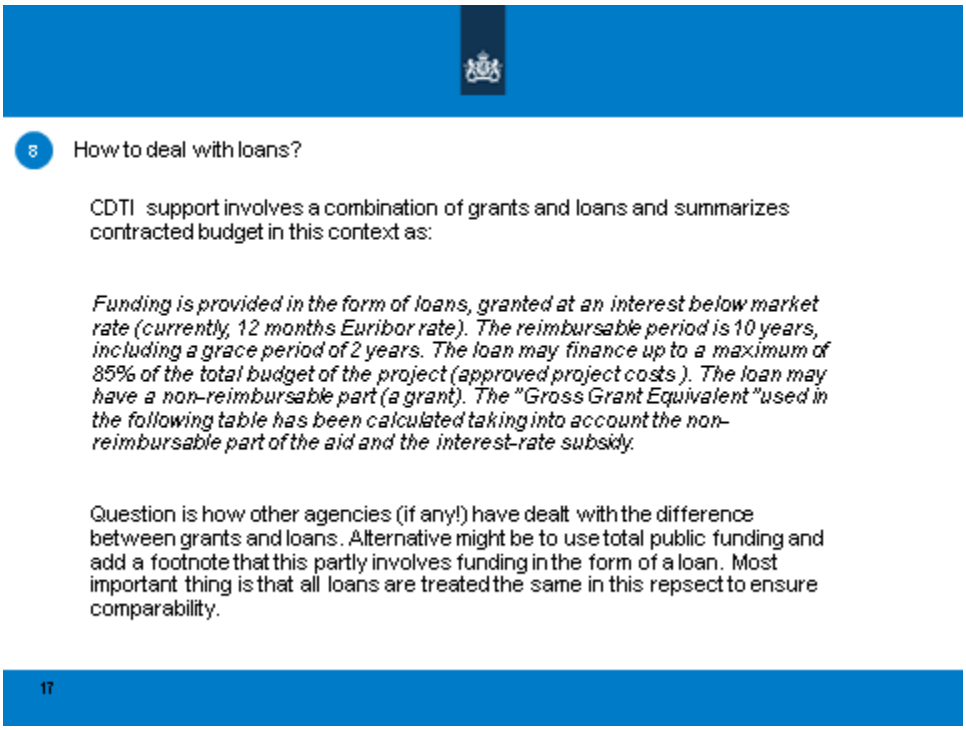
A positive decision is an issued voucher (and successful application), a negative decision is an unsuccessful application. The total number of applications is then simply the amount of 'positive and negative decisions' in a year.
It was crucial to point out that we should use the moment of decision during the year, since some agencies noted the date of application, and then a different date for the moment an application was granted a voucher (e.g. an issued voucher). That could cause confusion if the application is in a different year than the issuance. This problem is tackled by using the moment a decision is made on an application, following the reasoning above.

## 7. Multiple payments in different years to the same company




In both cases mentioned we have decided to attribute multiple payments in different years to the first year a payment was made. Self-evidently these payments have to be attributed to the same project.

## 8. How to deal with loans?




| |
|---|
| Solution:<br>use to 'Gross Grant Equivalent', like CDTI did, since it is a widely accepted way to tackle this. It is a standard indicator used by the EC. |

This issue arises at FFG, CDTI and Tekes.

## 9. Coping with currency difference

9 Coping with different currencies

Reminder!

| | 2012 | 2013 | 2014 |
|---|---|---|---|
| Dasl (Denmark) | 0,13 | 0,13 | 0,13 |
| HAMAG-BICRO (Croatia) | 0,13 | 0,13 | 0,13 |
| TA CR (Czech Republic) | 0,04 | 0,04 | 0,04 |
| RCN (Norway) | 0,1158 | 0,1283 | 0,13 |
| PARP (Poland) | 0,2391 | 0,2383 | 0,2390 |


- 'For comparative reasons, all amounts are translated into Euro, using the average exchange rate of that particular calendar year (amounts were originally in another currency)'

18

## 10. Missing data


- Use
  - 0
  - Not available
  - Not relevant


Use:

- 0
- not available
- not relevant

a