25 EUREKA

Economic Impact of International Research and Innovation Cooperation

- Analysis of 25 years of Danish participation in EUREKA

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Content

Abstract in Danish - Dansk resume

Om EUREKA

EUREKA er et middel i realiseringen af visionen om Det Europæiske Forskningsrum (ERA) i tråd med både nationale og internationale politiske målsætninger. Set fra et dansk nationalt perspektiv er EUREKA et middel til at høste fordelene ved øget internationalt samarbejde – både for finansierende og forskningsudførende aktører i den private og offentlige sektor. EUREKA er først og fremmest rettet mod international koordinering af nationale midler til forskning og udvikling (FoU). I modsætning til f.eks. Det Europæiske Rammeprogram har EUREKA således ingen fælles midler, men er alene finansieret af nationale midler.

Dansk deltagelse i EUREKA

Danmark var blandt stifterne af EUREKA i 1985. Frem til år 2000 havde Danmark et specifikt EUREKA-tilskudsprogram. Siden 2001 har danske ansøgere i stedet kunne benytte sig af andre tilskudsprogrammer til EUREKA-projekter. I perioden 1985-2010 har danske virksomheder deltaget i 185 EUREKA-projekter, heraf 5 i såkaldte Cluster projekter. I 2008 startede et nyt EUREKA-program, Eurostars. Siden da er der givet tilskud til dansk deltagelse i 33 Eurostars-projekter.

Effektundersøgelsen af EUREKA

Den økonomiske effekt af at have deltaget i EUREKA-projekter måles gennem en statistisk analyse af virksomheder, der har deltaget i EUREKA-projekter fra 1990 til 2000 i forhold til andre, der ikke har deltaget. Der indgår 76 virksomheder, der har deltaget i EUREKA projekter. Heroverfor opstilles to kontrolgrupper:

- En gruppe består af 756 virksomheder, der ikke deltager i samarbejdsprojekter, men ligner de EUREKA-deltagende virksomheder på en række parametre.
- En anden gruppe består af 79 virksomheder, der har deltaget i andre nationale og internationale samarbejdsprojekter.

Sammenligningen med de to kontrolgrupper viser en signifikant positiv effekt af EUREKA-deltagelse. Effekten vises i årlige ændringer af vækstrater.

Fire effekter

Effektundersøgelsen viser fire statistisk signifikante effekter af deltagelse i EUREKA.

Deltagelse øger eksport. EUREKA-deltagere øgede deres eksport-vækstrate. Tre år efter deltagelse i EUREKA var væksten i eksport for EUREKA-deltagere omkring 13 procentpoint højere end i de to kontrolgrupper.

Deltagelse øger omsætning. EUREKA-deltagere øgede vækstrate i omsætningen dobbelt så hurtigt sammenlignet med lignende virksomheder, der ikke har deltaget i samarbejdsprojekter.

Deltagelse øger beskæftigelse. EUREKA-deltagere øgede vækstraten for beskæftigelse med 4-5 procentpoint. Effekten er allerede tydelig fra det første år, og varer ved i adskillige år, i sammenligning med de to kontrolgrupper og er stigende henover perioden.

Deltagelse øger produktivitet. EUREKA-deltagere øgede vækstraten i arbejdsproduktivitet med 11-12 procentpoint. i forhold til lignende virksomheder, der ikke har deltaget i samarbejdsprojekter.

I tråd med internationale studier

De danske resultater peger i samme retning som resultaterne af andre undersøgelser gennemført af EUREKA-sekretariatet på europæisk plan, samt de foreløbige resultater af andre medlemslandes undersøgelser.

Summary & conclusions

Setting EUREKA apart

EUREKA is a mean to realise the European Research Area (ERA), in line with both national and international policy objectives. From a Danish perspective, EUREKA Denmark is a means to reap the advantages of international cooperation for both funding agencies and research performers in the private and public sector in Denmark.

EUREKA is set apart primarily through its efforts to coordinate national funds for R&D at the international level. Unlike the European Framework Programmes, EUREKA has no common pot, and relies fully on national funds.

Danish Participation in EUREKA

Denmark was among the founding countries of EUREKA in 1985. Until 2000, Denmark had a national funding scheme for EUREKA-participants. Since 2001, Danish applicants have used other national funding schemes to fund participation. From 1985 to 2010, total Danish involvement in EUREKA includes participation in 185 Individual Projects, 5 Clusters and 33 Eurostars Projects.

The impact of EUREKA

The economic impact of EUREKA participation is measured via a statistical impact assessment of 76 businesses participating in Individual EUREKA Projects from 1990 to 2000. This group is compared to two control groups:

- One group of 756 businesses, not participating in consortia type projects, but are similar to EUREKA participants on a number of parameters.
- Another control group is composed of 79 businesses, participating in other national and international consortia type programs.

In comparison to the two control groups participants in EUREKA-Individual projects experience significant and positive impact of participation. Impacts are measured in annual changes in growth rates.

Four effects

The impact assessment shows four statistically significant effects of participation.

Participation increases exports. Participants in EUREKA significantly increased growth rates in exports. Three years after participation, growth in exports for EUREKA-participants was around 13 percentage points higher than both control groups.

Participation increases turnover. EUREKA participation increased growth rates in turnover twice as much, compared to businesses not participating in consortia type instruments.

Participation increases employment. EUREKA-participation increases growth rates in employment with 4-5 percentage point. This impact is significant from year-one after participation and persists for several years compared to both control groups.

Participation increases productivity. The results of the impact assessment show that EUREKA participation increased growth rates in labour productivity by some 11-12 percentage points annually.

In line with international studies

These findings are in line with results of other studies carried out by the EUREKA-secretariat at European level as well as preliminary results of the studies made by other EUREKA-member countries.

1 Introduction

EUREKA is an intergovernmental network launched in 1985 to support market-oriented R&D and innovation. Today (2011), Denmark has been a member of EUREKA for 25 years.

This study is an assessment of the economic impact of EUREKA in Denmark. The study was prepared by DAMVAD for the Danish Agency for Science, Technology and Innovation (DASTI).

Parallel to this study, a number of other EUREKA-member countries as well as the EUREKA-secretariat are conducting similar impact studies. As such, the purpose of this study is threefold: Firstly, in a Danish context, this study provides a basis for formulating priorities for future Danish participation in the EUREKA-network. Secondly, in an international context, this study is one piece of a larger puzzle, showing the impact of EUREKA internationally. Thirdly, the study contributes to methodology developments for measuring the impact of EUREKA in other countries.

This report is divided into four central chapters in addition to the first introductory chapter:

Chapter 2 sets EUREKA apart from other policy instruments, describing the goals, organisation and instruments of EUREKA.

Chapter 3 analyses the extent of Danish participation in EUREKA and contrasts Danish participation with that of other EUREKA member countries.

Chapter 4 analyses the impact of EUREKA on participating Danish businesses in terms of productivity, exports, turnover and employment.

Finally **Chapter 5** explores the early implications for participants of the transition to Eurostars, the newest policy instrument employed by the EUREKA-network.

At the core of the report is the impact study of Danish participants in EUREKA Individual Projects. The impact study is conducted as a "triplet-study", in which EUREKA-participants are compared to two control groups through propensity score matching. One group is composed of similar businesses in general, while the other is composed of businesses participating in other funding instruments.

This analysis shows that participation in EUREKA-Individual projects has significant and positive impact upon participating businesses compared to similar businesses in general and participants in other funding instruments.

2 Setting EUREKA apart

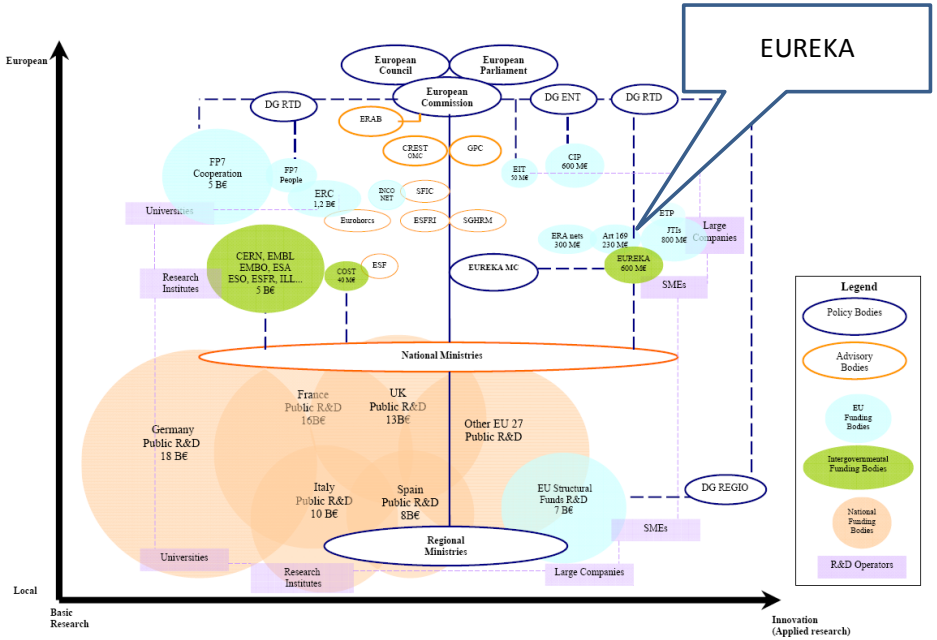
Initially, this chapter describes the goals, organisation and instruments of EUREKA. It is against this backdrop that the impacts of EUREKA will be assessed later in this report.

2.1 EUREKA - overview

EUREKA is an intergovernmental network launched in 1985 to support market-oriented R&D and innovation projects by industry, research centres and universities across all technological sectors. It is now composed of 40 members, including the European Community.

EUREKA is aimed at "*Raising the productivity and competitiveness of European businesses through technology. Boosting national economies on the international market, and strengthening the basis for sustainable prosperity and employment.*"[1]

Figure 2.1: EUREKA's place in the European Research Area (ERA)



Source: EUREKA (2010)

EUREKA supports the competitiveness of European companies through international collaboration and in creating links and networks for innovation. The objective is to bring high quality research and development efforts to the market and to use the multiplying effects of cooperation.[2]

Figure 2.1 gives an overview of the national and international funding landscape for R&D in Europe, organised by internationalisation and closeness to market.

As shown, EUREKA is one of a wide range of national and international policy instruments directed at intensifying international R&D-collaboration between businesses.

What sets EUREKA apart is its international dimension to national R&D funds. EUREKA seeks to do this through three defining characteristics:

Decentralisation: EUREKA is a decentralised cooperation structure with National Project Coordinators (NPCs) located in each of the member countries. This means that administration of the Danish EUREKA-applicants is managed at the national level. In Denmark, EUREKA is managed by the Danish Agency for Science, Technology and Innovation (DASTI), which is the central stakeholder in the programme and first point of contact for Danish businesses planning to participate in a EUREKA-project.

[1] EUREKA (2011)

[2] EUREKA (2011)

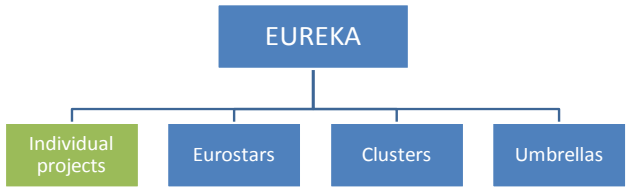
Coordination: EUREKA facilitates international cooperation between project partners in the EURERKA-member countries. Here, the NPCs function as ambassadors for the network as well as advisors to applicants wishing to apply for EUREKA. Also, EUREKA facilitates cooperation between national funding instruments and agencies themselves, also through the NPC's. Through its coordinating role, EUREKA attempts to bring an international dimension to national funding agencies and projects in the member countries.

Nationally funded: EUREKA is funded nationally. Unlike the European Framework Programmes, EUREKA has no common pot, and each member country primarily funds the costs of its own national project partners. While some countries have set aside earmarked funds for EUREKA-participation, others have 'built-in' additional funding for EUREKA-participants in national instruments. As for Denmark, earmarked funding for EUREKA-participants ceased in 2001. EUREKA is further set aside by its choice and design of funding instruments. Of special importance to this analysis is the *Individual EUREKA Projects*-instrument. It is the impact of Individual EUREKA Projects on Danish business participants, which is the focal point of this impact assessment.

2.2 EUREKA's four policy instruments

EUREKA employs four funding instruments targeted at different aspects of international R&D-collaboration, as shown below:

Figure 2.2: Funding instruments in EUREKA



Source: DAMVAD 2011

The four instruments are briefly described below:[3]

Individual EUREKA Projects are market-oriented R&D projects labelled by EUREKA and involving partners from at least two EUREKA member countries. The project consortium develops new project, technology and/or service for which they agree the intellectual property rights and build partnerships to penetrate new markets.

Eurostars are European research and development projects. This instrument is the newest addition to EUREKA, added in 2008. Eurostars can address any technological area, but must have a civilian purpose and be aimed at the development of a new product, process or service. They must involve at least two participants from two different Eurostars-participating countries. In addition, the main participant must be a research-performing small or medium sized enterprise (SME).

EUREKA Clusters are long-term, strategically significant industrial initiatives. They usually have a large number of participants, and aim to develop generic technologies of key importance for European competitiveness, primarily in ICT and, more recently, energy and biotechnology.

Umbrellas are thematic networks within the EUREKA framework, which focus on a specific technology area or business sector. The main goal of an umbrella is to facilitate the generation of EUREKA projects in its own target area. Umbrella activities are coordinated and implemented by a working group consisting of EUREKA representatives and industrial experts. The working group meets on a regular basis.

[3] EUREKA (2011)

Danish participation in EUREKA

From 1985 to 2010, total Danish involvement in EUREKA includes:

- Participation in 185 Individual Projects
- Participation in 5 Clusters
- 33 Eurostars Projects

In addition, Danish participants are currently active in two EUREKA-clusters and two EUREKA umbrellas.

Some key characteristics of each of the four funding instruments are summarised in table 2.1 below:

Table 2.1: An overview of EUREKA funding instruments

	Individual projects*	Eurostars	Clusters	Umbrellas
Supports	Business-driven cooperative R&D-projects with international participation	SME-driven, cooperative R&D-projects with international participation	Cooperation activities between a large number og industrial participants around generic technologies	International network-activities aimed at creating Individual EUREKA projects or Eurostars projects
Average cost (M€)	1.6	1.4	20	-
Average participants per project	3.4	3.4	20	-
Share of SMEs	52%	70%	35%	-

Source: EUREKA 2011. *2008-2010

Individual EUREKA Projects

The focus of this analysis is Danish participation in *Individual EUREKA Projects*, which is the first and most frequently used funding instrument in the EUREKA network. Individual EUREKA Projects is the oldest funding instrument in EUREKA and accounts for some 90 per cent of all projects funded under EUREKA since its establishment in 1985. There are currently some 722 Individual Projects running under EUREKA with a total budget of €1.3 billion.[4] The key characteristics of Individual EUREKA Projects are further elaborated in table 2.2 below:

Table 2.2: Key characteristics of Individual EUREKA Projects

Characteristics of Individual EUREKA Projects	
International cooperation	Must involve a minimum of 2 independent partners from 2 different EUREKA Member Countries.
Bottom-up	Applicants are free in their choice of topic, partner(s) and timeframe, provided there is market potential for the idea.
No limitations on size	EUREKA projects can be of any size.
Ownership of IPR	Project participants retain complete ownership of intellectual property rights (IPR).
Non-specific to technology	Projects can be launched in virtually all technological areas.
Multiple annual application dates	Projects are approved approximately four times per year.
Limited reporting	There are only limited reporting obligations and a shorter time to contract than e.g. SME-projects in FP7.

Source: EUREKA (2011)

As described in table 2.2, Individual Projects have a very open format. Its main requirements are international cooperation and market potential.

2.3 The political context of EUREKA

EUREKA cannot be seen in isolation from the political objectives it is meant to achieve. As described above, the EUREKA-network both has a national and an international dimension. The impact of EUREKA should

[4] EUREKA (2011)

therefore be seen in light of both international and national political objectives.

EUREKA in European research policy

In its international context, EUREKA should be seen as part of the broad effort to realise the European Research Area (ERA).

In January 2000, the European Commission launched the policy to develop a European Research Area (ERA), moving towards a knowledge-based economy and sustainable development in Europe. The partnership covers all EU Member States but goes beyond the EU to other European countries, such as the EFTA countries and candidate countries. As set out in the ERA Vision, by 2020 all actors should fully benefit from the "Fifth Freedom" across the ERA: free circulation of researchers, knowledge and technology. The ERA aims to provide attractive conditions and effective and efficient governance for research and investments in R&D intensive sectors in Europe. It seeks to create added value by fostering a healthy Europe-wide scientific competition whilst ensuring the appropriate level of cooperation and coordination. Also, it is to be responsive to the needs and ambitions of citizens and effectively contributes to the sustainable development and competitiveness of Europe.[5]

As a policy instrument employed toward the realisation of ERA, EUREKA seeks to internationalise national funds, rather than creating a common pot (as is the case for the Framework Programmes). In this respect, EUREKA is set apart both in its coordinating role of national funding agencies and as a funding instrument for international collaboration.

EUREKA in Danish research policy

In its national context, EUREKA should be seen as a means to reap the benefits of international cooperation for Danish research performers in the private and public sector. Moreover, in its coordinating role for funding agencies, EUREKA should be also be seem as a means to overcome the challenges involved in international coordination of Danish national funding agencies. DAMVAD pinpointed a number of challenges related to international coordination in a recent international comparison of internationalisation efforts of more than 70 national research councils in Europe.[6]

Like many other countries in the wider OECD area, the rationale behind the Danish support for international cooperation is driven by the fact, that only a very small proportion of total knowledge production takes place in Denmark. For Danish businesses, transnational R&D-collaboration enables additional exploitation of complementary research competency, more efficient coordination of research activities, which in turn increases competitiveness. For national governments (and funding agencies), international cooperation enable thematic synergy, financial leverage and easier access to international funding.[7]

These broader rationales are captured in the five original objectives for Danish membership of EUREKA:[8]

- Technological advancement
- An international network of contacts
- International profiling of the participating businesses and research institutions
- Development of businesses' strategy
- Market advantages

[5] Council of the European Union (2008)

[6] DAMVAD (2009a), see also DAMVAD (2009b)

[7] OECD (2010)

[8] Danish Agency for Development of Trade and Industry (1994)

These original objectives are in line with the goals outlined in 2006 by the Danish Government presented in *Strategy for Denmark in the Global Economy*, specifically: [9]

- Publicly financed expenditure on research and development should reach 1 per cent of gross domestic product (GDP) by 2010. Public and private companies and institutions should spend a total of at least 3 per cent of GDP on research and development by 2010.
- Danish companies and public institutions should be top performers in innovation
- Denmark should be a top performer in turning research results into new technologies, processes, goods and services.

The goals and rationale behind EUREKA membership is thus closely in line with the national objectives.

[9] The Danish Government (2006)

3 Danish participation in EUREKA

In this chapter we describe Danish participation in EUREKA and contrasts Danish participation with that of other EUREKA member countries. Furthermore, we take a closer look at the R&D-behaviour the businesses forming the treatment group in the impact study.

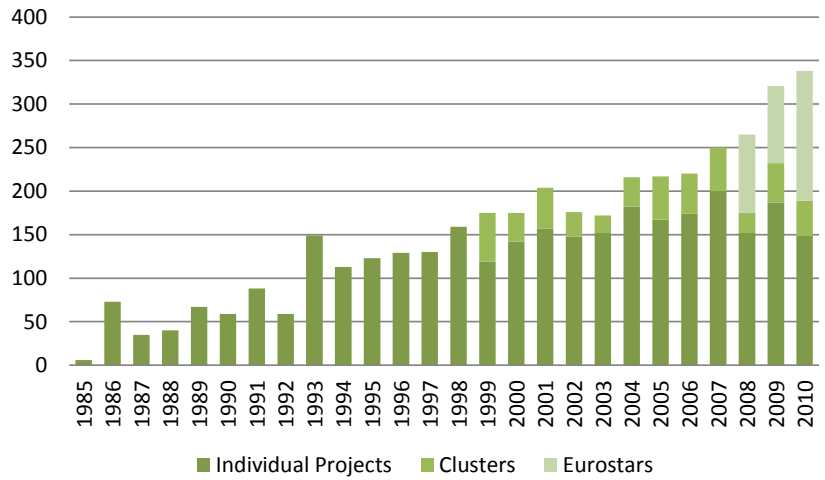
3.1 A varied history of participation

EUREKA was established by a Conference of Ministers of 17 countries and Members of the Commission of the European Communities, meeting in Paris in 1985.[10] Figure 3.1 shows the total number of Individual Projects and Eurostars-projects endorsed throughout the lifetime of EUREKA. In total, 3.156 Individual Projects and 400 Eurostars projects have been endorsed through this period.

Denmark was among these first member countries in the EUREKA network. Danish participation dates back to the start in 1985 and Danish partners participated in the first EUREKA Individual Projects. Figure 3.2 below shows the number of endorsed EUREKA projects with Danish participation since the establishment of EUREKA.

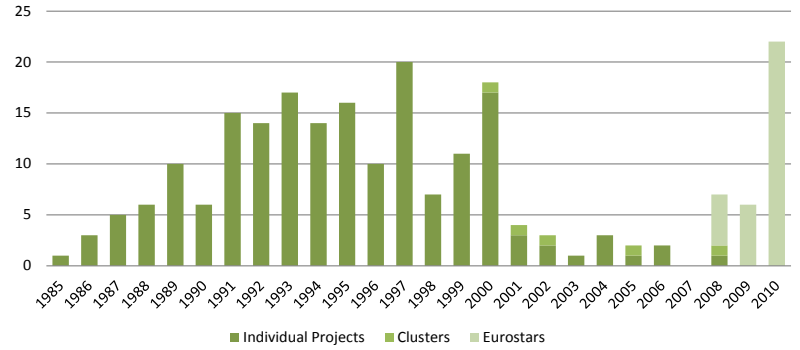
From 1985 to 2010, total Danish involvement in EUREKA amounts to participation in 185 Individual Projects, 5 Clusters and 33 Eurostars Projects.[11] In addition to these, Danish participants are currently active in two EUREKA Clusters and two EUREKA-umbrellas.[12]

Figure 3.1: The number of endorsed EUREKA projects 1985-2010



Source: The EUREKA secretariat 2011

Figure 3.2: The number of endorsed EUREKA projects with Danish participation 1985-2010



Source: DAMVAD 2011 based on start dates, EUREKA participation data (2010)

As is the case for EUREKA as a whole, Individual Projects have been the primary instrument for Danish participation throughout the period. As shown in figure 3.2, the history of Danish participation is characterised by an initial "uptake"-period from 1985 to 1990 with participation in

[10] EUREKA (2011)

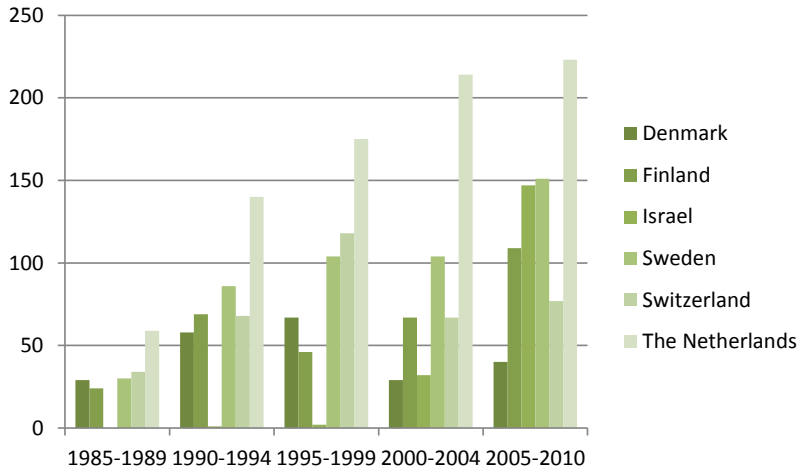
[11] These funding instruments are described in the previous chapter.

[12] DASTI (2011a)

between five to 10 projects annually. Through the 1990s, participation increased, averaging some 10-15 projects, albeit with large annual variations. The number of Individual Projects with Danish participation decreased significantly in 2001 and stabilised at around 0-3 projects annually. Through the latter three years participation in Eurostars usurped Individual Projects before finally replacing them in 2010.

This is illustrated in figure 3.3 below, contrasting Danish participation in Individual Projects, Cluster projects and Eurostars with five comparative research and innovation front age countries.

Figure 3.3: The number of endorsed Individual Projects, Cluster projects and Eurostars Projects in Denmark and comparable countries 1985-2010



Source: DAMVAD 2011 based on start dates, EUREKA participation data (2011)

As shown, compared to these countries, Danish participation in EUREKA in general decreased until the introduction of Eurostars, while other comparable countries steadily have increased their level of engagement in most of the EUREKA instruments.

3.2 A shift in the Danish funding scheme

The marked decline in the number of Individual Projects with Danish participation followed the decision of the Danish government to withdraw funding for Danish participants in EUREKA Individual Projects in 2001. Danish participation is therefore characterised by two distinct participation strategies – before and after 2001.

Conditional loans before 2001

Prior to 2001, Danish earmarked funds for EUREKA-participants amounted to some DKK 60-70 million annually (about EUR 10 million). These funds were granted as conditional loans, co-financing Danish EUREKA-participants. Maximum funding was set at: [13]

- 50 percent for SMEs participating in high-risk R&D-projects.
- 40 percent for large businesses and for SMEs participating in medium-risk projects.
- 30 percent for large businesses participating in low-risk projects.
- 100 percent for public research organisations participating as independent partners (not paid sub contractors) in the project.

Funding was granted as loans with a payback time of five years conditioned by revenues generated by the results of the project.[14] The following costs could be funded through the loan:

- Direct use of internal man hours
- Materials and equipment

[13] Danish Agency for Development of Trade and Industry (1994)

[14] There are no records as to the exact amounts granted and their distribution across participant types.

- External assistance/consultants
- Travel costs
- IT-expenses
- Other project related costs
- Patenting costs

As described in chapter 4, this impact analysis focuses on businesses participating in EUREKA Individual Projects prior to 2001. It is thus the impact of this funding scheme, which is assessed. As we will see in the following, this is a very different funding scheme employed from 2001 and forward.

No funding from 2001 and onwards

In 2001, national funding for EUREKA was withdrawn. This decision was part of shift in policy away from direct government support of businesses towards framework conditions for business-R&D. From 2001 and onwards, Danish participants in EUREKA received no national funding through participation in Individual EUREKA Projects.

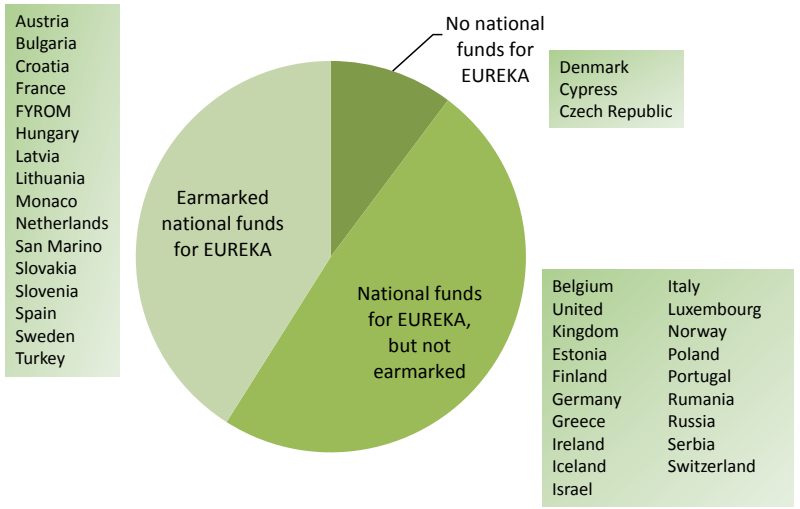
As shown in figure 3.2 above, this decision meant a significant decline in the number of Individual Projects with Danish Participation from 2001 through to 2010.

From 2001, Danish partners in Individual EUREKA Projects have largely been self-funding their participation. This is due to the fact that no Danish research or innovation programmes have referred to EUREKA as a platform for international cooperation.[15]

Figure 3.4 below shows the principal funding schemes for Individual Projects of the EUREKA-member countries.

[15] It is important to note that Danish Participants still can obtain funding from parallel participation in other funding instruments. Likewise, their EUREKA project partners retained funding for their EUREKA-participation according to their national funding scheme.

Figure 3.4: Principal funding schemes in the EUREKA member countries



Source: DAMVAD based on EUREKA participant information and information from national NPC's. No information is available for Malta and Ukraine.

As shown above, the current Danish policy of funding for EUREKA is shared by Cypress and the Czech Republic. The other member countries are divided between earmarked funds dedicated to EUREKA-Individual Projects (16 countries) and funding such projects through other national means (19 countries).

The latter category of countries covers a wide range of funding schemes in which funding for EUREKA-participants is "built in" to other national funding instruments. One such example is Germany, described in the box below:

Example: The German funding scheme

Through the German funding scheme it is possible for German SMEs participating in Individual Projects to receive grants covering 35-50% of eligible costs to a maximum of 350,000 Euro. Also, universities and research institutions can receive funding up to 100% of eligible participation costs to a maximum of 170,000 Euro. These funds are allocated as top-ups through the participation in national funding instruments.

A third group of countries retains earmarked funding specifically for EUREKA participants, either in the form of a top-up or a separate funding scheme in line with the Danish scheme prior to 2001. One such example is Hungary as described in the box below:

Example: The Hungarian funding scheme

In Hungary, large companies can receive funding for 50-75% of eligible participation costs in EUREKA Individual Projects. Small companies can receive funding of a maximum of 80% of eligible costs. Universities and research institutions can receive funding up to 100% of eligible costs. These funds are earmarked for EUREKA through special budget of 2 million euro per year.

Throughout the member circle, EUREKA is funded through a very wide range of diverse funding schemes, both in terms of source, size and form of funding.

Implications for Danish participants

Through interviews with recent Danish participants in EUREKA, it is possible to shed some light on the implications of the shift in Danish participation strategy.[16] These can be summarised as follows:

Unwillingness to do anything 'extra'. Nearly all recent Danish participants reasoned that since additional costs of EUREKA-participation were not externally funded, they were unwilling to undertake additional efforts themselves. Recent Danish participation is therefore limited to projects that meet the EUREKA-requirements by default or through very limited additional effort (e.g. already have an attached international partner, an application form already written in English, people very familiar with EUREKA, etc.).

Using existing international partners. International partners in recent Individual Projects were all well known by one or more Danish consortium partners beforehand. Danish participants felt that they had little incentive to seek out and engage new international partners in the project.

Going for the brand value of EUREKA. The EUREKA-brand played an important role in considering EUREKA-participation in the absence of additional funds. This was especially true for participants applying for national funds in parallel with EUREKA-participation. Here, participants reasoned, that EUREKA-participation had improved their chances of obtaining approval for national funds.

Foreign partners' incentives still work. The absence of national funds for Danish participants did not deter foreign partners from involving Danish participants in their consortia. Several Danish participants said that their participation in EUREKA was due to invitations from (usually well known) international partners. These were in turn motivated by additional national funding obtained through their national EUREKA-funding scheme.

The implications outlined by recent Danish EUREKA-participants indicate that the shift in the Danish participation strategy had significant impact on incentives and motivations for participating in EUREKA Individual Projects.

[16] As part of this study, we conducted interviews with all recent Danish participants in individual projects ending no earlier than 2008 (see Appendix 1).

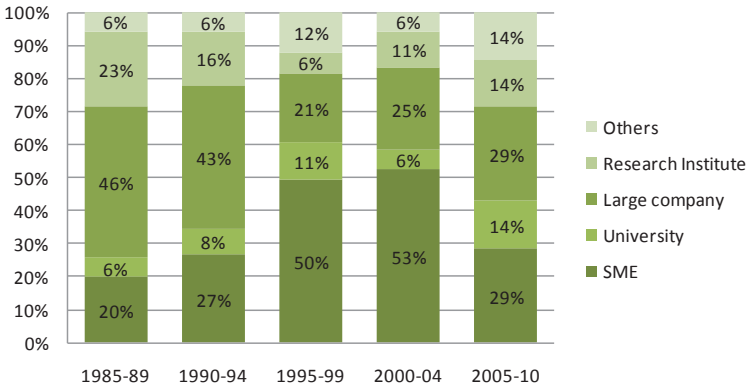
3.3 The Danish participants in Individual Projects

Through the period from 1985 to 2010, 290 Danish partners participated in 185 Individual Projects. In the following, we take a closer look at the characteristics of Danish participation in Individual Projects.

Growing share of SMEs

Figure 3.5 below gives an overview of the types of organisations participating in Individual Projects through the full period of Danish participation in EUREKA:

Figure 3.5: Participants in Individual EUREKA Projects by type (1985-2010)



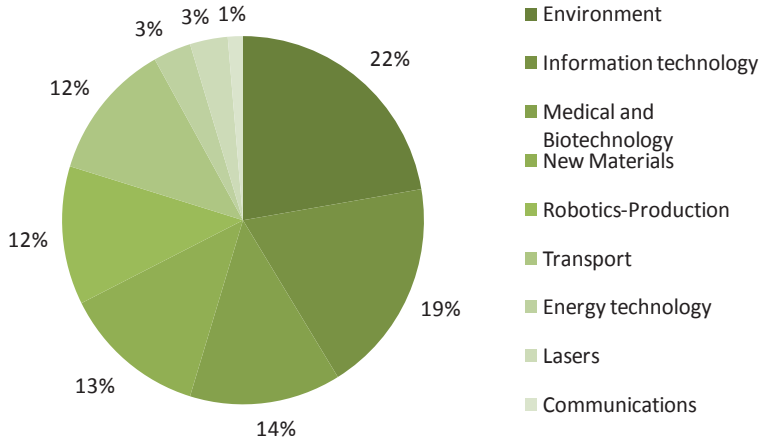
Source: DAMVAD 2011 based on start dates EUREKA participation data. "Others" include government agencies and other organization types.

While large companies held the greatest share of participants during the early years of EUREKA, the share of SMEs surpassed them through the latter half of the 90s and through to the mid-00s. During the latter years of participation, where very few projects involved Danish participation, the share of SMEs was equaled by larger companies which could self-fund their participation.

Environment, ICT and biotechnology are most frequent

Figure 3.6 below shows that Danish participants engaged in Individual Projects covering a wide range of topic areas.

Figure 3.6: Individual Projects distributed by topic area (1985-2010)



Source: DAMVAD 2011 based on EUREKA participation data (EUREKA classification of topic areas)

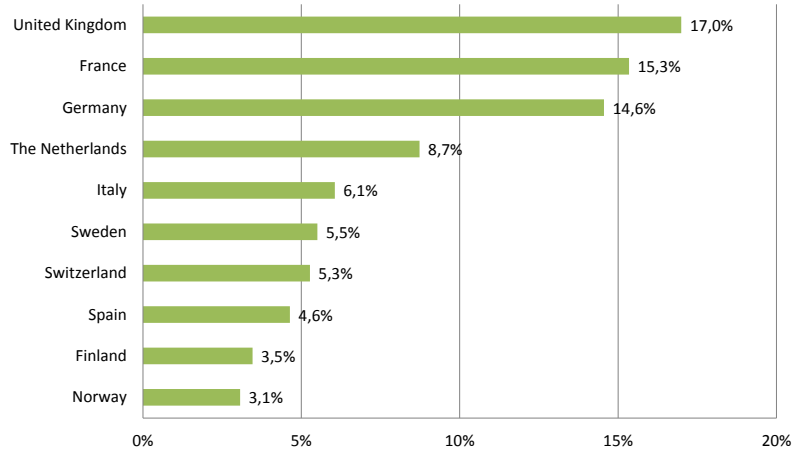
The three largest areas: environment, information technology, and medical and biotechnology accounted for more than half of all projects with Danish participation. These topic areas are also generally predominant for Individual Projects in EUREKA as a whole. These areas correspond to the three priority areas in the Seventh Framework Programme, where Danish participants are most active (measured by number of participants).[17]

Partnerships concentrated in top-five countries

Figure 3.7 gives an overview of the post frequent partner countries in Individual EUREKA Projects with Danish participation:

[17] DASTI (2010), p. 34

Figure 3.7: Top ten partner countries' share of all partnerships in Individual EUREKA Projects (1985-2010)



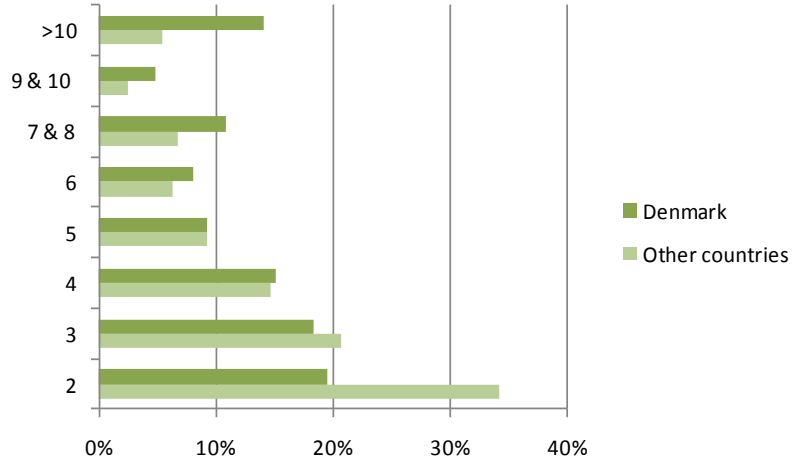
Source: DAMVAD 2011 base on EUREKA-participation data. Where more than one partner from the same country participates in a project, these are counted more than once.

As shown above, the top ten partner countries account for 84 percent of all partnerships. The top three partners – United Kingdom, France and Germany – account for nearly half of all partnerships (47 percent). The most important partner countries in EUREKA Individual projects mirror the most important ones in EU's Seventh Framework Programme.[18] EUREKA thus seems to reinforce cooperative ties with the "usual" circle of Danish partner countries for international R&D-cooperation – countries in relatively close geographic proximity and with a similar level of wealth. Interestingly, EUREKA does not appear to be widening this circle.

Danish participants are part of larger consortia

Figure 3.8 shows the share of consortia of various sizes for Denmark and EUREKA member other countries.

Figure 3.8: Size of consortia as share of all consortia for Denmark and other countries (1985-2010)



Source: DAMVAD 2011 based on EUREKA participation data

As shown above, Danish partners generally participate in larger consortia than other EUREKA member countries. This tendency is most pronounced among the largest and smallest consortia.

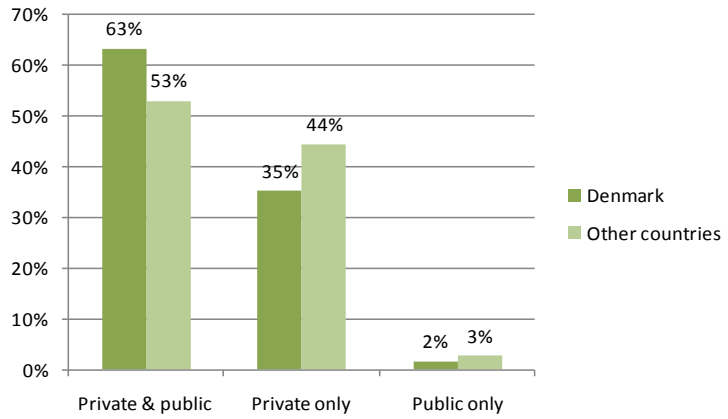
As described in chapter 2, the minimum consortium size allowed under the requirements of Individual Projects is composed of two partners from separate countries. 19 percent of consortia with Danish participants are of this type versus 34 percent across all other member countries. Inversely, 14 percent of consortia with Danish participation consist of ten or more participants versus six percent for other countries.

Public-private consortia are most common

Figure 3.9 below shows the shares of public and private consortia constellations in Individual Projects with Danish participation and for other member countries.

[18] DASTI (2010), p. 43

Figure 3.9: Public and private consortia constellations for Denmark and other member countries (1985-2010)



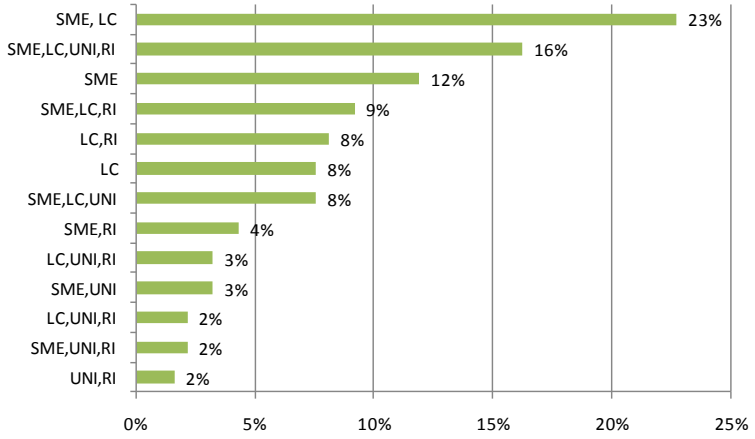
Source: DAMVAD 2011 based on EUREKA participation data

As shown, consortia with both public and private partners are most common. Also, public-private consortia take up a larger proportion of Danish participation than for other countries. Common for all Eureka Individual projects is that very few consortia are composed entirely of public sector organisations.

Small and large business partners are most frequent

Figure 3.10 below shows a breakdown of the most common consortia types involving Danish participation in EUREKA-Individual Projects.

Figure 3.10: Consortia constellations in consortia with Danish participation



Source: DAMVAD 2011 based on EUREKA participation data (SME = small and medium enterprise, LC = large company, UNI = University, RI = Research Institute). The consortia types involve one or more of the partner type.

While public-private consortia are the most common consortium type overall, the single most common consortia constellation involves one or more SME's and large companies. Interestingly, the second most important consortia type, accounting for 16 percent of all consortia with Danish participation, has representation from all four partner types.

3.4 Participants' R&D behaviour

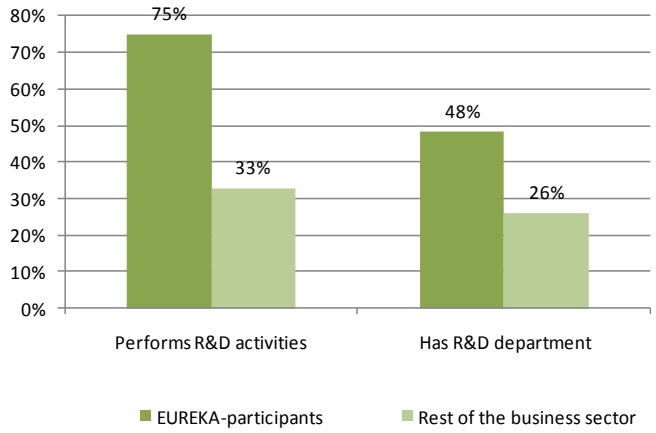
In this section, we take a closer look at the R&D-behaviour of EUREKA-participants in comparison with the rest of the business sector. This analysis is limited to business participants in EUREKA during the period 1990-2000[19], which are also represented in national R&D-statistics.[20]

[19] These are the businesses included in the impact assessment, described the next chapter.

More R&D-performers among EUREKA-participants

Figure 3.11 below shows the share of R&D performing businesses and businesses with a dedicated R&D-department among EUREKA-participants and the rest of the business sector.

Figure 3.11 Share of businesses performing R&D and with R&D-department



Source: DAMVAD 2011 based on EUREKA participation data and private sector R&D-statistics from Statistics Denmark. For participants N=56 and for the rest of the businesses sector N=11.112.

As shown above, the share of R&D-performers among EUREKA-participants is nearly twice that of businesses in general. Noticeably, one in four EUREKA-participants is not an R&D-performer. The share of businesses with a dedicated R&D-department is also significantly higher among EUREKA-participants.

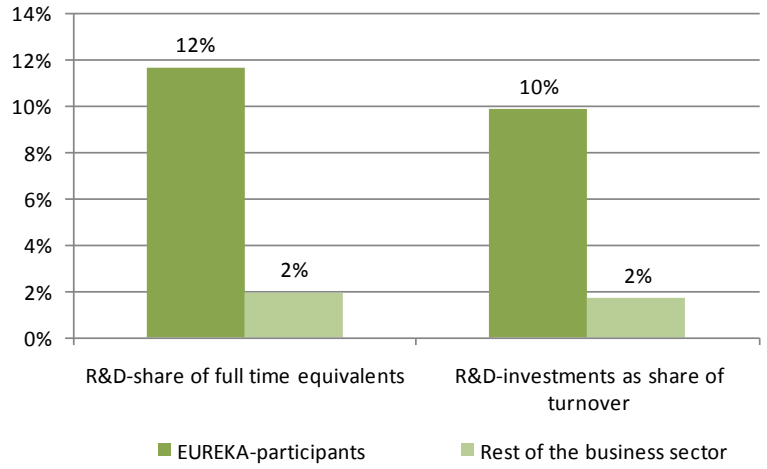
[20] R&D-data on business participants is selected from the participation year as well as the subsequent and following year and data is selected for the earliest possible year. The same method is applied for the business sector in general. Each participating business appears only once.

The majority businesses choosing to participate in EUREKA-Individual projects are already actively involved in R&D and nearly half have a dedicated R&D-department before entering the project.

EUREKA-participants are heavily dedicated to R&D

Figure 3.12 compare time and investments dedicated to R&D for EUREKA-participants and for the rest of the business sector.

Figure 3.12 R&D-intensity and R&D investments



Source: DAMVAD 2011 based on EUREKA participation data and private sector R&D-statistics from Statistics Denmark. For participants N=56 and for the rest of the businesses sector N=11.112.

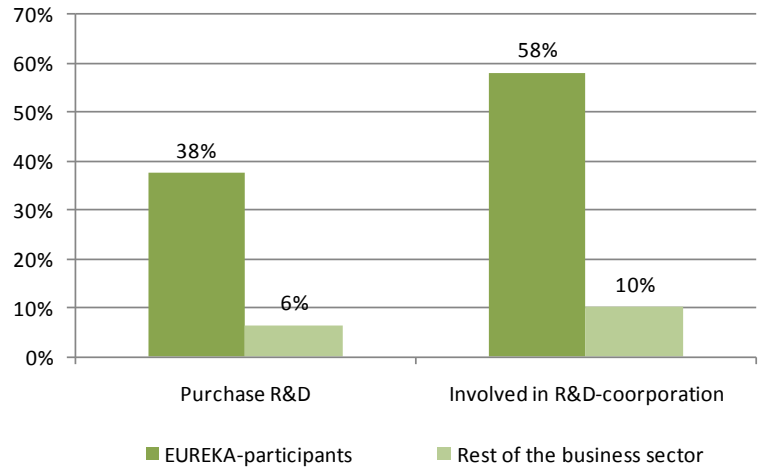
As shown above, EUREKA-participants dedicate significantly more time and money to R&D-activities than the rest of the business sector – by a factor of six and five, respectively. While R&D-intensity is already high before participation, these factors are likely to increase further as part of the involvement in EUREKA.

Given these differences, participants in EUREKA are already heavily dedicated to R&D-activities before entering the project compared to businesses in general.

EUREKA-participants purchase and cooperate more

Figure 3.13 shows the share of businesses purchasing R&D from external suppliers among EUREKA-participants and for the business sector in general. Also, the figure shows the share of businesses involved in R&D cooperation with external partners.

Figure 3.13 R&D-purchase and R&D cooperation



Source: DAMVAD 2011 based on EUREKA participation data and private sector R&D-statistics from Statistics Denmark. For participants N=43 and for the rest of the businesses sector N= 8.179.

The share of businesses purchasing R&D and involved in R&D-collaboration is significantly higher among EUREKA-participants than for businesses in general. Interestingly, before involvement in the EUREKA-project, 42% of participants were not involved in R&D-collaboration with external partners.

Danish participation in summary

As described in this chapter, Denmark has a varied history of participation in EUREKA. Denmark was among the first EUREKA-member countries to join the network in 1985.

Danish involvement in EUREKA is characterized by a marked shift in participation 2001, where national funding for EUREKA was withdrawn. The annual number of projects with Danish participation declined significantly. The participants' interest and willingness to participate have been declining because of this, recent participants in Individual Projects say. With the introduction of Eurostars in 2008 Danish participation again increased to mid-1990s levels.

The most frequent topic areas for Danish participation are environment, ICT and biotechnology. Danish partnerships are concentrated on relatively few countries. In comparison with other EUREKA-member countries, Danish participants are involved in larger consortia, most frequently private-public partnerships. Nonetheless, the single most frequent consortium type is composed of small and large businesses.

Taking a closer look at the R&D-behavior of business-participants from 1990 to 2000, these are different from Danish businesses in general on several accounts: The share of R&D-performers is significantly higher, they are more R&D-intensive in terms of both time and money, and they cooperate more with external R&D-partners.

It is these businesses that are the focal point of the next chapter. In the following, we take a look at the impact of EUREKA on participating businesses.

4 The impact of EUREKA

The focus of this chapter is the impact of EUREKA Individual Projects on participating Danish businesses in terms of productivity, exports, turnover and employment. In the following we compare these with similar businesses in general and with similar businesses participating in other funding instruments, respectively.

4.1 What is meant by impact

The key question addressed in this impact analysis is the question of causality. This means determining whether participation generates an increase in companies' performance or whether already well-performing businesses chose to participate.

In order to tell whether companies experience an increase in performance *as a result* of participation in EUREKA it is therefore important to establish a proper basis for comparison – the counterfactual situation.

The construction of a control group enables a comparison between participations and a group of similar companies with the purpose of analyzing whether participants performs better than none-participants.

Establishing control groups

In this impact study, we establish two separate control groups and use each to compare the performance between participants and similar non-participants.

One consists of a group of 756 Danish companies with similar characteristics as participants. The second consists of 79 companies, which in addition to having similar company characteristics as participants, previously have participated in other funding instrument.

Combined, these two control groups constitute a comparison basis which allows us to analyze whether participation contributes to economic performance of Danish businesses and at the same time analyze whether participants experience an increase in performance *in addition* to the effect of participating in other funding instruments.

Companies are selected for a control group according to the matching method called "propensity score matching". This method estimates for each company the probability of participating in EUREKA conditional on company-specifics, such as industry, company size, turnover per employee, and exports per employee. According to the estimated probability, participants are matched to similar non-participants according to *nearest neighbour* matching method. This is further elaborated in appendix 1.

As a result, the control groups consist of companies that are similar to participants, where the only observed difference is the fact that these companies did not participate in EUREKA.

As a basis for statistical analysis, the 76 EUREKA participants included in the study is a relatively low number. This constitutes a challenge for the impact assessment, especially in terms of estimation precision and the relatively large influence of outliers. In order to improve the precision of the estimation and to increase the robustness of the results, this analysis utilizes a matching technique, which identifies ten similar non-participants for each EUREKA-participant[21]. As a result, the number of observations is increased, which improves the estimation precision thereby enhancing the opportunity of obtaining statistical significant results.

However, the number of businesses participating in other programs is relatively low. As a result, participants are matched one to one with this second control group. As we will see below, it is still possible to achieve statistically significant results, using this control group.

[21] Appendix 1 explains the implemented matching procedure in greater detail.

Impact measurement

Businesses' performances are studied across time with the purpose of analysing any differences in performance between participants and companies in the two separate control groups. The impact assessment is carried out using a *difference in difference* approach, as further explained in appendix 1.

Data for the impact assessment consists of information on businesses' economic performance during the period 1990-2008, which is found in the Accounts-Statistics and VAT-statistics provided by Statistics Denmark.

As performance measurements we use the *growth in*:

1. Productivity per full time equivalent[22]
2. Export per full time equivalent
3. Turnover per full time equivalent
4. Total number of full time equivalents

Companies are included in the analysis from the participation year and onwards,[23] which enables us to study how the effect of participation changes over time. Constant prices are used throughout the analysis in order to avoid any inference coursed by the rate of inflation.

In order to enhance the robustness of the results certain performance criteria are imposed which are described in appendix 1. To strengthen the robustness even further we remove the 5 percent best and worst performances for participants and non-participants.

In the following, we describe the impact of EUREKA against the two control groups described above.

Statistical significance

Statistical significance (here shorted "sign.") indicates the likelihood that the difference has occurred by chance. A low significance thus equals a strong result. I.e. 5 pct. sign. indicates that there is a 95 % probability for having a real correlation. 10 pct. Sign. indicates that there is a 90% probability for real correlation.

[22] A full time equivalent is equal to the normal hours of labour of a full time employee.

[23] Companies in the control groups are included in the analysis according to the year of participation for the matched participant.

4.2 The impact of EUREKA on productivity growth

Labour productivity is a measure of the average value created by a business per labour year performed.[24] Growing labour productivity means that businesses are improving the size of their income relative to their expenses – thus becoming more competitive. To increase the productivity and competitiveness of European businesses through technology is a key goal of the EUREKA-network, as described in chapter 2.

Figure 4.1 and 4.2 compares growth in labour productivity of EUREKA-participants to similar businesses in general and with similar businesses participating in other funding instruments, respectively. EUREKA-participants are labelled "treatment", while the comparison group is labelled "control". The blue arrows indicate statistically significant differences[25] between the two groups. Both comparisons are made over a time period of six years since participation in EUREKA.

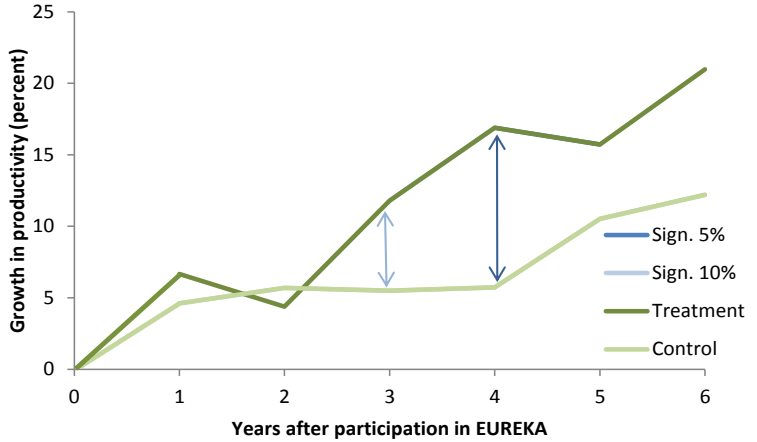
Participants outperform similar businesses

Figure 4.1 shows that compared to similar businesses, EUREKA participants experienced significantly higher growth in labour productivity three and four years after participation.

Three years after participation, labour productivity of EUREKA-participants grew more than twice as fast as non-participants (by 11.8% and 5.5%, respectively). Four years after participation, the difference in growth rates between participants and non-participants further increased. On average, growth rates for participants were 16.9% while labour productivity of non-participants grew by 5.7%.

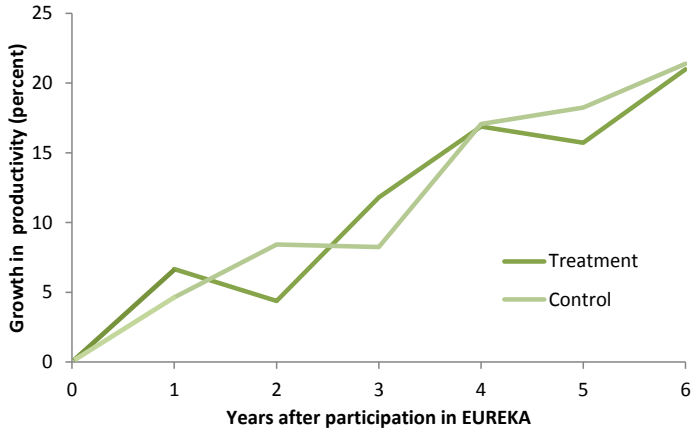
[24] Defined as the business' turnover minus its expenses divided by the total number of full time equivalents in the business.

Figure 4.1: Productivity growth of EUREKA participants compared to similar Danish businesses not participating in cooperation programmes



Source: DAMVAD 2011. The total number of observations is 76 for the treatment group and 756 for the control group.

Figure 4.2: Productivity growth of EUREKA participants compared to similar businesses participating in other national and international cooperation programmes



Source: DAMVAD 2011. The total number of observations is 76 for the treatment group and 79 for the control group.

Participants equal participants in other programmes

Figure 4.2 shows that growth in labour productivity of EUREKA-participants was not significantly different from that of similar businesses participating in other consortia programmes. With some variation, EUREKA-participants and participants in other consortia type programmes share similar growth rates in labour productivity throughout the six year period after participation.

Interpreting results

The results of the impact assessment show that EUREKA participation significantly increased growth in labour productivity. These productivity gains are on par with similar businesses participating in other funding instruments.

Recent studies carried out by DAMVAD and others as well as interviews with recent participants in Individual Projects suggest some possible explanations for this result:

Raising R&D-expenditure: In a recent study DAMVAD found that private R&D-investments had a marginal return of 66%[26] for R&D-active businesses and 30% for innovative businesses. [27] Given the co-financing-requirements of Individual EUREKA Projects (see chapter 2), the productivity gains of EUREKA-participants over similar non-participants may be explained by increasing participants' R&D-expenditure over what it would otherwise have been.

Public private cooperation: In another study, DAMVAD found that marginal returns from R&D expenditure are increased further if made in cooperation with a university or TNO and still further if made in cooperation with both. [28] As described in chapter 3, Danish EUREKA-participants most frequently participate in broad constellations of public and private partners. .Additional cooperation with other organisations may likewise have contributed to productivity gains of participants over non-participants.

Some examples from interviews with recent EUREKA-participants shed more light on these general findings:[29]

Commercially successful application: One business interviewed successfully implemented a new and stronger material in its production line, decreasing production time and costs. This first application prompted further experimentation and new applications.

An early "no-go": One business interviewed actively used collaboration to test early development ideas against partners' expertise, obtaining an early and external go/no-go decision as to whether to proceed with the project. Interestingly, while the project was found to be technologically or economically unfeasible, the project allowed termination of the project much earlier than would otherwise have been possible. This saved resources, which were then available for other R&D-efforts.

Raising terminal value: One business interviewed used cooperation as a means to raise the secondary value of the project to the point where failure of the core idea was not decisive for deeming the project a failure. This business indicated, that even though the project idea proved infeasible, the secondary value in terms of learning, education, international development partnerships, and new ideas generated by the project made up for failure of the core idea.

[26] In other words, each additional DKK spend on R&D translates into DKK 1.66 of additional turnover.

[27] DAMVAD (2010)

[28] DAMVAD (2011)

[29] As part of this study, we conducted interviews with all recent Danish participants in individual projects ending no earlier than 2008 (see Appendix 1).

4.3 The impact of EUREKA on export growth

Export per full time equivalent is a measure of the value of the goods and services that businesses sell outside of their national markets per unit of labour.[30] As described in chapter 2, boosting national economies on the international market is an important goal of the EUREKA-network.

Participants outperform similar businesses

Figure 4.3 shows that compared to similar businesses, EUREKA participants experienced significantly higher growth in exports three years after participation.

Three years after participation, exports of EUREKA-participants grew more than twice as fast as non-participants (by 22.4% and 9.7%, respectively).

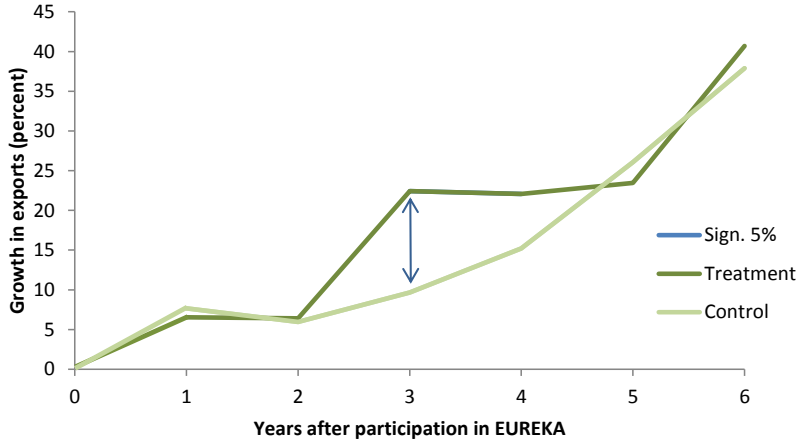
Participants outperform participants in other consortia type programmes

Figure 4.4 shows that compared to similar businesses participating in other funding instruments, EUREKA-participants likewise experienced significantly higher growth in exports three years after participation.

Three years after participation, exports of EUREKA-participants grew more than twice as fast as participants in other instruments. At this point the export growth for EUREKA-participants and participants in other instruments were 22.4% and 8.8%, respectively.

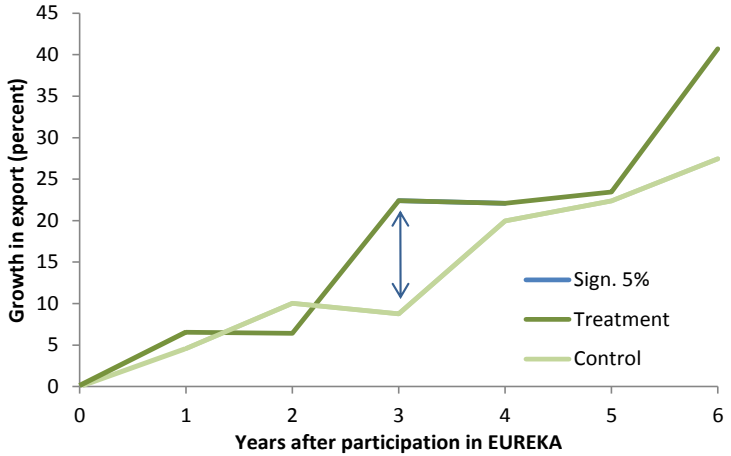
[30] Defined as the business' turnover abroad divided by the total number of full time equivalents in the business.

Figure 4.3: Export growth of EUREKA participants compared to similar Danish businesses not participating in cooperation programmes



Source: DAMVAD 2011. The total number of observations is 76 for the treatment group and 756 for the control group.

Figure 4.4: Export growth of EUREKA participants compared to similar businesses participating in other consortia programmes



Source: DAMVAD 2011. The total number of observations is 76 for the treatment group and 79 for the control group.

Interperting results

The results of the impact assessment show that EUREKA participation significantly increased growth in exports, some three years after participation. Growth in exports for EUREKA-participants was higher than similar businesses in general as well as similar businesses participating in other funding instruments. Interviews with recent participants in Individual Projects as well as the impact of EUREKA on productivity suggest some possible explanations for this result:

The internationalisation requirement. As described in chapter 2, a key requirement of Individual Projects is participation from at least two EUREKA-member countries. This requirement created an economic incentive to cooperate with new or existing business partners abroad. Among recent business participants, [31] there are several examples of buyers and suppliers cooperating internationally along the value chain. These relationships may provide more important export opportunities for EUREKA-participants than for participants in other funding instruments (with no internationalisation requirement) or businesses in general.

Increased competitiveness. As shown above, labour productivity of EUREKA-participants improved significantly. EUREKA-participants thus increased their competitiveness, making them more attractive for international as well as national buyers. While productivity gains of EUREKA-participants equalled participants in other funding instruments they outperformed them in terms of exports. This may suggest that export gains of EUREKA-participants could be due to increased productivity *in concert* with intensified or new cooperative ties with international business partners, rather than productivity alone.

[31] As part of this study, we conducted interviews with all recent Danish participants in individual projects ending no earlier than 2008 (see Appendix 1).

4.4 The impact of EUREKA on turnover growth

Turnover growth per full time equivalent is a measure of the income that businesses generate from the sale of goods and services.[32] Growth in sales is an indication that businesses are growing their markets, selling more goods and services to existing or new customers.

Participants outperform similar businesses

Figure 4.5 shows that compared to similar businesses, EUREKA participants experienced significantly higher growth in turnover four years after participation. Turnover of EUREKA-participants grew more than twice as fast as non-participants (by 10.5% and 5.1%, respectively).

Participants equal participants in other consortia type programmes

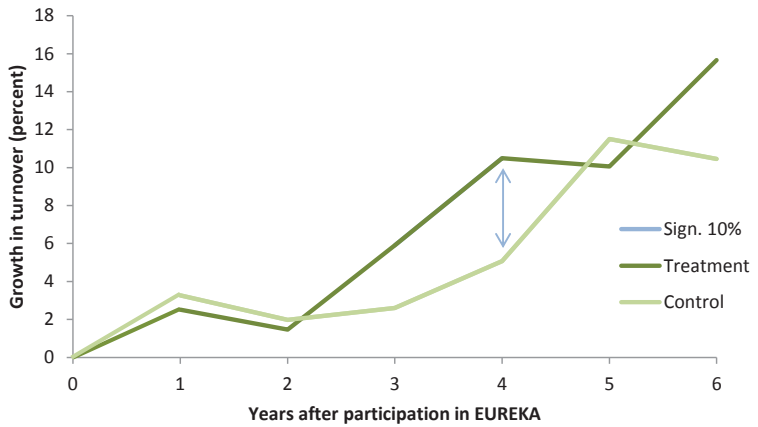
Figure 4.6 shows that growth in turnover of EUREKA-participants was not significantly different from that of similar businesses participating in other consortia type programmes. EUREKA-participants and participants in national programmes share similar growth rates in turnover throughout the six year period after participation.

Interpreting results

The results of the impact assessment show that EUREKA participation significantly increases growth in turnover over similar non-participants. Growth in turnover is on par with similar businesses participating in other consortia type programmes.

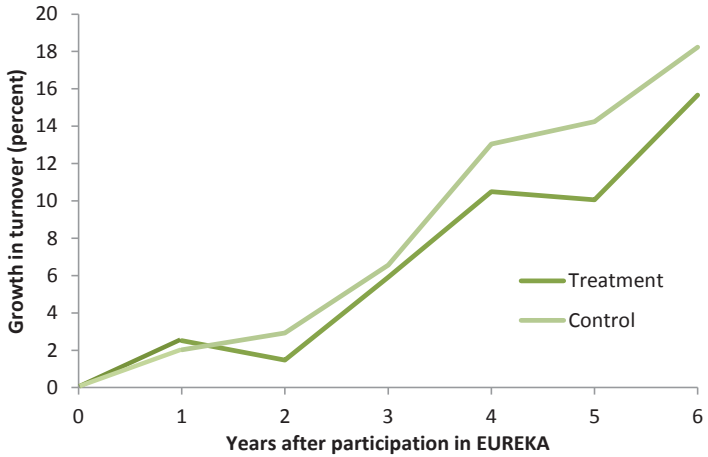
[32] Defined as the business' turnover divided by the total number of full time equivalents in the business.

Figure 4.5: Turnover growth of EUREKA participants compared to similar businesses not participating in cooperation programmes



Source: DAMVAD 2011. The total number of observations is 76 for the treatment group and 756 for the control group.

Figure 4.6: Turnover growth of EUREKA participants compared to similar businesses participating in other consortia programmes



Source: DAMVAD 2011. The total number of observations is 76 for the treatment group and 79 for the control group.

This result is in line with an earlier analysis of expected turnover from participation in EUREKA-projects, conducted by the EUREKA Secretariat. (see box below).

Conclusions from the EUREKA Secretariats study of final reports

Based on an analysis of 1.000 final reports from businesses participating in EUREKA from 2000 to 2005 (20% of the overall participants), this study found, that participation resulted in 13 million of additional turnover for each million of public investment in a EUREKA project (achieved and expected). Final reports are based on Participants data and assumptions (not an audit).

While the conclusions of this impact study cannot confirm the sizes of these figures, both studies indicate a positive relationship between participation in EUREKA and turnover. This result should be seen in light of the earlier results of the impact assessment, which suggests some possible explanations for this result:

Emphasis on foreign markets. As described earlier, businesses participating in EUREKA experienced higher growth in exports than similar non-participants. Combined with higher growth in turnover (see figure 4.3), this suggests that EUREKA-participation increases emphasis on foreign markets. For participants in other funding instruments, a different picture emerges. While EUREKA participants experience higher export growth, turnover remains the same. One possible explanation is that increased emphasis on foreign markets – and thus exports – comes at the cost of decreased emphasis on national markets.

Increased competitiveness. The impact of EUREKA on turnover is similar to impact on labour productivity, which was described earlier. Here, EUREKA-participants experienced higher productivity growth than non-participants, but similar productivity growth to participants in other consortia type programmes. In light of this result, the impact on turnover may be explained by increased productivity compared to non-participants.

4.5 The impact of EUREKA on employment growth

Growth in employment is a measure of the amount of labour employed by a business and thus the level of its activity. As described in Chapter 2, job creation is an explicit goal of the EUREKA-network. Here, growth in employment is measured as the relative increase in the number of full time equivalents of labour carried out by a business. Increasing employment means that the businesses employ more labour, either by hiring new employees or increasing the hours of labour of the existing labour force.

Participants outperform similar businesses

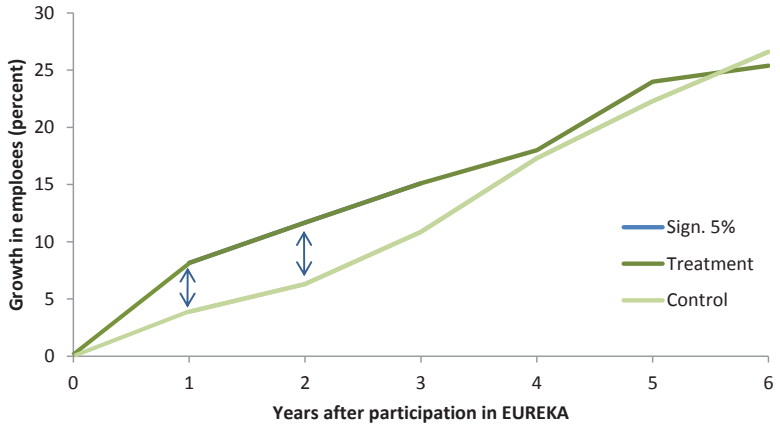
Figure 4.7 shows that compared to similar businesses, EUREKA participants experienced significantly higher growth in employment one, two and three years after participation in a EUREKA-Individual Project. Unlike productivity, exports and turnover described above, the impact of employment appeared from year one after participation, and persisted through to (and including) year three.

The relative difference between participants and non-participants is greatest in year one (8.1% versus 3.9%, respectively), decreasing towards the end of the period (with 15.1% and 10.9% in year three, respectively).

Participants outperform participants in other instruments

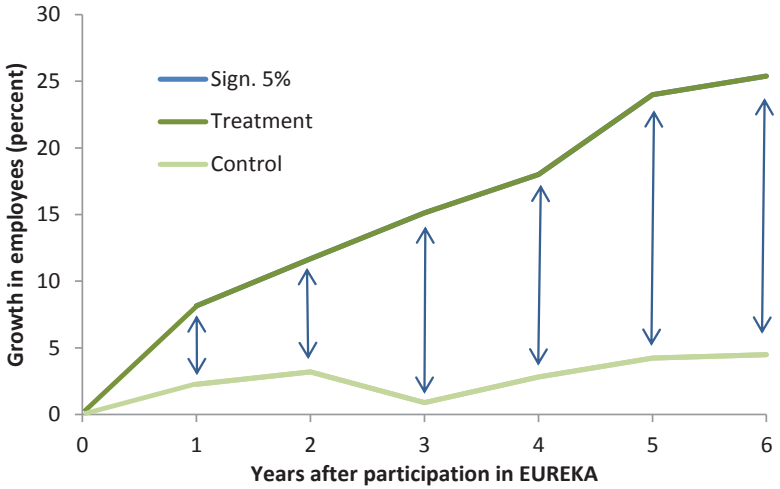
Figure 4.8 shows that compared to similar businesses participating in other funding instruments, EUREKA-participants experienced significantly higher growth in employment throughout the six year period of the impact study.

Figure 4.7: Employment growth of EUREKA participants compared to similar businesses not participating in cooperation programmes



Source: DAMVAD 2011. The total number of observations is 76 for the treatment group and 756 for the control group.

Figure 4.8: Employment growth of EUREKA participants compared to similar businesses participating in other consortia programmes



Source: DAMVAD 2011. The total number of observations is 76 for the treatment group and 79 for the control group.

Interpreting results

The results of the impact assessment show that EUREKA participation significantly increased growth in employment. This impact is significant from year-one after participation and persists for several years for both control groups.

In light of the earlier results of the impact assessment as well as insight into the Danish funding scheme, some possible explanations are:

Increasing turnover and exports. As shown earlier, EUREKA-participants experienced significantly higher growth in both turnover and exports compared to non-participants. A higher level of activity (more sales) in both the Danish home market and on foreign markets is likely to have increased the need for labour.

An injection of capital. As described in chapter 2, funding for EUREKA-participants was granted in the form of loans with a payback time of five years conditioned by revenues generated by the results of the project. Following approval, this loan was granted at the start of the project. This is likely to have prompted initial hiring of additional labour for the project itself as well as for any support functions needed. Additional investments in labour may have persisted for a number of years after the initial launch of the project, which may explain why labour growth persists for a number of years after participation.

A shifting labour force composition. A third factor potentially contributing to growth in labour may be a change in the composition of the labour force to accommodate more the knowledge-intensive functions of R&D-activities of the project itself or subsequent R&D activities prompted by it.

5 The transition to Eurostars

This chapter takes a closer look at the newest policy instrument in the EUREKA-network, the *Eurostars Joint Programme.* It gained approval from the European Parliament and Council in 2007 and was launched in 2008. While it is too early to include Eurostars-participants in an impact assessment, this chapter introduces the Eurostars Programme and presents the early indications from Danish participants. These are based on interviews with participants.

5.1 Setting Eurostars apart

As described in chapter 2, Eurostars is one of four policy instruments employed by the EUREKA-network. Eurostars is an initiative set up under Article 185 of the Treaty on the Functioning of the European Union, in partnership between the European Commission, 27 Member States and 6 associated countries[33]. Eurostars is organised around and managed by the EUREKA-network. At the national level, the programme is coordinated by National Programme Coordinators (NPCs) and National Funding Bodies (NFBs). In Denmark, DASTI coordinates the Danish participation in the Eurostars Programme[34].

Eurostars attempts to harmonise and synchronise national support programmes for SMEs[35]. The Eurostars Programme aims to give research-intensive SMEs[36] the opportunity to apply for grants in international project consortia, which can comprise R&D performing SMEs, research organisations and/or large companies from at least two EUREKA member countries. With its particular focus on SMEs, the main participant of the consortium must be a research-performing SME, and at least 50% of the project's core activity should be carried out by SME[37]. With an additional focus on promoting *market-driven projects*, Eurostars projects must have a maximum of three years duration, and the products and services developed must be available to the market no later than two years after project.

The approval of projects for funding is based on formalised project evaluation and ranking criteria. The national funding bodies only screen the applications, without a granting mandate. The evaluations and rankings are centrally performed by a single international panel of experts consisting of Eurostars technical experts and the Eurostars Independent Evaluation Panel (IEP). Thus, national funding bodies do not interfere with the ranking process.

Eurostars-projects are funded through a "virtual common pot". That is grants for Eurostars project applications are jointly funded by national funds and from the EU Commission[38]. The participating countries, have committed an earmarked budget to the Eurostars Programme for each cut-off date (there are two annual cut-off dates) funding participation from the respective countries.

Member countries fund their national shares of approved Eurostars-projects in prioritised order, based on project evaluations, until the national allocation is depleted. Because national earmarked budget levels vary considerably between member countries, some countries may run out of its national earmarked funding before others. Eurostars projects can only be initiated when funding commitments from all countries participating in the project have been made or alternatively

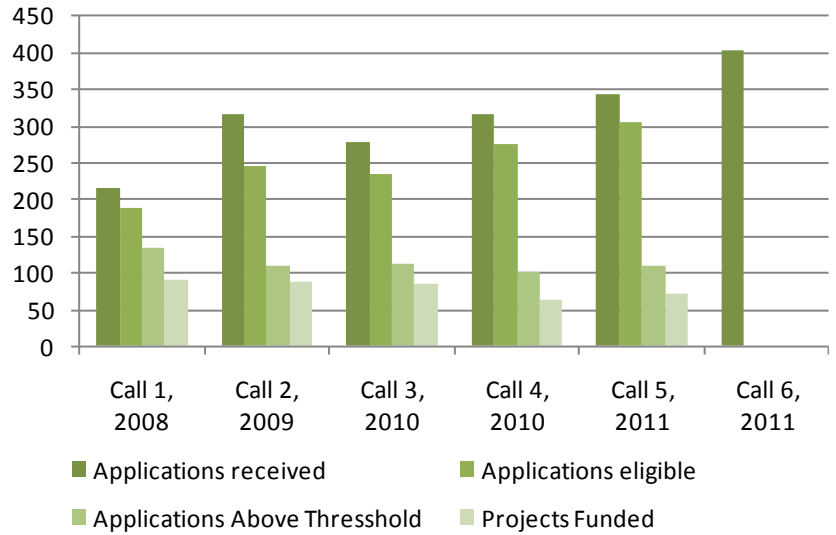
[33] All EU Member States are involved in Eurostars. In addition, Croatia, Iceland, Israel, Norway, Switzerland and Turkey are also participating (Interim Evaluation, Eurostars (2010))
[34] Interim Evaluation, Eurostars (2010)
[35] Interim Evaluation, Eurostars (2010)
[36] An R&D performing SME is an SME in which at least 10% of manpower in terms of full time equivalent (FTE) is occupied with R&D or 10% of annual turnover is dedicated to R&D.
[37] EUREKA (2011)
[38] The public funding originally committed to the Eurostars Programme between 2008 and 2013 amounts to 400 M€. Of this, 75 pct. (300 M€) is provided by the governments of the Eurostars Member Countries and 25 pct. (100 M€) by the 7th Framework Programme of the EU. On a project-level, the Commission's financial contribution to approved Eurostars projects is at most 33% of the national financial contribution (Interim Evaluation, Eurostars (2010))

a partner decides to self-fund their part. A shortfall of any country to fund the joint project may result in the cancellation of the project, since no projects with participation from that country will be funded, despite the formal approval of the project.

Since the first Eurostars call in 2008, the number of applications, approved projects as well as the national earmarked funds have increased steadily. A major increase in the number of approved projects took place when two annual calls were introduced in 2010.

From call to call there has been a steady increase of 15-20 pct. in the number of applications. In the latest call (spring 2011), 400 applications were received making it the largest call so far. With the second call coming up in September a total of 850 Eurostars-applications are to be expected in 2011. Around 150 Danish projects will receive grants this year. The Earmarked budget has likewise increased. The development is shown in figure 5.1. Note that applications for call six have just been received, and have not yet been evaluated.

Figure 5.1: Development in Eurostars applications from 2008 to 2011



Source: Interim Evaluation, Eurostars (2010)

Figure 5.1 also shows the approval rate of applications. Applications above the funding threshold are applications that have received a positive evaluation, but were not funded because of insufficient funds.

Summing up, the Eurostars Programme is set apart from Individual EUREKA Projects through the following characteristics:

- the combined central and decentralised management and common guidelines for all member countries. Whereas other Individual EUREKA Projects are managed at a decentralised level, Eurostars applies central programme management for application and evaluation but national management for funding.
- Eurostars has been the first European funding and support programme to be specifically dedicated to SMEs

- Eurostars projects are collaborative (rather than individual), meaning that they must involve at least two participants (legal entities) from two different Eurostars participating countries[39]
- the international virtual common pot with joint funding for Eurostars projects by national research and innovation funds and the EU Commission
- the financial instruments of the two programs also differ. In Eurostars grants are provided as project funding whereas Individual EUREKA projects are based on loans.

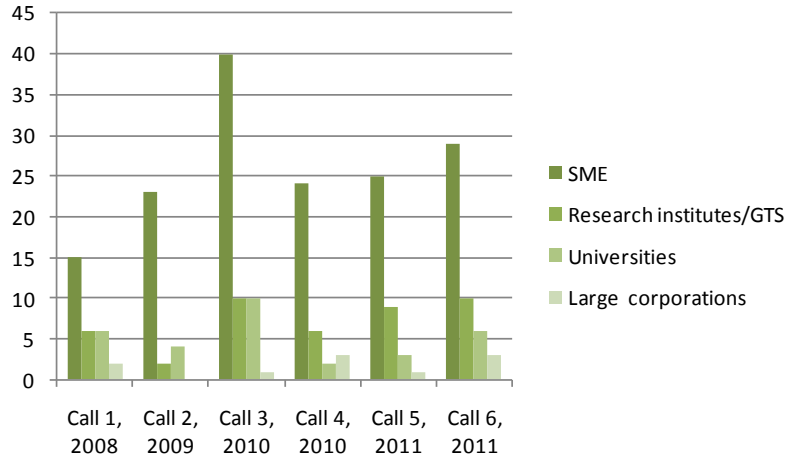
In the following, we take a closer look at Danish participation in Eurostars.

5.2 Danish participation in Eurostars

As described in chapter 3, Eurostars have now surpassed Individual EUREKA Projects as the primary instrument for EUREKA and hence also for Danish participation.

The number Danish project applications with Danish participation rose from 21 applications in the first call (2008) to 29 project applications in call 6 (2011). The types of applicants that participate in the projects comprise universities and research institutes, large companies and SMEs as is depicted in the figure below, showing the development in the types of applicants on the projects with Danish participation.

Figure 5.2: Types of Danish applicants in Eurostars applications



Source: DASTI (2011)

As the figure indicates it is not surprising that the vast majority of project applicants are SMEs as their participation in Eurostars is a funding criterion. SME participation accounts for 72 percent of the project participants.

The share of Danish university participants is slightly higher than the overall Eurostars average[40]. The difference could be seen in relation to the marked oriented system of Approved Technological Service institutes (GTS-Institutes) in Denmark which traditionally have played an important role in creating synergy between SME's and research institutions.

[39] Eurostars (2011)

[40] Eurostars Secretariat (2011)

In the recent round of applications (call 6), the Danish participants in the 29 applications with Danish participants contained 29 SMEs, 10 GTS-institutes, 6 universities, and three large companies[41].

Project profile

The overall profile of Eurostars projects are shown in the table below.

Table 5.1: Project profile

Characteristics	Average project	Average Danish project
Consortia	3 participants	3,7 participants
Budget	1,4 million Euro	1,6 million Euro
Duration	27 months	26 months
Partnering countries	2 countries	2 countries

Soruce: Eurostars Secretariat (2011)

As the table shows, the Danish projects are mirrored in the characteristics of the average Eurostars projects, however with small variations. Interestingly, the characteristics of the Danish Eurostars participants differ from that of Individual EUREKA projects as these characteristics depicts larger project with bigger consortia, participating countries and budgets, as described in Chapter 3.

Funding

As presented, the funding scheme for projects in Eurostars program is divided between national funding and funding from EU through the virtual common pot system. Thus, the projects with Danish participants activate the funding system from DASTI and the EU. The table below provides an overview of Eurostars funding of projects and the corporate funding. Furthermore, the table shows the funding of Danish partners in programme as well as DASTI's contribution to these projects.

Table 5.2: Overview of the Eurostars funding (Million Euros)

	Call 1, 2008	Call 2, 2009	Call 3, 2010	Call 4, 2010	Call 5, 2011	Total
Total budget (All countries)	129	128	130	80	107	574
Corporate funding (total, all countries)	69	65	69	42	58	303
Public funding (total, all countries)	60	63	61	38	49	271
EC funding	15	16	15	10	12	68
Member states' funding	45	47	46	28	37	203
Funding of Danish partners (DASTI + EU)	1,3	1,4	4,1	1,6	2	10,4
Share of funding for Danish partners RTI + EU) of the total public funding	2%	2%	7%	4%	4%	4%
RTI's contribution for Danish partners	1	1,1	3	1,2	1,5	7,8

Source: Eurostars secretariat (2011). The "call year" is referring to the year where the funding decision was taken

The Danish participation in projects as listed in the table above shows that the share of funding for Danish partners has increased from 1.3 million Euros in the first call in 2008 to 2 million Euros in the fifth call in 2011. The contribution from the Danish National Funding Body, DASTI, has followed the increase but in a slower rate. In relation to this, it is worth noting that starting from 2010 there have been two annual calls which has also resulted in an increase in project funding and thus the amount of projects that get funded.

During the period from 2008 to 2010, Denmark doubled its share of the total funding from Eurostars from 2 percent in the first call to 4 percent in the fifth call. The Danish Council for Research and Technology has thus increased its funding to Eurostars.

[41] According to the common rules of Eurostars, large companies should be able to receive a small grant for their participation. Because of the limited grants allocated to the Eurostars program in Denmark, the DASTI has chosen not to provide grants to companies with more than 500 employees.

The table below shows the success rate of the applications with Danish participation and for all applications.

Table 5.3: The success rate of applications with Danish participation

	Call 1, 2008	Call 2, 2009	Call 3, 2010	Call 4, 2010	Call 5, 2011
All applications	215	317	279	316	342
Approved applications	90	90	85	64	71
Success rate	42%	28%	30%	20%	21%
Applications with Danish partners	21	19	39	25	26
Approved applications with Danish partners	5	6	15	7	9
Success rate	24%	32%	38%	28%	35%

Source: DAMVAD 2011, based on Haifa State of affairs. The high number of application and the success rate in call 3 can be contributed to the fact that DASTI had introduced a pre-project funding programme for Eurostars. This programme was terminated after call 3

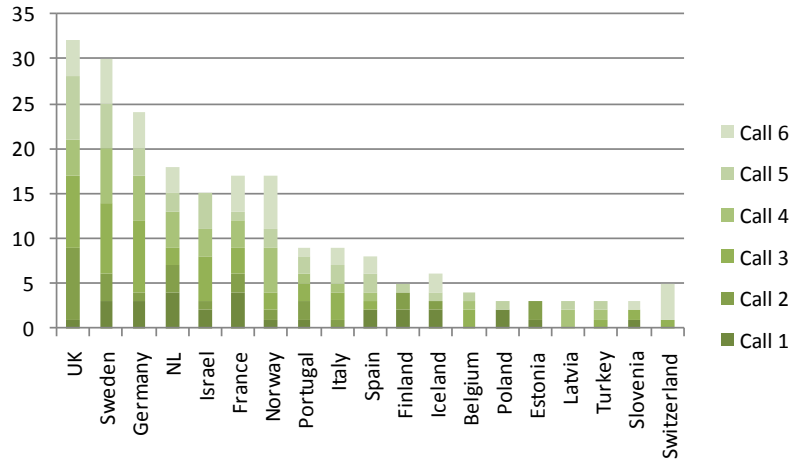
The applications with Danish participation have a high success rate as shown in the table above. The success rate for projects with Danish participation has improved during the period from 24 percent in 2008 to 35 percent in fifth call in 2010, despite the fact that the overall success rate for all applications has declined. The decline of the overall success rate reflects that the competition for funding has increased and that the amount of approved applications has declined.

Partner countries

The figure 5.3 shows that across the sixth application calls, the partners with whom the Danish participants have collaborated with are relatively stable. The three most frequent collaboration partners being United Kingdom, Sweden and Germany. This corresponds well to the main collaboration partners from Individual EUREKA Individual Projects (see Chapter 3).

Interestingly, the figure shows how new countries emerge as collaboration partners. This is indicated by the presence of Switzerland and Israel as a new collaboration partners. Up until this recent round of applications, it was uncommon for Danish participants to collaborate with Swiss partners. The changes in this behaviour may be associated with a joint call that has increased the awareness of collaboration opportunities between the two countries. The same has been the case for Israel where joint calls and partnering events have resulted in 15 joint applications of which 10 were approved above the threshold and 8 was funded by DASTI. The sudden emergence of new collaboration partners thus also indicates that there may be other potential collaboration partners that arise in the future application rounds if PR-campaigns etc. are applied.

Figure 5.3: Partner countries for Danish Eurostars participants (based on applications)



Source: DASTI (2011b)

In the following, we take a closer look at some early indications from Danish participants in Eurostars projects.

5.3 Early experiences from Eurostars-participants

Through interviews with recent Danish participants in Eurostars, it is possible to gain some early insights into the indications from participants in Eurostars.[42] These can be summarised as follows:

SMEs at the centre. The focus on SMEs in Eurostars actively gives participating SMEs a central role in the innovation and development process. According to participants, this allows the SMEs to drive the process and strengthen their competences and skills through a collaborative process. The SME oriented focus sets Eurostars apart from other international programmes and is considered by participants to be a significant benefit to participating.

Administration at a minimum . The administrative burden through the application process is not considered a barrier to applying for funds. Participants emphasised the administrative ease in working with Eurostars. This is an advantage which makes Eurostars stand out in relation to other international programs. Flexibility was also mentioned in regards to the fact that Eurostars is not determined by specific calls with predefined topics. According to respondents, this entails greater flexibility to define the projects and tailor projects to the needs of the SME. The ease of Eurostars program organisation is considered a "best practice" example for international programmes among the respondents.

Room for high-risk, high-gain projects. In the interviews, it was highlighted that a main motivation for applying for funds through Eurostars is the possibility to get financial support to the development or testing of ideas that probably would not have been tested or developed if external resources were not available. In particular, ideas considered risky for the SME, but with potential high gains are sought funded through Eurostars. In the absence of Eurostars participants indicated that they would seek alternative means of external support for their projects. Participants underlined that should the SME fail to obtain external financial support, the project proposals would not get developed due to limited funds and the risk profile of the projects.

Small consortia are welcomed. Participants praise the fact that consortia can be kept small (two SMEs from different countries is a requirement from Eurostars). Small consortia make it easier to cooperate as well as manage the project for SMEs. In this way, "shadow partners" only included in the consortium primarily to meet programme-requirements, can be avoided.

Concerns about commercialisation. Commercial expectations to Eurostars projects are high and early signs are promising, according to interviewees. However, commercialisation and marketing of new products are seen as potentially challenging for SMEs to manage on their own due to high demands on additional investments at the end of the project. This may prevent some projects from reaching the market.

Relations may be more valuable than the project. Despite the fact that projects have not yet been completed, participants highlight that the process have strengthened and developed competencies through the collaboration with international partners. It was emphasised that the value of strengthening of competences reaches far beyond the value of the Eurostars project.

PROs are important for SME-participants.[43] Participants indicate that public research organisations (PROs) serve an important function in informing SMEs of opportunities for participating in the programme, as Eurostars is still relatively unknown among SMEs. Additionally, the PROs play a role in providing support for those SMEs that are unfamiliar with project management and application processes for

[42] As part of this study, we conducted interviews with recent Danish participants in Eurostars (see Appendix 1).

[43] Among the respondents 4 out of 9 were TNO's or research institutes

international projects. Further, the PROs have a widespread international network that is used to help Danish SMEs to get in touch with relevant international partners and a way to get the SMEs into interesting projects for Danish SMEs.

The international dimension

Participants already have international experience. The international experience varies from participation in other European programs such as FP7 to international collaboration with other businesses, or through export markets. Because participants already have international experience, it is common that the international partners are often known before. According to the majority of projects covered through the interviews, the international partner was the initiator of the project, inviting the Danish SME or PRO to participate in the project based on previous experience from collaborating.

Eurostars vs. FP7. Most of the interviewed participants have experience with or knowledge of participation in EU programs such as FP7. In comparing the two programs, the participants accentuated Eurostars as their preferred program based on the SME orientation, the opportunity to keep projects small, the ability to choose topic themselves and most explicitly; the administrative ease in applying for funds. However, participants did highlight advantages of FP7 programs providing more funds than Eurostars.

Challenges to participation

Although participants overall consider Eurostars as an attractive programme, there are barriers and obstacles that could be improved.

Concerns about "bad standing". Eurostars is currently funded by a common pot. Member countries thus fund their national shares of approved Eurostars-projects in prioritised order until the national allocation is depleted. This will not happen simultaneously for all member countries and some project consortia may therefore acquire funding for only some parts of the consortia. Based on this experience, participants fear that project participants from some countries will be excluded from consortia as their funding is highly uncertain. Some countries are in better "standing" than others, is the impression among participants. Countries are thus unofficially divided into an "A–team" and a "B-team" dependent on their priority of Eurostars .

Lack of transparency in award systems. Participants with experience from several applications noted the lack of transparency in project-evaluation making learning from one application to another difficult. The formal project evaluations are not distributed to participants. Instead oral feedback session with DASTI disseminates the assessments of the project.

5.4 Suggestions for future improvements

Participants in Eurostars proposed suggestions to how participation could be improved. Their suggestions are summarised below:

A simpler financial structure. In order to prevent the problems of uneven depletion of national funds, leaving some parts of international consortia unfinanced, participants suggest that the countries agree on a simpler financial structure. If political support for this suggestion cannot be found, the contribution of each country to the programme should be more visible.

Improved readiness of SME's. In some European countries (Germany and the Netherlands, in particular) Danish participants mentioned that there are substantial efforts getting SMEs involved in R&D-projects, nationally as well as internationally. Consequently, more attention is paid to qualifying and preparing SMEs for involvement in Eurostars.

Provide draft contracts. Participants highlight the problem of participants spending more time on drawing up contracts than project related tasks. Providing draft contracts may be of great help to participants.

Streamline project briefings. It appears that each country decides on how to report on the project to the NPCs. It would be an asset to participants if standard requirements existed across member

countries, thus enabling different international project partners to work out one common project briefing.

Increase awareness among SMEs. Eurostars is still relatively unknown. In order to get more qualified SMEs to apply, a promotion of Eurostars among SMEs would be beneficial.

Larger funds. Participants advocate for larger project sums in order to accommodate larger projects. The maximum size of funds available today results in projects having to split up over several application rounds.

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Appendix 1: Impact study methodology

This paper utilizes a matching approach to estimate the causal effect of participation in EUREKA. This approach matches each participant with a similar *non*-participant and hereby simulating the counterfactual situation.

The counter factual situation describes the performance paths participants would have followed had they not participated in EUREKA. Clearly it is not possible to observe the participants' outcome with and without treatment at the same time. As a result we must find a proper substitute for participants' outcome had they not participated.

Assuming that the average outcome of the population of *non*-participants is a valid approximation for the counter factual situation is, however, not a possible solution since participants and *non*-participants may differ in the absence of treatment. This selection problem arises since participants may be more likely to participate and possibly more likely to benefit from participation.

To circumvent the challenges from selection bias we employ a certain matching technique which identifies *non*-participants that are similar to participants on several company specific characteristics.

Matching approach

This paper utilizes a particular matching approach called propensity score matching. For all companies the estimation of the probability of participating in EUREKA is conditioned on observed relevant company specific characteristics.

The probability of participation is estimated using a logit model, which relates the probability of being treated with several company specific characteristics such as industry, company size, turnover per full time equivalent, and export per full time equivalent. Thus, the logit model estimates the following conditional probability:

$$P(treatment|industry, company\ size, turnover, export)$$

Here, *treatment* is a variable that takes the value "one" in the event of participation and "zero" in the opposite case.

The probabilities are estimated conditional on five different industries and three different size levels.

Industries are subdivided as:

- Low technological manufacturing
- High technological manufacturing
- Wholesale and retail trade
- Knowledge intensive business services
- Other

Company size is subdivided as:

- 1 to 50 full time equivalent
- 50 to 250 full time equivalent
- Larger than 250 full time equivalent

The predicted probability from the logit-model is interpreted as the propensity score and therefore constitutes the specified probability of participating conditional on company specific characteristics.

Participants are matched to *non*-participants according to a matching algorithm which for each treated unit identifies companies in the population of *non*-participants with identical or similar propensity score. This matching algorithm is called Nearest Neighbour matching.

Since a relatively low number of companies participated in EUREKA it is desirable to enhance the number of control units in order to lower the variance on the estimator thereby raising the estimation precision. Therefore the Nearest Neighbour matching algorithm is augmented in such a way that ten control units are identified and selected for each

participant according to the propensity scores. In other words, this matching algorithm picks for each participant those ten *non*-participants that come closest in terms of propensity score.

A matching ratio of 1:10 requires a vast amount of observations and can as a result not be implemented considering the group composed of companies, which have previously participated in other funded research and innovation programmes. For this group of business the matching algorithm is adjusted to identify one similar *non*-participant for each participant according to the propensity score.

It is important to consider the quality of the matching, which can be done by testing whether there is additionally explanatory power stored in the covariates considering businesses' treatment status after the matching procedure has been carried out. In other words, the test indicates whether any observed systematic differences exist between participants and the control group (consisting of the matched *non*-participants).

For each matching procedure performed the existence of systematic differences between the treatment group and the control group are tested. We are able to reject the presence of such differences. A proper balance between participants and matched non-participants is thus ensured using this matching procedure. We are thus able to interpret any differences in outcomes between the well selected and adequate control group and of participants as the causal effect of participating in EUREKA.

Difference-in-difference method

The difference-in-difference model is implemented in order to appropriately estimate and detect whether participants and non-participants performs differently. Any differences can be attributed to the participation in EUREKA.

This analysis uses four different performance measurements:

- Productivity per full time equivalent
- Exports per full time equivalent
- Turnover per full time equivalent
- Total number of full time equivalent

The difference-in-difference analysis is conducted for each of these performance measurements which involve the comparison between participants and non-participants on the basis of each performance measurement.

The difference in difference estimator is given by:

$$\delta = Y_1^T - Y_0^T - \left(Y_1^C - Y_0^C\right)$$

where δ is the participation effect and Y_t^i captures the performance at time t for group i where i indicates treatment status. The participation effect is calculated as the difference in the development in performance between the treatment group and control group. For both groups the difference in performance is calculated as the performance at time 1 subtracted performance at time 0. The difference-in-difference estimator is employed for each year after participation in order to calculate the participation effect over time.

Whether or not there is a statistical significant participation effect is tested using a standard t-test.

Performance criteria

The presence of extreme observations may distort the participation effect and reduce the estimation precession. Data can contain extreme values due to the occurrence of measurement errors or due to mergers and split offs of businesses. Such extreme observations can have a disproportionately large impact on the analysis.

To avoid the distorting impact of outliers this paper implements certain performance criteria, which serve as thresholds for which outliers are corrected. In the research literature it is common to remove companies that experience a tripling or a halving in performance between two successive

years[44]. Due to the relatively low number of participants this approach cannot be implemented.

Below we outline the chosen performance criteria introduced in order to correct outliers at the company level.

Where performance in a single year doubles or halves compared to the two neighbouring years we use the two neighbouring observations to correct the outlier by taking the average performance of these two years.

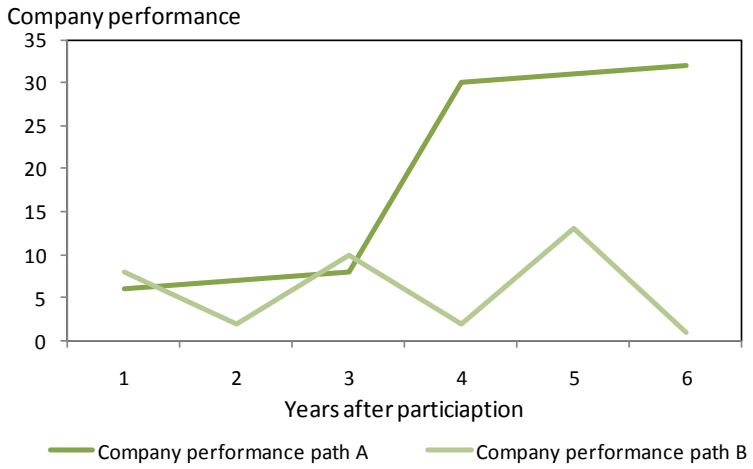
The same procedure is implemented in the event that two successive years are outliers as specified above.

There are certain types of abnormal performances, which cannot easily be corrected. Two such cases are illustrated in the figure below.

The outlined correction strategy cannot be implemented with the intention to correct for level shifts in which performance for some reason changes abnormally from one year to the other but remains at the new level for remaining period. The case of a level shift is illustrated in path A in the figure below. To correct for this type of outliers we remove the period from where the level shift occurs.

[44] See as an example Mairesse, Jacques og Hall, Bronwyn Hughes, 1995, '' Exploring the Relationship Between R&D and Productivity in French Manufacturing Firms''.

Figure A.1: Illustration of abnormal performance paths



Source: DAMVAD 2011

It is however not possible to correct for circumstances described by path B where performance fluctuates abnormally throughout the period. In this case we remove the entire business from the sample.

In addition the 5 per cent best and worst performances for each year for participants and *non*-participants are removed from the sample. This correction is implemented to further minimize the impact of outliers in order to secure a high degree of robustness and reliability of the estimated participation effect.

Before the elimination of outliers there are 95 Danish participations for which a satisfactory amount of data is available. Due to the elimination of outliers the number of observations on participants drops to 76, cf. table A.1.

This analysis establishes two separate control groups. One consists of a group of businesses that are similar to EUREKA-participants. The other consists of a group of businesses that in addition to being similar in terms of company specific characteristics also participated in other funded national programs. The table below shows the amount of observations after correction of outliers which are used to carry out the impact assessment for both groups.

Table A.1: Amount of observations before and after correction of outliers

	Group 1: Similar business	Group 2: Participants in other funded programs
Before correction of outliers		
Treatment group	95	95
Control group	950	95
After correction of outliers		
Treatment group	76	76
Control group	756	79

Source: DAMVAD 2011

Data

The group of non-participants (which in addition to having similar characteristics as participants also participated in other funded programs than EUREKA) have participated in either Innovation Consortium or EU's framework programs. After correction of outliers 68 percent of the selected businesses participated in Innovation Consortium while 32 percent participated in EU's framework programs.

Funding for Danish participation was withdrawn in 2001 and as result the participation period is constraint to the period between 1985 and 2001. This imposes a challenge regarding the availability of data since the majority of participation found place relatively early in relation to the presence of data. The presence of microdata at Statistics Denmark and the amount of information increases over time meaning that information at the firm level generally speaking is limited at the beginning of the nineties.

To solve this challenge we conduct the impact assessment using the VAT statistics which contains microdata at the firm level for 1990 and onwards. The VAT statistics holds information on companies' industry, turnover, total expensive, export, and import[45].

Information on company size is contained in the Accounts Statistics, which is available for the entire period of the program. We merge information on the firm level from the different statistics using the unique company identification number. Information in the Account Statistics is gathered as stocktaking each year at the end of November. Every company that is subject to registration according to Danish legislation is part of the statistics and as a result close to 100 percent of Danish businesses are included.

This enables the construction of a panel data containing information on company characteristics and companies' performance covering the period 1990-2008. The great time dimension of the panel data enables the estimation of the effect of participation in EUREKA and in addition how this effect changes over time.

In addition, this analysis utilizes information from the research, development and innovation statistics. This information is gathered at the firm level by the means of a questionnaire, which includes all business with more than 250 employees. For businesses with less than 250 employees a random sample is selected to participate in the questionnaire conditioned on preselected criteria concerning industry and size[46].

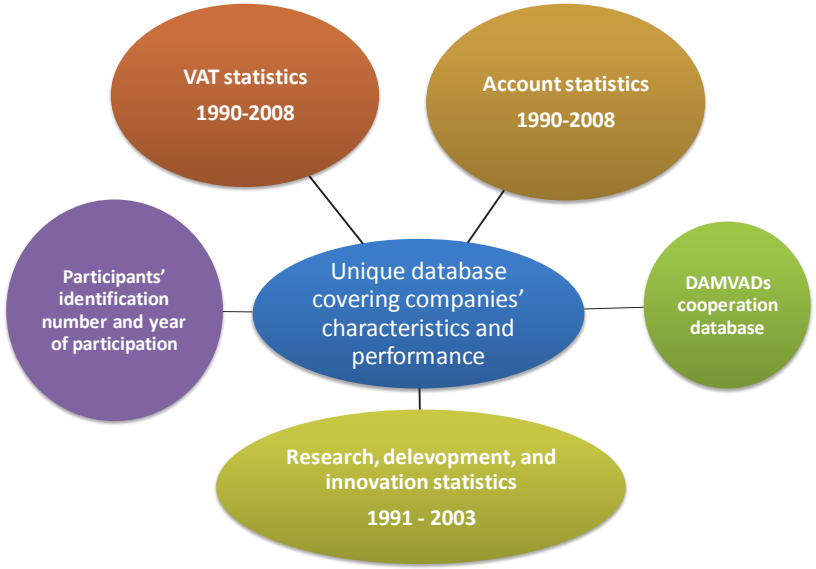
In order to obtain information on companies' previous participation in other funded programs DAMVADs cooperation database is included.

[45] It would have been preferable to conduct the analysis using several additional covariates such as information on the employees' educational level and information on the companies' engagement in research, development, and innovation activities.

[46] For further information on the selection of participations refer to the description of the methodology at Statistics Denmark's homepage.

The corporation database covers all large programs in relation to research and innovation funds in Denmark. All together the database consists of more than 1,600 projects including 5,000 Danish project participants, with approximately 1,200 unique participants. The database covers the period 1995 to 2010.

Figure A.2: Merging of different data sources



Source: DAMVAD 2011

The figure above presents the combination of different data sources which when put together establish a unique database for conducting an impact assessment of the Danish participation in EUREKA. Companies' identification number is used to combine data at the firm level from the different sources.

Appendix 2: Interview methodology

The purpose of this appendix is to provide an overview of the qualitative sources for the study. This section thus covers how the respondents were selected, how the interviews were performed and how data was treated.

Selection of respondents

As this study covers the impact of two different EUREKA programs; Individual EUREKA Projects and Eurostars, respondents were identified from these two programs. It was attempted to reach two groups of the same size comprising approximately 10 respondents from each program.

The selection of respondents from the population of participants in individual EUREKA projects was based on specific program specifications. The main objective in selecting respondents was identifying projects that were completed in the year 2008 or later in order to get the experiences from recent participation. As the Danish participation in individual EUREKA projects has decreased significantly, the total population comprised of eight projects. From these eight projects, seven were interviewed in relation to the study. The characteristics on the seven project participants are specified in the table below.

Population of participants in individual EUREKA projects

Organization name	Organization type	Project start	Project end
DBI plastics a/s	SME	02-Jan-2002	02-Apr-2008
Barsmark a/s	SME	01-Sep-2005	01-Apr-2008
IPU - Institute for product development	SME	01-Oct-2006	01-Oct-2009
DTU - Department of manufacturing engineering and management (IPL)	University	01-Oct-2006	01-Oct-2009
RISOE- Department of materials research	Governm./Nat. Admin.	01-Oct-2006	01-Oct-2009
Sonion Roskilde a/s	Large company	01-Oct-2006	01-Oct-2009
DELTA	Research Institute/GTS	02-Jun-2008	02-Jan-2010

The selection of respondents from Eurostars was based on providing a versatile sample of the Danish participants in Eurostars programs. None of the Eurostars projects have been completed yet and thus this did not serve as a criterion. Instead the selection has emphasised on getting a sample comprising Danish Research Institutes/GTS as well as SMEs with international experience from participation in international programs and also with a record of growth.

The Danish Agency for Science, Technology and Innovation has provided DAMVAD with a gross list of participants comprising ten participants. Out of these ten participants, nine were interviewed. The participants are presented in the table below.

Population of participants in Eurostars projects

Organization name	Organization type
Bioneer	Research institute/GTS
Technological Institute	Research institute/GTS
DELTA	Research institute/GTS
Technological Institute	Research institute/GTS
MSVision	SME
Zealand Pharma	SME
GomSpace Aps	SME
IPU	SME
Noliac	SME

Approach

Respondents were contacted by telephone to inform them about the Impact study on Danish participation in EUREKA and to ask them if they would participate in an interview concerning their participation in Individual EUREKA Projects and Eurostars projects, respectively.

Before the interviews were conducted, an interview guide was send to the respondents in order for them to familiarise themselves with the themes and specific questions comprised in the interview.

The interviews were conducted as semi structured interviews allowing for the interview to progress along a defined structure, but with the possibility to pursue interesting leads that may arise during the interview.

Conduct of interviews

For practical reasons, the interviews were predominately conducted as phone interviews, and lasted approximately one hour.

The interviews with participants in individual EUREKA projects and Eurostars projects were structured around the same topics that are central to determine the participation in the programs. These themes were also reflected in the interview guide and comprised the following:

- Characteristics on the specific project
- Motivation to engage in the project
- The value deriving from participating in a project
- Potentials for improvements

Treatment of interview data

Transcripts were prepared from each interview consisting of the main arguments and reflections from the interviews.

The interview transcripts were treated anonymously. Accordingly, there has been no direct use of quotes or other specific presentation of an individual participant as part of the final reporting.

PUBLICATIONS IN THE THE SERIES OF INNOVATION: ANALYSIS AND EVALUATION 2009 - 2010

01/2009 Effektmåling af innovationsmiljøernes støtte til danske iværksættere

02/2009 Rammer for innovativ IKT-anvendelse – erfaringerfra Den Regionale IKTsatsning

03/2009 Analyse af forsknings- og udviklingssamarbejde mellem virksomheder og videninstitutioner

04/2009 International Evaluation of the Danish GTS-system – A step beyond

05/2009 Proof of concept-finansiering til offentlige forskningsinstitutioner –Midtvejsevaluering

06/2009 Mapping of the Danish knowledge system with focus on the role and function of the GTS-net

07/2009 International Comparison of Five Institute Systems

08/2009 Review of science and technology foresight studies and comparison with GTS2015

09/2009 Analyse af små og mellemstore virksomheders internationale FoU-samarbejde

10/2009 Ikt-anvendelse og innovationsresultater i små og mellemstore virksomheder

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13/2009 Kommercialisering af forskningsresultater - Statistik 2008

14/2009 Erhvervslivets forskning, udvikling og innovation i Danmark 2009 – Den økonomiske krises betydning

15/2009 Finanskrisens påvirkning på IT-startups

16/2009 Universiteternes Iværksætterbarometer 2009

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18/2009 The Gazelle Growth Programme – Mid Term Evaluation

19/2009 Nye former for samarbejde om privat forskning, udvikling og innovation - midtvejsevaluering af åbne midler

20/2009 Innovationsagenter - Nye veje til innovation i små og mellemstore virksomheder. Erfaringer fra midtvejsevaluering af pilotprojektet Regionale Innovationsagenter

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22/2009 Dansk innovationspolitik 2009 – Den økonomiske krises betydning for fremme af erhvervslivets forskning, udvikling og innovation

23/2009 Serviceinnovation og innovationsfremmesystemet

24/2009 Performanceregnskab for Videnskabsministeriets innovationsnetværk 2009

25/2009 Performanceregnskab for innovationsmiljøerne 2009

01/2010 Produktivitetseffekter af erhvervslivets forsk¬ning, udvikling og innovation

02/2010 Erhvervslivets forskning, udvikling og innovation i Danmark 2010

03/2010 An Analysis of Firm Growth Effects of the Danish Innovation Consortium Scheme

04/2010 Effektmåling af videnpilotordningens betydning for små og mellemstore virksomheder

05/2010 InnovationDanmark 2009 - resultater og evalueringsstrategi

06/2010 Kommercialisering af forskningsresultater - Statistik 2009

07/2010 Performanceregnskab for Videnskabsministeriets GTS-net 2010

08/2010 Innovationsnetværk Danmark - Performanceregnskab 2010

09/2010 Performanceregnskab for Videnskabsministeriets Innovationsmiljøer 2010

10/2010 Universiteternes Iværksætterbaromenter 2010

12/2010 Brugerundersøgelse af GTS-institutterne 2010

LIST OF PUBLICATIONS 2011

01/2011 Analysis of Danish innovation policy - The Industrial PhD Programme and the Innovation Consortium Scheme

02/2011 Økonomiske effekter af erhvervslivets forskningssamarbejde med offentlige videninstitutioner

03/2011 Erhvervslivets forskning, udvikling og innovation i 2011

04/2011 Evaluering af GTS-instituttet DHI

05/2011 Evaluering af GTS-instituttet Bioneer

06/2011 Evaluering af GTS-instituttet FORCE Technology

07/2011 Erhvervslivets Outsourcing af FoU

08/2011 Innovation Network Denmark - Performance accounts 2011

09/2011 Performanceregnskab for Videnskabsministeriets Innovationsmiljøer 2011

10/2011 GTS performanceregnskab

11/2011 Kommercialisering af forskningsresultater – Statistik 2010 (Public Research Commercialisation Survey – Denmark 2010)

12/2011 Evaluering af GTS-instituttet DELTA

13/2011 Evaluering af GTS-instituttet DBI

14/2011 Evaluering af GTS-instituttet Teknologisk Institut

15/2011 Impact Study of Eureka Projects

16/2011 24 ways to cluster excellence – successful case stories from clusters in Germany, Poland and the Nordic countries.

17/2011 Nordic-German-Polish Cluster Policy Benchmarking

18/2011 Impact Study: The Innovation Network Programme

19/2011 Universiteternes Iværksætterbarometer 2011

20/2011 Access to Research and Technical Information in Denmark

INTERNATIONALT SAMARBEJDE BETALER SIG FOR DANSKE VIRKSOMHEDER

Denne analyse viser, at virksomheder, der har deltaget i EUREKA-projekter, oplever en stor eksportfremgang, fordobler omsætningen og både forøger beskæftigelsen og arbejdsproduktiviteten i forhold til andre virksomheder.

"Jeg er meget glad for, at denne analyse leverer bevis for, at det kan betale sig for danske virksomheder at finde udenlandske samarbejdspartnere. Det er mit håb, at endnu flere virksomheder vil begive sig ud på et udenlandsk eventyr, for internationale samarbejder styrker væksten og medvirker til at bringe både den enkelte virksomhed og det danske samfund hurtigere ud af krisen", siger videnskabsminister Charlotte Sahl-Madsen.

I analysen sammenlignes økonomien i virksomheder, der har deltaget i EUREKA-projekter med to grupper af tilsvarende virksomheder, der enten slet ikke har deltaget i samarbejdsprojekter eller har deltaget i andre samarbejdsprojekter.
Analysen viser, at:

- EUREKA-projektdeltagere tre år efter deltagelsen i EUREKA-projekter har øget deres eksportrate med 13 procentpoint i forhold til de to kontrolgrupper.
- EUREKA-deltagere øgede vækstraten for beskæftigelse med mindst 4-5 procentpoint. Beskæftigelseseffekten er tydelig allerede fra det første år efter projektet er afsluttet og er stigende i de efterfølgende år i forhold til begge kontrolgrupper.
- EUREKA-deltagere fordoblede deres omsætning sammenlignet med virksomheder, der ikke har deltaget i nationale og internationale forsknings- og innovationsprogrammer.
- EUREKA-deltagere øgede vækstraten i arbejdsproduktivitet med 11-12 procentpoint i forhold til lignende virksomheder, der ikke har deltaget i samarbejdsprojekter.

"Både store og mindre virksomheders konkurrenceevne styrkes markant, når de samarbejder internationalt. Det viser, at det er vigtigt at satse på forskellige innovationsprogrammer, så vi appellerer til alle slags virksomheder", siger Charlotte Sahl-Madsen.

OM DANSK DELTAGELSE I EUREKA
Danmark var blandt stifterne af EUREKA i 1985. Frem til år 2000 havde Danmark et specifikt EUREKA-tilskudsprogram. Siden 2001 har danske ansøgere i stedet kunne benytte sig af andre tilskudsprogrammer til EUREKA-projekter. I perioden 1985-2010 har danske virksomheder deltaget i 185 EUREKA-projekter, heraf fem i såkaldte Cluster-projekter. I 2008 startede et nyt EUREKA-program, Eurostars. Siden da er der givet tilskud til dansk deltagelse i 33 Eurostars-projekter