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Qualitative evaluation on the participation and impact on high-tech start-ups from participating Eureka instruments

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1 Introduction

1.1 Background and objective of the study

Eureka is a publicly-funded, intergovernmental network established in 1985, involving 45 countries. Eureka's aim as a programme is to enhance European competitiveness by fostering innovation-driven entrepreneurship in Europe, between small and large industry, research institutes, and universities.

From July 2019 to June 2020, the Netherlands holds the chairmanship for the Eureka programme. The Dutch chairmanship focusses on two strategic priorities:

1. developing the Eurostars 3 programme;
2. setting up a future strategy for the Eureka industrial clusters in key technological areas such as ICT and microelectronics.

In the context of this chairmanship the RVO (Rijksdienst voor Ondernemend Nederland), the Dutch Enterprise Agency, has commissioned Panteia and the Erasmus Centre for Entrepreneurship (ECE) to carry out a qualitative evaluation of the Eureka Programme, specifically of three key instruments: Eurostars, ITEA, and PENTA.

Objective of the study

The objective of the study is to provide recommendations to improve the Eurostars, ITEA, and PENTA instruments of the Eureka programme. Specific attention will be paid to the way in which the instruments can be made more accessible for start-ups, scale ups, the complementarity and the alignment with SME subsidy programmes from the Horizon 2020 program (i.e. SME instrument phase 2), and how to raise follow up financing through access to venture capital, private investors, and banks.

Based on qualitative and quantitative data this study addresses the following research questions:

1. How many start-ups/scale-ups participated in Eureka projects during the last years sorted by sector, maturity and country in number and budget and what was the growth in participation or amounts invested via Eureka?
2. What was the leverage of the participation in Eureka instruments? What did the subsidy contribute to?
3. How can the start-up/scale ups be typified based on indicators such as: sector, growth path in capital, revenue and FTE.

Based on desk research and interviews, eight best practices for high tech enterprises which participated in Eureka have been developed and a Strengths, Weakness, Opportunities and Threats (SWOT) analysis for the Eureka programme instruments has been carried out as well. Finally, recommendations have been developed based on the findings collected throughout the study.

Structure of the report

Chapter 2 of this report examines the population of enterprises participating in the Eurostars, ITEA, and PENTA instruments and the outcomes of the analysis. Following this, eight best practice case studies are presented in chapter 3. Chapter 4 presents the SWOT analysis for the Eureka instruments. The report closes with chapter 5, which summarises the main findings of the study and provides recommendations for the next Eureka programme. Annex 1 includes the technical annex providing detailed information on the data enrichment and analysis.





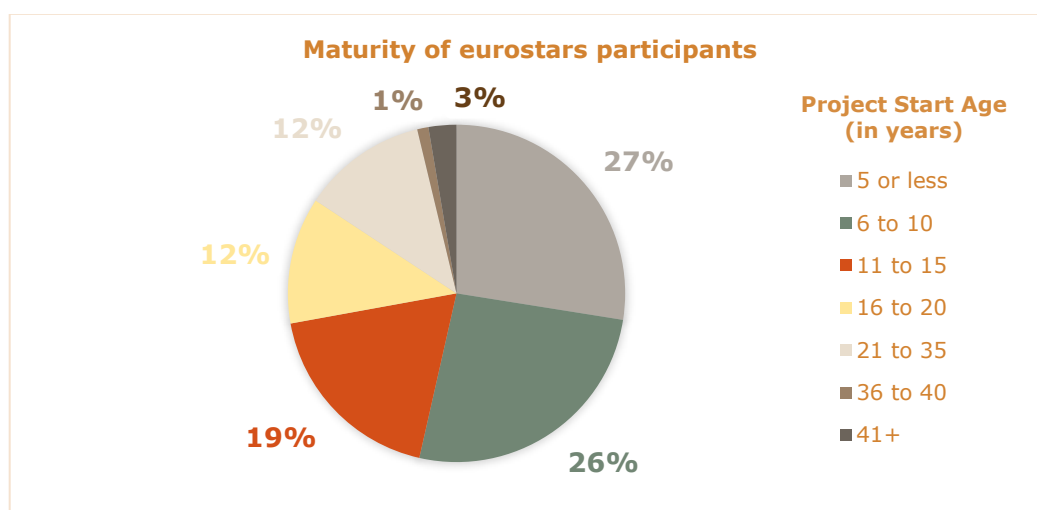
2 Outcomes of Eureka's instruments

As part of the research activities for this evaluation of the Eureka instruments, a quantitative analysis has been conducted into the participants of Eureka's Eurostars, ITEA 3, and PENTA instruments. The aim of the data analysis presented here is to characterise and typify Eureka participation, to reveal the contribution of Eureka instruments (specifically, potential growth and investment paths) to its participants, and the leverage of participation.

2.1 Characteristics of Eurostars Eureka Participations

A total of 4,259 participants took part in Eurostars projects over the past 12 years (2008-2020).¹ Participant data from Eureka secretariat show that the companies involved in Eurostars projects are usually relatively young (in terms of age when starting the projects) and small (in terms of employee size). The majority of Eurostars participants consists of companies that are younger than 10 years old (see figure 1), while the average number of employees (when registering for the project), is around 24. Of the Eurostars project participants 27% are start-ups (defined as 5 years or younger at the start of the project)².

Figure 1: Maturity (in years) of participants at the start of Eurostars projects (2008-2020)



N = 2,882 (participants for which founding years of companies are available)

Source: Panteia/ECE based on Eurostars Participation data EUREKA Secretariat

For the remainder of this sub-section, a total of 2,882³ participants enterprises involved in Eurostars projects from 2008 to 2020 are analysed in more detail. Of this number, there were 793 start-ups from 32 countries who participated in Eurostars projects – henceforth referred to as *Eurostars Start-ups*. The companies that are not considered as start-ups are hereafter classified as *Eurostars Enterprises*.

Eurostars participants can be classified into different participant types: Main, Partner and Withdrawn. 45% of Eurostars participants are classified as Main participants, while 51% are Partners, and 4% have Withdrawn from the Eurostars projects. The average age of the different types all fall within the range of 11-15 years old, with the Partner participants being the most mature, (with an average age of 14 years), followed by Withdrawn participants

¹ These participations do not represent unique companies. Several companies participated in more than one project and these participations are analysed separately.

² See the Technical Annex on Data Analysis and Enrichment for more detailed definitions.

³ Not all 4,259 project participations were analysed for comparability purposes. See the Technical Annex on Data Analysis and Enrichment for more information.

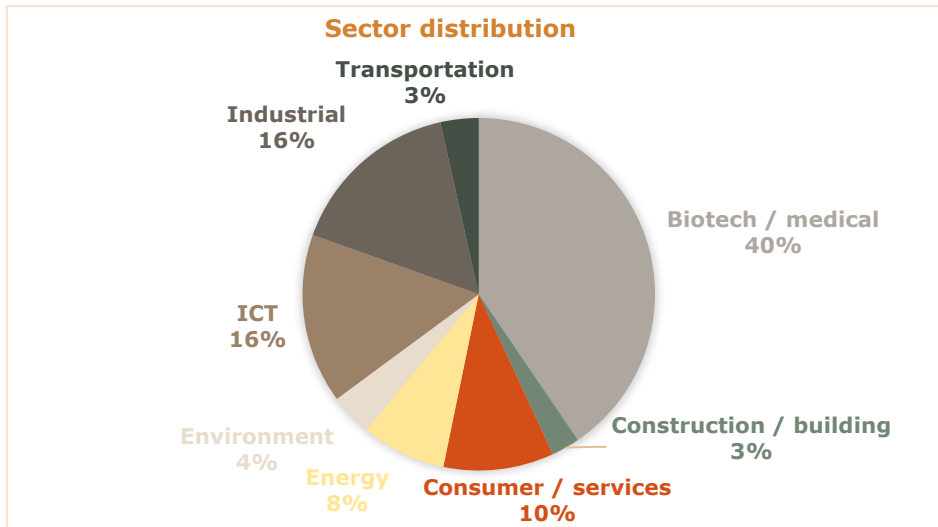


(average age of 13 years), while the Main participants appear to be the youngest, (average age of 11 years). When considering start-up participants, 50% are classified as Main participants, while 47% are Partners and 3% have Withdrawn from Eurostars projects.

2.1.1 Sector allocation

Participating companies operate in different sectors as is illustrated in Figure 2. For Eurostars participants in general, Biotech/medical companies seem to dominate the participations while there are less participating companies involved in Transportation, Environment and Construction/building.

Figure 2: Sectoral Distribution of Eurostars participations from 2008 to 2020



N = 2,882

Source: Panteia/ECE based on Eurostars Participation data EUREKA Secretariat

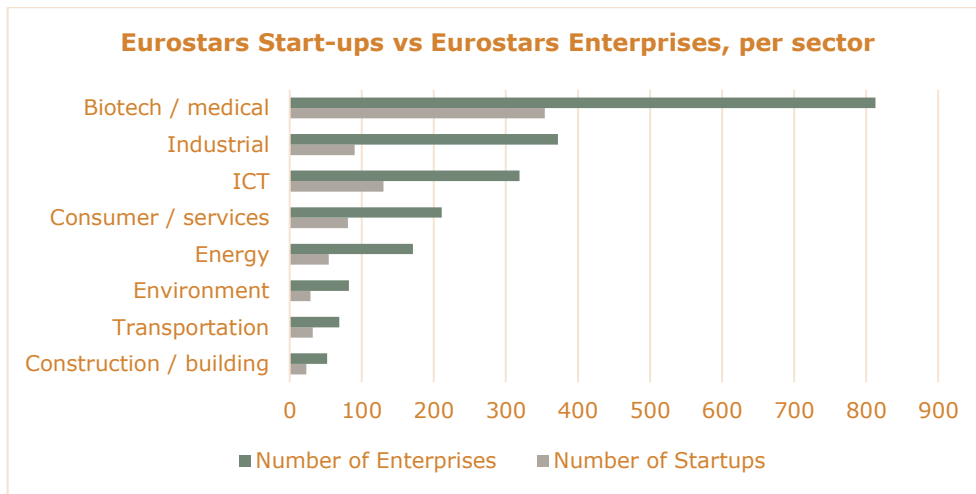
Figure 3 depicts Eurostars participants in numbers across the different sectors and according to the different types of participants. The data shows a larger proportion of Eurostars Start-ups in the Biotech/medical sector, specifically, 45% of all start-ups are in Biotech/medical sector, compared to 39% of Eurostars Enterprises.

The figure also shows that a larger proportion of Eurostars Enterprises is active in the Industrial sector. Specifically 18% of all enterprises are in the Industrial sector, compared to 11% of Eurostars Start-ups.

Despite these differences the sectoral pattern remains largely the same for both Eurostars Start-ups and Eurostars Enterprises. That is, the sectoral distribution of Eurostars Start-ups and Eurostars Enterprises is comparable to what is displayed in Figure 2, with the exception of more noticeable differences in the Biotech/medical and Industrial sectors.



Figure 3: Number of Eurostars Participations from 2008 to 2020 (composed of Eurostars Start-ups and Eurostars Enterprises), per sector



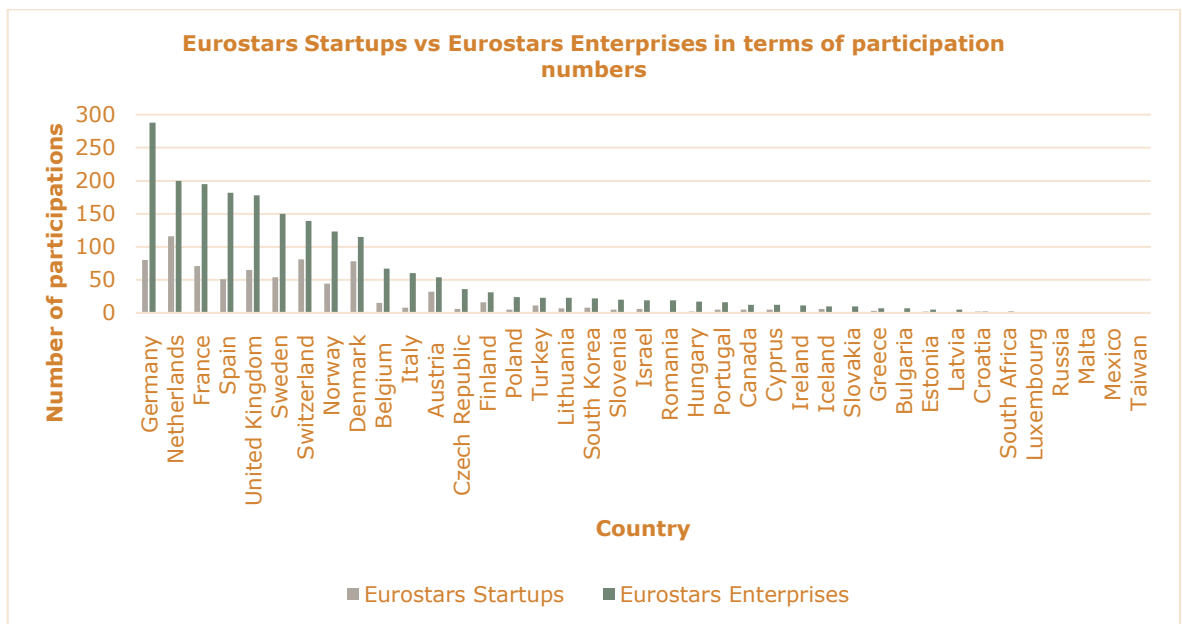
N = 2,882 (Participants); N = 2,089 (Enterprises); N = 793 (Start-ups)

Source: Panteia/ECE based on Eurostars Participation data EUREKA Secretariat

1.1.2 Origin countries⁴

Enterprises participating in Eurostars projects originate from 42 different countries. The highest number of overall Eurostars participants is based in Germany, which is also the country with the highest number of *Eurostars Enterprises* (288). A different pattern emerges when it comes to *Eurostars Start-ups*, with the Netherlands representing the highest number of start-up participants (116). Figure 4 below shows a more detailed country breakdown for the numbers of participants in each country for both *Eurostars Start-ups* and *Eurostars Enterprises*.

Figure 4: Number of Eurostars Participations from 2008 to 2020 for Eurostars Start-ups and Eurostars Enterprises (per country)



N = 2,882 (Participants); N = 2,089 (Enterprises); N = 793 (Start-ups)

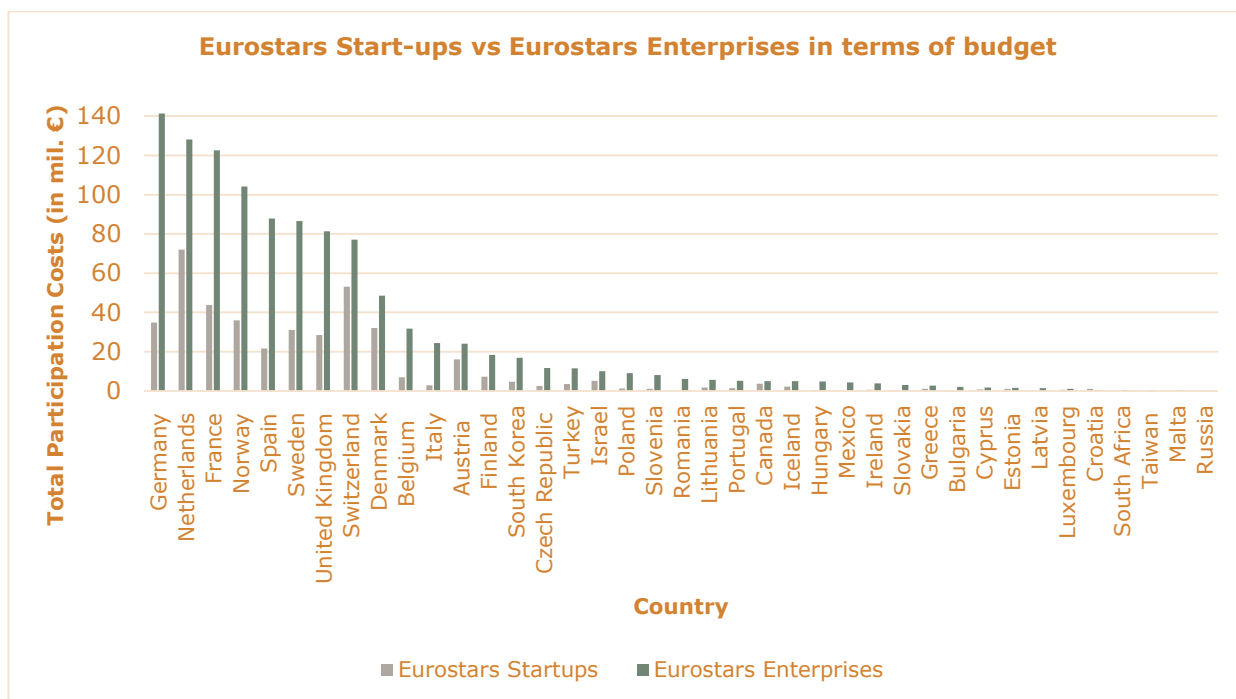
Source: Panteia/ECE based on Eurostars Participation data EUREKA Secretariat

⁴ Only 39 out of 42 participant countries are shown in Figure 4 because Brazil, The United States and China are excluded due to the lack of data on the founding years for the companies from these countries.



Besides its relatively high number of participating start-ups, the Netherlands also represents the country with the highest budgets amongst start-ups (i.e. overall participation costs out of the total amount of money invested in Eurostars participation by the enterprise). However, the same pattern does not seem to hold for the rest of the countries with high levels of start-up participants. For example, French Eurostars Start-ups seem to invest more money in Eurostars participation than German start-ups in Eurostars do, even though Germany has more *Eurostars Start-ups* in terms of numbers of participants. See figure 5 for more detail concerning the budget per country for *Eurostars Start-ups* and *Eurostars Enterprises*.

Figure 5: Budget (i.e., total participation costs for enterprises in millions of euros) of Eurostars Participations from 2008 to 2020 for Eurostars Start-ups and Eurostars Enterprises



$N = 2,882$ (Participants); $N = 2,089$ (Enterprises); $N = 793$ (Start-ups)

Source: Panteia/ECE based on Eurostars Participation data EUREKA Secretariat

2.2 Characteristics of Eureka Clusters participants

A total 695 SMEs participated in the ITEA 3 and PENTA Eureka Cluster Projects (specifically, 593 in ITEA 3 and 102 in PENTA) over the past 6 years (2014-2020). Of these participants, 61% of projects are still running at this moment.⁵ The 695 SME participants represent 49% of the overall ITEA 3 and PENTA participants (because approximately 49% of these participants are SMEs).⁶

Approximately 70% of international SME cluster participants are considered to be start-ups when joining a project, while 40% of Dutch SME cluster participants fall into the start-up category of 5 years or younger.⁷

⁵ Data source: Panteia/ECE based on ITEA 3 and PENTA Participation data, EUREKA Secretariat

⁶ Source: https://www.penta-eureka.eu/projects/project_partners.php ; <https://itea3.org/project-partners/page-all.html>

⁷ These numbers are rough estimates and should be interpreted with caution as they are based on subsample calculations. See the Technical Annex on Data Analysis and Enrichment for more information.



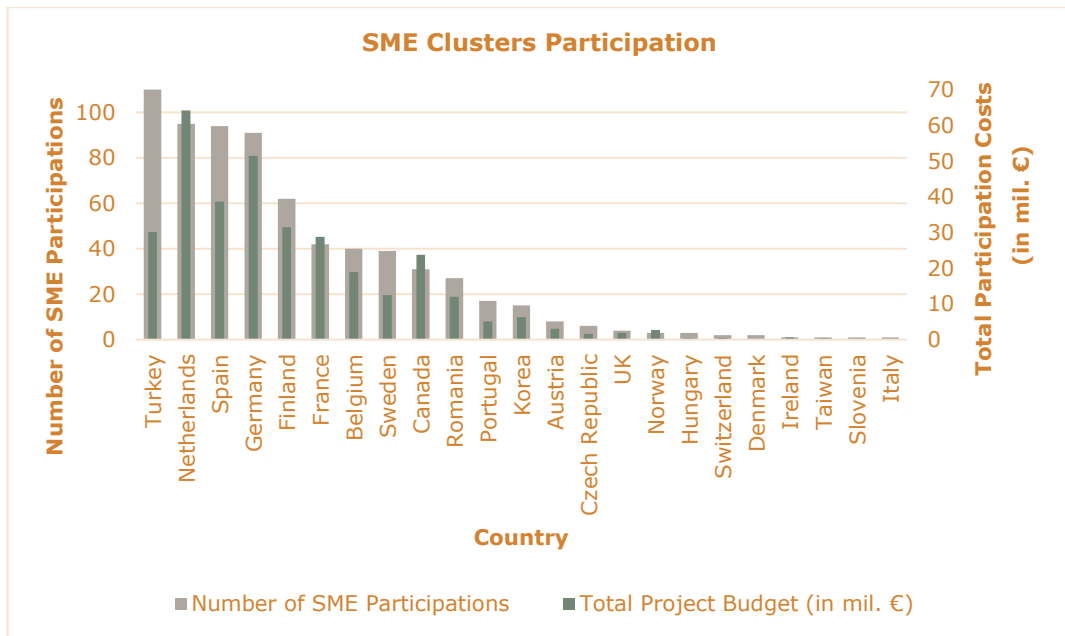
2.2.1 Sector allocation

The ITEA 3 cluster concentrates on software innovation, while the PENTA cluster focuses on electronic components and systems.⁸ The sub-sector in which most SME participants are active is that of computer software (comprising approximately 43% of the subsample). When it comes to Dutch SME cluster participants, it is the semiconductor and industrial sub-sectors (each comprising approximately 22% of the subsample) which seem to dominate.⁹

2.2.2 Origin countries

The SMEs participating in Eureka clusters span across 23 different countries, as illustrated in 6. It seems that the amount invested by the participants in the cluster projects is not related to the amount of participations per country. Although Turkey represents the country with the highest amount of SME participants, the Netherlands has the largest total project budget. In other words, the amount invested in cluster projects by Dutch SMEs exceeds those invested by SMEs in other participant countries.

Figure 6: Number and budget (i.e., total participation costs in millions of euros) of SME Cluster participations from 2014 to 2020



N = 695;

Source: Panteia/ECE based on ITEA3 and PENTA Participation data, EUREKA Secretariat

2.3 Leverage of Participation in Eureka Instruments

In order to analyse the leverage of participation in Eureka instruments (in addition to the subsidy received from Eureka grants), a representative subsample was created for Dutch participants as well as international (i.e., non-Dutch) participants. Using characteristics, (such as origin country, company age, number of employees, and others), of the total population data, a subsample of 100 companies (50 Dutch and 50 international) was selected. This subsample was then enriched with external datasets, (such as Orbis, Tracxn, Dealroom and Crunchbase), to gauge the growth and investment paths of Eureka participants. It is important to keep in mind that the leverage of participation in cluster instruments is limited and

⁸ Source: <https://itea3.org/about-itea.html>; <https://www.penta-eureka.eu/penta/vision-mission.php>

⁹ These numbers are rough estimates and should be interpreted with caution as they are based on subsample calculations. See the Technical Annex on Data Analysis and Enrichment for more information.



challenging to measure due to the fact that 61% of the projects are still running, while only 9% of the population data represents participation that is recently completed and only 1% is completed.¹⁰

2.3.1 Growth path

The first element analysed to determine the leverage of Eureka participation is the growth path of the Eureka enterprises. The growth paths are examined from the perspective of participants from the Netherlands as well as international (non-Dutch) participants. The following section consider several growth factors such as turnover, profitability and employment.

Eurostars

Several companies participate in more than one Eurostars project. Specifically, around 21% of international companies participated in more than one Eurostars project, while almost 37% of Dutch companies participated in more than one Eurostars project.

Eurostars - internationally

Approximately 30% of the international Eurostars participants experience some type of growth upon joining a project, in at least two out of the following three indicators: revenues, profits or number of employees. Of these companies that experienced growth, 41% can be defined as a scale-up. Overall, 12% of international Eurostars participants are scale-ups, of which an overwhelming majority scaled up *after* participating in Eurostars (80% scaled up after joining a Eurostars project while 20% of were already scale-ups when joining a Eurostars project).

Out of international companies in the sample, 23% improved their liquidity position after joining a Eurostars project.¹¹ This means that they experienced an increase in their Current Ratio (current assets to current liabilities), demonstrating an improved position in terms of ability to cover their short-term debts. This could be beneficial in helping companies divert their resources towards growth rather than covering their operational expenses. Only 2% of international participants seem to experience bankruptcy after joining a Eurostars project. Overall, this implies that participation in Eurostars projects not only helped these companies further develop their technologies but also helped them overcome their financial constraints, which is highlighted in the literature¹² to be particularly applicable to younger firms that face high liquidity constraints.

Eurostars – in the Netherlands

Similarly to international participants, approximately 30% of Dutch Eurostars participants general experience growth (in employment).¹³ Of these Dutch Eurostars participants which grow, it seems that these companies increase, on average, by 14 employees over a period of 3 years. Although only 2% of the Dutch Eurostars participants in the subsample are scale-ups by the strict definition (i.e. must have 10 employees at the start of the period), 12% still experienced a scaling up in number of employees *after* joining a Eurostars project.

¹⁰ See the Technical Annex on Data Analysis and Enrichment for more information about how the subsample was created and thereby enriched.

¹¹ An improved liquidity position is reflected by an increase in Current Ratio over a period of 3 years, given that the most recent current ratio is higher than 1. See Technical Annex on Data Analysis and Enrichment for more information.

¹² García-Quevedo, J., Pellegrino, G., & Vivarelli, M. (2014). R&D drivers and age: Are young firms different?. *Research Policy*, 43(9), 1544-1556.

¹³ Only limited consecutive employment data (over a period of 3 years) was available for the Dutch subsample. Therefore, it is still possible that these companies experienced revenue growth despite the lack of data to demonstrate it.



After joining a Eurostars project, 27% of Dutch companies in the sample were able to successfully improve their liquidity positions (by increasing their Current Ratio). In other words, 27% of the Dutch Eurostars participants do not require additional investments to cover their operational expenses. This implies that there is more space for additional funding to contribute to company growth and scaling, rather than covering existing debts. In terms of bankruptcy, less than 5% of Dutch participants become liquidated after joining a Eurostars project. Nevertheless, this implies that participation in Eurostars projects not only helped Dutch companies further develop their technologies but also helped them overcome their financial and liquidity constraints, which is a problem that is particularly faced by younger firms.

Clusters

Concerning the cluster participants, no scale-ups could be identified based on the participant data received via the Eureka Secretariat. Although none have been identified as scale-up enterprises per se, around half of international cluster SMEs still experienced growth in the number of employees. Specifically, the median increase in employees over a period of 3 years is 5 for international cluster SME participants. Similarly, just over half of Dutch cluster SMEs grow in employment with a median growth of 4 employees over a period of 3 years.

2.3.2 Investment path

Not only is it important to consider the growth path of the Eureka companies after participating in Eureka projects, but Eureka participation could also have leverage on the investment path of the project participants. The following addresses the funding pattern of the Eureka participants.

Eurostars

Eurostars - internationally

23% of international Eurostars participants raise funding (in addition to Eurostars subsidies). The participants receive investments ranging from €50,000 to over €5 million.¹⁴ Out of the companies that were funded, each company raised on average 4 rounds of funding¹⁵ with majority (73%) of these funding rounds occurring *after* the participants have joined a Eurostars project.

Eurostars - in the Netherlands

51% of Dutch Eurostars participants raise funding (in addition to Eurostars subsidies). The participants receive investments ranging from €50,000 to over €20 million.¹⁶ From the Dutch companies that were funded, each company raised on average 2 to 3 rounds of funding with almost 60% of these funding rounds occurring *after* the participants have joined a Eurostars project.

Clusters

For both International and Dutch SME clusters, each participant raises 2 rounds of funding, on average. Approximately 67% of Dutch SMEs and around 57% of international SME cluster participants are funded. Most of these funding rounds occurred *before* the start of the projects, which is understandable given the more recent time frame of the clusters projects.

¹⁴ This range is based on the subsample analysis so in practice, it could be much broader.

¹⁵ It is possible that these rounds of funding occur across different Eurostars projects.

¹⁶ This range is based on the subsample analysis so in practice, it could be much broader.



Eureka participants in general

Both Eurostars and Clusters participants raise a diverse portfolio of investments, which include (but is not limited to) those listed below in Table 1.

Table 1: Origin of Investment Raised for a sample of Eureka participants

Grants from a variety of institutions, such as:	Investments for different levels of development - Seed, Series A-C, Post-IPO from:	Exits via:
<p>European Union (EU)</p> <ul style="list-style-type: none"> • European Innovation Council • EASME (Executive Agency for Small and Medium-Sized Enterprises) • Horizon 2020 FET (Future and Emerging Technologies) <p>EUREKA Network Projects</p>	<ul style="list-style-type: none"> • Venture capitalists • Angel investors • Accelerators • Debt financing • Private equity 	<ul style="list-style-type: none"> • Going public, i.e. IPO (Initial Public Offering) and listing on the stock market • Acquisition by another firm

N = 100; data sources: Tracxn, Dealroom, Crunchbase.

For most participants in the sample, the trend seems to entail first receiving some type of (EU) grant before joining Eureka projects and thereafter receiving venture capital investments after joining.

Around 33% of Dutch participants and 20% of international participants raise additional funding from two or more different sources of investment. When it comes to Eurostars projects, these companies follow a promising investment trajectory that is independent of their participation type. This means that regardless of whether they were a Main participant or a Partner participant, these companies were still able to raise additional funding from different sources of investment. This could be because companies that receive a more diverse portfolio of investment often participate in more than one Eurostars project, where they play different roles as a Main participant in one project while being a Partner participant in another.

The top Eureka performers in terms of successfully acquiring funding also seem to be *younger* and *smaller* (in employee size) than the participants that raise less (or even no additional) funding. While the average age of the sample Eureka participants is between 9 and 10 years old at the time the projects started, the average starting age of the “top Eureka financing performers” is around 7 years old. Similarly, the average size of the companies (when they register for the projects) in the sample of Eureka participants is around 30 employees while those that successfully acquire multiple sources of funding only have around 16 employees on average.



3 Best practices: 8 enterprise case studies

As part of this evaluation 8 best practice cases have been developed for enterprises who participated in Eurostars, ITEA, and/or PENTA projects. The main aim is to establish the experiences with Eureka programmes amongst different enterprises, their growth trajectories, and to discover how Eureka contributed to the development of the enterprise.

To select and develop best practices and success stories, a list of successful enterprises is made based on the participant data received from the Eureka Secretariat. In this case enterprises who had participated in both Eurostars and a cluster project were identified, yielding a list of 54 enterprises to select best practice cases from. Further desk research was conducted on this long list of enterprises and in cooperation with RVO eight enterprises were selected¹⁷. The RVO and the authors of this report thank the enterprises for their participation.

The list of enterprises presented are:

1. Evalan B.V.
2. Wellness Telecom
3. GTX Medical
4. EagleScience
5. LG Sonic
6. ViNotion
7. Industrial Pathways
8. Taiger

3.1 Evalan B.V. (NL)

Introducing Evalan B.V.

Evalan is an innovation company based in Amsterdam and Philadelphia that aims to develop, market and sell innovative IoT systems. The company was founded in 2005 by Mr. Henk Schwietert and two other partners. The start of the enterprise had its ups and downs and within 6 months the two partners left, leaving Mr. Schwietert as the de facto founder and CEO.

The idea for the enterprise was born while Mr. Schwietert and his two partners were working at their previous employer, an American company working in telemetry, now known as the Internet of Things (IoT). This enterprise was a pioneer in this technological area but did not see the full market applications for their technology. Around 2000 the company realised that they were well ahead of most other industrial companies and decided to spin out the group that was working on the telemetry projects as a separate company. Anticipating a significant market potential for companies that specialise in Internet of Things applications, Mr. Schwietert decided that this could be an area of interest for a new start-up, and Evalan was established.

At first Evalan engaged in a few different foreign contracts, supplying technological solutions. These contracts were not overly successful. Then came a contract with a client where Evalan was requested to develop tailor made monitoring systems to collect data on how this client's products were being used. A series of indicators for different aspects

¹⁷ At the time of writing this report, global and national health measures in connection with the Corona virus were existing which made approaching the enterprises more complicated.



of product use and consumption was developed by Evalan to meet the client's needs. All this information could be sent to and examined via a central server.

A new two pronged business model

This approach of tailoring product solutions to the needs of a client, rather than rolling out generic technological products became the new way of working for Evalan. This approach involves a longer term collaboration with clients as product solutions must be maintained and updated when necessary. The client tends to come up with new desires or requirements for their product and this leads to the further development of the product solution in question.

During these processes of developing a solution further, Evalan also tends to discover new chances or opportunities to apply the innovations in question to other areas as well, thereby expanding on an existing product or concept. This in essence forms a second, main line of business activity within Evalan. Evalan uses EU funds and subsidies for this process of further developing an existing product or piece of technology. It is in this prong of the business model that Eureka financing is used.

Evalan participated in and initiated **various Eureka programmes** with a wide assortment of their projects. Evalan has participated in:

- Two Eurostars projects: COMFORT and SACON;
- Two ITEA projects: MoSHCA and FoodFriend;
- The PENTA project PLANtAR; and the Catrene project NEXGEN.

Instead of examining each project in turn, those that made special impact and led to the development of new technology and new Eureka funded projects are examined briefly below.

MoSCHA - 'My Mobile and Smart Health Care Assistant

The first project Evalan participated in was the MoSHCA project, which ran as a part of the Eurostars programme from October 2012 till March 2016. MoSHCA is short for 'My Mobile and Smart Health Care Assistant.' Comprised of eleven partners this project aimed to create a mobile health environment designed to improve the patient-doctor interaction and control of chronic diseases.

The MoSHCA project yielded various valuable outcomes both in form of dissemination and exploitation. Over 10 research publications have been made in the context of this project, over 30 demonstrations of prototypes given at meetings, fairs and events, and more than 30 presentations given at conferences and symposiums.

The MoSHCA project also led to several valuable products being developed. So far the research has been used to create an epilepsy app that detects epileptic seizures with a proprietary sound algorithm. This app is being used to monitor 2000 patients at 's Heeren Loo care group in the Netherlands. Additional apps created include a general fitness app called Healthify as well as Care Me At Home, an app created to enable premature babies to be monitored at home. Technology developed in the MoSHCA project was also used towards developing technology in the COMFORT project, another of Evalan's ITEA projects.

From MoSCHA to COMFORT and SensiStep

The COMFORT project was started in September 2015. This project uses innovative IoT technology to provide real time feedback on the impact of physical activity on the joints



of patients rehabilitating from leg or hip injury. It used technology from the MoSHCA project supplemented with new research to create the product **SensiStep**; an innovative tool based on IoT technology that provides real time feedback on the impact of physical activity on the joints of patients rehabilitating from leg or hip injury. SensiStep supports patients and medical professionals in partial physical therapy by providing feedback that helps them perform successful load bearing exercises. This technology is currently being used professionals at UMC Utrecht, the Netherlands.

Evalan's NEXGEN project kicked off May 2016 and ran till June 2019. This project was focused on developing different sensor-based body monitoring technology to address health and healthcare issues. It led to the creation of micro-electronic technologies and components for mobile and wearable healthcare-systems.

ITEA project outcomes and impact for Evalan

In terms of broader outcomes of the project for Evalan, as the enterprise's first main Eureka project, MoSHCA led to many lessons. The collaboration with in the ITEA project MoSHCA were very interesting for Evalan. Although it was not entirely clear what was expected from Evalan within this new European programme, the project leader for this particular consortium was especially good and helpful. As first time participants the exact ways of working and requirements were all new to Evalan and the project leader gave very good support to the project partners, including Evalan.

After the MoSHCA project, Evalan experienced a growth rate of 100% in turnover, employees, and profitability each year, in 2016, 2017 and 2018. During that same period Evalan has added 40 FTEs to the enterprise and expects that growth will continue in 2019. Evalan's assets has grown between 2014 and 2018 by approximately 88%. In terms of a broader technological impact, the technology Evalan developed within the MoSHCA project has contributed to the further development of related technology and product.

Though MoSHCA is an example of a good product which was developed and with further technological possibilities and developments, the impact of a project on an enterprise varies per project. As a whole, Evalan indicates that participation in Eureka projects has contributed enormously to its growth and development. One of the projects (Sensi Step) indeed led to the establishment of a subsidiary enterprise which now has over 30 people employed and the product is being offered in hospitals all over Europe.

Contribution of Eureka programme financing

Regarding other sources of financing, Evalan has not made use of much external or public financing for its enterprise or its projects. The enterprise itself was started with private capital. One of the few sources of public financing came from the ECSEL programme. However, Evalan focuses its attention and efforts on the Eureka programme and its instruments. The enterprise consciously invests its efforts in Eureka for the network, for the financing, and Evalan is active in the Eureka network activities as well; they go to meetings and conferences, see their partners there and meet familiar as well as new faces. According to Evalan, once you learn how to use the Eureka programme it is very manageable to conduct products with.

If there had been no Eureka financing to make use of, Evalan would no doubt have considered other avenues for its business activities. It is of course difficult to say what the enterprise would have done without such financing, but Evalan indicates that it would most likely have taken on a different business model, using technology from



abroad rather than developing it themselves. The shape of the enterprise would likely have been different too, more of a trading enterprise rather than one with a technological foundation as is the case now.

In terms of growth, it is difficult to say how much growth is due to the Eureka instruments and how much is due to Evalan's own activities. However, Mr. Schwietert estimates that since using Eureka and now, the turnover has increased tenfold and employment has increased substantially.

Key success factors for Evalan

Given Evalan's many projects and the fact that the MoSHCA project was the first amongst these, this section focuses on the success and fail factors for this particular project.

- ❖ A number of key factors played a role in the relative success of the MoSHCA project.
- ❖ The **project leader** emphasised the **core rationale in cluster projects** that the focus is on technological development which can then be brought to market. However, cluster projects show a measure of flexibility and freedom for enterprises to adapt to the innovations and technologies within a sector, which evolve continuously. The ultimate goal of the projects is to work and develop a certain technology and to consider its applications. In that spirit changing the approach to developing the technology is perfectly reasonable as long as it allows for organisations to indeed develop the technology in question; this appears to be an important success factor distinguishing Eureka from other financing programmes.
- ❖ Another success factor appears to have been **Evalan's own efforts to contribute** in a sound, timely, and reliable manner. It appears that one gets out what one puts in with these projects. Making efforts to be a good partner increases a company's chances of **being invited for a next project consortium**.
- ❖ Evalan focuses its attention and efforts on the Eureka programme and its instruments. The enterprise consciously invests in Eureka as its main source of external financing for product development for the sake of both the network of collaboration partners and for the financing.
- ❖ Evalan is also active in the **Eureka network activities** as well, going to meetings and conferences, see their partners there and meet familiar as well as new faces. This in turn has led to networks of collaboration partners in and across Europe for Evalan. Indeed these networks together with the financing of innovations are the core reasons for Evalan's use of the Eureka programme.

All in all, given the growth and technological impact Evalan has reached with the help of Eureka financing, the enterprise indicates that they are unequivocal fans of the Eureka programme.

3.2 Wellness Telecom, (ES)

Introducing Wellness Telecom

Wellness Telecom was established in Spain in 2008 and is a high-value technology company with over 11 years of experience in the development and implementation of IoT solutions, cybersecurity, Big Data and artificial intelligence. The main mission of the enterprise is to provide clients with the best possible, quality solutions and products, simplifying and automating administration and operations by incorporating the technology into state-of-the-art cybernetics and devices. Wellness Telecom has two



domains: IT networks and Smart Cities and the enterprise develops products for these two main business areas.

The smart technology which Wellness Telecom develops, is used to combat issues faced by cities, regions, public service industries, and business by providing solutions in a “smart” way. Wellness Telecom’s specialisation includes a large range of multi-vertical projects which include the design, implementation and operation of integral solutions, including safe cities, clean and efficient cities, smart destinations and connected industry.

Evolving technological ambitions

In 2009 the focus area of Smart Cities was less of a prevalent technological area than today (2020). It was not a common area of work then and Wellness Telecom was a pioneer in the field. The enterprise started considering basic services in a city and how to automate and digitise these. The first services they developed included both the hardware and software for municipal waste disposal and lighting. They developed products for these two main areas and applied for funds. Following this and learning from its experiences with automating these service areas, Wellness Telecom moved into other service areas relating to Smart Cities, including water management.

Wellness Telecom developed a prototype for industrialising water using the IoT concept. However, to further industrialise this prototype and to bring it to market the enterprise made use of Eurostars. It did so with partner organisations from Hungary and Romania as these were also countries in which the enterprises wanted to become more active; Eastern Europe was an interesting region for Wellness Telecom to move into. In expanding its portfolio in this way, Wellness Telecom achieved access to new market areas.

Using Eureka instruments

Wellness Telecom engages in end to end development of their products, designing and producing the hardware all the way to the software. As with most R&D enterprises, further developing products for its two domains and engaging in the necessary research and development included a certain degree of (financial) risk for Wellness Telecom. The enterprise uses funds such as Eureka to reduce the risk of investing to evolve and develop the enterprise’s products.

To make their products and technologies more competitive, Wellness Telecom uses external funds. Within the enterprise the policy is that if technology can be applied to an existing product within the enterprise, a succinct business plan is developed for the product and how it could be further developed. This business plan takes the form of a sort of white paper which is presented to the company directors; these then decide if this product development will be financed internally or if they require external financing. Following this the enterprise searches for an appropriate programme for financing the product development.

Wellness Telecom has participated and initiated various Eureka projects. The company is currently participating in two projects, SWAM in the Eurostars instrument and POLDER in the ITEA instrument. These two are described below.

- **POLDER**, refers to POLicy & Data Exploitation & Re-use, and is part of the ITEA 3 program. The project kicked off November 2018 and is currently running until June 2022. POLDER aims to design, develop and deploy a software tool-suite to support government, city councils and related organisations in the elicitation, design and application and validation of policymaking. POLDER proposes a hybrid policymaking model, where policy is made:



Data driven, Model driven Society driven. The consortium of the project consists of 17 partners in total, coming from Finland, Romania, Spain, and Turkey.

- The latest project Wellness Telecom participates in is **SWAM**. SWAM, refers to Smart Water Management system for better environment sustainability and relates to the sectors environmental engineering and technology. SWAM aims to support Sustainable Development Goals and the implementation of EU initiatives (IEP Water) by providing a vigorous, smart and effective water management system according to the needs of each region or city. Wellness Telecom has a lead role in this project, which runs from 2018 to 2022, and is doing so in collaboration with enterprises from Romania and Italy.

Eureka project outcomes and impact for Wellness Telecom

Looking at tangible project outcomes, Eureka has helped Wellness Telecom to develop its market position and has contributed to new business partnerships. Between 2008 and 2011, the enterprise's revenue grew with 35%. Between 2011 and 2014, while the LBA Eurostars project was running, the enterprise appeared to scale -up, growing in revenue in those years by around 145%. Wellness Telecom staff also grew along with the revenue, from 7 to 54 employees between 2009 and 2013.

One of the company's key success factors here, is its leadership position within the market. Another aspect that illustrates Wellness Telecom's growth is the partnership in 2018 with Enzen. Enzen is a global leader in the Energy and Utilities sector, and the goal was to expand Wellness TechGroup's portfolio for smart cities and industry. Besides this it focusses on the applications of IoT innovation and new technologies on energy and utilities under the global economy.

From a societal perspective too, projects such as POLDER and SWAM contribute to helping policy makers understand the behaviour of citizens, will optimise energy consumption, tourism, transport , waste disposal, health, services, water management and more, thereby working to improve the quality of life for citizens across Europe.

Next stages of development

Around two years ago (2018), Wellness Telecom consciously decided to scale up and to move from being an SME to a large enterprise. To do so Wellness Telecom needed investors. One of the enterprise's key credentials was its experience in research and development and its in-house capabilities in that regard, as well as running large international projects (some over 20 million €). These were motivating credentials for investors to eventually invest in the company and to allow it to grow. The fact that Wellness Telecom knew how to innovate and the R&D experience made the enterprise much more attractive and find investors. The investment allowed Wellness Telecom to become a global organisation and to work together with partners in South America, Korea, and other global regions. This is especially due to the R&D experience and this experience in turn is due to external financing from programmes such as Eureka.

Wellness Telecom has had overall good experiences with the different Eureka instruments. Besides the financing and resulting technological evolution and development of their products, the international networks are also very valuable. Adapting to partners and finding common points of interest and cooperating is part of the process of collaborating with foreign partners in project consortia. However, Wellness Telecom prefers to think of these project partners as "copetitors" (instead of competitors); project partners which help Wellness Telecom to further develop certain products, and which help them enter into new sectors with those products should be viewed not so much as competitors as collaboration partners, that is, "copetitors". These partners allow them to penetrate into different markets and make their products better.



Wellness Telecom indicates that it would most likely have grown much more slowly if it had not been for their use of Eureka programmes. The funds they receive via Eureka helped catalyse the development of new products, which allows for growth and breaking into new markets, which in turn requires hiring more people. Research is by its very nature a risky business; outcomes are rarely certain. Wellness telecom cannot always carry this risk itself and therefore the evolution of the enterprise would have been much slower.

3.3 GTX Medical B.V. (NL)

Introducing GTX Medical

GTX Medical is a medical device corporation, founded December 2014, splitting off from the Swiss Federal Institute of Technology (EPFL) in Lausanne. GTX Medical is devoted to treating individuals with a spinal cord injury and providing them with accelerated recovery and a better quality of life. As such they have, GTX has participated in multiple Eureka projects to allow them to research develop new treatments. GTX medical has developed, and is currently running clinical tests, on a ground-breaking implantable spinal cord stimulation treatment that provides an opportunity for rehabilitation from a spinal cord injury with Targeted Epidural Spinal Stimulation (TESS). They do this through an implantable spinal cord stimulation system with real-time motion feedback. Preliminary clinical results are confirming a series of scientific breakthroughs developed in animal models over the past 15 years. The treatment has also already been shown to restore locomotion walking in a select number of patients with spinal cord injury.

Using Eureka instruments and project outcomes

This research and the resulting medical breakthrough findings originated from three four Eureka funded R&D projects (DISPERSE, RESTORE, WALKAGAIN, and CONFIRM!), that built upon each other to led to the creation e of new technological innovative products.

- In DISPERSE, funded through the PENTA cluster, GTX Medical and the other partners in the Netherlands, Belgium and Ireland created methods to safely and effectively perform MRI scanning of patients with multiple implants.
- In the RESTORE project (PENTA), the consortium collaborated to create technology that could more accurately depict the anatomy of a patient's spine, and allowing medical professionals (neurosurgeons) to prepare the placement of the stimulation lead on the spine with high precision to obtain the best possible outcomes: the delicate and personalised work of attempting to reconnect spinal pathways. The project partners also started developing a personalised electrode array configurations to use in their therapy.
- In the WALKAGAIN project (PENTA), GTX Medical collected locomotion data in people with a spinal cord injury, to support the development and validation of gait detection algorithms as well as a wearable device to adjust the stimulation settings in real-time..
- Since April 1st 2019, GTX Medical started a new project through Eurostars, named CONFIRM!. This project aims at research into confirmative neuromodulation surgery for rehabilitating people with spinal injury.
- In April 1st 2020, GTX initiated a new project through Eurostars, called PREP2GO. This project aims at the development of a pre-operative planning system, based on deep learning and computational modelling, for neuromodulation surgery in spinal cord injury rehabilitation.

GTX Medical conducted these interrelated research projects with the help of Eureka funding as well as with a financial loan from RVO, the Netherlands Enterprise Agency. The pioneering



nature of the research and the medical, societal value of helping treat spinal injuries and allowing patients to regain the use of their legs are in part due to the use of both Eureka and national public financing. The CONFIRM! and PREP2GO Projects indeed commenced during the running of the DISPERSE, RESTORE, and WALKAGAIN project triumvirate. This suggests that the CONFIRM! and PREP2GO projects were something of how a spin-offs product area arising from the work being done in the other three, related projects.

GTX Medical is a privately-held company, backed by venture capital funds and a government loan. A series A investment round in 2016 resulted in a financing of had received investments through other channels, including the loan from the Dutch agency, the RVO and through some €26 million € together with other partners in a Series A investment round in 2016. The degree to which growth of GTX Medical has grown thanks to opportunities offered by the Eureka projects above is difficult to quantify concretely. However, from 2016 to 2018, the enterprise total assets grew from around €4.7M € to € 9.6 M €, and increase of around 103%. Its employees grew in number from 11 to 35 over the same period. It appears that during this period the enterprise was able to scale-up.

Swiss ties and next steps

The most considerable factor contributing to the success of GTX is that they address a medical need for which there is no other solution resulting in reversing the paralysis to some degree. This makes them highly relevant and competitive in the market and disruptive towards non-restorative medical aids such as exoskeletons. The international collaboration with partners in Switzerland appear to have arisen in part due to the origins of the company in Switzerland and has been expanded further with the financing of collaborative research projects through Eureka.

In 2019 GTX announced the merger with the US-based NeuroRecovery Technologies Inc. into GTX Medical B.V. The newly merged company started working on a Targeted Epidural Spine Stimulation (TESS), “an implantable spinal cord stimulation system with real-time motion feedback for locomotion” and a Non)Invasive Electrical Stimulation System (NESS), a transcutaneous stimulation system to treat upper-limb paralysis, according to GTX Medical. The merger brings together the technical and research expertise of both institutes as well and turns GTX into a global player.

3.4 EagleScience B.V. (NL)

Introducing EagleScience B.V. (NL)

EagleScience Software BV is a company that creates software for businesses. The enterprise does not have one specific product it creates as the business model is to turn the ideas and desires of their clients into software applications; EagleScience adapts to whatever the client is seeking.

In practice, EagleScience works with different clients: both small and large businesses as well as scientific institutes. For their products, the innovative ideas are offered by the client, and EagleScience helps make the ideas reality.

The CEO of EagleScience spent over a decade working in applied research. After becoming a solo-entrepreneur in the Netherlands, he became involved in valorisation and consulting on bringing research innovations to market. This grew into setting up various enterprises, all of which are innovation driven. What became apparent here was the need across various sectors for tailored software development.



In the first phase of innovative product development, a fast, affordable prototype (or MVP, minimal viable product) is needed, so new ideas can be tested with users. A key success factor in this process is understanding the idea (vision) of the inventor and the needs of the future user. With these in mind, a first version of the product is built using the latest techniques. Subsequently, after a successful evaluation, the prototype can be scaled to a fully operational product.

The first enterprise set up by Mr. Grootjen, (EagleScience CEO), grew very fast, starting mainly with students from Delft University and later working with the first fixed contracts. After a few years this led to the spin-offs of multiple enterprises. EagleScience grew into the main software development company it is now. The company focuses its activities on developing new software from the ground up with the newest technology. This has been the business approach for EagleScience for the last 6 years.

Use of Eureka instruments

EagleScience mainly does project based work for clients. The Eureka project financing offers more freedom and innovation to develop technologies in ways that are useful to the company. This freedom to innovate and explore technological innovation leads to new client propositions and, additionally, own products that can be brought to the market in a spin-off company. EagleScience has participated in several Eureka projects, providing the software solutions to make the projects aim possible.

- One of the projects EagleScience participated in was the **SenSuit project** which kicked off in March 2016. In this Eurostars project they worked together with a Dutch and German consortium of three companies and a research institute. The SenSuit project aimed to develop a state of the art firefighting suit by integrating sensors into firefighting suits measuring the firefighter's vitals. It gives the firefighters instant feedback through vibrations and sends the information to the firefighting trucks so the commander can keep an eye team. This creation of a terminal for on the firetruck and the communication with the suit was EagleScience's contribution to the project. All in all, this suit makes the work of firefighters safer because it allows them and their commanders to easily keep an eye on their health while carrying out their work. SenSuit Safety Systems, an addition project of EagleScience was a continuation of the work that was done in the SenSuit project. The main success factor of this project is the innovative and useful product. It addresses not just a gap in the market, but an actual demand.
- The other project EagleScience participated in was **Neurostars**, a Dutch and French collaboration which started September 2016. The Neurostars consortium aimed to create a breakthrough medical imaging device: a 3D brain visualiser that creates a realistic 3D visualisation of the inside of the human brain. By combining multiple neuro-imaging sources, and using an algorithm that recognises crucial types of tissue (e.g. veins, brain, and tumour) and patterns, the imaging device can become accurate and full colour. A 360° specific modelling engine makes the 3D model interactive in a virtual reality environment and provides an intuitive user interface. This adds a high degree of value visualisation that is highly relevant for clinical practice.

Project outcomes and impact of Eureka on the enterprise

The financing has led to growth and security within EagleScience, especially in the early years of the enterprise. EagleScience started with 5 people and now has 22 employees. The turnover of the enterprise has grown from between 300 k€ and 400 k€, to around 1.3 million€ a year.

The development and growth in terms of both revenue and employees is partially due to the long-term Eureka financing. Due to the new avenues of product development and innovation which are made possible through Eureka financing, EagleScience was able to



hire people to work on those projects. The innovations and products which arose from this gave rise to new areas which required hiring more people as the enterprise grew.

The Eureka financing has been especially helpful in hiring employees; the project financing and the flexibility it offers made it possible to hire people (especially during the difficult economic years at the start). Beyond this however, the financing and the way of working made EagleScience an attractive place to work for young people in particular; having space for research and development is an appealing aspect of working at EagleScience and one which the enterprise actively tries to maintain in his enterprise.

A further positive outcome was the establishment of the enterprise Elitac, set-up partly based on the Sensuit project. While this enterprise was not established because of Eurostars, the collaboration between Elitac and EagleScience became deeper and closer due to Eurostars financing. Similarly, with Braincarta, partner in the Neurostars project, was first a client and then became a collaboration partner through the intense collaboration which arose during the Neurostars project.

It should be noted that during the Eurostars project duration, the system behind the Sensuit was not yet working well enough, in part because some of the consortia partners were unable to deliver what they had hoped to deliver within the project plan. This was quite unfortunate but these things happen indicates EagleScience. This happens and is inherent to innovation. Now another larger multi-national company has taken on the further development of the Sensuit which EagleScience views as a natural progression in technologicla devleopment.

Eureka and other sources of financing

If EagleScience had not made use of Eureka financing, it would probably have opted for Horizon2020 funding instead. However, the enterprise would not have made this decision lightly, being a smaller enterprise. It costs much time, effort and money to prepare a H2020 project application and the research tends to be of a more fundamental nature. This means collaborating more with universities or research institutes, which tend to have other goals and expectations as to enterprises. Furthermore, H2020 involves larger projects where the oversight and role of individual organisations tends to become smaller.

EagleScience has made use of MIT subsidies on occasion. Other Dutch subsidies have lower subsidy rates, are less financially attractive, and tend to have stricter application assessment. Furthermore, they make use of WBSO financing (a Dutch subsidy for R&D in SMEs of all types).

The Eureka financing was very important in the growth of EagleScience; it made it possible to hire people and this in turn made it easier to research and innovate and try new things, which in turn led to the need for more people. The enterprise is unsure whether other subsidies or financing could have helped him achieve the same. EagleScience also estimates that it would not have grown as rapidly if had not used Eureka financing.

3.5 LG Sonic

Introducing LG Sonic

LG Sonic is a company that was originally founded in 1999 and saw reorientation and restart in 2011. LG Sonic is a leading international manufacturer of algae control and



bio-fouling prevention systems. Their main aim is to reduce or eliminate harmful chemicals in our global water environment. They do so in part by offering a chemical-free ultrasonic technology that controls algae without disturbing the natural balance within water ecosystems. LG Sonic looks for end-users that face algae problems in their water reservoirs.

Some of LG Sonic's main clients include municipalities, drinking water treatment plants, owners of power plants and wastewater treatment companies. The company has a large presence on both the European, and the North and South American market.

Use of public funds and Eureka

In the past, LG Sonic has coordinated and participated in several European Funded (non-Eureka) projects, through FP7 amongst other things. They kicked off their participation in Eureka with a 2009 project called FISH-CWUS on which the Faculty of Health Studies at the University Of Ljubljana was the main partner. The project aimed to create a water process control instrument to use in water recycling. They specifically focused on two things: units for vertical constructed wetland and units using ultrasound for sensitive water treatment systems where chemicals are an unsatisfactory solution.

LG Sonic's most recent project was Eurostars project LiceSonic which started in May 2017. This project had as a goal to create an environment friendly ultrasonic solution to control sea lice in open finfish production. LG Sonic is primarily responsible for R&D whereas the other two consortium partners are responsible for the exploitation of the ultrasonic solution LG Sonic will develop.

The growth of LG Sonic and the role of Eureka

The role of this project was very important to the development of LG Sonic. LG Sonic is active in the water sector, their mission is to work towards a water sector without chemicals. Upon entering the field, it was important to get to know the market. The water sector is quite large, with drinking water, waste disposal, cleaning, and aquaculture being some of the main fields within the sector.

Upon closer inspection of the sub-sectors LG Sonic discovered that the aquaculture sector suffers billions of euros worth of damages worldwide due to pest and environmental problems. This then became the area for LG Sonic to target with the LiceSonic project. This required information on the aquaculture sector, the main players, the challenges, and how to market their product in that context.

As LG Sonic needed information and insight on the market and sectors they were targeting, they needed knowledgeable partners. For this reason, LG Sonic teamed up with a Norwegian start-up who was very familiar with the sector; they knew how the market worked and the end-users for the product. This start-up was included in the Eurostars project team amongst others.

After much time investigating and developing the project in the office, the project team wanted to test the product (an ultrasound device to clean chemicals out of water in this case). The first tests were done in the field (not as pilots in controlled surroundings), and showed a reduction of some 60% in the chemicals in water at around 10 times chapter than competitors at the time. LG Sonic and its partners seemed to have developed a new state of the art in the technology.



After the first successful round of testing, more tests were conducted with end-users to ensure that the first positive results were not some fluke or due to environmental reasons. The results were verified in new tests as well amongst end-users. The results were amazing and almost seemed too good to be true says Mr. Yousef.

Overall impact of Eureka on LG Sonic

The product development and success would not have happened without Eurostars. There was too much risk, too many unknown factors (such as partners, the way the water sector worked, etc.). LG Sonic needed to partner up with European partners to get the product off the ground and into markets and would not have taken on the financial risk of developing and commercialising this product without Eurostars.

LG Sonic is currently active in some 96 countries. It has various different end-users for its products but they mainly fall in the public and government institutions category. It has offices in USA, the Arab Emirates, and is working to set up in Brazil as well. The external public financing provided a significant boost, and LG Sonic grew with about 35% every year after establishment in 2011. During 2019 the growth was closer to 300%.

LG Sonic has been expanding swiftly in recent years and the enterprise is a scale-up at the international level. To do this LG Sonic needed between 2 and 4.3 million € of investment. Until now they have received around 3 million € in investment; 50 to 60% of this investment has been private and the rest public investment. Scaling up in technological and innovative sectors is difficult without external funding and the rationale and design of the Eureka instruments are a very good way to do so.

3.6 ViNotion (NL)

Introducing ViNotion

ViNotion is a specialised high-tech limited liability company in the field of image analysis technology. Founded in March 2007 as a spin-off of the Video Coding and Architectures research group at Eindhoven University of Technology, the enterprise uses its technology to build systems to detect objects in video. The technology works by using pattern recognition and machine learning techniques, or to analyse object behaviour, so called intelligent video analysis. ViNotion aims to innovate by building upon their specialized experience in the development of video content analysis, optimized for real-time traffic analysis. As such, they participate in both national and international innovation projects.

ViNotion primarily develops surveillance systems that learn and model specific objects from photo- and video input. For example: surveillance systems that analyse traffic (pedestrians, cyclist, crowds, and motorized vehicles) but also waterway analysis and management systems.

ViNotion and the Eureka programme

ViNotion is an innovative enterprise and first participated in the Eureka programme as a start-up. It was established as a spin-off from another enterprise and aimed to put a specific product into the market. This required a significant effort because although the idea for the product was clear, it needed to be further developed, tested, and put into market. In terms of both time and money this was a very intensive process.



As ViNotion works with software, they needed employees with the right technical backgrounds and experience so that the software could be developed and commercialised. This process alone can take years. The market of course also changes. As such, between the conceiving a product idea to the generation of revenue from a marketable product can take years (up to around a decade in fact). To finance all of this was not possible for a young enterprise such as ViNotion. To bring an innovative product into the market requires a lot of investment, which is especially challenging for start-ups and scale-ups usually.

For this reason ViNotion looked for external public funding and came across the Eureka programme. To date, ViNotion has run a large number of projects within the Eureka programme and clusters. ViNotion's first Eureka project was project ViCoMo, which ran from September 2009 till December 2012. ViCoMo, standing for Visual Context Modeling (ITEA), developed video-enhancing algorithms and improved intelligent visual systems enabling recognition project. The key achievements in the field of 3D modelling during this project included full automatic infrastructure recognition in geo-referenced images along with autonomous simulation from video inputs. Beyond this, behaviour tracking, logistics control and transportation tracking were improved with technology gained in this project.

Other projects include:

- TASP AIR, a project that develops technology that analyses traffic through motion sensors;
- PS-CRIMSON (via ITEA), a project that concerned itself with solving some of the major logistical issues of smart cities;
- MACH, or Massive Calculations on Hybrid systems (ITEA), focussed on the development of new high profile computing hardware to be used by the members of the consortium in their own application domains (and was used by ViNotion to develop software used by the Dutch government);
- APPS, a project that improved surveillance systems in the maritime domain;
- SMART, or Spatial Modelling Analytics and Real-time Tracking (ITEA), which is currently developing a tracking system that can be used to minimise urban traffic congestion.

Outcomes and impact of Eureka projects

Not only does the financing help to bridge the time between conceiving of an idea and developing it, the cooperation with project partners facilitated by Eureka participation was also an important benefit for ViNotion. Universities can be valuable resources as they have researchers and research projects running, which enterprises like ViNotion collaborate on. They can keep track of the research progress when they collaborate with a university, and universities in turn benefit from enterprises' skills in bringing innovations to market. It is almost impossible to research, develop, and market technological innovations alone and collaborations are a must, especially for SMEs.

The financing and collaboration with partners were the two main reasons for ViNotion making use of the Eureka programme. If it had not been for this financial injection to develop and commercialise their software ViNotion estimates they would have gone bankrupt. Regular investors are usually not willing to take technological risks and typically need to see returns on their investments on relative short notice, something which is difficult in an R&D stage with large technological challenges for innovation. For this reason using a public source of financing like Eureka fit the enterprises needs better.

The exact growth due to Eureka is difficult to distinguish. However, Eureka projects did lead to hiring more people as the company's need for expertise grew. This in turn led to more innovation and more profit, requiring more employees in turn. Currently



ViNotion has 18 employees of which ViNotion estimates one third to one half have been hired as a result of Eureka programme participation. Since 2018, ViNotion has also been awarded further public financing (to the amount of 50,000 €), through the European Innovation Council Grant.

ViNotion has recently started to orient and look for investors to scale up the enterprise. This is a recent process and the enterprise is being careful with what type of external investment it would ideally like to use.

3.7 Industrial Pathways (SE)

Introducing Path Solutions Sweden

Industrial Path Solutions (IPS) is a Swedish company that was founded in 2012 as a spin-off from the Fraunhofer-Chalmers Centre to manage and sell the IPS software which Fraunhofer-Chalmers Centre created. IPS software is a software suite for virtual project realisation. This means that it allows whoever is using it to have a virtual space in which they can design and test products or optimise their existing systems.

Finding suitable financing, Eureka!

IPS had looked at other subsidy programmes to expand their business activities, but struggled to find the right fit. Due to its history and establishment the enterprise has a strong commercial as well as a research focus. Finding both these principles emphasised in programmes was not easy as not many subsidies or financing instruments have such a dual focus. Eureka was an exception in this regard. The first project IPS engaged with was a Eurostars project. The Eurostars rationale is very much focused on commercialising research results for markets. This was a good fit for IPS in 2015 and turned offered a substantial boost. Their products went to market quicker through Eurostars than through national industry partners or through academic or research entities.

IPS has been a part of several Eureka subsidised projects:

- DDA-Flex, short for a Digital Tool for Durability Assessment of Flexibles, is a Eurostars project that kicked off in July 2016. The project aimed to develop a software tool for simulation based assessment of the durability of cables and hoses, to be used in the digital validation of assembly and disassembly processes.
- The ITEA project, MOSIM, started in 2018. This project aims to create a library, open modular framework and a co-simulator to enhance the availability of efficient and interactive simulation and analysis of realistic human motions for professional applications in different fields of industry.
- In 2019 IPS started another Eurostars project called ED-VIMA. This project is meant to improve and evaluate assembly processes for rigid, and in particular flexible, components with regards to ergonomic human motions.

The outcomes and impact of Eureka instruments

The Eureka projects have helped to strengthen the IPS workforce. Due to two projects, IPS has hired new employees. This was possible thanks to the financing which was received. For an enterprise that started out with two employees this was a large jump. In terms of concrete, measurable indicators, IPS revenue grew between 700,600€ in 2015 to 1.853.900 € in 2018, an increase in revenue of around 164%.

While the precise contribution of Eureka financing is of course difficult to establish, IPS indicates Eureka financing played an important role in the enterprise's growth. The financing enables productive development and the strengthening of the software. During



the Eurostars project however, there was a real need to develop its software further. IPS would not have developed further product applications and prototypes if not for the project; they would have needed to see more concrete demand or need to have had capital available to warrant such further development. Eurostars contributed to the improvement and further innovation of IPS' software applications. This and the ITEA project in turn led to job creation within the enterprise.

Looking at international networks and collaboration, IPS knew their German and Swedish partners before going in to Eurostars the project. The ITEA project on the other hand, put IPS in contact with new partners, including big enterprises like Daimler, which IPS indicates they would otherwise not have gotten into close contact with. This also works in reverse, with project partners coming to Sweden and IPS introducing them to other Swedish partners. The contact and physical visit in this case were good steps and contributed to the IPS' international network.

The Corona situation has shown incidentally that much of the communication and contact can go via telecom calls quite well too. More contact is usually a favourable thing for a consortium of partners and using telecom platforms, this could be facilitated further in future.

3.8 Taiger (ES)

Introducing Taiger

Taiger, founded in 2009 in Spain, provides AI solutions which use human-like reasoning to automatically read, comprehend, and extract data. Taiger is based in Spain with headquarters in Singapore. Since 2009, this Spanish enterprise assists and provides solutions and options to enterprises, industry leaders and governments with cost efficient services.

The enterprise implements technological innovations for current societal challenges. It has operations focusing on transforming unstructured data into implementable knowledge for industry leaders across financial services, insurance and government sectors. The company has gained various awards and recognition from multiple companies. Taiger is currently allocating resources and investment towards expanding its presence globally such as in South Korea and Japan, Mexico, USA and the United Arab Emirates. Furthermore, in September 2019 it initiated its official global technology and commercial collaboration with Microsoft. Through this cooperation, enterprises can access improved automation capability with more cost efficient techniques to process information.

Use of Eureka instruments

Taiger has participated in multiple Eureka projects, such as the APP project, under the Eurostars instrument, and EMOSPACES, SOMEDI, CITISIM and DEFRAUDify under the ITEA instrument.

- **The EmoSpaces** (Enhanced Affective Wellbeing based on Emotion Technologies for adapting IoT Technologies), is an ITEA project which kicked off in May 2016, running until September 2019 in the (smart) health sector. The main innovative aspect of this project are the emotion and sentiment, key for improving the intelligence services in IoT. Overall there were 19 partners involved in the project from Romania, France, Korea, and Spain.
- **The SoMeDi** project, is referred to *Social Media and Digital Interaction Intelligence*, was initiated on December 2016 and ran until December 2019 and is part of the ITEA. The main objective is to research machine learning and artificial intelligence techniques, which can be used to convert interaction data into interaction intelligence and approaches that



can be used in social media so as to systematise this development. Overall, there are 10 partners involved from Spain, Romania, and Turkey.

- **The CitiSim project**, referred to *Smart City 3D simulation and monitoring platform*, kicked off December 2016 and lasted till December 2019. The rationale behind this project is the need for to create a platform for a smart city ecosystem. The aim is to distribute important information on various urban dimensions via a platform which can have significant impact on a large spectrum of users such as citizens, companies, city councils. CitiSim allows a development of urban areas through technology that aims for energy savings and efficiency, mobility and emergency management. Five different partners were involved, from Romania and Spain.
- **The DEFRAUDify project**, refers to *Detect Fraudulent Activities in dark web and clear web to protect your business*. The project kicked off in March 2020 and currently is running, due in to finish March 2023. The rationale of the project is to develop mechanisms to assist private business to detect suspicious conduct that occurs online. 19 partners are involved in this project from the Netherlands, Romania, Turkey, and Spain.

Project outcomes, social impact, and impact for the enterprise

Prior to participating in Eureka programme instruments, Taiger appears to have been scaling up. Database information for the enterprise, shows that between 2012 and 2015, staff increased from 6 to 16 employees, and revenue grew strongly with 132%. Taiger started participating in Eureka projects during the scale up process and continues to do so, evidenced by its continued global expansion.

Looking at project outcomes, for EmoSpaces, the project report estimates that the e-Health has a great impact on the consumers and the internet users. Individuals use health apps for their convenience with the possibility to enhance their quality of life. There is a total 31.35% increase on the usage of these apps between 2016 and 2020. Since the EmoSpaces offers education on an interactive format and trainings according to the emotions of the employees that can assist them to increase their performance, it is estimated that such e-learning and trainings can increase revenues of the companies up to 42%.

The social impact is also significant. E-learning is not always possible without taking into consideration the social demands of citizens and the information society. The project and the enterprises involved avoid social exclusion as they believe that in order to have a digital society must not socially exclude its citizens and they must take into account all their needs. It is also estimated that the project can bring approximately between 200.000€ and 600.000€ euro annually.

For Taiger, there has been a visible, significant growth in recent years. As with other enterprises participating in Eureka, the exact impact of projects to enterprise growth is difficult to define concretely. However, the enterprise's workforce has grown as it develops and expands its scope of activities into further sectors. A good example is the establishment of a new centre for R&D in artificial intelligence in Segovia in Spain.

New sectors, new collaborations

As the company is expanding Taiger seeks to hire more people in the sectors of research, training in programming, engineering, and computer linguistics. Besides this evident growth in employment, Taiger is expanding its activities and entering new research avenues. This is evident in turn in Taiger's ambition to invest 3.7 million € in its AI research centre in collaboration with the Spanish local government of Castile-Leon, increasing the number of employees from 5 to over 75 within three years and to 150 within five years.



As the Spanish representative for ITEA policy, Ayuso Gonzalez states, the importance of Eureka clusters and the Spanish involvement is vital not only for the EU market access but also for networking relationships. Spain has a quality software solutions and Eureka programs provide the organisational and monitoring framework to extend to the EU and even further. Taiger has, through its Eureka projects, engaged in various collaboration projects with partners in and outside of Europe, contributing to national authorities' goals as well.

It would appear then that as with other enterprises, Taiger has benefited from participating in Eureka projects as these have contributed to the enterprise moving into new product areas and sectors (such as AI, E-health through EmoSpaces, and transport and city management areas through the CitSim project). The projects engaged in have a societal benefit, thereby contributing to the broader objectives of the Eureka programme. While it is not clear what the exact growth has been in terms of revenue of Eureka participation, the new sectors, international collaboration, and profitable new areas of activity are all positive impacts for the enterprise.



4 Eureka programme instruments: SWOT Analysis

This chapter examines the main strengths, weaknesses, opportunities and threats of the Eureka Programme on the basis of desk research. Where relevant differences between start-ups compared to scale-ups, are included.

4.1 Strengths of the Eureka Programme Instruments

Strengths of Eurostars, ITEA, and PENTA

Reduces financial risk associated with R&D, leading to innovation, and growth

- R&D and innovation are by definition less secure investments; one is pushing the boundaries and it is not certain what the outcomes will be. Investment is needed to research and innovate, however. If enterprises do not have a large enough, concrete need or demand from clients and/or financial capital, they tend to innovate less.
- A key strength of both Eurostars and cluster projects (ITEA and PENTA), is that they help to reduce the financial risk for enterprise to innovate. This is a huge added value, particularly for SMEs and especially so for start-ups and scale-ups. Innovations made during projects often lead to an enterprise exploring different technological and innovative avenues, advancing their existing products and services.
- This innovation and R&D facilitated by Eureka financing has led to enterprises entering new market areas, new sectors, hiring new employees to meet these new demands within the company, and in some cases, the set-up of spin-offs. Enterprises indicate they would most likely not taken the time to further research and develop many of their products developed under Eureka without the financing it provides. This applies to SMEs especially who on average, have less resources to engage in intensive R&D, and particularly to start-ups.

Programme rationales and design: bottom-up, near-to-market approach

- Another unique factor of both the Eurostars and cluster instruments is their bottom-up approach. According to participants this flexibility created by the bottom-up approach, compared to other funding programmes, is an important advantage of the programme.
- The programme rationale of both the Eurostars and cluster instruments is a dual focus on technological development and innovation as well as on commercialisation of innovations. There is a difference in the emphasis on each of these two focus areas between Eurostars and cluster instruments, which is reflected in the instrument design, as illustrated below.
 - **Eurostars** has a stronger market and commercialisation focus. This is reflected in the programme design as the budgets and duration for projects are lower compared to cluster projects. The application procedure and requirements are less burdensome and criteria to entry are easier to comply with. This is especially attractive to SMEs and start-ups in particular; they can make use of Eurostars financing more easily and flexibly work to develop and market a technological product. For start-ups the comparative added value of having R&D financed and bringing a project to market tends to be higher than for a more established enterprise.
 - **Cluster projects** on the other hand have a more technological and research focus. Though it remains important that technological areas have a potential to be commercialised, there is a stronger focus on benchmarking the technology within a given cluster. Projects are on average of a longer duration, involve higher levels of financing, and more partners from different countries. The emphasis here is on more long-term, technological R&D which can be applied and used in other parts of a given industry. The application procedure is lengthier and more complex, involving more administration, including from project partners.
- Furthermore, there is, flexibility in deadlines and thematic focus. This arguably allows Eureka projects to start faster compared to other European R&D funding programmes. This



is most relevant in industries where technologies change and evolve quickly. This flexibility gives industrial partners the independence to decide the focus of the project and ultimately have a market-oriented project. In practice this approach seems to work, with 73% of the Eurostars SME main partners reporting successful commercialisation of their project results.

Generates experience in international R&D projects for enterprises

- A further strength of both the Eurostars and the cluster instruments are that they provide enterprises with experience in international R&D projects. Both instruments require working with partners from other countries, though in the ITEA and PENTA case there is a requirement for larger consortia with partners from different countries. Having participated in an international research project gives enterprises good track record, which can make them more eligible to apply for further research, or makes an enterprise an attractive partner to invite into other research or project consortia. The Eureka project label provides concrete certification of a partner's involvement in Eureka projects. This effect is important for both scale-ups and start-ups though again, particularly so for start-ups. The comparative added value of experience and track record is higher for a younger enterprise.
- Besides making an organisation attractive for further project involvement, it also makes them attractive for investors. Having R&D experience and experience in international projects has helped lead to concrete investment in some participants of Eureka programmes, allowing them to grow and in some cases, to scale-up.

Role of national agencies and national level support

- A strength of the Eureka programme is the decentralised approach of having national authorities and funding bodies co-finance Eureka projects. This means that authorities and enterprises have room to finance areas of technological development and research which align with the national interests. In its design the Eureka programme tries to embed the national as well as the European relevance of R&D and innovation projects.
- Furthermore, the national agencies involved in implementing the Eureka programme provide national level support to project applicants and partners. Being able to support participants within the national context, knowing the national administrative and business customs as well as understanding the Eureka programme, allows for nationally tailored support to participants. Additionally, unlike a more centralised support system, support at the national level can be provided in the native language.

Tools and aids developed to support project applications and implementation

- In connection with the point above is the fact that especially within the **Eurostars** instruments, more tools and supports have been developed which help project participants in both their applications and their project implementation. For Eurostars especially the online participant portal is said to work well, it is fairly intuitive to use. Furthermore, besides the coaching provided by some national agencies, the Eurostars programme also involves a questionnaire of around 50 questions for participants to go through. If they have gone through these questions project partners can have a large proportion if not all of their application prepared. While such aids exist for other Eureka instruments, such coaching and guiding materials and tools were seen as particularly good in the Eurostars instrument.
- The availability of such support tools is especially valuable for start-ups and new users who are likely need extra guidance during their first encounters with Eureka programme financing.
- The **clusters** also include coaching and support to project partners during both the application and the project implementations processes. Specifically, project applications receive feedback on their applications and on how to improve them, helping to develop applications from a project outline to a fully-fledged proposal. If a project is approved, the national agency and the programme instrument coordinators assign industry experts to annually check and monitor project process. These experts can brainstorm and provide coaching and feedback to the project participants, which is considered to be valuable by project stakeholders. The fact that it is industry experts and not necessarily Eureka



programme stakeholders offering such coaching works especially well; partners can more easily accept the substantive feedback on the content and technical progress of their research from a peer.

Strengths of the Cluster instruments

International collaboration and networks of mixed organisations

- Eureka is unique in that fact that it provides an international dimension to a national funding scheme. Because the project consortia must consist of multiple nationalities, Eureka programmes provide access to international markets and organisations, within and outside of Europe. According to a 2017 study, Eureka participants perceive the benefits of Eureka's international nature in the form of entering new markets (69% of surveyed participants; local or foreign markets), improvements of their market share (68%), and increases of exports (67%).
- The access to international collaboration is a particular strength of the cluster instruments as consortia tend to be bigger, involving more and different types of organisations. Projects provide access to a network of like-minded enterprises, as well as organisations such as research institutes and universities. This helps establish networks for enterprises (which has a comparatively larger added value for SMEs and particularly, start-ups), and creates ecosystems of value chains within different cluster projects.
- For start-ups especially this is an important added value of the cluster programmes. In participating in cluster projects they come into contact with large enterprises in their industry which they would otherwise not have been able to reach. Having access to the top players in an industry tends to be an especially big networking boost for SMEs, and start-ups in particular.

Cluster efforts to increase the chance of funding

- A particular strength of the PENTA instrument is that together with the Euripides cluster, the two clusters work to develop a bottom-up Strategic Research Agenda. This Agenda sets the main themes and direction of research and development which industry experts consider most relevant and useful to work towards during the coming years.
- Added to this, PENTA coordinators try to promote dialogue between the national agencies, project partner applicants, and national authorities. In what some call a "guided bottom-up" approach, industry are encouraged to establish directions for research but to consider national interests in developing their project proposals. In this way the chances of having projects receiving a favourable evaluation and getting financed are increased.
- Like PENTA, ITEA also develops a research agenda, known as a Roadmap. ITEA specifically refers to this as a Living Roadmap and develops this with industry players. The Living Roadmap covers the state of the art of technology relevant to ITEA sectors, and updates the Living Roadmap with outcomes from ITEA projects. The Living Roadmap provides a full text search mechanism to find information on the State of the Arts (SotAs). Other project consortia may use this living document on the state of the art of technology in the ITEA cluster sectors to promote technological collaboration and development.

Strengths of the Eurostars instruments

Simple(r) application process

- The Eurostars programme has a streamlined online system and the national agencies offer support throughout the process. According to Eurostars 2 participants, the application process was straightforward, and furthermore the evaluation of the application was fast and transparent.
- The application process for Eurostars has been described by stakeholders as a straightforward application approach. The projects and by extension, the applications involve smaller consortia, and less administration, with a stronger focus on bringing products to market. The programme set-up lowers barriers to entry for SMEs in particular; an application can take one to a few weeks which is a more manageable investment of resources for SMEs compared to not only clusters, but compared other financing instruments as well.



4.2 Weaknesses of the Eureka Programme Instruments

Weaknesses of Eurostars, ITEA, and PENTA

Lack of project management financing

- Project management is an area of activity which is necessary to running international projects, whether the consortia of partners be large or small. Coordinating the application process and the project once it starts running requires resources from the coordinating enterprise. However, project management is not financed in Eurostars or the clusters ITEA and PENTA.
- For clusters especially the application process and implementation of a project can be time consuming and demand significant capacity from the main or leading partner. In consortia with sometimes up to 30 partners, not financing project management can mean that a partner has to put in more resources than budgeted for in a project plan to carry out the project management. This lack of financing can also be a detriment to (smaller) partners taking a more active role.
- For SMEs, in Eurostars or clusters, not having project management financed can be a definite challenge within Eureka programmes. In Eurostars, where SMEs and start-ups are more likely to take a coordinating or main partner role compared with the clusters, the lack of project management financing means such an enterprise would have to finance this activity themselves. For smaller or younger enterprises with less capacity this can be a real challenge to participating in Eureka.

Lack of harmonisation of funding rules and decisions

- For both the Eurostars instruments and the clusters, the decentralised nature of the Eureka programme has led to some challenges with the harmonisation and synchronisation of funding rules and decisions between participating countries. For instance, budget deficiencies in some countries have led to some projects in Eurostars 2 not receiving funding although they meet all the other requirements. Additionally, each country has their own funding rate, making it relatively difficult for some organisations to participate from countries with low funding rates.
- The difference in funding rules affects both Eurostars and cluster instruments. If certain project partners in a consortium do not receive approval from national funding bodies and do not get financed, the composition of the consortium changes. Work tasks and planned activities within a project need to be changed and this can be challenging and undermine the project plan originally submitted by the consortium.
- A further aspect is the difference in the timing of decisions by Eureka evaluators and national bodies. There can sometimes be a lot of time in between a Eureka level decision on a project and the national decision, sometimes of up to a year. In the fast-paced, technical sectors, innovations and evolutions happen fast. Therefore if decisions for funding take too long, a project which was planned to start months to a year ago, is no longer as relevant or pioneering as the technology or innovation has already been further developed by others in the sector. This applies to both Eurostars and the ITEA and PENTA clusters.

Differences amongst national agencies

- Besides the differences in funding levels and national funding rules, there are differences amongst agencies as well. Some national agencies have a lot of expertise and experience and can offer very good support. Other agencies in turn who have less experience are not always able to help project partners as efficiently and this can lead to delays or shifts in project plans.

Administrative burden

- Though Eureka has made efforts to ease the administrative burden on SMEs, it is still considered an issue. According to a European wide survey of firms, approximately 40%



claimed administrative burden of Eureka projects as a barrier to participation when surveyed in a 2017 study.

- Additionally, according to a survey of High Level Representatives, in comparison to Eurostars 1, the proceeding Eurostars 2 had a greater administrative burden, with the addition of self-assessments and ethic requirements. However, according to Eurostars 2 participants, in comparison to other financing programmes in general, the administrative burden is much lower for Eurostars, as the process is comparatively easy and fast.
- Despite the strides made in reducing administration involved in Eurostars projects, the applications still remain a calculated risk for SMEs, especially for start-ups. Eurostars applications still require administration to organise and a good application takes anywhere from between 40 to 100 hours if not more to prepare. For an SME, this is a lot of man hours and capacity which go into an application. Added to this is the fact that chances of success are usually not clear when submitting, so that SMEs have trouble making the calculation of whether go through the effort of submitting an application is worth it. Helping SMEs to discuss the perceived chances of success of their project application could help to mitigate this somewhat, (though the aforementioned risk is somewhat inherent in application procedures).
- Cluster projects tend to be more complex and long-term projects, involving higher financing, and different types of partners. As a result, for clusters the administrative burden involved is much higher. More administration is needed, including from consortium partners which tend to be more numerous. Preparing an application takes more time and resources, to the point that SMEs have difficulty in leading a cluster proposal in practice.

Insufficient promotion of Eureka programme instruments

- A weakness of the three programme instruments here is that they have not been sufficiently promoted in recent years. Though ITEA has its success stories for particularly good projects which do help to highlight what can be achieved from ITEA funding, overall, more could be done. National authorities as well as enterprises are not fully aware of the Eureka programme and how it can help work towards national economic and technological interests or how it can benefit an enterprise.
- A factor which appears to contribute here is that it is not always clear who the main target group is for the programme and its instruments. Not having a clear view of the end-users or target groups of the programme makes it difficult to tailor the content of promotion and to use suitable communication and dissemination channels to spread said content.

Weaknesses of the Cluster instruments

Difficulty finding suitable partners and building consortia

- According to a European wide survey of firms, about 43% of surveyed firms report finding suitable partners is a barrier to participating in Eureka projects. Eureka has implemented measures to ease this challenge, such as online platforms where companies can post inquiries for partners, as well as the designation of the NPC to help with finding suitable partners for SMEs within their country.
- The national financing rules can make project consortia less stable. If a project is approved but partners from a country do not receive national funding, they usually cannot participate in the consortium and the project plan has to be adapted.
- For the cluster programmes, ITEA and PENTA both try facilitate a matchmaking of good project partners through events. However, though these help to finding consortium partners, stakeholders indicate that this does not indicate much about the actual ease and quality of the collaboration. Dealing with partners who, for whatever reason, do not deliver, or who face difficulties when engaged in the project can remain a challenge for a consortium.

4.3 Opportunities from the Eureka Programme Instruments

In contrast to the sections above on strengths and weaknesses, many of the opportunities identified here apply both to the Eurostars and Cluster programme instruments, though



sometimes to different degrees. As such little distinction is made in the opportunities and threats of the Eurostars, ITEA, or PENTA programme instruments.

Compared to other programmes, SMEs have a high chance of receiving funding through

- Because start-ups and scale-ups have a relatively better chance of receiving funding when applying to Eureka programmes compared to other programmes (higher success rate), more of these businesses should be encouraged to apply. On the other hand, as more apply, the success rate will inevitably decline (given funding does not increase accordingly).
- **Eurostars** has made efforts to become more streamlined and accessible, for instance through the reductions of administrative burden involved in applying for and using the instrument. SMEs especially have a good chance of receiving financing through the Eurostars channel as the requirements are more straightforward when compared to clusters, but also when compared to other funding instruments. Interviewees indicate that Horizon2020 funding for instance requires comparatively more time and is more administratively complex.
- **Clusters** too provide SMEs with opportunities by inviting them into larger consortia with large enterprises, research institutes, and universities.
- As has been indicated throughout this chapter, many of the strengths, weaknesses, as well as opportunities apply more acutely to start-ups compared to other SMEs or enterprises; having less financial and human resources available compared to larger or older enterprises, the added value of such strong international partners and the financing of R&D projects is higher for start-ups.

Promotion of Eurostars, ITEA, and PENTA programmes: expand and include impact on enterprises

- For Eurostars, ITEA, and PENTA, there is room to improve the promotion of the Eureka instruments to enterprises and in so doing, to enhance the complementarity of the different instruments of the Eureka programme. Promotion could be improved for Eurostars and the cluster programmes. More promotion of the value of participating in projects, innovations achieved, and the impact of participation on enterprises would boost the awareness and hopefully, the use of the programme.
- The differences in the programme instrument aims and design could be highlighted so that applicants get a better idea of which instrument suits them best.
- PENTA has for instance taken, a leaf out of the ITEA book and in recent years has started developing success stories to demonstrate the value of Eureka project participation for enterprises. An added element could be to further emphasize what a project has meant for the participating enterprises; currently the ITEA (and PENTA) accounts focus on the technological advancements made during a project. This could be complemented with more information on how enterprises have benefited. Indeed such promotion could also be extended to Eurostars projects.
- Promotion and dissemination of Eureka projects could be further enhanced by exploring dissemination avenues which reach both enterprises, policy makers, and other technological stakeholders.

More coordination in funding rules and decisions between Participating Countries

- One of the strengths of Eureka is the role of national agencies and authorities in the programme. However, as indicated above, this also creates vulnerabilities. An exploration could therefore be made by national stakeholders and the Eureka instruments to harmonise certain aspects of the decision-making, such as the timing of national decisions to fund. An investigation could be made of the degree to which the decision-making timing could be better aligned with Eureka instruments.
- More coordination in funding rules and decisions will ultimately make Eureka projects more successful and prevent delays in projects, changes to project plan implementation, and



reduce the chance of technology being developed by other competitors. This applies to both Eurostars and cluster instruments.

Support further pre-networking and networking

- As finding suitable partners is a known challenge for those wanting to participate in Eureka, further efforts to support networking may help and encourage start-ups and scale-ups to participate in Eureka. According to a Swedish study, pre-existing networks are essential for having a successful Eureka project, as new networks are considered more risky. For this reason, cluster programmes tend to involve networking events to help matchmaking between potential project participants.
- Especially for start-ups, with smaller or no networks, it may be helpful for Eureka provide more support in pre-networking (networking before the application process). Start-ups tend to have less resources to go and visit networking events compared to larger or more established enterprises and so exploring approaches which make it easier for start-ups to attend is another opportunity for the Eureka. There is an opportunity here for Eureka instruments to explore other approaches to helping start-ups especially to find project partners.
- This will also be beneficial to scale-ups, as more than one-third of European scale-ups report consider networking effects and/or partnerships as a key advantage compared to their competition.

More support for follow-up funding and other sources of funding in general

- Follow-up activities of Eureka projects cannot all be financed by Eureka. Eureka could cooperate more with European and international funds to secure funding for follow-up projects of Eureka participants. They could also support Eureka participants in finding the right investors by maintaining lists or contacts for sources of national external financing which are interested in innovative SMEs. National agencies can play a pivotal role in bringing sources of external financing in touch with Eureka participants after a project is finished.
 - **Start-ups:** crowdfunding and business angels are usually particularly useful sources of external financing.
 - **Scale-ups:** venture capital and corporate/strategic investors are key, followed by business angels, in order to raise the large amounts needed to fund scale-ups. The average amounts raised from external financing such as venture capital and corporate/strategic investor is a lot higher than amounts from subsidies thus helping scale-ups receive these types of external financing is highly beneficial. Additionally, Eureka can play a role in connecting scale-ups with foreign investors specialized in scale-ups. Foreign investors tend to be bigger and thus more capable to meet a scale-ups financial needs. Furthermore, foreign investors can also provide access to foreign markets external equity is correlated with better HR practices in scale-ups.

Expand support tools for start and scale-ups – coaching, mentoring, investor readiness programmes

- Eureka could expand the more soft support tools. The national agencies engage in coaching and support already for clusters and Eurostars instruments, during the application procedure and the project implementation. However, this support could be made more standardised across national agencies on the one hand, and tailored support to different types of enterprises could be provided. For instance, specific materials and aids could be developed for start-ups and for enterprises looking to scale-up. These materials could be produced by Eureka together with national agencies to ensure that similar though nationally relevant material is used across national agencies.
- Tailoring the information to target groups of organisations could also be considered. For instance, some of the E!InnoVest networking programme events are selective. Eureka could provide alternative avenues for start-ups and scale-ups that are not given access to



these event to expand their financial networks. Eureka could also host financial networking event specifically for scale-up and start-ups, which connect these businesses with the appropriate investors for each. For instance, scale-ups are in more need to venture capital, while business angels are more appropriate for start-ups. The Eureka programme could further improve the levels of financial literacy of start-ups through their E!Innovest programmes.

- Scale-ups seem to need helps in terms of recruitment and HRM practices. According to a 2019 study, only 25% of scale-ups use recruitment agencies and/or head-hunters to find potential employees; 36% have an on boarding process in place; 78% prefer to firing employees slowly rather than rapidly (could be interpreted as inefficient).
- Furthermore, the national agencies could take up a more supportive role in bringing together information on the different sources of available, external financing in their country. Inventorying different sources of external financing and the preferred types of enterprises such as finances invest in, national agencies could play a matchmaking role, bringing together SMEs (notably start-ups and scale-ups), with possible suitable sources of external financing, public or otherwise.

Widening the network of country partners

- More cooperation with third countries and Associated Member States would expand access to international markets for start-ups and scale-ups.
- Investigating other programme countries could not only help the expansion of international networks for enterprises, but could also help achieve the societal impact goals of the Eureka programme. By sharing expertise and resources with more countries outside of Europe the shared impact of technological projects could be widened across national stakeholders as well.

4.4 Threats of the Eureka Programme Instruments

As with the section on opportunities, the threats identified to the Eureka programme instruments were not overly specific to either the Eurostars, ITEA, or PENTA instruments. As such little distinction is made here between threats to these three instruments.

Uncertainty of (national) funds and timing of decisions

- The uncertainty of pledged national funds can be due to several reasons, such as an economic crisis. In any case, if national funds of each participant are not all secured, the Eureka project cannot commence. This leads to lost projects and budgets of other Participant Countries not spent.
- National interests and the timing of decision-making regarding the funding of a project can introduce uncertainty as well. Aligning the timing of national level decisions with Eureka timelines could prove challenging. Indeed one of the strengths of the programme is the space for national authorities to guide project which align with their national interests. Finding a balance between providing such space and efficient, more homogenised decision-making timelines will be challenging.

Administrative requirements: a necessary evil

- The administration involved in Eureka instruments, during the application as well as the project implementation phase has been simplified in recent years. However, some research shows that enterprises still find it challenging. This may however, be a necessary evil; a certain degree of administration is required to ensure that parties receiving public financing adhere to certain criteria. Certain requirements such as relating to reporting during projects also appear necessary to maintain focus and direction during a project of several years. Expectation management amongst project participants could be considered to mitigate this threat somewhat.



Insufficient promotion project outcomes and impact, especially to national authorities

- A further threat here is that if the added value and impact of participation in Eureka programmes is not highlighted more, that national interest and funding may decline. As it stands, Eureka contributes to growth, job creation, and technological product development for enterprises, as well as often producing societally valuable innovations. While the technological advancements are documented and reported on, the contribution of products to enterprises and society as a whole may need to be highlighted more for national stakeholders. This may highlight the value of the programme and help to achieve (more) sustainable financing channels.

Table 2 SWOT Analysis for Eureka instruments

Strengths	Weaknesses
<p>Eurostars, ITEA and PENTA:</p> <ul style="list-style-type: none"> • Reduces financial risk associated with R&D, leading to innovation, and growth • Programme rationales and design: bottom-up, near-to-market approach • Generates experience in international R&D projects for enterprises • Role of national agencies and national level support <p>Clusters:</p> <ul style="list-style-type: none"> • International collaboration and networks of mixed organisations • PENTA efforts to increase the chance of funding <p>Eurostars:</p> <ul style="list-style-type: none"> • Simple(r) application process • Tools and aids developed to support project applications and implementation 	<p>Eurostars, ITEA and PENTA:</p> <ul style="list-style-type: none"> • Lack of project management financing • Lack of harmonisation of funding rules and decisions • Differences across support from national agencies • Administrative burden • Insufficient promotion of Eureka programme instruments <p>Clusters:</p> <ul style="list-style-type: none"> • Difficulty finding suitable partners and building consortia
Opportunities	Threats
<p>Eurostars, ITEA and PENTA:</p> <ul style="list-style-type: none"> • Compared to other programmes, SMEs have a high chance of receiving funding through • Promotion of Eurostars, ITEA, and PENTA programmes: expand and include impact on enterprises • More coordination in funding rules and decisions between Participating Countries • Support further pre-networking and networking • More support for follow-up funding and other sources of funding in general • Expand support tools for start and scale-ups – coaching, mentoring, investor readiness programmes • Widening the network of country partners 	<p>Eurostars, ITEA and PENTA:</p> <ul style="list-style-type: none"> • Uncertainty of (national) funds and timing of decisions • Administrative requirements: a necessary evil • Insufficient promotion project outcomes and impact, especially to national authorities



5 Overall observations and recommendations

Based on the desk research, the data enrichment and analysis, the best practices developed, the SWOT analysis, and the interviews conducted within this study, a number of general observations can be made. The various strengths and weaknesses of the Eureka programme are summarised here and based on these, a series of recommendations are made at the end of this chapter.

5.1 Outcomes of Eureka's instruments

The main observations resulting from the data enrichment and analysis are summarised below.

Characteristics of Eurostars participants

The majority of Eurostars participants consists of companies that are younger than 10 years old while the average number of employees (when registering for the project), is around 24. Almost one third (27%) of Eurostars project participations are start-ups, defined as 5 years or younger at the start of the project. When considering start-up participants, 50% are classified as Main participants, while 47% are Partners and 3% have Withdrawn from Eurostars projects.

For Eurostars participants in general, Biotech/medical companies seem to dominate the participations while there are less participating companies involved in Transportation, Environment and Construction/building. Amongst start-ups in Eurostars, 45% are active in the biotech/medical sector, compared to 39% of enterprises in Eurostars. Furthermore, relatively more of the Eurostars start-ups are active in the ICT sector than in the Industrial sector.

The highest number of overall Eurostars participants is based in Germany. Germany also has the highest number of *Eurostars Enterprises*, with 288, followed by the Netherlands and France. The highest number of Eurostars Start-ups are based in the Netherlands followed by Denmark and Switzerland.

The Netherlands also represents the country with the highest budgets amongst start-ups (i.e. overall participation costs out of the total amount of money invested in Eurostars participation by the enterprise).

Characteristics of cluster participants

A total 695 SMEs participated in the ITEA 3 and PENTA Eureka cluster projects (specifically, 593 in ITEA 3 and 102 in PENTA) from 2014 to 2020. The 695 SME participants represent 49% of the overall ITEA 3 and PENTA participants (because approximately 49% of these participants are SMEs).

Around 70% of international SME cluster participants are start-ups when joining a project, while 40% of Dutch SME cluster participants are start-ups.

The ITEA 3 cluster concentrates on software innovation, while the PENTA cluster focuses on electronic components and systems. The sub-sector SMEs are most active computer software (approximately 43% of the subsample). For Dutch enterprises this is the semiconductor and industrial sub-sectors.

The SMEs participating in Eureka clusters span across 23 different countries. Although Turkey represents the country with the highest amount of SME participants in clusters, the Netherlands has the largest total project budget for clusters, with Dutch SMEs spending more on cluster projects than their counterparts from other countries.



Leverage of participation in Eureka instruments

Overall, Approximately 30% of the international Eurostars participants experience some type of growth upon joining a project in terms of revenue, profit, or employees. For Dutch enterprises this was also around 30%. Broadly speaking, of the participant data used in this study, some 12% of international Eurostars participants are scale-ups, of which 80% scaled up after joining a Eurostars project while 20% were already scale-ups when joining a Eurostars project. For Dutch enterprises only 2% of the Eurostars participants in the subsample are scale-ups by the strict definition and 12% experienced a scaling up in number of employees *after* joining a Eurostars project.

Within the cluster participant data scale-ups could not be identified. In any case, around half of international cluster SMEs still experienced growth in the number of employees. The median over a period of 3 years is an increase of 5 employees. Similarly, just over half of Dutch cluster SMEs grow in employment with a median growth of 4 employees over a period of 3 years.

For most participants in the sample, the trend seems to involve first receiving some type of (EU) grant before joining Eureka projects and thereafter receiving venture capital investments after joining. The top Eureka performers in terms of successfully acquiring funding also seem to be *younger* and *smaller* (in employee size) than the participants that raise less (or even no additional) funding. While the average age of the sample Eureka participants is between 9 and 10 years old at the time the projects started, the average starting age of the “top Eureka financing performers” is around 7 years old.

5.2 Overall observations regarding the use of Eureka instruments

Rationale and goals of the Eureka instruments

A first and important observation is that the Eureka programme **leads to growth** amongst enterprises. This assessment came forward almost unequivocally from the research conducted. Enterprises who made use of the Eureka instruments experienced the freedom and capacity to further continue their research and innovation for their existing products and services. This has often led to an enterprise exploring different technological and innovative avenues, advancing their existing products and services. This in turn has led to enterprises entering new market areas, new sectors, needing new employees to meet these new demands within the company, and in some cases, spin-off companies which focus their energies on these new products or services. Interviewees indeed indicate that it is not just the growth which Eureka helps to achieve, but the **pace of the growth** it helps enterprises reach which makes it an attractive instrument to use.

Interviewees were also asked what they would have done without Eureka financing. While it is difficult to say this with certainty, most estimate that their growth would have been substantially slower at the very least and that in some cases their business models and growth trajectory would have been different as well.

An especially positive feature of the Eureka programme, notably the clusters, is that it **provides access to a network of like-minded enterprises**, as well as organisations such as research institutes and universities. In bringing such partners together, there is exchange of knowledge and approaches and technological learning. Different types of organisations bring different expertise and this is seen as a favourable way of creating ecosystems of value chains within different cluster projects. Beyond this, the consortia establish networks which are useful to enterprises outside of a cluster project. Indeed it seems that together with the



flexibility of this R&D enterprise focussed Eureka programme, the networks it helps to provide are a second key reasons for making use of the programme.

A key goal of Eureka projects is to allow SMEs, large enterprises, research institutes, and universities is to work and develop a certain technology and to consider its applications. Another goal of the Eureka programme is for enterprises to be able to **achieve product results with the technology they develop**. There is an emphasis on the fast exploitation of technologies which is good for enterprises, particularly in the Eurostars instrument.

Eureka allows a **degree for flexibility amongst enterprises** to adapt their approaches to developing a given technology so that the project development benefits the enterprise and its activities as well. The focus is on marketable innovations which not only enhances further technological innovation in a sector but which also help enterprises to grow.

This flexibility, together with the **amounts of financing** Eureka helps to provide and the **duration of the projects** financed are all positive features of the programme which sets it apart from other R&D or innovation subsidies aimed at (small and medium) enterprises. Horizon2020 for instance has also been used by some of the enterprises interviewed. However, with comparatively more complex application procedures (with more administration), and a more fundamental focus on the research and development compared commercial interests, Horizon2020 is less flexible concerning research and development activities within a project.

Programme design: applications and project implementation of Eureka instruments

At a more operational level, the experiences with the application processes for Eurostars are **generally seen as positive**. Especially in Eurostars, the application process and requirements involved are considered to work well. The project consortia in Eurostars tend to be smaller, more manageable, and often easier to set up as enterprises may know one another beforehand. The application administration is also seen as fair and not overly burdensome, and with concentrated effort for a week or two, most enterprises, (including SMEs), feel confident of being able to prepare and submit good proposal. Dutch enterprises indicated that the Dutch Agency, the RVO, provides good support and coaching to navigate the administrative requirements with Eureka instruments; the degree to which this applies for other national agencies is not clear.

Though the applications procedures for the cluster instruments are also seen as positive over all, there are some issues which make it **more challenging compared to Eurostars applications**. As project consortia are larger, it takes more time and efforts for a lead partner to set up. More administration is required for an application, including from consortium partners of which there may be many, which takes time and effort. The scope of project proposals are also wider so that all in all, they take longer to prepare. This means that in practice only large enterprises and organisations can submit applications and this makes it more challenging for SMEs to take more dominant roles in an application process. While it is technically possible for a small enterprise to do so as well, it costs comparatively more resources (time specifically and by extension, money). Project coordination can involve approaching some 30 partners for input, chasing partners which do not deliver or which do not deliver up to standard for instance.

A note to add here is that while not ideal for start-ups, there is an underlying rationale to the application procedure design for Eurostars and clusters; the rationale and programme designs differ. As indicated above, cluster projects tend to involve more partners from more countries (on average 4 countries with around 20 partners), a higher



budget, longer project duration, and larger project impact. As these projects work on the state of the art and benchmarking of a given technology and its further application for an industry, the impact of cluster projects is generally budget broader as well. The complex administration procedures, though challenging (and especially so for SMEs), there is a sense of proportionality with the scope and expected impact from these cluster projects.

Indeed, it is important to bear in mind the opportunities offered by both Eurostars and clusters. Eurostars is more accessible to start-ups as well as scale-ups than the cluster projects. In principle, by using Eurostars, gaining (further) international R&D and innovation project experience, putting a project into the market ideally, and gaining a Eureka label, enterprises (including SMEs), can move more easily into cluster projects. Having participating in a Eureka project can create useful track record which puts an enterprise on the proverbial map, raising the chances of it being invited into a cluster consortium. This is of course not the only means by which enterprise get invited into cluster consortia, but other Eureka programme experience can certainly be helpful.

The **evaluation of applications** is said to be good and straightforward for Eurostars. An enterprise can prepare a good proposal and knows that there is a good chance of it being honoured. For cluster projects the evaluation process is a bit less transparent. There appear to be more factors at work when it comes to evaluating a cluster project compared to Eurostars.

This observation seems to relate to the role of national authorities in Eureka and the **approach to financing projects**. With ITEA for instance, a proposal can be developed by a consortium and approved by the ITEA coordinator. Only then are the countries of origin of the consortium partners involved to discuss whether or not they want to finance the input required for their country. In this way a consortium is very **dependent on the type of partners selected for financial reasons as well as technical**; if the partner comes from a country where the technology or sector in question is less prominent, the national financing body may choose not to finance the project. In that situation the partner from that country cannot participate. If this happens several times within one consortium there is the risk that the composition changes, and in some cases, significantly so.

In PENTA projects the assessment is similar, with national authorities deciding after a project application is technically approved whether they accept the financial proposal for the project. National authorities and agencies have their own national interests and sectors or markets of focus. The added value of this approach to financing is that **national authorities can finance projects which tie in with their strategies for R&D and innovation** in their countries. However, it does introduce a degree of uncertainty for consortia compositions and the execution of a project.

In PENTA and ITEA projects attempts have been made to **mitigate space between project proposals and the interest areas of national authorities**. By encouraging national agencies for Eureka to engage with national authorities and to understand where their focus areas lie, the PENTA programme tries to promote the development of project proposals which match with national interests. Besides this, PENTA (and another cluster, Euripedes), develop a multi-year Strategic Research agenda, highlighting key directions of research and innovation in their relevant sectors. This agenda is developed from the bottom-up, by the industry across Europe. This gives organisations who wish to apply for PENTA financing an idea of which areas are especially interesting to conduct



a project on. In so doing, the PENTA programme coordinators try to maximise the chances of project proposals being accepted.

A further aspect of the application process and the assessments thereof relates to **the timing of the decision making**. The Eureka coordinators and technical experts assess a project proposal while a decision to finance a project is sometimes made up to a year later. In some cases this means that within a consortia, some partners can and want to start the work but are restricted because their collaboration partners cannot start yet. Some enterprises are in a position to pre-finance some of their work, but this is not the case for all. The very reason for making use of Eureka is usually to reduce the financial risk of conducting R&D and technological innovation after all. Disconnect between the timing of the technical decision and decision to finance from national authorities can negatively affect the consortia composition and the implementation of a project.

Furthermore, as many of the enterprises using Eureka are active in highly technological sectors, the sometimes lengthy decision-making time can mean that a project idea is no longer as relevant a year later; the **technology in question may have already advanced** or been further developed by other organisations by the time a project can start. While the fast-paced development the sector is inherent to such high tech areas, exploring possibilities of aligning the timing of decision making procedures in countries could be a way to remedy this phenomenon.

Regarding the actually **implementation and running of a project**, once a project is won this seems to **go relatively** well and enterprises benefit from participations. There are some issues which at times can make implementation less than smooth. One is that in big consortia, such as in the cluster programmes, it can be difficult to coordinate a project. **Project management of large consortia** of some 30 organisations requires time and money; the amount time needed to coordinate and manage but also to follow-up with partners, or chase those who do not deliver inputs, can be large. Project management however, is not financed in projects. This means that here too SMEs are less likely to take a more coordinating role in a consortia as they have on average less capacity to do so. This means that the chances to build experience in that area on average are lower for SMEs. A further aspect relating to project implementation is that there is an element of luck involved with consortia partners; every so often an enterprise may find themselves in consortia with a project partner who (for whatever reason) is unable to deliver their inputs. This can lead to delays and frustration for the rest of the consortium.

A final point of observation is that while the impact of the Eureka programme seem to be strong for enterprises, the **promotion** of this fact has been less strong. Some interviewees indicate that the return on investment for enterprises as well as national authorities has not been highlighted enough and that this could use further attention. PENTA some years ago opted to start using ITEA like success-stories to show project achievements. However, the added benefit of Eureka to enterprises has not been promoted as strongly as it could have been. Historically part of the reason for this appears to have been that technological sectors are difficult to promote due to their complexity. In recent years however, the world and its laymen (politicians and citizens) have become more tech savvy. With technology underlying consumer products like phones and tablets, or discussions on climate change, the average person is more familiar with technological developments. There would appear to be more room now to promote a programme like Eureka, which supports R&D focuses enterprises.



All in all, research demonstrates that while there are some areas for improvement, the Eureka programme has a positive impact on enterprises in terms of their growth, notably, the pace of that growth, and on international networks and collaboration. Both these aspects have contributed to the performance of the enterprises participating in Eurostars, ITEA, and PENTA. R&D and innovation have by their very nature, unsure outcomes. Advancements and progress are by no means a given, which is why R&D are economically less sure investments. However, if sectors and countries are to develop, research must be able to continue. For societies and enterprise to benefit, technological innovation and R&D must be able to be marketed as well. For this reason, subsidies for R&D performing enterprises are key to Europe and other partner countries to advance. Such subsidies and financing helps to reduce the financial risk inherent to R&D activities, risks which enterprises cannot always carry, or are less inclined to carry. While other European and national subsidies for enterprises exist, enterprises interviewed in the context of this evaluation indicate that the set-up of the Eureka programme makes it more accessible, flexible, and focused on both R&D and innovation as well as enterprise growth.

5.3 Recommendations

Based on the observations outlined above, a number of recommendations can be made.

Explore further alignment in the timing of project proposal decisions

The role of national authorities in the financing of Eureka projects is one of its strengths in many ways. National authorities can support technological areas and innovation which align with their own national strategies for technological development. However, this approach of involving national authorities in this way can be a double-edged sword. As indicated above, a lack of alignment between the timing of decision-making between national authorities and with Eureka instrument coordinators mean that delays can enter into projects. To remedy this, the Eureka programme and its national agencies could explore the possibility of aligning the decision-making time lines further to reduce the time between a technical assessment and the national decision to finance a project.

Explore further alignment of industry and national authority interests

The ITEA instrument maintains a Living Research Agenda with the state of the art of the technology described and updated using ITEA project outcomes. The PENTA and Euripedes clusters work with a Strategic Research Agenda, developed bottom-up by experts from their respective industries. This Strategic Research agenda helps enterprises by indicating which areas of research are deemed important for the coming years by the industry and which countries are pioneering in those areas. This Agenda, combined with more consultation by national agencies of the national authorities in a country, could help participants of Eureka instruments to set-up project proposals which align both industry goals and the goals of national authorities. This in turn could increase the chance of a project being financed and the return on investment for authorities. Such approaches used here could be explored further for the Eurostars and ITEA instruments. This observation regarding alignment of interests has in fact also been made by the current Eureka chairmanship. The RVO will amongst other activities, spend its year as chair (July 2019 to July 2020), exploring how to better align national industry with national authority interests.

Financing project management of larger consortia

Another recommendation relates to project management and consortia. Project management could become a financed component within projects. This is a fairly time



consuming activity in the case of big consortia and an activity which can also provide enterprises with valuable management experience. In not financing this activity only large enterprises tend to be able to take coordinating roles. It could therefore be an idea to finance project management as well, not only to include SMEs more but also because this is part of project implementation also simply demands resources.

Project partner lists and project partner feedback

A further idea could be to introduce an evaluative element at the end of a project cycle so that enterprises can offer feedback on project partners. This in turn could help other enterprises in future when searching for project partners. As the Spanish national agency has a list of possible partners for bilateral funding programmes, a similar list could be produced and maintained centrally for the Eureka programme participants: who operates in which areas, their core business activities, past involvement in Eureka projects, and how others found working with them. This would naturally require some careful consideration to ensure that enterprises are also safeguarded from potentially unfair criticism in the feedback they receive from other project partners.

Investigate options for common supportive and information materials across national agencies

Regarding the application processes, while complex for clusters, the Dutch enterprises indicate that the coaching and support receive from the national agency is very good and helpful. While other national agencies no doubt also offer similar support, further developing and, where possible, sharing of coaching materials across the national agencies implementing Eureka could be beneficial. This would help standardise the support to a degree regarding Eureka procedures and requirements. Preparing information on the assessment procedure, the benefits and the risks could also be considered to provide enterprises with more transparency in this front.

Adapt the promotion of the Eureka programme

One of the final recommendations would be to re-evaluate the promotion of the Eureka programme. The promotion of the programme could be made more harmonious across the Eureka programme instruments. For instance, PENTA adopting success stories similar to ITEA success stories a good step. Using such tools could be extended to other Eureka instruments. The promotion and dissemination channels could also be expanded to include spaces which both enterprises, institutions, and policy makers use. A suggestion would also be to include more content in these success stories on the contribution which the programme makes to the development of an enterprises. While the focus on technological and product innovation is of course very good, this could be supplemented with information on the value of the programme and how it has helped an enterprise's growth and development.

Defining the target groups for Eureka programme instruments

Related to the insufficient promotion of the programme is the fact that it could be clearer who the proverbial client is of the Eureka instruments: does it chiefly target policy makers? Enterprises? Or multiple groups? Having a clear sense of who is targeted as the end-user of this programme is important. This allows for a defined strategy and approach in both promotion of the programme and the implementation of the programme. If it is clearer who the main target is of the programme, it becomes easier to establish what kind of supports or tools this target group requires (part of programme implementation), what kind of challenges they may face, and in which areas of the programme design more (or less) flexibility needs to be introduced. Having a clear sense of the client(s) or end-user(s) of the Eureka programme is therefore an important step



to better tailoring the programme to the needs of the target group. In aid of this, the rationales and target groups of the different instruments Eurostars, ITEA, and PENTA could be clarified further and promoted accordingly.

Explore other pre-networking options to improve accessibility amongst SMEs

Concerning SMEs, and especially younger or smaller enterprises, a further recommendation would be to explore how to make pre-networking events more accessible. Especially for cluster instruments, where consortia are larger and more diverse, getting in with the right partners is important, and the pre-networking events help in this process. However, for SMEs, who have on average less resources, attending such meetings (requiring travel costs and the human capacity to physically attend) can be a challenge. If the Eureka programme wishes to include more SMEs, and notably, start-ups and scale-ups, exploring other support activities in aid of networking could be useful. Start-ups could for instance receive a small subsidy for their travel, or the opportunities for digital(ly transmitted) presentations could be explored so that even if enterprises cannot attend, they can still get an impression of interesting themes and players in a given sector or technological area.

Expand support tools for start and scale-ups and level the playing field across national agencies

If Eureka wishes to include more SMEs, notably start-ups and scale-ups in the Eurostars or cluster instruments, an option could be to further develop specific tools and supports for these types of enterprises. For start-ups more information could be developed and made available on what to expect during a Eureka project, how to develop project work plans, how to administrate the finances, etc. Practical level information for enterprises which are not only younger, but new to the Eureka programme.

For scale-ups, similarly tailored aids and supports could be prepared. How to go about finding investors for your enterprise to help you scale-up for instance, how to market your Eureka label in a good way to as to highlight your experience and track record, etc.

Having such practical guides and supportive tools could not only help start-ups and scale-ups navigate Eurostars, ITEA, and PENTA instruments, but could also serve the purpose of helping to reduce differences across national agencies and the support they can offer project partners.

Complementarity between Horizon2020 SME Instrument and Eureka

National authorities and the EU each try to make various funding tools and subsidies available for R&D, for SMEs, or both. One EU instrument in particular is examined here and compared with the Eureka programme for its alignment and complementarity. In accordance with the requests for this study, a brief analysis is provided here of the Eureka programme and the Horizon 2020 SME Instrument, specifically, Phase 2.

The **SME Instrument, Phase 2** within Horizon 2020 centres on helping enterprises to generate an innovative project idea and to develop a prototype of the this innovation. This innovation should be accompanied by a business plan by the end of this Phase 2. The SME Instrument makes financing available to SMEs and is divided into three phases, each with a different focus, different requirements and desired outcomes. Phase 2 is the Innovation Project Phase and is followed by the Commercialisation Phase (Phase 3).

Complementarity SME Instrument Phase 2 and Eurostars

At first glance there appears to be overlap between this SME Instrument Phase 2 and the Eureka programme instruments. However, the Eureka programme instruments may



be better placed in between Phases 2 and 3 of the SME instrument. Eurostars for instance specifically aims to support enterprises who have an innovative product or service which is close to market. In many cases this means a prototype has been developed. The Eurostars instrument seems to be particularly complementary to Phases 2 and 3 of the SME instrument.

While Eurostars is similar in its focus to Phase 2 (and 3) of the instrument, there are notable differences. Eurostars focuses specifically on R&D intensive enterprises and requires that enterprises work with at least one partner from another country, thereby promoting international networks and collaboration. These are often deemed especially useful for SMEs which have on average less access to such networks compared to larger enterprises. The SME Instrument in turn focuses on SMEs generally and restricts the involvement of larger enterprises (which do not receive funding if they join an SME instrument consortium). The international project partner element in Eurostars is a distinguishing feature here.

Complementarity SME Instrument Phase 2 and ITEA and PENTA

Clusters such as ITEA and PENTA have a different rationale compared to Eurostars; there is a stronger technological development focus than the Eurostars instrument and the emphasis on international networks is much stronger. Indeed, getting into touch with large enterprises and industry leaders across countries is one of the key benefits of cluster programmes for participating enterprises.

A further factor is that enterprises that make use of Eureka programmes, cite the dual focus on technological innovation as well as a market focus (though the balance between these principles varies per Eureka instrument), as especially attractive features of the programme. This gives rise to the often cited higher level of flexibility which these enterprises experience when taking part in Eureka programmes. This flexibility is a very attractive aspect, and especially given that the R&D and innovation heavy sectors tend to evolve very fast; project plans must be able to adapt accordingly.

Therefore, while the target groups for the SME Instrument and Eureka instruments are similar, they are not the same. Added to this, the way the Eureka programme has been designed makes it attractive to R&D enterprises in particular, the flexibility and importance of international networks, as well as the importance of national interests in the programme are key features which distinguish Eureka from the SME Instrument.

Further exploring avenues for follow-up financing

Turning to the issue of other sources of financing for SMEs, the national agencies involved in implementing the Eureka programme could play a pivotal role. Often these agencies are well placed within business and industrial networks to be aware of other sources of external, public or private financing. Two comparable suggestions could be made here to improve the access to financing amongst Eureka programme participants:

1. The first is to provide a comprehensive overview the European funds and subsidies available, highlighting which types of enterprises can apply to which. Eligibility requirements and descriptions of the nature of the support to be provided can be displayed on one place or platform to make it easier for enterprises to navigate the various international subsidies. One page of the Agency website, or a tool which is regularly updated which allows enterprises to compare subsidies and instruments could be beneficial. This would help to highlight the complementarity as well as the differences between international, notably European, instruments.
2. The same thing could be done for national level sources of financing, both private and public. National agencies could try to make a list of private financiers and the types of



enterprises they like to fund. Business Angels, Crowdfunding groups, venture capital, or micro funds could all be collected and maintained in a database of sorts. Enterprises looking for financing could consult a national agency and gain an overview of different public and private sources of external financing available. The national agency could then engage in a sort of match-making to bring enterprises together with sources of financing which are likely to fit their needs.

A number of the recommendations sketched above could be implemented to help and enterprises to gain follow up financing. The inventory of both European and national level subsidies described above is an important first step. Following this, other efforts can be made by both project partners and the national agencies implementing Eureka. These include preparing common support information materials across national agencies and tailoring support materials to the different end-users of Eureka projects. As indicated earlier in this chapter, these could include how to help start-ups find suitable project partners, how to make a project plan for an international project, but also how to market and promote R&D&I experiences, or how to market and maximise the use of the Eureka label once it has been gained. Such activities can help start-ups and scale-ups on the path to finding further financing.





Annex 1: Literature list

- Aernoudt, R. (2017). Executive Forum: the scale-up gap: and how to address it .
Venture Capital, 361-372
- Astor, M., Polder, M., Cincera, M., Kramer, J.P., Nellen, J. Biela, J., Streicher, J., & Fombasso Toyem, G. (2017), Impact Assessment of Eureka Network Projects and Cluster Projects, available at:
<https://www.eurekanetwork.org/sites/default/files/impact-assessment-eureka-network-projects-and-cluster-projects-main-findings-and-recommendations.pdf>, accessed on 24.02.2020
- Bayona-Sáez, C., & García-Marco, T. (2010), Assessing the effectiveness of the Eureka Program, available at:
<https://www.sciencedirect.com/science/article/abs/pii/S0048733310001721>, accessed on 03.03.2020
- Bormans et. al (2019) European Startup Monitor 2019, available at:
http://europeanstartupmonitor2019.eu/ESM_3.0Color.pdf, accessed on 09.03.2020
- Collewaert, V., Manigart, S., Standaert, T. (2019), European Scale-up Report, available at:
https://static1.squarespace.com/static/595b81a486e6c029dc25c3e0/t/5e1edd b293fea070e54b195d/1579081143363/European+Scale-up+Report_study_Startups.beScale-Ups.eu-VlerickBusinessSchool.pdf accessed on 09.03.2020
- Damvad (2012), The Impact of Eureka in the Netherlands, available at:
<https://www.eurekanetwork.org/content/impact-eureka-netherlands>, accessed on 24.02.2020
- Durufié, G., Hellmann, T., & Wilson, K. (2017), From start-up to scale-up: examining public policies for the financing of high growth ventures, available at
https://bruegel.org/wp-content/uploads/2017/04/WP-2017_04.pdf, accessed on 11.03.2020
- Eureka Network (2020), Brexit: no impact for British participants, available at:
<https://www.eurekanetwork.org/content/brexit-no-impact-british-participants>, accessed on 03.03.2020.
- European Commission (2016), Europe's next leaders: the Start-up and Scale-up Initiative, accessed on 25.02.2020
- E!Innovest (no date), EUREKA Innovest Programme, available at
<https://eurekainnovest.eu/about/overview.html> accessed on 06.03.2020
- Faber, J., van Dijk, J., & van Rijnsoever, F. (2016). Incentives and barriers for R&D-based SMEs to participate in European research programs: An empirical assessment for the Netherlands. Science and Public Policy, 43(3), 414-428. Accessed on 24.02.2020
- FFG (no date), EUREKA, available at: <https://www.ffg.at/en/program/eureka>, accessed on 24.02.2020
- Hedin, S., Mattson, H., & Sandén, P. (2012), Eureka Impact Evaluation - Effects of Swedish participation in EUREKA Projects, available at:
https://www.vinnova.se/contentassets/d79807a978114659b973db227fb69975/va_12_08.pdf, accessed on 03.03.2020
- Innosuisse (no date) Eureka: cross-border innovation, available at:
<https://www.innosuisse.ch/inno/en/home/go-global/EUREKA.html>, accessed on 03.03.2020



- Patton, D. & Huynh, T. (2018), What are the barriers to start-up and scale-up in R&D intensive firms?, available at: <https://www.enterpriseresearch.ac.uk/wp-content/uploads/2018/11/No11-SOTA-What-are-the-barriers-or-enablers-of-start-up-and-scale-up-D.Patton-1.pdf> accessed on 09.03.2020
- Shaton, M., Lehmann, A., Pando, E., Vicini, I., Cincera, M. (2017), Interim Evaluation of Eurostars-2 Joint Programme, available at: https://ec.europa.eu/research/evaluations/pdf/report_interim_evaluation_eurostars2_051011.pdf, accessed on 24.02.2020
- Vervaeck, J. (2019). Analysis of The Belgian Scale-Up Gap (Doctoral dissertation, Ghent University).



Annex 2: Technical Annex data analysis and enrichment

Introduction

This technical annex provides supporting detail to the analysis conducted within the *Qualitative evaluation on the participation and impact on high-tech startups from participating in EUREKA instruments*. The outcome of the analysis is reported in Section 3 of the full report.

The annex covers the following areas:

1. **Definitions:** describes the accompanying calculations used to define the companies.
2. **Methodology:** describes the methods that were employed to:
 - select the subsample for the data enrichment (STEP 1)
 - acquire the data for the subsample (STEP 2)
 - analyse the data (STEP 3)

Definitions:

The following definitions are used in the research. They are simplified due to:

- the innovative nature of the EUREKA network: all companies involved in the projects are already considered to be high-tech
- the limited company-level information available¹⁸

Startup: a company that is less than or equal to 5 years old when starting the project.¹⁹

Scale up: a company which has experienced an average annualised growth (in employment, revenue or profitability) of at least 20% over 3 years - with at least 10 employees at the start of the period.²⁰

SME: small and medium-sized enterprises with a staff headcount that is less than 250. Further categorisation using staff headcount is as follows: micro < 10; small < 50; medium < 250.²¹

Step 1 - Sub-sample selection for data enrichment

The following information for EUREKA projects was provided, of which participation can be broken down into the following data entries:

- 4,259 participations for 1881 Eurostars projects
- 102 participations for 22 SME-partnered PENTA projects
- 593 participations for 70 SME-partnered ITEA 3 projects

¹⁸ E.g. it was only possible to calculate whether a company is a startup for 67.67% of the Eurostars dataset since only 2882/4259 entries provided the correct information for the companies' registration year. For Clusters (ITEA3 and PENTA): we were only provided with SME partners datasets, thus no calculations were possible at all (before enrichment stage) as there is no data for registration year.

¹⁹ Adapted from the OECD definition of a young firm (from 0-5 years old).

²⁰ Adapted from the OECD definition for a 'scale up business', we will instead measure whether a company has scaled up before or after their participation in the Eureka projects (rather than adhere to the strict definition of whether a company is a scale up or not).

²¹ See https://ec.europa.eu/growth/smes/business-friendly-environment/sme-definition_en for more information.



To enrich this data, we have selected a subsample of 100 EUREKA *participants* comprising of:

- 50 Dutch EUREKA participants
- 50 International (non-Dutch) EUREKA participants

To ensure that the subsample can represent the entire population of EUREKA participation as accurately as possible, we employed a **multi-phase stratified random sampling methodology**. In stratified sampling, categorical variables (in our case, the characteristics that were taken into consideration) are selected to form strata, or subsets, of the total population by dividing the data up into number of strata such that within each of the strata the values of the variable of interest are expected to be relatively similar. Stratified sampling is therefore performed to preserve the strata proportions of the population within the sample as it focuses on the most important subpopulations and ignores irrelevant ones.²²

The selection of the 50 Dutch EUREKA participants

The entire population (i.e. full dataset) of Dutch EUREKA participation comprises of 506 data entries:

- **411** participations for **Eurostars** projects
- **95** participations for SME-partnered **Cluster** projects²³
 - 30 for SME-partnered PENTA projects
 - 65 for SME-partnered ITEA3 projects

The entire Dutch population (of 506 participations) was first isolated then proportioned into strata per instrument. From these proportions, we were able to calculate how many companies per instrument subsample was necessary to create a total subsample of 50 Dutch EUREKA participants. See Table A1 below for how the Dutch subsample comprising of Eurostars, ITEA3 and PENTA Clusters instruments was determined.

Table A1: Proportionately Stratified Dutch Subsample

EUREKA instrument	Dutch population	Proportion	Stratified subsample
Eurostars	411	81%	41
ITEA3	65	13%	6
PENTA	30	6%	3
	506	100%	50

Eurostars

For Eurostars, a proportional distribution of the following characteristics was taken into consideration when constructing the Dutch Eurostars subsample:

- **Sector** (Market Area)
- **Size** (Number of Employees)
- **Participant Role** (Main, Partner or Withdrawn)
- **Participation Costs** (in M€)
- **Age** (when starting the project)

See Table A2 below for how the subsample for Eurostars was constructed based on the above characteristics.

²² Hassan, H. A., & Idrees, A. M. (2010, March). Sampling technique selection framework for knowledge discovery. In *2010 The 7th International Conference on Informatics and Systems (INFOS)* (pp. 1-8). IEEE.

²³ Only data from SME participants in Cluster projects was provided.



Table A2: Proportionately Stratified Eurostars Dutch Subsample

Sector (Market Area)	Eurostars Population	Proportion	Stratified Subsample
Biotech / medical	249	61%	25
ICT	42	10%	4
Consumer / services	27	7%	3
Industrial	27	7%	3
Energy	24	6%	2
Environment	22	5%	2
Transportation	12	3%	1
Construction / building	8	2%	1
	411	100%	41

Size (# Employees)	Eurostars Population	Proportion	Stratified Subsample
no data	13	3%	1
0-10	214	52%	21
11-20	77	19%	8
21-30	34	8%	4
31-40	20	5%	2
41-50	13	3%	1
51-60	6	1%	1
60+	34	8%	3
	411	100%	41

Participant Role	Eurostars Population	Proportion	Stratified Subsample
Main	242	59%	24
Partner	156	38%	17
Withdrawn²⁴	13	3%	0
	411	100%	41

Participation Costs (M€)	Eurostars Population	Proportion	Stratified Subsample
<=0.5	167	41%	17
(0.5-1)	170	41%	17
>=1	74	18%	7
	411	100%	41

²⁴ Since the purpose of this study is to evaluate the impact of high-tech startups *participating* in EUREKA instruments, no withdrawn participants are included in the subsample.



Start Age	Eurostars Population	Proportion	Stratified Subsample
no data/ incorrect entries	95	23%	9
0-5	116	28%	12
6-10	91	22%	8
11-15	52	13%	5
16-20	26	6%	4
21-35	22	5%	2
36-40	2	0%	0
41+	7	2%	1
	411	100%	41

Clusters

For the PENTA and ITEA3 clusters, a proportional distribution of the **Participation Costs** was taken into consideration when constructing the Dutch Clusters subsample. See Table A3 below for how the Clusters Subsample was constructed using the participation costs criteria.

Table A3: Proportionately Stratified Clusters Dutch Subsample

Participation Costs	PENTA Population	Proportion	Stratified Subsample
no data	3	10%	0
<=€500,000	8	27%	1
(€500,000- €1M)	11	37%	1
>= €1M	8	27%	1
	30	100%	3

Participation Costs	ITEA3 Population	Proportion	Stratified Subsample
no data	1	2%	0
<=€500,000	21	32%	2
(€500,000- €1M)	37	57%	3
>= €1M	6	9%	1
	65	100%	6

The selection of the 50 International (non-Dutch) EUREKA participants

The entire population (i.e. full dataset) of International (non-Dutch) EUREKA participation comprises of 4,448 data entries:

- **3,848** participations for **Eurostars** projects
- **600** participations for SME-partnered **Cluster** projects
 - 528 for SME-partnered PENTA projects
 - 72 for SME-partnered ITEA3 projects

After isolating the Dutch population from the data, the entire International population (of 4,448 participations) was proportioned into strata per instrument. From these proportions, we were able to calculate how many companies per instrument



subsample was necessary to create a total subsample of 50 International EUREKA participants. See Table A4 below for how the subsample for Eurostars and Clusters was determined.

Table A4: Proportionately Stratified International Subsample

EUREKA instrument	International population	Proportion	Stratified subsample
Eurostars	3848	87%	43
ITEA3	528	12%	6
PENTA	72	2%	1
	4448	100%	50

Eurostars

For Eurostars, a proportional distribution of the following characteristics was taken into consideration when constructing the International Eurostars subsample:

- **Participant Country**
- **Sector** (Market Area)
- **Size** (Number of Employees)
- **Participant Role** (Main, Partner or Withdrawn)
- **Participation Costs** (in M€)
- **Age** (when starting the project)

See Table A5 below for how the subsample for Eurostars was constructed based on the above characteristics.

Table A5: Proportionately Stratified Eurostars International Subsample

Country	Eurostars Population	Proportion	Stratified Subsample
Germany	562	15%	6
France	399	10%	5
Spain	359	9%	4
United Kingdom	343	9%	4
Switzerland	302	8%	3
Sweden	285	7%	3
Denmark	270	7%	3
Norway	214	6%	2
Austria	139	4%	2
Italy	121	3%	1
Belgium	115	3%	1
Czech Republic	74	2%	1
Finland	69	2%	1
Israel	57	1%	1
Turkey	50	1%	1
Portugal	48	1%	1
Poland	47	1%	1
Lithuania	45	1%	1
South Korea	42	1%	1
Hungary	41	1%	1
Greece	39	1%	0
Slovenia	35	1%	0
Romania	28	1%	0
Canada	26	1%	0



Cyprus	25	1%	0
Iceland	20	1%	0
Estonia	19	0%	0
Ireland	18	0%	0
Slovakia	14	0%	0
Bulgaria	12	0%	0
Latvia	10	0%	0
Croatia	6	0%	0
Luxembourg	3	0%	0
South Africa	3	0%	0
Russia	2	0%	0
Taiwan	1	0%	0
Brazil	1	0%	0
Malta	1	0%	0
Mexico	1	0%	0
United States	1	0%	0
China	1	0%	0
	3848	100%	43

Sector	Eurostars Population	Proportion	Subsample
Biotech / medical	1377	36%	16
ICT	683	18%	7
Consumer / services	414	11%	6
Industrial	675	18%	6
Energy	272	7%	3
Environment	152	4%	2
Transportation	168	4%	2
Construction / building	107	3%	1
	3848	100%	43

Size (# Employees)	Eurostars Population	Proportion	Stratified Subsample
no data	91	2%	1
0-10	1781	46%	20
11-20	769	20%	8
21-30	331	9%	4
31-40	238	6%	4
41-50	133	3%	1
51-60	87	2%	1
60+	418	11%	4
	3848	100%	43



Participant Role	Eurostars Population	Proportion	Stratified Subsample
Main	1636	43%	20
Partner	2066	54%	23
Withdrawn ²⁵	146	4%	0
	3848	100%	43

Participation Costs (M€)	Eurostars Population	Proportion	Stratified Subsample
<=0.5	2314	60%	27
(0.5-1)	1253	33%	12
>=1	280	7%	4
no data	1	0%	0
	3848	100%	43

Start Age	Eurostars Population	Proportion	Stratified Subsample
no data	1261	33%	15
incorrect entries	20	1%	0
0-5	673	17%	9
6-10	657	17%	9
11-15	479	12%	4
16-20	323	8%	3
21-35	322	8%	2
36-40	29	1%	0
41+	84	2%	1
	3848	100%	43

Clusters

Based on calculations of the marginal distribution of the population per EUREKA instrument (as demonstrated in Table A4), only 1 PENTA participant should be included. As such, the country with the highest amount of PENTA participation has been selected, i.e. Germany (with a participation of 32). From the German population, the company selected is within the category of participation cost that dominates the dataset (i.e. less than €500,000). See Table A6 below for a complete participation cost breakdown of the German PENTA population.

Table A6: Participation Cost Breakdown for German PENTA Population

Participation Costs	PENTA Population
<=€500,000	16
(€500,000-€1M)	11
>= €1M	5
	32

²⁵ Since the purpose of this study is to evaluate the impact of high-tech startups *participating* in EUREKA instruments, no withdrawn participants are included in the subsample.



For the ITEA3 cluster, a proportional distribution of the **Participant Country** was first taken into consideration when constructing the ITEA3 Clusters subsample. See Table A7 below for how the 6 countries (Turkey, Spain, Finland, Germany, Sweden, Belgium) were selected for the ITEA3 Subsample. The same method as per Table A6 was employed to select the participants for each of these 6 countries in the ITEA3 international subsample

Table A7: Proportionately Stratified ITEA3 International Subsample

Country	ITEA 3 Population	Proportion	Stratified Subsample
Turkey	110	21%	1
Spain	88	17%	1
Finland	60	11%	1
Germany	59	11%	1
Sweden	39	7%	1
Belgium	30	6%	1
France	30	6%	0
Canada	29	5%	0
Romania	27	5%	0
Portugal	16	3%	0
South Korea	15	3%	0
Austria	8	2%	0
Czech Republic	5	1%	0
Norway	3	1%	0
Hungary	3	1%	0
Denmark	2	0%	0
Switzerland	1	0%	0
Italy	1	0%	0
Slovenia	1	0%	0
Taiwan	1	0%	0
	528	100%	6

Participation Costs	ITEA3 Population	Proportion	Stratified Subsample
no data	12	2%	0
<=€500,000	360	68%	4
(€500,000-€1M)	128	24%	1
>= €1M	28	5%	1
	528	100%	6

Step 2 – Acquiring data for sub-sample

The following databases are used to acquire the relevant variables to enrich the subsample: Orbis, Tracxn, Crunchbase and Dealroom. The aim for this enrichment stage is to identify the trend of capital invested in EUREKA participants using data from Tracxn, Crunchbase and Dealroom, while the aim is to identify scale-ups using EUREKA participants' company data over time provided by Orbis. See Table A8 for the variables offered by each database.



Table A8: Variables available²⁶ per Database

Tracxn	Crunchbase/Dealroom	Orbis
Company name, founding year, city, state, country, company stage, editor's rating, business models, facilitators, IPOs, News articles, founder information, Funding: <ul style="list-style-type: none"> • total funding • funding rounds • funding amounts per round, • institutional investors 	<ul style="list-style-type: none"> • Number of funding rounds • Total funding amount • Founding date • Founders • Operating Status • Funding Status • IPO Status • Company descriptions 	Company data: <ul style="list-style-type: none"> • Industry Financial data: <ul style="list-style-type: none"> • revenues • profit/loss Employment data: <ul style="list-style-type: none"> • number of employees Ownership data: <ul style="list-style-type: none"> • shareholders' funds • shareholders names

Eureka participants

The list of 50 Dutch companies that have been enriched are as follows:

Eurostars	PENTA	ITEA3
1. Amsterdam Scientific Instruments B.V.	1. D4T Systems SA	1. bunq B.V.
2. Bioceros BV	2. Technobis Fibre Technologies BV	2. SynerScope B.V.
3. BrainCarta B.V.	3. Novioscan BV	3. Recore Systems BV
4. CAPILIX, B.V.		4. Prodrive Technologies BV
5. DS TAGS Group B.V.		5. Verum Software Tools BV
6. Elitac B.V.		6. Datenna BV
7. FlexGen B.V.		
8. Lead Pharma Holding BV		
9. Meatless BV		
10. Merus BV		
11. MIMETAS		
12. Omnigen B.V.		
13. Optics11		
14. Delmic B.V.		
15. Pepscan Therapeutics BV		
16. Quantib		
17. RiverD International B.V.		
18. Solarus Sunpower BV		
19. Soteria Medical BV		
20. Thirona BV		
21. UbiQ Bio BV		
22. XYZTEC BV		
23. 2M Engineering ltd		
24. FeyeCon Development & Implementation B.V.		
25. Opra Turbines B.V.		

²⁶ Variables available does not guarantee that such *data* is available for each company in the subsample.



26. Vostermans Ventilation B.V. 27. AIM BV 28. Brapa Consultancy 29. LG Sonic BV 30. EagleScience 31. Future Diagnostics Solutions B.V. 32. HippoLine BV 33. IBR Consult BV 34. Lighthouse International Dataservices B.V. 35. Low Vision Totaal BV 36. Pamgene International B.V. 37. R&R Mechatronics International B.V. 38. TubaScan Ltd. 39. Vabrema BV 40. Self-screen BV 41. Quest Photonic Devices B.V.		
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Enrichment of the 50 International (non-Dutch) EUREKA participants

The list of 50 Dutch companies that have been enriched are as follows:

Eurostars	PENTA	ITEA3
Germany <ol style="list-style-type: none"> 1. CellTool 2. SICOYA 3. UltraFast Innovations GmbH 4. InnLas Laser GmbH 5. Supracon AG 6. E-Flox GmbH France <ol style="list-style-type: none"> 1. 6MOUV 2. BIONEXT 3. FASTLITE Sarl 4. ENERBIM 5. CQFD Composites Spain <ol style="list-style-type: none"> 1. BEONCHIP S.L. 2. ZUBIOLA, S. COOP. 3. Progenika Biopharma SA 4. Tecnologías Digitales Audiovisuales, S.L. United Kingdom <ol style="list-style-type: none"> 1. Izon Science Europe Ltd. 2. Glycomar Limited 3. Kromek Limited 	Germany <ol style="list-style-type: none"> 1. InfraTec GmbH Infrarotsensorik und Messtechnik 	Spain <ol style="list-style-type: none"> 1. Alerion Technologies S.L. Belgium <ol style="list-style-type: none"> 1. Apogado Germany <ol style="list-style-type: none"> 1. catkin GmbH Turkey <ol style="list-style-type: none"> 1. Medron Medikal Teknolojiler LTD Finland <ol style="list-style-type: none"> 1. Intopalo Digital Oy Sweden <ol style="list-style-type: none"> 1. Digital Nordix AB



<p>4. BioDot Ltd</p> <p>Switzerland</p> <ol style="list-style-type: none"> 1. Consulteer, AG 2. ID Quantique SA 3. GBiotech SARL <p>Sweden</p> <ol style="list-style-type: none"> 1. Cathprint AB 2. Askalon AB 3. Biomotif AB <p>Denmark</p> <ol style="list-style-type: none"> 1. Innogie ApS 2. PentaBase ApS 3. Pipeline Bioresearch ApS <p>Norway</p> <ol style="list-style-type: none"> 1. Maritime Robotics 2. Bilde og Røntgenanalysesystemer AS <p>Austria</p> <ol style="list-style-type: none"> 1. NBG FOSA GmbH 2. tatwort Nachhaltige Projekte GmbH <p>Italy</p> <ol style="list-style-type: none"> 1. Molecular Stamping <p>Belgium</p> <ol style="list-style-type: none"> 1. Adaptive Eyeworks <p>Czech Republic</p> <ol style="list-style-type: none"> 1. FOLLER <p>Finland</p> <ol style="list-style-type: none"> 1. Silicon Laboratories Finland Oy <p>Israel</p> <ol style="list-style-type: none"> 1. CollPlant Ltd. <p>Turkey</p> <ol style="list-style-type: none"> 1. Normmed Medikal <p>Portugal</p> <ol style="list-style-type: none"> 1. FiberSensing - Sistemas Avançados de Monitorização, S.A. <p>Poland</p> <ol style="list-style-type: none"> 1. AVSystem sp.j. <p>Lithuania</p> <ol style="list-style-type: none"> 1. Geozondas Ltd. <p>South Korea</p> <ol style="list-style-type: none"> 1. COWeaver <p>Hungary</p> <ol style="list-style-type: none"> 1. Saniplant Biotechnological Research and Development Ltd. 		
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Step 3 – Analyse data

Analysing Eurostars population

Cleaning the data

From the 2908/4259 participants that had data for their registration year, only 2882 were correctly recorded. We therefore excluded 26 companies that had incorrect entries for their registration year and only performed analysis on the data entries with a registration year. The maturity of the companies that were included in analysis are as follows:

Start Age	# Eurostars Participations
5 or less	793
6 to 10	750
11 to 15	536
16 to 20	350
21 to 35	345
36 to 40	31
41+	77
	2882

The main variables considered in the analysis are:

- the **number of** (start-up and non-start-up) **participations**
- **Total Costs (M€)** – sum of the project costs contributed by the participants in a specific category
- **Total Subsidy Received (M€)** – sum of (national and EU) grants received by the participants in a specific category

From the 2882 participations, we found 793 start-up participations thus amounting to a proportion of 27.52%. The following calculations were then performed based on the start-up participations:

Country	# start-up participations	Total Costs (M€)	Total Subsidy Received (M€)
Netherlands	116	72.03	8.8
Switzerland	81	53.03	20.42
Germany	80	34.77	12.68
Denmark	78	32.11	14.6
France	71	43.83	15.35
UK	65	28.44	11.7
Sweden	54	31.11	14.95
Spain	51	21.55	8.89
Norway	44	35.9	18.81
Austria	32	16.1	8.8
Finland	16	7.26	3.71
Belgium	15	7.02	4.32
Turkey	11	3.47	2.94
South Korea	8	4.61	2.94



Italy	8	2.79	0.87
Lithuania	7	1.74	1.18
Israel	6	5.2	1.88
Czech Republic	6	2.5	1.29
Iceland	6	2.15	0.83
Poland	5	1.22	0.57
Portugal	5	1.41	0.42
Cyprus	5	0.77	0.31
Canada	5	3.73	1.84
Slovenia	5	1.02	0.45
Greece	3	1.07	0.24
Estonia	2	1.13	0
Croatia	2	1.11	0.37
Hungary	2	0.46	0.3
Bulgaria	1	0.22	0.16
Ireland	1	0.51	0
Slovakia	1	0.16	0.08
Luxembourg	1	0.51	0
793	418.93	159.7	

Sector (Market Area)	# startups	Total Costs (M€)	Total Subsidy Received (M€)
Biotech / medical	354	211.08	90.33
Construction / building	23	7.56	3.42
Consumer / services	81	31.81	13.48
Energy	54	34.03	13.38
Environment	29	12.36	4.26
ICT	130	70.95	32.43
Industrial	90	35.45	16.07
Transportation	32	15.67	5.44
793.00	418.91	178.82	

Maturity (years)	# startups	Total Costs (M€)	Average Costs (M€)	Total Subsidy Received (M€)	Average Subsidy Received (M€)
<0 years	2	0.84	0.42	0.40	0.20
0 years	11	5.85	0.53	3.03	0.30
1 year	82	44.09	0.54	16.59	0.24
2 years	174	89.76	0.52	37.60	0.24
3 years	169	88.19	0.52	40.30	0.25
4 years	177	94.05	0.53	42.72	0.27
5 years	178	96.13	0.54	38.18	0.26
793.00	418.91	178.82			

- From the rest of the 2882 participations, 2089 non-start-up enterprises (*Eurostars Enterprises* in the report) were then analysed, yielding the following results:

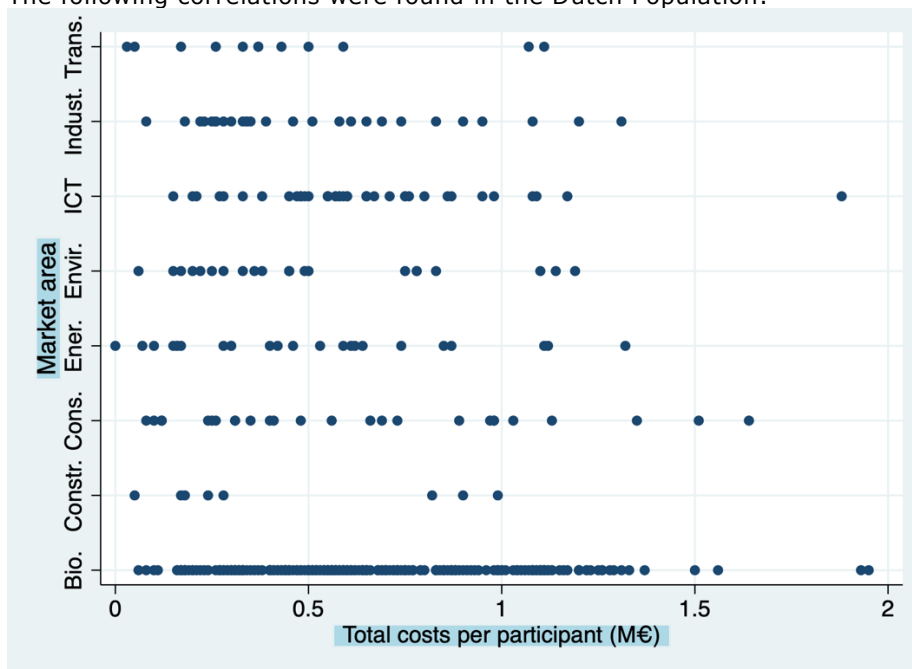


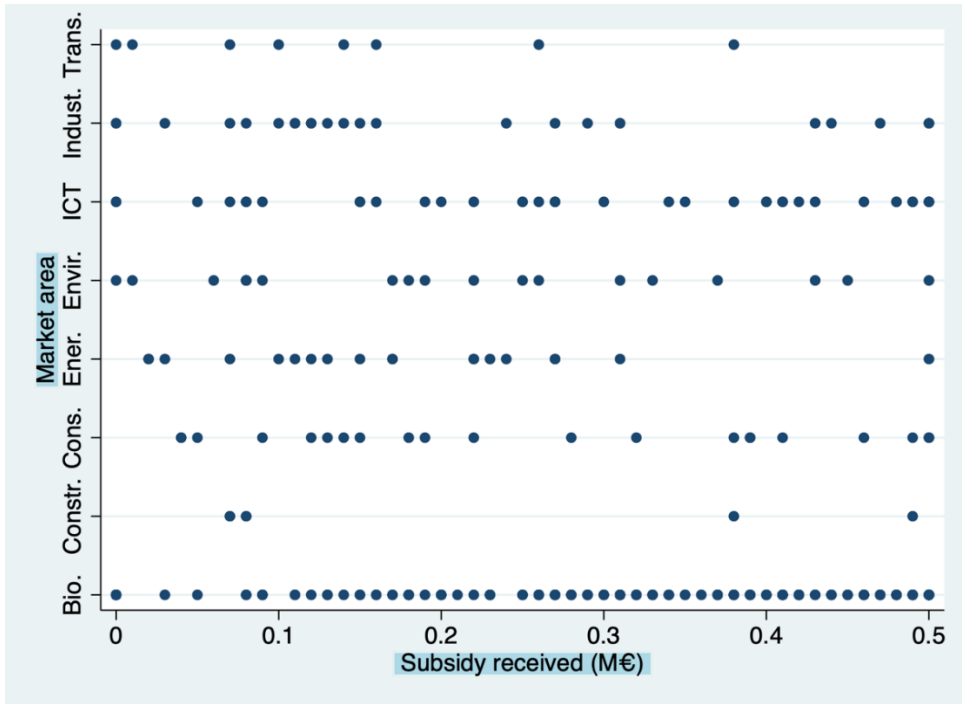
Country	# participants	Total Costs (M€)	Total Subsidy Received (M€)
Germany	288	141.3058599	53.95917654
Netherlands	200	128.2191932	53.94196
France	195	122.621096	43.526555
Spain	182	87.84490356	39.21733051
United Kingdom	178	81.30229508	33.74949252
Switzerland	139	77.00591315	31.38018395
Sweden	150	86.58671646	41.67437305
Denmark	115	48.55054517	24.17322545
Norway	123	104.1189719	47.3632132
Austria	54	24.07778158	11.451237
Italy	60	24.42775617	8.26622363
Belgium	67	31.77487932	18.28429866
Czech Republic	36	11.706521	6.33800997
Finland	31	18.32570852	8.13806
Israel	19	10.013984	1.722178
Turkey	23	11.44701246	9.12543048
Portugal	16	5.20590899	1.90194315
Poland	24	9.05839475	4.44698177
Lithuania	23	5.6197115	3.468578
South Korea	22	16.92306052	11.19268458
Hungary	17	4.82692	1.8260972
Greece	7	2.705269	0.74773321
Slovenia	20	8.0051684	3.70783879
Romania	19	6.117442	3.42107239
Canada	12	5.02260293	1.98304049
Cyprus	12	1.64523	0.8327372
Iceland	10	4.97514898	2.70930215
Estonia	5	1.58570003	0
Ireland	11	3.9004133	1.233275
Slovakia	10	3.0126042	1.6896384
Bulgaria	7	2.0887695	0.66716561
Latvia	5	1.453858	0.89833661
Croatia	2	0.47777772	0.33320305
South Africa	2	0.439266	0.24801818
Luxembourg	1	1.00289	0
Russia	1	0.090143	0
Malta	1	0.20625	0.11449152
Mexico	1	4.277	0
Taiwan	1	0.24	0
2089	1098.208666	473.7330853	



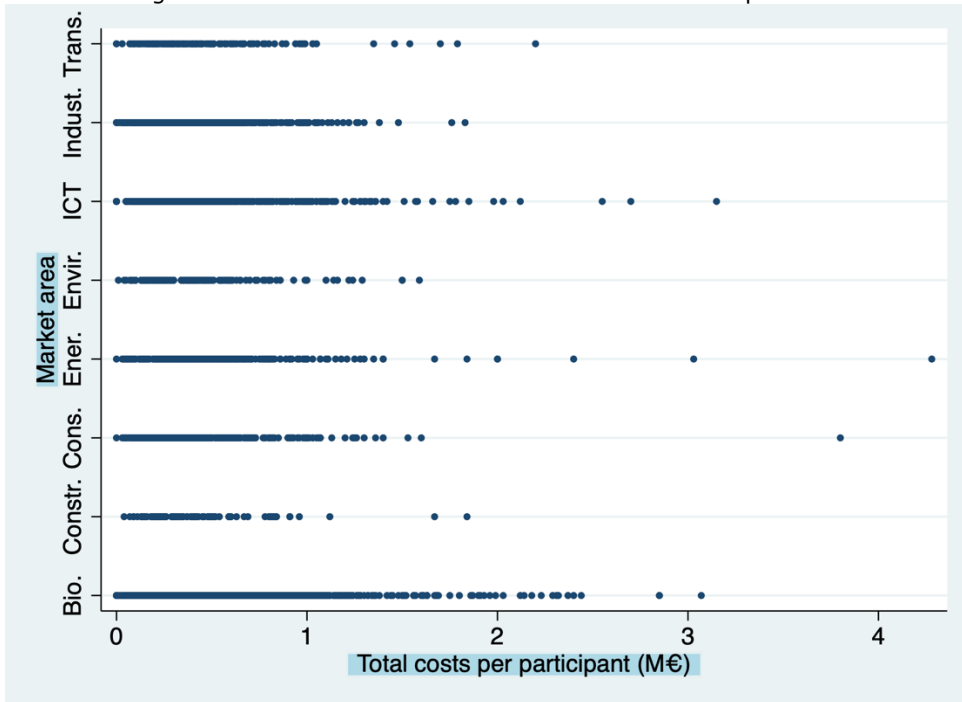
Market Area	# participants	Total Costs (M€)	Total Subsidy (M€)
<i>Biotech / medical</i>	813	494.4578732	210.3452751
<i>Construction / building</i>	52	21.3094332	9.72155958
<i>Consumer / services</i>	211	91.41202066	41.30986655
<i>Energy</i>	171	87.59840235	34.43412967
<i>Environment</i>	82	37.76228004	16.30222471
<i>ICT</i>	319	172.3283342	75.16695896
<i>Industrial</i>	372	160.5019794	74.65467426
<i>Transportation</i>	69	32.8383431	11.79839641
	2089	1098.208666	473.7330853

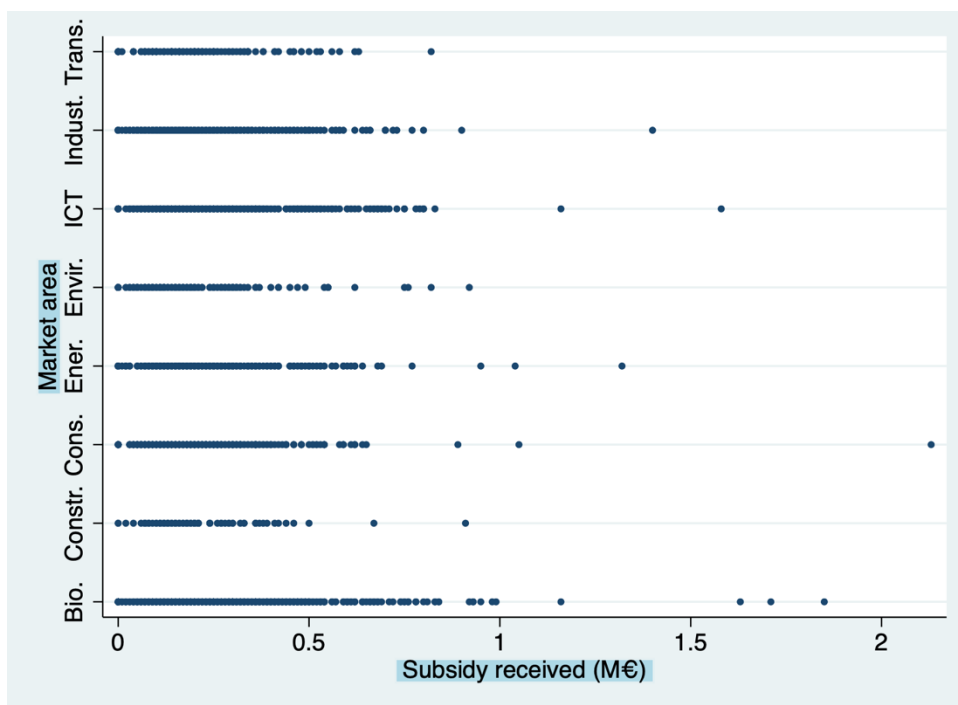
The following correlations were found in the Dutch Population:





The following correlations were found in the International Population:





Analysing clusters population

- 593 ITEA3 SME participations:

Country	#SMEs	Final costs (€)
AUT	8	3076967
BEL	30	14039909.06
CAN	29	21921071.41
CHE	1	91000
CZE	5	1303625
DEU	59	28687610
DNK	2	182300
ESP	88	35476586.48
FIN	60	30665984.04
FRA	30	16747123.77
HUN	3	388800
ITA	1	56000
KOR	15	6268672.983
NLD	65	40274383.06
NOR	3	2662600
PRT	16	4029088.29
ROU	27	12023341.83
SVN	1	256000
SWE	39	12462969.5
TUR	110	30074002
TWN	1	390000
593		261078034.4



- 102 PENTA SME participations:

Country	#SMEs	Final costs (€)
<i>BEL</i>	10	4863596
<i>CAN</i>	2	1825000
<i>CHE</i>	1	343000
<i>CZE</i>	1	285100
<i>DEU</i>	32	22726170
<i>ESP</i>	6	3143100
<i>FIN</i>	2	829900
<i>FRA</i>	12	11992000
<i>GBR</i>	4	1844500
<i>IRL</i>	1	626000
<i>NLD</i>	30	23882187
<i>PRT</i>	1	1060000
102	73420553	

- The two cluster datasets were then merged to create the population Clusters dataset, yielding the following numbers:

Country	Total Number of SMEs	Budget (€)
<i>Netherlands</i>	95	64156570.1
<i>Germany</i>	91	51413780
<i>Spain</i>	94	38619686.5
<i>Finland</i>	62	31495884
<i>Turkey</i>	110	30074002
<i>France</i>	42	28739123.8
<i>Canada</i>	31	23746071.4
<i>Belgium</i>	40	18903505.1
<i>Sweden</i>	39	12462969.5
<i>Romania</i>	27	12023341.8
<i>Korea</i>	15	6268672.98
<i>Portugal</i>	17	5089088.29
<i>Austria</i>	8	3076967
<i>Norway</i>	3	2662600
<i>United Kingdom</i>	4	1844500
<i>Czech Republic</i>	6	1588725
<i>Ireland</i>	1	626000
<i>Switzerland</i>	2	434000
<i>Taiwan</i>	1	390000
<i>Hungary</i>	3	388800
<i>Slovenia</i>	1	256000
<i>Denmark</i>	2	182300
<i>Italy</i>	1	56000



<i>Project Status</i>	<i>#SMEs</i>	<i>proportion</i>
<i>Completed</i>	10	1%
<i>FPP Decision Pending</i>	17	2%
<i>Labelled</i>	183	26%
<i>Recently completed</i>	64	9%
<i>Running</i>	421	61%
	695	

- Based on project websites²⁷:
 - 43% of PENTA partners are SMEs
 - 54% of ITEA3 partners are SMEs

Analyzing enriched sub-sample data

International sub-sample

Eurostars

- 9/43 participated more than once in Eurostars

Growth path:

- 12/43 grew in revenues, profits or number of employees
- 5/43 are scale-ups
 - 4/5 after project start; 1/5 before project start
- 1/43 bankrupt
- 10/43 improved liquidity position: increase in current ratio to greater than 1

Investment path:

- 10/43 receive additional funding
 - 40 rounds in total – 4 rounds on average
 - 27/37 (only 37 had dates to check this) after joining a project
- 10/43 have 2 or more additional sources of finance

Clusters

- 5/7 of SMEs are startups when joining a clusters project
- 0 are scale-ups

International Company	LinkedIn Sector
InfraTec GmbH Infrarotsensorik und Messtechnik	Electrical & Electronic Manufacturing
Alerion Technologies S.L.	Computer Software
Apogado	Information Technology & Services
catkin GmbH	Logistics & Supply Chain
Intopalo Digital Oy	Computer Software

²⁷ https://www.penta-eureka.eu/projects/project_partners.php ; <https://itea3.org/project-partners/page-all.html>



Digital Nordix AB	Information Technology & Services
Medron Medikal Teknolojiler LTD	Computer Software

Growth path:

- 3/6 (only 6 companies had consecutive data to see if they grew) experience employee growth

Investment path:

- 4/7 receive additional funding
 - 1/7 have 2 or more additional sources of finance

Dutch subsample

Eurostars

- 15/41 participated more than once in Eurostars

Growth path:

- 11/41 grew in number of employees
- 1/41 is a scale-up (by strict definition of having 10 employees at the beginning of the period)
 - 5/41 scaled up
- 2/41 bankrupt/liquidated
- 11/41 improved liquidity position: increase in current ratio to greater than 1

Investment path:

- 21/41 receive additional funding
 - 51 rounds in total – 2.43 rounds on average
 - 30/51 after joining
- 13/41 have 2 or more additional sources of finance

Clusters

- 4/9 of SMEs are startups when joining a clusters project
- 0 are scale-ups

Dutch Company	LinkedIn Sector
D4T Systems SA	Semiconductors
Technobis Fibre Technologies BV	Mechanical Or Industrial Engineering
Novioscan BV	Medical Device
bunq B.V.	Banking
SynerScope B.V.	Information Technology & Services
Recore Systems BV	Semiconductors
Prodrive Technologies B.V.	Electrical & Electronic Manufacturing
Verum Software Tools BV	Computer Software
Datenna BV	Information Services



Growth path:

- 5/9 of SMEs grew in number of employees

Investment path:

- 6/9 receive additional funding
 - 3/9 have more than 2 additional sources of finance

Dealroom

- From 2007-2019: "Eurostars SME programmes" and "Eureka Network Projects" as "investors" contributed to 5,501 investment rounds
 - 265/5501 → around 5% are exits
- 59% of participants are startups & scaleups (2,737/462,766 recorded on Dealroom that use Eurostars)

Dealroom qualifies startups based on the following qualifying characteristics:

1. **Innovative by design:** the product and/or business model are innovative. In most cases, the company is tech-enabled: proprietary tech/software or business processes heavily enabled by tech.
2. **Rapidly scaling/scalable:** as a result of #1, this means that the company can achieve high growth by leveraging its platform.

In other words, these are venture-backable companies.

Scaleup: A startup in its growing phase (Growing revenue and over 51 employees)

