

MASTER

Creating a subsidy receiving consortium

A mixed methods research on identifying consortium characteristics for SMEs to be granted a subsidy

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Creating a subsidy receiving consortium:

**A mixed methods research on identifying consortium characteristics for SMEs to be
granted a subsidy**

Master Thesis Innovation Management

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Abstract

This research investigates the possible relationship between different consortium characteristics and the ranking a project receives for their subsidy request, based on the project strength. By extending on previous research by Cantner and Kösters (2012), which focused on identifying product characteristics that could benefit a subsidy request, the focus of this research is directed towards consortium characteristics. Analyzing projects that participated in the SME oriented Eurostars subsidy program, this research conducted a one-way cluster regression followed by semi-structured face-to-face interviews to generate quantitative and qualitative insights. The quantitative results show no significant effect for the number of partners, the participation of domestic partners and the participation of universities and research institutes within the consortium on the chance of receiving a higher ranking. The interviews create new insights in terms of a partner selection based on country of origin and are contradictory to the literature about domestic partners and academic participation within this dataset. Next to that, possible influential factors on the chance of receiving a higher ranking are found. These effects should be looked into and could lead to adjustments within the Eurostars program.

Table of content

Abstract.....	2
Chapter 1: Introduction	5
1.1 Problem indication.....	5
1.2 Research questions	8
1.3 Research design	8
1.4 Structure of thesis.....	9
1.5 Theoretical and practical value.....	9
Chapter 2: Eurostars	10
2.1 Eurostars introduction	10
2.3 Grading criteria Eurostars	11
2.4 Scope of sub-criteria	12
Chapter 3: Existing literature	13
3.1 Added value through co-operation.....	13
3.2 Realistic and clearly defined project management & planning.....	14
3.3 Reasonable cost structure	15
3.4 New applied knowledge.....	16
3.5 Conceptual model.....	17
Chapter 4: Methodology.....	21
4.1 Research design	21
4.2 Quantitative data collection and analysis.....	21
4.3 Qualitative data collection and analysis	22
4.4 Variables.....	24
4.5 Reliability and validity	25
Chapter 5: Results	27
5.1 Descriptive statistics and correlations	27
5.2 One-way cluster regression	28
5.3 Interview analysis.....	29
5.3.1 Number of partners	29
5.3.2 Domestic partners.....	30
5.3.3 University and research institute participation	30
5.3.4 Additional remarks.....	31
5.3.5 New insights.....	31
Chapter 6: Discussion.....	33
6.1 Findings of the current research.....	33
6.2 Theoretical implications.....	34

6.3 Managerial implication	35
6.4 Limitations and future research.....	37
6.5 Conclusion	39
Reference list	41
Appendices.....	49
Appendix 1: Eurostars participating countries.....	49
Appendix 2: Explanation of sub-criteria.....	50
Appendix 3: Example information of project on Era-learn website	54
Appendix 4: Invitation participation interviews	55
Appendix 5: Interview Guide	56
Appendix 6: Initial Codebook deductive analysis.....	58
Appendix 7: Final Codebook deductive analysis.....	59

Chapter 1: Introduction

1.1 Problem indication

The number of Small- and Medium-sized Enterprises (SMEs) is increasing a lot throughout the last years and by 2018 they were already significantly present with 25.1 million SMEs active in the European Union (Van de Vrande et al., 2009; Clark, 2019). Compared to large companies, SMEs work most of the time at the edge of markets or niche markets and have more possibilities to specialize their offer and to customize service (Vanhaverbeke et al., 2012). According to Marullo et al. (2018), SMEs have advantages over large companies in terms of rapid decision making, high-risk taking, fast reaction to market requirements, and high adaptability of routines. With these advantages, SMEs can have a high impact on the speed and level of innovation within society. However, what makes it difficult for SMEs to enter the market is that they do not have the internal resources to compete with the larger companies and to enter the high innovative markets (Vanhaverbeke et al., 2012).

To overcome this lack of internal resources alliances can be created, which is a present form of open innovation (Baum et al., 2000; Chesbrough 2003b; Eisenhardt & Schoonhoven, 1996). Alliances are useful to a firm because they can combine resources, share risks among the allied partners (Hamel et al., 1989; Ohmae, 1989), can be used to gain new competencies (Hamel et al. 1989, Hennart, 1991), and can serve as signals of enhanced legitimacy for firms (Baum & Oliver, 1991). However, studies have found that SMEs are significantly less eager than large companies to participate in alliances because they also bring several new risks in terms of costs, trust, and information sharing (Das & Teng, 1999; Hagedoorn & Schakenraad, 1994; Rambo, 2012). When these new risks are minimized, SMEs can be more willing to participate in alliances. New opportunities can be created for SMEs and their partners, which can result in strong relations and more innovative products on the market (Vanhaverbeke et al., 2012).

The generation of new knowledge by alliances leads to new innovations, productivity growth, creation of high-profile jobs and solutions for societal challenges, which is highly supported by governments (Pilinkiene, 2015). To stimulate this alliance creation, governments came up with joint R&D subsidies, in which governmental money is shared by firms participating in an alliance to realize an R&D project (Broekel et al., 2015; Schwartz et al., 2012). These subsidies are used as incentives to encourage the sharing of knowledge and resources between firms.

The European Union came up with several subsidy programs to stimulate SMEs to participate in international alliances by reducing the financial risk of these alliances. 'Eurostars' is one of the most successful programs of these subsidy programs ('Evolution: Eurostars', 2021). This subsidy program helps SMEs overcome the difficult transition from R&D towards the upcoming demonstration and commercialization phase (Barr et al., 2009; Weyant, 2011). This thesis will focus on Eurostars, the largest international funding program for SMEs in Europe. The main goal of Eurostars is to stimulate SMEs forming alliances on the international level. Reasons for these alliances on the international level are, according to Badger and Mulligan (1995): (i) new ways to broaden the client base, (ii) access to new geographical markets, (iii) recognition as an international contractor, and (iv) future project information and networking. Studies have shown that international research collaboration has already increased significantly over the years, but mainly by large companies (Adams et al., 2005; Glänzel & De Lange, 1997; Hicks & Katz, 1996). By using the Eurostars subsidy program, the European government tries to encourage SMEs to participate more in these international alliances to hopefully also benefit from their advantages.

Subsidy programs like Eurostars are promising initiatives to stimulate companies to continue with their high-risk projects by decreasing the financial risk. Cantner and Kösters (2012) looked into the projects that participate within these types of subsidy programs and found that certain characteristics of projects influenced the chance a project would get a subsidy granted or not. Specifically, Cantner and Kösters (2012) looked at significant product and service characteristics that increased the chance of receiving an R&D subsidy. Their results showed significant effects for (i) products compared to services, (ii) novelty, (iii) created in a spin-off, (iv) cooperative R&D, and (v) working in a team compared to alone. The last variable looks like a consortium characteristic, but it merely describes whether there was a consortium or not to create the product. What Cantner and Kösters (2012) did not consider in their research are the characteristics of the consortium itself. A consortium can differ in many ways, like the number of partners or the division of responsibility, which all can have their influence on the strength of a project (Wernerfelt, 1984; Beamish & Kachra, 2004). By identifying significant consortium characteristics that can have an effect on a higher ranking within a subsidy program, new insights can be generated about consortium characteristics that could increase the strength of a project.

A company that could benefit from these new insights about consortium characteristics is Real1ze, a firm that works with subsidy programs like Eurostars. Real1ze is a company located in Eindhoven who supervises this research. As a consultancy firm, their goal is to support different types of

companies with their risky high tech innovations. (“Real1ze, Over ons”, 2021). They guide as an intermediary party that support these companies in their subsidy application by writing the application from start to finish. By discussing, consulting and researching, a clear subsidy application report will be written with the goal to receive a granted subsidy. In this way, Real1ze helps companies to increase the chance they get their new technology subsidized. This subsidy decreases financial risks, which is one of the barriers for SMEs to enter markets. The added value of Real1ze in the research is their experience and knowledge about different subsidy programs like Eurostars, their network of current and previous customers, connections with subsidy executing parties and their guidance throughout this research. Real1ze is also one of the initiators of this research, since new knowledge about consortium characteristics that could increase the chance of receiving a subsidy could help Real1ze with their consultancy.

1.2 Research questions

Following from the research gap mentioned above, the research question of this thesis is:

What characteristics of a consortium influence the chance of receiving a higher ranking for a subsidy request?

To answer the problem statement the following research questions should be answered:

1. *Which grading criteria based on consortium characteristics are used to determine if a project receives Eurostars funding?*
2. *Which effects between consortium characteristics and project strength are identified in previous literature that are in line with the consortium-based sub-criteria?*
3. *Which effects between consortium characteristics and the ranking of a Eurostars project are found within the Eurostars database?*
4. *Which effects are found by interviewing Eurostars participants, and are these similar to the effects found in the database?*

1.3 Research design

The research strategy of this research is a mixed-methods strategy in which quantitative data analytics is followed by qualitative interviews (Burns, 2009). This method results in a rich understanding of which choices SMEs have to make in choosing the right partners during the creation of their consortia (Schoonenboom & Johnson, 2017). The data analysis gives insights into which consortium characteristics resulted in higher project rankings in the past, whereas the interviews add knowledge to the understanding of why SMEs made the choices for certain partners throughout the projects, how these decisions are evaluated and how these consortium characteristics are experienced throughout the project. The units of analysis for the quantitative part of the research are funded Eurostars projects since data about these projects is publicly available. These projects were funded between 2008 and 2018. For the interviews, multiple contacts of Real1ze, a company active in requesting subsidies on behalf of innovative companies and supervisor of this research project, have been approached by email for participating in semi-structured online one-to-one interviews (Saunders et al., 2007). This data is analyzed by inductive content analysis, to create an overview of what the choices and experiences were of the companies during their innovative project trajectories (Chandra & Shang, 2019). This mixed-methods strategy provides quantitative insights which can be validated and explained through qualitative interviews.

1.4 Structure of thesis

The structure of this research is as follows. The second chapter elaborates on the Eurostars program, making the goals and structure of the program clear. The third chapter describes in-depth possible key consortia characteristics that have been identified in previous literature, resulting in multiple hypotheses. Chapter 4 describes the chosen research design and which research methods are used in this thesis. The results of this thesis are presented in chapter 5. Chapter 6 describes the discussion and conclusion of this research. Lastly, references and appendices are presented in the document.

1.5 Theoretical and practical value

This research will be an addition to the research of Cantner and Kösters (2012), which concluded that the characteristics (i) product compared to service, (ii) novelty, (iii) created in a spin-off, (iv) cooperative R&D, and (v) teamwork are significant characteristics of a product to increase the chances to receive a subsidy. By reviewing multiple researches from the academic literature in the third chapter, about the effects of consortium characteristics on project strength, more insights are gained on the possible direct effects between the composition of a consortium and the strength of a project within the scope of an international subsidy program.

On a practical note, these results will firstly allow executives of the Eurostars program to evaluate if the possible found effects are the effects that are preferred within the Eurostars program and if the evaluation criteria reflect what they should reflect. Secondly, for SMEs, the results will give insights on which consortium characteristics they have to focus on to increase the chance of a higher ranking to receive subsidy funding for their project. Lastly, these results will increase the knowledge for subsidy program consultancy companies to advise companies within their search for a consortium or Eurostars subsidy funding.

Chapter 2: Eurostars

2.1 Eurostars introduction

In this research, the focus lies on the largest European subsidy for SME alliances, called Eurostars. This subsidy program focuses explicitly on international collaboration between SMEs (Eurostars, 2021). Eurostars is a collaborative program from the European Union and the so-called 'Eureka Network', which is the world's biggest public network for international co-operation in R&D and innovation. It is defined as an intergovernmental innovation network. In the Eurostars program, governments work together to finance market-driven research and development programs, which are created by the market and by partners. Only financing is still needed to get these researches and programs up and running. This is performed in a market-oriented, bottom-up and international co-operation-based way. Eurostars has been active since 2008, offering two application moments, so-called cut-offs, per year for companies to participate in. Between 2008 and 2014 Eurostars 1 was active with 10 cut-off moments. Eurostars 1 continued under the name Eurostars 2, now being at cut-off 14. There are a total of 47 countries that are affiliated with the Eurostars program, mostly located in Europe. A list of the participating countries can be found in appendix 1. For a project to be eligible for Eurostars, it should have an R&D performing SME as the prime applicant, because innovative SMEs are the target group of Eurostars. However, it is common that other types of companies are added to the consortium, like universities or research institutes to provide extra resources.

A typical Eurostars project consists of a minimum of two partners of which one partner should be located in a different country than the other partner(s), and in a country that is part of the Eurostars program. The goal of the Eurostars project is to create collaboration between SMEs on an international level, so they can use each other's technological knowledge and skills to strengthen their technology or activities. Each project that is submitted will be evaluated in three steps.

- First, a basis check will be performed to see if the submission is complete and eligible for the Eurostars program
- If the project is complete and eligible, it will be evaluated by 3 individual experts on three main criteria. The main criteria are (i) basic assessment, (ii) market & commercialization, and (iii) innovation and R&D, with each consisting of four sub-criteria. An elaboration on these sub-criteria can be found later in this report. A score between one and six is given for each sub-criterion by each expert, resulting in

an average score for each sub-criterion. The average of the four sub-criteria per main criterion will result in a final score per main criterion.

- An independent evaluation panel will evaluate all the projects and the scores they received again. This re-evaluation gives adjusted scores to each project if perceived necessary. The score a project can receive lies between 0 and 600 and is based again on the three main criteria. Projects receive a final score, which will result in a ranking of all the projects, starting with the strongest project at place number one.

This ranking will be the dependent variable within this research. Based on this ranking a subsidy will be provided or not. This provision depends on the available budget since there is only a limited amount of money available. The money gets divided by the so-called Virtual Common Pot (VCP), which will be elaborated on later in this research. This approach ensures that countries only subsidize partners from their own country until they are out of subsidy budget. Up front, each country can decide how much money they want to invest within innovative parties from their country, and based on the ranking of projects this money will be divided. Between 2014 and 2018 there was a total of 618 million euros of funding that went towards 899 out of the 3.104 subsidy applications.

2.3 Grading criteria Eurostars

Each Eurostars project that gets submitted will be reviewed by three evaluators and receive a grade for different criteria. The three basic criteria on which a Eurostars project is graded, as mentioned earlier, are (i) basic assessment, (ii) market and commercialization, and (iii) innovation and R&D. Each of these criteria consists of several sub-criteria. These sub-criteria can be found in table 1. These sub-criteria cover several aspects that should be present within a project according to the governing parties of Eurostars. A list of these aspects per sub-criteria can be found in appendix 2.

Table 1: Main- and sub-criteria Eurostars project

Criterion	Sub-criteria
Basic Assessment	<ul style="list-style-type: none"> - Quality of consortium - Added value through co-operation - Realistic and clearly defined project management & planning - Reasonable cost structure
Market and commercialization	<ul style="list-style-type: none"> - Market size - Market access and risk

	- Competitive advantage
	- Clear and realistic commercialization plans
Innovation and R&D	- Degree of innovation
	- New applied knowledge
	- Level of technical challenge
	- Technical achievability and risk

2.4 Scope of sub-criteria

The main goal of this research is to specifically look into the characteristics of the consortium itself. The twelve sub-criteria on which a project is graded are mentioned in table 1 above, but consortium characteristics do not affect all of these sub-criteria. A detailed explanation of these sub-criteria can be found in appendix 2. By looking in depth into these sub-criteria it becomes clear that the ranking of several of these sub-criteria can be influenced by consortium characteristics. For example, the sub-criterion *new applied knowledge*, is evaluated, among other things, by the element *the project with this consortium will lead to the creation of new knowledge*. This element describes that when the consortium leads to the creation of new knowledge it will receive a higher ranking for the sub-criterion *new applied knowledge*, which implies that consortium characteristics have an effect on this sub-criterion. Several of these sub-criteria have these elements where consortium characteristics can have an effect on the grading of this sub-criteria. These sub-criteria are the scope of this research, since consortium characteristics are the main focus of this research. The relevant sub-criteria and their consortium directed elements are described in in table 2 below.

Table 2: Sub-criteria related to consortium characteristics

Sub-criterion	Element
Added value through co-operation	Support and expand capabilities and knowledge of each partner
Realistic and clearly defined project management & planning	Well described project management structure (e.g. taking decisions, reporting)
Reasonable cost structure	Cost breakdown is well structured and corresponds to the tasks and activities to be implemented by each partner
New applied knowledge	The project with this consortium will lead to the creation of new knowledge

Chapter 3: Existing literature

The sub-criteria, mentioned in table 2 above, that could be influenced by the composition of a consortium are looked into by identifying previous literature that describes possible relations between the aspects of a sub-criterion and the characteristics of a consortium. This chapter starts out by describing relevant literature for each sub-criterion. Next, hypotheses are generated based on the insights from this literature and the available data within the Eurostars database about previous projects. This results in a conceptual model that could explain the possible effects between consortium characteristics and the ranking of a Eurostars project.

3.1 Added value through co-operation

The goal of Eurostars is to generate new knowledge by supporting international co-operation. This co-operation should result in new knowledge to invest in projects. According to the resource-based view (RBV), having more resources add value to a consortium due to the increased sustainable advantage it gains from tangible and intangible resources (Amit & Schoemaker, 1993; Wernerfelt, 1984). RBV states that a multi-partner consortium results in greater returns because there is access to more expertise than smaller consortia. Multi-partner consortia identify a more opportunities and neutralize a greater number of threats. More partners result in more possibilities, so RBV encourages consortia to work with more partners. The RBV is in line with the sub-criterion *added value through co-operation*, since including more partners expands the capabilities and knowledge of each partner within the project.

Not only the quantity of extra resources has an effect on the added value from co-operation, but also the origin of the resources according to Beamish and Kachra (2004). They performed research among 1335 joint ventures to find the ideal number of partners in a consortium, with the focus on differences between the partners. They found a significant positive effect on a project's probability to achieve profit, performance and survival by the inclusion of unaffiliated partners from the same country, compared to affiliated partners or international partners. Unaffiliated partners use different resources within their practices and they do not compete within the same market. According to Beamish and Kachra (2004), this effect occurs not because there are cultural differences between the partners, but because they draw resources from different resource bases.

The interesting part about the Eurostars program is that it is obliged for a project to have at least two partners from different countries participating in the Eurostars program, and that the participating partners within a consortium are always unaffiliated. From the moment there is a collaboration between two parties from different countries, it is always possible to add other

unaffiliated partners to the consortium. Beamish and Kachra (2004) state that the inclusion of an unaffiliated partner, from the same country as another partner, has a positive effect on a project's performance and survival due to the combined effect of perceiving no international barriers and drawing resources from different resource bases. So, this inclusion of unaffiliated partners from already participating countries can have a positive effect on the sub-criterion *added value from co-operation*.

3.2 Realistic and clearly defined project management & planning

The project management and planning of a project can be affected in multiple ways by consortium characteristics. Firstly, Schaan and Beamish (1988) performed research that looked into variables that could influence the survival of collaborations between multiple partners. They noted that the inclusion of more partners within a consortium resulted in more complications within project management. The reason they gave for this effect is that the managers of the projects were expected to accommodate the interests of more parties, which had a negative effect on the management and planning throughout the project. Franko (1971) even describes this effect as a reason for the increase in failures of international collaborations. This accommodation has, according to him, a negative effect on the project management and planning, specifically in the project management structure. The number of partners within a consortium has a negative effect on the strength of a project according to Schaan and Beamish (1988) and Franko (1971), because it affects *the project management and planning* of a project significantly.

Secondly, each Eurostars project should be able to commercialize their project in two years, since it is a guideline of the Eurostars project. Since it is possible to work with universities or other research based partners during the Eurostars program, this commercialization could become an issue, because the goal of these parties is mainly research and development, and not bringing a product to the market. This could result in differences in goals during a collaboration. Academic parties tend to work on long-term projects with academic goals as journal publications and dissertation completion (Niedergassel & Leker, 2011). Industrial parties on the other hand are more time driven with speed to market due to competitive pressures and generating revenue (Bjerregaard, 2010). This difference between long-term and short term goals could significantly affect the project management and especially the planning, since academic and industrial partners work with different points in time for the completion of a project. Mannak et al. (2019) looked into R&D consortia in which university and industry partners collaborated, with the focus on these timeline related differences. Their results show that if industry and academic partners worked parallel on multiple programs through multiple years, these timeline difficulties were not present since each party could

focus on their own deadlines within this longitudinal project. However, since an SME does not have the resources to work parallel on multiple programs through multiple years this is not an option for an SME. They most of the time work on one project where these timelines difficulties are not desired in a project. Because of these differences in timeline a collaboration with an academic partner could negatively affect the project planning.

Lastly, project management is easier for a consortium of partners that find themselves in the same circumstances as a firm, because the goals are more similar (Vonortas, 2012). According to Doz et al. (2000) do firms from the same embedded national or regional culture have the same interests and find themselves under the same circumstances and goals. They even share interests on development standards and norms about behaviour. So what can be concluded from Vonortas (2012) and Doz et al. (2000) is that the inclusion of domestic partners within a consortium can have positive effects on the project management of a project, since there is a higher chance that partners find themselves in the same circumstances, so have the same interests and goals.

3.3 Reasonable cost structure

A reasonable cost structure ensures that the financial risks of a highly innovative project are kept as low as possible. According to TCA, an increase of partners within a consortium increases this financial risk. TCA focuses especially on the financial aspect of more partners within the consortium. There have been several researches on the effect of the number of participants on the financial aspect of a project, mostly based on TCA (Rindfleisch & Heide, 1997; Jones & Hill, 1988). TCA involves the financial contribution of a partner to engage in a project in terms of management costs of the coordination of the project. These costs can include searching, contracting, monitoring and enforcement (Dyer, 1997). The search for and working with an extra partner is a costly undertaking, so working with more partners can become a costly project. TCA discourages consortia to work with many partners, due to the financial risks it brings.

The cost structure of a project includes all the tasks and activities implemented by each partner within a project. The inclusion of more partners within a consortium affects this cost structure, since more variable costs have to be included for searching, contracting, monitoring and enforcement (Dyer, 1997). These variable costs are on forehand not known, and bring more risk to a cost structure if these increase within a project. To keep these variable costs as low as possible less partners should be included within a consortium. These financial risks of variable costs can have a significant impact on the cost structure of the project, which is not undesirable. One could argue that the inclusion of more partners results in a less *reasonable cost structure*, due to the increase in financial risks.

3.4 New applied knowledge

As mentioned earlier, the goal of Eurostars is to create new knowledge through international co-operation. Companies should search for partners that complement them to generate new insights or that could deliver the desired resources. Brunswicker and Vanhaverbeke (2015) describe five ways of how an SME can look for a possible consortium partner, namely: (i) the minimal searcher, (ii) the supply-chain searcher, (iii) the technology-oriented searcher, (iv) the application-oriented searcher, and (v) the full scope searcher. The minimal searcher is reluctant to open up their innovation activities to the outside and is not really practicing open innovation. The supply-chain searcher tries to create relatively intense interactions with direct customers and suppliers in comparison to other external sources. Whereas the supply-chain searcher focuses on the trajectory of the product, the technology-oriented searcher focuses on technology-push innovation strategy and accessing inventive trends as early as possible. Relative high interaction with universities, research organizations, intellectual property right (IPR) experts and innovation network partners are important for the technology-oriented searcher. The fourth type, the application-oriented searcher, focuses more on network partners and tries to interact with customers and suppliers in the value chain. This type scores low on interaction with universities, research organizations and IPR experts. Lastly, the full-scope searcher focuses on all types of innovation sources to interact with. When looking at the five types of partner search strategies, one of them focuses mainly on the creation of new knowledge and is highly innovative, namely the technology-oriented searcher. This creation of new knowledge and high innovation is desired by the Eurostars program. This type of searcher should score higher on the sub-criteria *new applied knowledge*.

According to Brunswicker and Vanhaverbeken (2015), partners of the technology-oriented researcher are universities, research organizations, IPR experts and innovation network partners, since these parties bring the most innovation and R&D with them. For SMEs, universities and research organizations are a relevant source of new types of knowledge within their consortium since science has a big impact on the search for inventions in terms of speed and size (Fabrizio, 2006; Shinn & Lamy, 2006). According to Fabrizio (2009), universities within a consortium bring an advantage for innovative projects, since they offer early access to innovative trends. The inclusion of these innovative partners in a consortium should increase the level of the *new applied knowledge* within the project. Since this is one of the sub-criteria of the Eurostars program, it would have a positive effect on the ranking of a project.

3.5 Conceptual model

Several consortium characteristics are mentioned in the literature above that could influence the grading of these sub-criteria of Eurostars projects. The found effects between the relevant variables and the sub-criteria can be found in table 3 below. By combining these new insights from previous literature with the limited information that can be obtained from previous Eurostars projects several hypotheses are generated in this section.

Table 3: effect of variables on sub-criteria

Sub-Criterion	Number of partners	Domestic partners	University and research institute participation
Added value through co-operation	+	+	
Realistic and clearly defined project management & planning	-	+	-
Reasonable cost structure	-		
New applied knowledge			+

The consortium characteristic that covers the most sub-criteria is the number of partners within the consortium. The RBV describes that involving more partners leads to more resources within the project which has a positive effect on the added value through the co-operation sub-criterion (Amit & Schoemaker, 1993; Wernerfelt, 1984). However, according to Franko (1971) and Schaan and Beamish (1988), does this increase in partners have a negative effect on the sub criterion project management & planning. On top of that, TCA also concludes that involving more partners within a consortium leads to negative effects in terms of financial risk, which results in a weaker cost structure in the project.

The increase in partners does have both positive and negative effects on the ranking of a project according to the found literature. There is the possibility of a trade-off between these three points of view, where more partners lead to more resources, but also more costs and risks and vice versa. To see if this trade of effect exists, Hu and Chen (1996) performed a research in which they considered these possible positive and negative effects. By looking at 2,442 joint ventures active within the Chinese manufacturing industry, they examined their success in terms of survival and performance to the number of partners within the joint venture. Their results showed an existing inverted U-shape effect between the number of partners and the performance and chance of

survival of a project, where there is an ideal number of partners. This inverted U-shape can also exist within the grading of subsidy applications, where the three identified effects on the number of partners balance each other out in an optimal number of partners. The difference between this research and the research from Hu and Chen (1996) is that their focus lied on joint ventures, where the focus in this research is directed towards consortia. The biggest difference between these two is that a joint venture is a new entity created from several partners, wherein a consortium each partner remains a separate entity. This can result in different ideas and levels of commitment between a joint venture or a consortium (Wroblewski, 2018). Since there is no research available about this inverted U-shape effect, found by Hu and Chen (1996), in the context of R&D collaboration in consortia with the inclusion of subsidies, this theory will be investigated in this research. This results in the first hypothesis:

H1: There is an inverted U-shaped effect between the number of partners within a consortium and the ranking of a Eurostars project.

The second consortium characteristic that is identified in the literature and present within the Eurostars database is the collaboration with domestic partners within a consortium. Beamish and Kachra (2004) found significant positive effects for performance and survival if partners within the consortium are unaffiliated and from the same country. These partners do still add new resources towards the consortium but do not bring cultural differences to the project. If these cultural differences occur more within a project it will have a negative effect on the value of the co-operation. This negative effect can result in a lower grade for the sub-criterion *added value through co-operation*, so it is best to keep the cultural differences as low as possible. Added value through co-operation is based on the benefits a collaboration brings where this is not possible in another way. The co-operation should support and expand capabilities and knowledge of each partner in the project. A barrier towards the expansion of capabilities and knowledge is the cultural difference between partners (Beamish & Kachra, 2004). By including domestic partners to expend capabilities and knowledge instead of international partners which bring new cultural differences to the project, the diffusion of these capabilities and knowledge will benefit every party within the consortium and increase the strength of a projects.

Another effect of including domestic partners within the consortium is the creation of similar interests within the consortium by adding partners with the same national culture. (Vonortas, 2012; Doz et al., 2000). This inclusion of partners with the same national culture can result in similar

interests in development standards and norm about behaviour, which will positively affect the project management of a project.

These two positive effects of the inclusion of domestic partners result in the following hypothesis:

H2: A higher percentage of unaffiliated partners from the same country in the consortium will have a positive effect on the ranking of a Eurostars project.

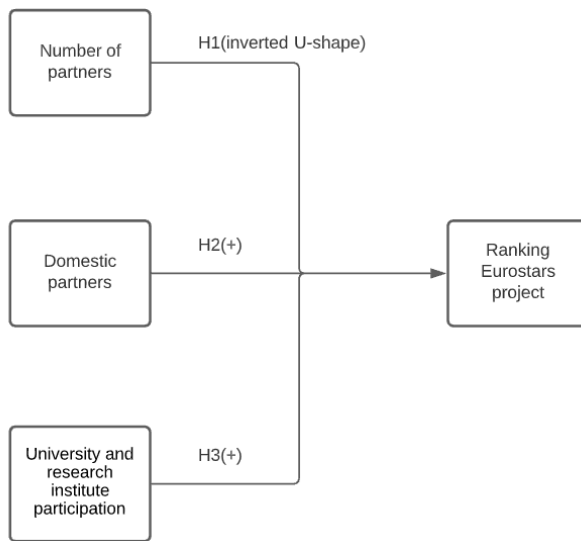
The last consortium characteristic that is discussed within the literature and represented in the Eurostars database is the type of partners that can be added to a consortium, and what resources these partners bring. The goal of Eurostars is to be highly innovative, and Fabrizio (2006) and Shinn and Lamy (2006) identified that universities and research institutes have a big impact on the search for inventions in terms of speed and size. It can be said that the inclusion of these partners should have a positive effect on the sub-criterion *new applied knowledge*. However, the inclusion of these academic parties within a consortium can also have a negative effect on the ranking of a project. As Niedergassel and Leker (2011) and Bjerregaard (2010) describe, there are differences in the timeline of industrial and academic parties, since they have different goals. This difference within the timeline can have a negative effect on the planning of a Eurostars project, which is one of the sub-criteria.

There are possible positive effects of the inclusion of academic partners within the dataset, but also possible negative effects. The main goal of Eurostars is to stimulate innovation, in which academic partners have a big positive effect according to Fabrizio (2006) and Shinn and Lamy (2006). Since this is the main goal of Eurostars, this effect should have a bigger positive effect than the possible negative effect of differences with the timeline. That is why the third hypothesis is as follows:

H3: A higher percentage of universities or research organizations in the consortium will have a positive effect on the ranking of a Eurostar project.

The above-mentioned hypotheses result in the conceptual model shown in Figure 1 below. Three different variables can affect the ranking of a Eurostars project. By testing these three hypotheses new knowledge can be created about the possible effects of consortium characteristics on the ranking of a Eurostars project.

Figure 1: Conceptual model



Chapter 4: Methodology

4.1 Research design

The strategy for this thesis is a mixed-methods study (Burns, 2009). By combining quantitative and qualitative research components the conclusion will be expanded and strengthened, which will result in higher validity (Schoonenboom & Johnson, 2017). This strategy fits this research since the aim is to search for explanations and in-depth insights regarding the extent to which consortium characteristics have an impact on the quality of a project. In this thesis, multiple Eurostars projects are analyzed to gain quantitative results about the possible significant consortium characteristics. By performing qualitative interviews in a later stage more in-depth knowledge will be gained about the choices different consortia made and whether they are in line with the literature and Eurostars sub-criteria. This makes it possible to answer the main research question.

4.2 Quantitative data collection and analysis

A causal-comparative research design is used for the quantitative analysis (Schenker & Rumrill, 2004), since this research tries to explain the grading of Eurostars projects based on their consortium characteristics. Several consortium characteristics were described in chapter three that could affect the several sub-criteria that are used to rank the Eurostars projects. A dataset, covering these consortium characteristics, was manually generated from information present on the 'Eralearn' website, where multiple Eurostars projects are presented with several details (Era-learn: Eurostars 2, 2021). This website gives a description about a project, shows the participating companies per consortium and gives specific information about these companies like country of origin and type of company. An example of the information given about a project can be found in appendix 3. The complete dataset on Eralearn exist of 1680 successful published projects.

Since the dataset is generated manually from this dataset, systematic sampling is used to get a representative dataset out of all the projects from the Eurostars program, since copying all the 1680 projects was impossible due to time constraints. The projects in the dataset were ranked on a manually generated variable named *score*. This variable is generated out of dividing a project's ranking by the number of participants during a certain cut-off. This results in a value of score between 0 and 1 which represents the strength of a project compared to other projects. This ranking of all the projects based on the variable score makes it possible to perform systematic sampling by selecting every third project in this list. This systematic sampling prevents a biased dataset, which results in a total of 560 projects that are looked deeper into. The final dataset exists of 543 projects, since not all projects on the Eralearn website provided the relevant data for this research. (Yates,

1948). The projects that are analyzed are published funded Eurostars projects who participated in the Eurostars program between 2008 and 2018. These projects participated during one of the so-called 'cut-offs'. A cut-off is a period in which a project can participate in Eurostars, and for each cut-off a new budget is available. From 2008 until now there have been 10 cut-offs in Eurostars 1, followed by 14 cut-offs in Eurostars 2. The projects used in this research are funded projects that participated between Eurostars 1 cut-off 1 and Eurostars 2 cut-off 9, since unfunded projects are not published, and projects that participated after Eurostars 2 cut-off 9 are still evaluated or executed, so also not published. The projects that are published on the Eurostars platform show several details of the projects, like the number of partners and the types of partners. By generating a dataset from this database, the available data is used to find possible significant consortia characteristics. To find possible effects between the dependent and independent variables a one-way cluster regression is used since multiple variables will be tested in the model. The cluster in this analysis is the specific cut-off a project participated in. These clusters may represent a hierarchical relationship in a cross-section (Baum, Nichols & Schaffer, 2010). Estimating the ranking of projects without controlling for clustering could lead to understated standard errors and overstated statistical significance, which should be avoided (Cameron, Gelbach & Miller, 2012).

4.3 Qualitative data collection and analysis

For the qualitative part of this research retrospective, semi-structured interviews were held (Longhurst, 2003). Four Dutch SMEs were interviewed that participated in the Eurostars program between 2019 and 2020,. Information about these SMEs can be found in table 4 below.

These companies are partners that worked together with Real1ze during the Eurostars program of which two were funded and two were not. A disadvantage of this retrospective approach is that respondents can perceive difficulties in recalling memories, as well as they could be affected by post-event rationalization (Ritchie et al., 2013). However, since the projects are a maximum of 2 years old, this danger will be prevented.

Table 4: details interviewed companies

	Cut-off	Subsidy received	Number of partners	Type of partners	Country of partners	Sector
Company 1	Eurostars 2	Yes	4	2 R&D SME	1 NL	Biological
	Cut-off 13			1 Large company	3 CH	Sciences/Technologies
					1 University	
Company 2	Eurostars 2	Yes	2	3 R&D SME	1 NL	Other industrial
	Cut-off 12				1 FR	technologies
Company 3	Eurostars 2	No	2	2 R&D SME	1 NL	Industrial
	Cut-off 14				1 BE	manufacturing, material and transport
Company 4	Eurostars 2	No	2	2 R&D SME	1 NL	Energy technology
	Cut-off 14				1 BE	

Diverse case selection resulted in these four companies, where two were funded and two were not. This gave the possibility for a wider range of variation of answers (Seawright & Gerring, 2008; Gajaweera & Johnson, 2015). The Real1ze partners that participated in Eurostars were contacted by e-mail in which the purpose of the study was explained and possible interest in participation was asked, as shown in appendix 4. The interviews were held in February 2021. The spoken language during the interviews was Dutch since this is the native language of both the interviewer and the participants. Interviews were conducted by Microsoft Teams since face-to-face meetings were impossible due to the COVID-19 crisis. Each interview took approximately 20 minutes and was recorded. Beforehand permission was asked for the use of a recording device and transcriptions of each interview were sent to the interviewee for validation and permission to use in this research.

The interviews allowed more in-depth investigation of the quantitative results and to reveal possible explanations for the choices companies made (Saunders et al., 2007). The semi-structured interviews consisted of questions that were related to the results of the quantitative data from the published Eurostars database and were included in an interview guide that was created in advance of the interviews. Topics covered the relevant project and company, the international collaboration,

working with different types of partners and the interviewees' own perception of the Eurostars project. In the end, participants were asked if they would add information that was not covered in the interview. The interview guide can be found in appendix 5. This format of interview guide made it possible to not work with a specific order in which these questions were asked. Open questions gave the respondents the possibility to elaborate on their answers to justify statements and to clarify uncertainties (Saunders et al., 2007). These semi-structured interviews helped with increasing data-saturation, since they elaborate on the quantitative results and the possibility was left for the interviewees to elaborate on their own experiences (Guest et al., 2006). Deductive coding was used since the questions in the interview guide covered the themes from the literature and the conceptual model (Fereday & Muir-Cochrane, 2006). This was done manually since there were only four interviews. The used codebook can be found in appendix 6.

4.4 Variables

The dependent variable *score* describes the ranking a project got, compared to the number of projects that participated within the concerned cut-off. By dividing the ranking a project got by the number of participants in the relevant cut-off each project got a value between 0 and 1, where a score closer to 0 represented a higher ranked project. Inverting this value by subtracting 1 minus this value resulted in a list where a score closer to 1 represented a higher ranked project.. This made it possible to create one variable for the rankings of multiple cut-offs to compare the different cut-offs, with different numbers of participants. Table 5 shows the independent variables and additional information about these variables. There are many other factors that may influence the ranking of a project. Financial assets, intellectual property and the experience with the program are examples of this, and could be used as control variables (Fichman and Levinthal, 1991). However, since this information is not publicly available, no control variables will be added to the analysis.

Table 5: Definition, hypothesized direction and effect on sub-criteria of independent variables

Variable	Definition	Eurostars Sub-criteria
Number of partners (inverted U-shape)	The <i>number of partners</i> refers to the different individual partners that were involved in one specific project that participated in the Eurostars program.	Added value through co-operation Reasonable cost structure Project management and planning

Domestic partners (+)	The variable <i>Domestic partners</i> describes the percentage of domestic relationships within the consortium compared to the total number of relationships. This number of relationships is estimated by the equation $NR=n*(n-1)/2$. <i>NR</i> = number of relations. <i>n</i> = number of partners	Added value through co-operation
University and research institute participation (+)	<i>University and research institute participation</i> shows the percentage of participating universities and research institutes within a consortium participating in the Eurostars program.	New applied knowledge

These variables are selected because they were present within the Eurostars database and describe a consortium characteristic of the projects that participated in the Eurostars program. First, the variable *Number of partners* describes the number of separate companies that are part of a Eurostars project. To check if there is a curve linear effect present between *Score* and *Number of partners* the variable *Number of partners2* is created. This variable is the square of the variable *Number of partners*. *Domestic partner* describes the percentage of the relations that are within the consortium that are between companies from the same country. The last independent variable is *University and research institute participation*, which describes the percentage of universities and research institutes that are present within the consortium

4.5 Reliability and validity

Reliability in a research will make sure that the results can be reproduced in a later stage when the research is repeated (Middleton, 2020). By clearly describing the methodology, it is possible to reproduce this research in the future. To increase the reliability a dataset will be used ranging from 2008 until 2018, retrieved from the Eurostars website. This data will stay available and can be used in further research, so if this research is conducted again the same results would come up. The used

dataset and the transcriptions of the interviews, together with the codebook, can be requested to make the data used in this research reusable for further research.

By having a high validity, a researcher can guarantee that the results measure what they are supposed to do (Middleton, 2020). There are four types of validity, called (i) internal, (ii) external, (iii) construction and (iv) ecological validity. Since there is not much data available in the Eurostars database, it is hard to validate that only the three defined independent variables measure the dependent variable completely, which results in a low internal validity. The external validity is high for the quantitative analysis since 543 projects are chosen randomly out of the Eurostars database. To gather more insights and increase validity, interviews will be done after the quantitative analysis. The construction validity is secured by asking targeted questions about the relevant project and consortium. The ecological validity is mediocre since the interviews were conducted via Microsoft Teams. This inclusion of the interviews to the quantitative analysis is called triangulation (Noble & Healy, 2019). Triangulation will make sure that the reasons behind the choices of consortia are known, which can validate the found results by using quantitative and qualitative research methods.

Chapter 5: Results

5.1 Descriptive statistics and correlations

Descriptive statistics of each variable and a correlation matrix can be found in table 6. Remarkably, there are three significant correlations, namely (i) between the *number of partners* and *domestic partners*, (ii) between the *number of partners* and *university and research institute participation*, and (iii) between *domestic partners* and *university and research institute participation*. However, this should not be a problem. The highest correlation is 0.473, which is classified as a moderate correlation (Schober, Boer & Schwarte, 2018).

Table 6: correlations independent variables

	Mean	Min	Max	SD	(1)	(2)	(3)	(4)
(1) Score	0.857	0.507	0.998	0.095	-			
(2) Number of partners	3.872	2	9	1.157	0.0329	-		
(3) Domestic partners	0.262	0	0.6	0.139	-0.024	0.473***	-	
(4) University and research institute participation	0.270	0	0.75	0.182	0.006	0.360***	0.418***	-

Note: * $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$; $N = 384$

By looking into the variance inflation factor (VIF) of these variables it is possible to conclude if there is multicollinearity or not. The VIF outcomes can be found in table 7. Rule of thumb says VIF values above 5 imply high correlation and are worrying. Since the VIF scores are close to 1.00 it can be concluded that there is no problem with multicollinearity within the data (Daoud, 2017). This makes it possible to continue with a regression on this dataset with these variables.

Table 7: VIF scores

Variable	VIF	1/VIF
Number partners	1.42	0.706
Domestic partners	1.34	0.744
University and research institute participation	1.26	0.791
Mean VIF	1.34	

5.2 One-way cluster regression

The results of the one-way cluster regression are shown in Table 8. A total of four models were run to examine partial effects for each variable and a model with all the variables included. In each of the four models, no significant effects are found between the independent variables and the dependant variable *Score*, indicating that the hypotheses are not supported. First of all, by looking at the first model, it becomes clear that the first hypothesis, an inverted U-shape effect, is not supported. Also, the other variables are individually not significant. The final model with each variable included shows no significance either. Looking at the R^2 values of the models it becomes clear that variance within dependant variable is minimally explainable by the variance within the independent variables since the values are close to zero. Also looking at the Prob>F value, the model shows that the data is not inconsistent with the null hypothesis, since these values are above 0.05. So, the independent variables do not explain variance in the outcome. The created hypotheses are not supported by this model.

Table 8: one-way cluster regression, dependent variable: Score

	Model 1	Model 2	Model 3	Model 4
Number of partners	0.004 (0.015)			0.016 (0.018)
Number partners ²	-0.000 (0.002)			-0.001 (0.002)
Domestic partners		-0.014 (0.030)		-0.043 (0.037)
University and research institute participation			0.003 (0.024)	0.002 (0.024)
N	543	543	543	543
Prob>F	0.766	0.648	0.9009	0.713
R ²	0.001	0.001	0.000	0.004

5.3 Interview analysis

By interviewing four companies that all participated within the Eurostars program, insights about decisions and experiences were generated. By asking questions directed at the three hypotheses more became clear about the choices each project made during the Eurostars project. The final codebook for these interviews can be found in appendix 7. What directly became clear during the start of the interviews is that each of the projects was looking for funding, but they were not directly focussed on the Eurostars program beforehand. When looking for funding it became clear the projects fitted within the Eurostars guidelines, which resulted in applications for a funding.

5.3.1 Number of partners

By asking each company how they created their consortium and searched for their partners it became clear that each of them looked for complementary resources to bring their technology to the market, which is in line with the RBV approach. Later, when the consortium was completed they looked for possible subsidy programs that applied for them, which led them to the Eurostars program.

When asking more questions about the number of partners within the consortium none of them reported any problems in terms of increased financial risk or problems with project management. The TCA view, where the number of partners increased risk, was not perceived by the interviewed companies. The goal of working together was to complement each other where necessary, so the project could be executed. The reaction of each company explained this:

“We found the partners we needed to execute our ideas” (Interview company 1, 2021)

“We were looking for a producer for our idea with our technology, which we found” (Interview company 2, 2021)

“They could create the right substance we needed in our project, so we worked together” (Interview company 3, 2021)

“We needed their technology in our product, so they joined our project” (Interview company 4, 2021)

Although the literature expects a trade-off between advantages and disadvantages on including partners within the consortium, the interviewees only acknowledged the complementary advantages of working together with other companies. This is a desired effect to see, since the Eurostars program goal is to let companies benefit from each other by collaboration and not create more risks for projects.

5.3.2 Domestic partners

The literature by Beamisch and Kachra (2004) found that including unaffiliated partners from the same country within the consortium has a positive effect in terms of performance and survival compared to unaffiliated partners from another country due to cultural differences. The interviewees responded to questions about this as follows:

“We did not perceive any difficulties with our international partners” (Interview company 4, 2021)

“Sometimes a different language, but not perceived as a barrier” (Interview company 2, 2021)

The other companies also responded they did not perceive any problems during their international collaboration. As can be seen earlier in table 4 with information about the interviewed companies and their projects, they collaborated with partners from Belgium, France and Switzerland, three West-European countries. One company gives this as an explanation for perceiving no cultural barriers within their consortium:

“Everywhere there are cultural differences which you have to deal with. However, I think these cultural differences within Europe became more manageable over the years, and are nowadays minimalistic present in international collaboration” (Interview company 1, 2021)

This could be an explanation for perceiving no international barriers within the project by each of the four interviewees.

Company 3 worked together with a company in Belgium where Dutch was the spoken language. They perceived this as a pleasant experience:

“Within the collaboration we spoke Dutch, since we both speak this language. This was perceived very pleasant, since this resulted in less uncertainties within the project” (Interview company 3, 2021)

This collaboration with a domestic partner is perceived as an advantage, since the uncertainties that can occur during collaboration with more cultural distant partners are reduced. This is in line with the previous literature that domestic partners within the project are an advantage for the strength of a project, and the ranking it will receive.

5.3.3 University and research institute participation

Only one of the interviewed companies worked together with a University within their project, namely company 1. According to Fabrizio (2006) and Shinn and Lamy (2006), this inclusion of a university should lead to more innovative projects. Company 1 reacts to their project with this university:

“We found a big difference between working with clinically oriented partners and academically oriented partners in terms of goals and how to achieve these goals. This resulted sometimes in misunderstandings” (Interview company 1, 2021)

The insight that is created from this interview and the literature is that working with a university or research institute can result in more innovative projects, but could also result in problems concerning project management and planning since more misunderstandings can occur between industrial and academic-oriented parties within the project. This was also addressed in the literature. Especially the differences in timeline for reaching the goals per partners could be an explanation for this.

5.3.4 Additional remarks

At the end of the interview, each interviewee was given to chance to make remarks on topics that were not covered. Company 2 reacted to this:

“We choose to work with a partner from France because the chance to receive a subsidy is higher if you work with a partner from France compared to a partner from Germany. We also had an opportunity to work together with this reliable partner from Germany, but choose to work together with this partner from France for the increased chance to get this subsidy granted” (Interview company 2 2021)

Remarkably, this is an example of a company choosing its partners based on the country it is located in instead of choosing a partner that possibly fits better within the project. The reason given for this is that the chance of receiving a subsidy in France is bigger than in Germany, due to subsidy funding budget in France. This could result in companies pursuing the subsidy fund at the expense of creating the strongest project. Eurostars should evaluate if this is the effect they want to create within their program.

5.3.5 New insights

When comparing the initial codebook, that was created after the literature analysis, and the final codebook, several changes can be seen. First, the literature describes possible negative effects of the increase of partners within a consortium. This negative effect was not mentioned during the interviews, so were not perceived by the interviewees. Secondly, when discussing the inclusion of domestic partners within a project, there was an addition in discussing international partners included in a project. These effects were not included in the initial codebook. Thirdly, the positive effect of including universities and research institutes within the project was included initially, but was not perceived by any of the interviewees. And finally, a theme that was not anticipated for was

the selection of partners based on their country of origin to increase the chance of receiving a subsidy. Several themes that were initially included in the codebook were not perceived by the interviewed companies. This could imply that there are deeper mechanisms present within consortia that can have an effect on the strength of a project, but which are not taken into account in this research.

Chapter 6: Discussion

This research aimed to analyze whether there are specific consortium characteristics that affect the chance of gaining a higher ranking for a project to receive subsidy funding. Four sub-questions were generated to accomplish this. First, information was given about the relevant subsidy program, namely Eurostars, and how a project gets ranked within this program. By evaluating the criteria that influence a project's ranking several criteria came up that could be influenced by the consortium. The literature review looked into relations between these criteria and consortium characteristics, which resulted in three hypotheses and a conceptual model. These hypotheses were tested using a one-way cluster regression on the Eurostars database where old Eurostars projects are presented. In a later stage, interviews were held with previous participants of the Eurostars project to gain insights into their experience with their consortium. These insights were used to reflect on the conceptual model and the results of the statistical analysis. This section summarizes the outcomes found throughout this research and strives to answer the main research question, *“What characteristics of a consortium influence the chance of receiving a higher ranking for a subsidy request?”*

6.1 Findings of the current research

In this research, three hypotheses were generated to see if there was an effect of a consortium characteristic on the ranking a project received. The hypotheses covered the consortium characteristics (i) number of partners, (ii) domestic partners, and (iii) university and research institute participation. The results of the one-way cluster regression supported none of the created hypotheses since every effect was not significant ($p > 0.05$). The interviews gave insights into companies' experiences during their Eurostars project. The only effect that was confirmed from the literature was the resource-based view from the companies within their project, which stated that new partners bring complementary resources within a project. All the other effects stated in previous literature were not experienced by these companies. The interviews also generated new insights. The first one is that a partner was included based on their country of origin compared to their added value. This effect occurred because Eurostars works with the VCP, which divides the subsidy funding in a specific way. The second insight that was mentioned during an interview was that a company experienced different goals during their collaboration with an academically-oriented partner. This research tried to find out if there are significant consortium characteristics that could increase a project's chance for a higher ranking to receive a subsidy, but no empirical evidence was found for this research question.

6.2 Theoretical implications

This research contributed to the previous research of Cantner and Kösters (2012) by repositioning the scope of their research from product characteristics towards consortium characteristics. The results show no significant effects between consortium characteristics and the chance for a higher ranking of a project to receive a subsidy. The effects described by previous literature are not supported within this particular subsidy program. However, there are still possible effects that could explain why no empirical evidence was found within this research.

Firstly, what is not taken into account in this research is how these choices in consortia partners affect the collaboration within the consortium itself. One interview mentions that the collaboration with an academic partner compared to an industrial partner is different because of the goals of each party. The literature from Fabrizio (2006) and Shinn and Lamy (2006) describes the effect of more innovative projects when universities or research institutes are included, but they do not describe the effect of the inclusion of such a partner on the collaboration itself between each partner. The collaboration itself can differ in many ways that can affect the strength of a project, like co-operation commitment and intensity (Bresnen & Marshall, 2010), trust between partners (Das & Teng, 2001) and different goals within the project (Brouthers, Brouthers & Wilkinson, 1995). These collaboration aspects are not possible to gather from secondary data collection, so not included in this research. However, these could have a significant effect on the strength of a project and the ranking it gets in a subsidy program. The consortium characteristics could affect these collaboration aspects, which in their turn affect the strength of the consortium. This could explain why no direct significant effect was found between the consortium characteristics and the ranking of a project. More fine-grained measures are needed to find effects between consortium characteristics, collaboration aspects and the strength of projects.

Secondly, a factor that can have an impact on a ranking, which cannot be adjusted by a consortium, is the sector in which it is active. One hypothesis of Cantner and Kösters (2012) in their research is the so-called 'picking the winner' approach, which describes an evaluating process in which not the most promising or out-of-the-box programs receives a high evaluation, but rather the more safe and less exiting programs. One of the reasons for this approach, according to Cantner and Kösters (2012), is that particular technologies may be seen as likely winners, e.g., biotechnology (Fier & Heneric, 2005). There is a possibility that the evaluators might prefer a focus on so-called 'future technologies'. This focus gets supported by the 'pro-innovation bias' (Karch et al., 2016). The pro-innovation bias describes a tendency of a person to have such a strong bias in the advantage of an innovation that affects a complete society causing the person to miss its risks, limitations and

weaknesses. This bias results in preferences for several technologies or sectors where these should not be present.

6.3 Managerial implication

On managerial level this research contributed to three types of parties: (i) the companies participating in Eurostars programs, (ii) the Eurostars program and the evaluators, and (iii) subsidy application consultancy companies, like Real1ze.

First, the Eurostars participating companies should not focus directly on their consortium characteristics when searching for partners, but on the quality of the collaboration they create by including new partners. The hypotheses that there are consortium characteristics that can improve the chance of receiving a higher ranking are not supported in this research. The focus in selecting partners should shift towards the collaboration quality a company wants to add to their consortium, based on research from Brouthers, Brouthers and Wilkinson (1995), Das and Teng (2001) Bresnen and Marshall (2010). These collaboration aspects will get influenced by consortium characteristics as one of the interviews showed (Interview company 1, 2021). The goal of choosing the right consortium is not directly to receive a higher chance of receiving funding but to generate better collaboration aspects, which can result in a higher ranking for a subsidy request.

Secondly, the results of this research show no direct effect between consortium characteristics and the ranking of a project. A more in-depth quality check of each project could reflect the strength of the complete project better, which is desired by the Eurostars program. However, one finding of the interviews was that a partner was selected based on their country of origin, because this increased the chance for a project to receive subsidy funding (Interview company 2, 2021). The goal of Eurostars is to create highly innovative projects, but this partner selection based on country of origin, as opposed to complementary resources does not stimulate this. A reason for this can be found in the way the financial aspects of Eurostars are arranged. As mentioned earlier, the Eurostars program works with the VCP. The VCP is designed to avoid cross-subsidization between countries and results in a situation where each country only subsidizes partners of projects from their own country. The VCP makes sure that the money that a country sets aside for subsidizing is also used for partners from that country instead of giving the subsidy to partners from different countries. However, this VCP also provides reason for discussion. Hünernund & Czarnitzki (2019) performed research in which they looked specifically at the Eurostars program and the way the subsidy money is split across the participating countries. They found that the VCP does not always result in giving the highest-ranked project a subsidy. Hünernund and Czarnitzki (2019) give an example. If four

countries, A, B, C and D, participate in a Eurostars program, and all have money to fund two participants of a consortium, the following ranking in table 9 would not fund the highest-ranked projects. The result of this is that projects could not pursue being the best project receiving the highest ranking of all projects, but pursue receiving a subsidy, no matter the strength of the project.

Table 9: Example of VCP

Quality Rank	Consortium	Receive complete subsidy
1	A, B, B	Yes
2	B, B, C	No
3	A, C	Yes
4	A, B, C, D	No
5	C, D, D	Yes
6	A, C, D	No

As we can see above the project with ranking one will get the complete subsidy, because countries A and B do have the money to subsidize this project. However, the project with ranking two will not receive the full subsidy, because the money of country B is already used completely for a better project. Now the part for discussion is that the project with ranking three can get a complete subsidized project because there is still money left in countries A and C. This scenario also repeats itself for the projects ranked in place four and five.

What can be learned from this is that it could be a good decision for SMEs to work together with partners from countries with a high budget, or partners located in countries with low participation rates within the Eurostars program. This improves the chance that there is a budget left for your project compared to countries with a relatively low budget. However, this should not be the approach of a subsidy instrument, where partner selection is based on country of origin instead of added value of a partner within the consortium. The goal of a subsidy program is to stimulate innovation, and this VCP way of dividing the subsidy money does not stimulate SMEs to push their boundaries with the most innovative ideas. The Eurostars executives should evaluate if this is the effect they want to achieve with the Eurostars project.

Third, for subsidy program consultancy companies like Real1ze, it would have been valuable if several consortium characteristics would have shown a significant effect on receiving subsidy funding. However, the new insights out of the interviews gave directions in which a consultancy company can steer in terms of creating a consortium. They can direct towards partners that have

experience within the subsidy field, partners that generate high levels of trust and partners with the same goals as the other partners, which creates stronger collaboration within the project. This will result in stronger projects and a higher chance of receiving a higher ranking and a subsidy. On the other hand, because of the VCP way of distributing the subsidy funding, subsidy consultancy companies can steer toward partners from countries with a high Eurostars budget or with low competition. This could increase the chance of receiving subsidy funding.

6.4 Limitations and future research

Four main limitations were identified within this research. Firstly, the data used in this research is retrieved from the Eurostars database. This database gives information about funded Eurostars projects from the start of Eurostars 1 cut-off 1 until Eurostars 2 cut-off 9. However, the available data that is presented is very limited. The literature describes other variables, like experience with alliances or the Eurostars program, as possible factors that can affect the strength of a project or application.

“The more alliances you do, the better you get at them” (Harbison & Pekar, 1998, pg. 41)

Another variable that could have an impact on the strength of a consortium is whether there has been an earlier collaboration between the partners. Research performed by Ring, Doz and Olk (2005) looked into conditions prior to an R&D consortia formation that have a positive effect on the quality and success rate of a consortium. One of the conditions they describe that has a possible influence on consortium quality and success rate is if there is a pre-existing social relationship between the partners within the consortium. They describe that a good social relationship results in interpersonal trust, which is capable of surviving the kinds of stresses that can appear from dealing with uncertainty, ambiguity, and mixed motives that are common at the formation of many consortia. This trust is defined as one's assessment of others' goodwill and reliability in a risky exchange situation (Ring & Van de Ven, 1994). In the literature, trust is often treated as a precondition for strong consortia and successful collaborations (Lane & Bachman, 1998; Cullen, Johnson & Sakano, 2000). What can be concluded from this is that a pre-existing social relationship, which occurs from earlier collaboration, can result in more trust between the partners. This trust helps against several problems that can occur during a project, which has a positive effect on the strength of the project. Unfortunately, it was not possible to look into the earlier collaboration between partners.

The third variable that is not available in the Eurostars database, and therefore not used in this research, is the use of professional subsidy consultancy companies and their professional subsidy application writers, like Real1ze. The use of experts who have experience in writing these types of

applications could have a significant effect on the ranking of a project, especially when a project has no experience with the Eurostars project. According to Horning (2006), these experts have a higher professional awareness, possess better professional skills and stand out in revising their own work until it is deemed complete. This set of skills would result in a more clear and stronger subsidy application which results in a higher ranking.

Next to having more variables that could influence the ranking of a project, another limitation of this research is the use of only four out of the twelve sub-criteria. The variables used in this research are linked to only four of the twelve sub-criteria by previous literature with the focus on consortium characteristics. Only partial possible effects could be explained. It is also hard to see the direct effects of these variables on the sub-criteria since the only value that represented the strength of a project was the ranking a project received. No information was available on how the projects scored on the three main criteria or on the twelve sub-criteria. Since this data was privacy sensitive, it was impossible to receive this information for the 543 projects that were included in the dataset. More fine-grained measures and variables could include more sub-criteria in the research to explain the ranking of a project.

The third limitation within this research is the number of performed interviews. Only four interviews were conducted since there was not much response from the partners of Real1ze. This resulted in four companies that did not differ significantly from each other in terms of countries they worked with together and the type of partners they worked with. This resulted in minimal insights about the experiences of these projects. The inclusion of more and more diverse projects could result in different responses and more support for certain choices within a project.

The last limitation of this research is that it is based on one subsidy program, the Eurostars program. This program has its own specific guidelines and restrictions for each project that wants to participate and projects are evaluated based on sub-criteria that are identical to other subsidy programs. Nowadays there are many R&D subsidy instruments, each with their own goals and application criteria. In the Netherlands alone there are already 47 different R&D subsidy programs, each one different from another ("RVO, Subsidies and Programmes", 2021). The generalizability of this project is low since the results of this research only apply to the Eurostars program.

This research results in multiple suggestions for future research. As mentioned in the research findings and the limitations there could be improvements in this research to get more reliable results and explain certain phenomena.

First, more in-depth research should look at the collaboration aspects that could be influenced by consortium characteristics. More knowledge about these effects could explain the results in this research and could steer towards new views about consortium choices to increase the strength of a product through better collaboration between the partners. Including these collaboration aspects within the research could also result in better coverage of the grading sub-criteria, since these collaboration effects could affect several sub-criteria where the consortium characteristics do not. By using network analyses or surveys it is possible to get insights into earlier collaboration, trust and other primary data that could affect the collaboration between partners.

Secondly, research could look into the effect of the pro-innovation bias on the ranking projects get. If this pro-innovation bias exists it could be evaluated by the Eurostars executives to find out if this bias is desired within this subsidy project. By including insights into the number of applications, their rankings and the number of subsidy grants per sector in this research it is possible to see if this pro-innovation bias is present and how it influences the rankings of projects active in a certain sector.

6.5 Conclusion

The goal of this research was to answer the research question, *“What characteristics of a consortium influence the chance of receiving a higher ranking for a subsidy request?”*, by answering four sub-questions. The first sub-question looked into the sub-criteria that exists within the Eurostars program and the second sub-question looked at which of these sub-criteria could be influenced by consortium characteristics. Previous literature describes three consortia characteristics that could affect one or multiple sub-criteria of the Eurostars program, namely (i) the number of partners, (ii) domestic partners, and (ii) university and research institute participation. By performing a one-way cluster regression no significant effects were found between these consortia characteristics and the ranking of a Eurostars project. The interviews were conducted to see if the effects identified by the literature were experienced by the participants in the Eurostars project. The only supported literature is the inclusion of more partners results in complementary resources for a project; the RBV. The interviews gave new insights in possible pro-innovation bias and collaboration aspects that could influence the ranking of a project. More research is needed to see if these effects exist within the Eurostars program and decrease the limitations within this research. Next to that new insights about the Eurostars program came to light that should be evaluated by the Eurostars program. First, the choice by a company to include a partner from a specific country over their added value, to increase the chance of receiving a subsidy was found during the interviews. Secondly, if the pro-innovation bias is present within the Eurostars program, the evaluation process should be evaluated

to see if this effect is desired or how it can be resolved by creating new guidelines or changing the sub-criteria.

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Appendices

Appendix 1: Eurostars participating countries

Argentina	Greece	Romania
Austria	Hungary	Russia
Belgium (Brussels)	Iceland	San Marino
Belgium (Flanders)	Ireland	Serbia
Belgium (Wallonia)	Israel	Slovakia
Bulgaria	Italy	Slovenia
Canada	Latvia	South Africa
Chili	Lithuania	South Korea
Croatia	Luxembourg	Spain
Cyprus	Malta	Sweden
Czech Republic	Monaco	Switzerland
Denmark	Montenegro	The Netherlands
Estonia	North Macedonia	Turkey
Finland	Norway	Ukraine
France	Poland	United Kingdom
Germany	Portugal	

Appendix 2: Explanation of sub-criteria

- **Quality of the consortium**

The management experience of the partners,

The core business activities of the partners,

Do the partners possess necessary and complementary key qualifications to meet the objectives and results?

As individuals, does each partner have the necessary technical experience to carry out their tasks?

Do all of the partners have commercial and/or scientific interests in achieving the results?

- **Added value through co-operation**

The benefits brought through co-operation – does this need to be done/benefit from being done cooperatively or internationally?

Does the project demonstrate clear sharing of risks, costs, know-how, of benefits?

Is there a clear synergy in the partnership, i.e. the collaboration results in outputs that are not independently obtainable and which are greater than what could be achieved by any partner on its own?

Does the co-operation support and expand capabilities and knowledge of each partner beyond project results e.g. admittance to a new market, new technology and new skills?

Do all SME partners stand to gain commercially from the exploitation of the project results?

Does one partner stand to benefit disproportionately from the exploitation of the project results (when compared to their input)?

- **Realistic and clearly defined project management & planning**

Methodology and planning approach,

Milestones (key decision points) and outcomes,

Task identification,

Does the project plan include a realistic time schedule in relation to tasks and objectives?

Are key issues to be addressed and project objective(s) and outputs fully identified and precisely formulated from the outset?

Are the project's goals clearly identified and logically set out through well-described work packages?

Are the work packages broken-down into logical, well-defined tasks which are relevant to the expected results?

Are the milestones and deliverables clearly identified? Do they allow verification of progress during project implementation, including go/no-go decisions?

Are the roles and responsibilities of each partner within each work package clearly described and differentiated in the work plan? Is task allocation by any partners to sub-contractors clearly identified?

Is the project management structure well described? Is there an appropriate and capable structure for implementing the project (e.g. taking decisions, tracking and ensuring progress, reporting, etc.)?

Does the main partner (as project manager) have relevant project management experience, including experience of multi-partner projects?

Do all partners have a well-defined role in the project and the assigned project tasks are in-line with that partner's core business?

If required, are the potential ethical/legal issues identified?

- **Reasonable cost structure**

Is the cost breakdown well-structured and corresponds to the tasks and activities to be implemented by each partner?

Are the costs reasonable (i.e. neither underestimated nor overestimated) for the proposed work and for each of the partners?

Are the project costs clearly justified? Are subcontracting costs appropriately justified?

- **Market size**

Have the applicants quantified the market size, growth prospects and expected market share?

Are these descriptions realistic?

Is there a profitable market for the product?

Does this represent a strong foundation for sustainable competitiveness?

Is the potential market share well-considered and justified?

- **Market access and risk**

Are the partners qualified to break into the market or, preferably, do they already have an established position?

Has the proposal identified barriers to the market and/or included important customers, or in other ways reduced the time and costs to market:

- Regulatory
- Standards and certification
- Commercial
- Competition
- Quality
- Pricing
- Market acceptance

- **Competitive advantage**

Will the product be unique with very few competing products?

Will the product have a significant price or quality advantage over competing products or benefits to the customer?

Will the partners be able to generate strong IP to prevent copying of the end results? Will they need to?

Will the know-how developed within the project be such that they would have a very strong and clear time to market advantage over the competition?

Have they carefully analyzed existing IP and assessed whether it might affect their marketing approach?

- **Clear and realistic commercialization plans**

Has the consortium clearly outlined the plans for the commercialization of the product?

Has the split or sharing of project outputs been defined with a view to commercialization?

Have the individual participant's business plans for the commercialization been defined and are they realistic?

Do the commercialization plans include realistic and credible projections for revenue, investment required, anticipated costs associated with the product launch on the market?

Have the participants a proven track record of commercialization of R&D?

- **Degree of innovation**

Is the product technologically new or a significant improvement on existing solutions?

Does it deliver objectively new products, processes or services to the consumer with an added value?

Is the product an advance on commercial state-of-the-art?

- **New applied knowledge**

Will the project lead to the creation of new knowledge which is not yet known in the area?

Will the project resolve an issue of technical uncertainty, resulting in new knowledge?

Will the new knowledge bring the partners to the forefront of the area in question and thus well beyond the present state-of-the-art?

Could the technology or knowledge being developed be the potential basis for a wide number of applications?

Does the application for the technology/knowledge have the potential to be expanded into other areas/sectors beyond the scope of the application being developed in this project?

- **Level of the technical challenge**

Does the project involve a high degree of technical challenge?

Does achieving the project results require the application of a significant level of specialist's know-how and knowledge?

Is the level of the technical challenge such that the project results could not easily be replicated by others?

- **Technical achievability & risk**

Is the approach technically sound or is it fundamentally flawed?

Is the appropriate technology being employed for the envisaged development?

Are the proposed technical developments achievable within the defined budget and timescale?

Is the research method described appropriate for achieving the technical developments (e.g. it includes a programme of design, test, analysis, decision and iteration if appropriate)?

Is there an appropriate analysis of the risks?

Are the associated technical risks well described and the approach to minimizing the effects of the risks has been outlined?

Does the project incorporate go/no-go decision points for appropriate outcomes and at regular intervals?

Appendix 3: Example information of project on Era-learn website

Project: 3D PRInting for Medical Education and training

Acronym	3D PRIME (Reference Number: 11315)
Duration	01/11/2017
Project Topic	We want to produce the next level of 3D printing services for medical training and education: Realistic and accurate 3D models of a particular patient; 3D prints that conform to the actual patient images with sub-millimetre accuracy and reflect the actual anatomic subtleties such as tissue hardness and fine-structures. These anatomically correct models would have the same elastic features as real organs, enabling a better learning experience.
Network	Eurostars 2
Call	Eurostars Cut-Off 7

Project partner

Showing 1 to 4 of 4 entries

NUMBER	NAME	ROLE	COUNTRY
1	Inova DE GmbH	Coordinator	Germany
2	Create it REAL	Partner	Denmark
3	University of Heidelberg	Partner	Germany
4	University of Tübingen	Partner	Germany

Full name	University of Heidelberg
Short name	UHEI
Type of organisation	Higher Education Institution
Partner Role	Partner
Country	Germany

Appendix 4: Invitation participation interviews

Beste,

Ik had via Bas Krekelberg vernomen dat ik je kan interviewen voor mijn afstudeeronderzoek. Leuk om te horen!

In mijn onderzoek kijk ik naar verschillende consortia binnen Eurostars en karakteristieken binnen deze consortia die misschien een bepalende factor spelen in het wel of niet verkrijgen van een subsidie. Ik zou graag een half uurtje met je willen inplannen om meer over jullie project te horen en de keuzes die jullie al hebben gemaakt de afgelopen tijd. Heb jij ergens nog een half uurtje vrij voor dit interview? Ik kan zelf bijna overal omheen plannen.

Met vriendelijke groet,

Bas van Rhenen

Research Intern Real1ze

Appendix 5: Interview Guide

Onderwerp	Vraag
Introductie onderwerp	<ul style="list-style-type: none"> • Vertellen over mezelf en studie • Vertellen over onderzoek • Alvast bedanken voor medewerking • Vertellen dat alles opgenomen wordt, en dat het getranscribeerde interview wordt opgestuurd naar geïnterviewd persoon voor een check
Introductie vragen	<ul style="list-style-type: none"> • Zou je mij wat kunnen vertellen over jullie bedrijf? • Rol van geïnterviewd persoon • Wat voor een product hebben jullie gecreëerd? • Waarom een subsidie? • Waarom Eurostars?
Partners	<ul style="list-style-type: none"> • Waarom een alliantie? • Welke partners zaten in het consortium? Vertel over deze partners • Wie nam de leiding in het project? • Welke voordelen hebben de partners gebracht? • Welke barrières waren er in de samenwerking • Heeft de samenwerking geresulteerd in het doel dat voor ogen was?
Soort partners	<ul style="list-style-type: none"> • Hoe was de communicatie met de soort partners? • Jullie hebben samengewerkt met *type partners*. Hoe is dit bevallen. • Had dit een speciaal effect? • Was dit soort partner echt nodig
Internationaal	<ul style="list-style-type: none"> • Was er een effect/verschil in samenwerking vanwege de internationalisatie van het project. • Verschillende landen noemen • Bracht dit voordelen?

	<ul style="list-style-type: none">• Bracht dit ook nadelen?
Einde	<ul style="list-style-type: none">• Denk je dat ik iets vergeten ben?• Zelf nog iets toevoegen• Bedanken voor medewerking in het onderzoek

Appendix 6: Initial Codebook deductive analysis

Theme	sub-theme	Definition
Basic information	B: basics	The person gives information about the project that does not cover other themes
Number of partners	N1: positive effect	The company perceived a positive effect by the inclusion of the partners
	N2: negative effect	The company perceived a negative effect by the inclusion of the partners
	N3: no effect	No effect was mentioned by the company
Domestic partners	D1: positive effect	The company perceived a positive effect by the inclusion of the domestic partners
	D2: no effect	No effect was mentioned by the company
University or Research institute participation	U1: positive effect	The company perceived a positive effect by the inclusion of universities or research institutes
	U2: negative effect	The company perceived a negative effect by the inclusion of universities or research institutes
	U3: no effect	No effect was mentioned by the company
Other insights	O1: new insight	The company mentioned another possible effect or experience in the interview

Appendix 7: Final Codebook deductive analysis

Theme	sub-theme	Definition
Basic information	B: basics	The person gives information about the project that does not cover other themes
Number of partners	N1: positive effect	The company perceived a positive effect by the inclusion of the partners
	N2: no effect	No effect was mentioned by the company
Domestic and international partners	D1: positive effect	The company perceived a positive effect by the inclusion of the domestic partners
	I2: negative effect	The company perceived a negative effect by the inclusion of international partners
	D2: no effect	No effect was mentioned by the company
University or Research institute participation	U1: negative effect	The company perceived a negative effect by the inclusion of universities or research institutes
	U2: no effect	No effect was mentioned by the company
Other insights	O1: New theme 1	The company mentioned another possible effect or experience in the interview